STATEMENT OF ENVIRONMENTAL EFFECTS

IN SUPPORT OF A DEVELOPMENT APPLICATION

PROPOSED COBAR MINE WORKERS VILLAGE EXPANSION
12769 BARRIER HIGHWAY, COBAR NSW

PREPARED FOR:

ROVEST HOLDINGS PTY LTD

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ENGINEERING ENVIRONMENT AGRICULTURE WATER

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The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All maps, plans, and cadastral information contained within this report are prepared for the exclusive use of Rovest Holdings Pty Ltd to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

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INTRODUCTION

1.1 BACKGROUND

Geolyse Pty Ltd has been commissioned by Rovest Holdings Pty Ltd (Rovest) to prepare a Statement of Environmental Effects (SEE) to accompany a Development Application (DA) for the expansion of existing mine workers accommodation village located at 12769 Barrier Highway, Cobar NSW.

1.2 SCOPE OF THIS REPORT

This SEE has been prepared pursuant to Clause 50 and Part 1 of Schedule 1 of the *Environmental Planning and Assessment Regulation 2000* and is provided in the following format.

- **Section 2** of this report provides a description of the subject site and its locality.
- **Section 3** outlines the proposed development.
- **Section 4** details the planning framework applicable to the subject site and proposed development.
- **Section 5** identifies the impacts of the proposed development.
- **Section 6** provides a conclusion to the SEE.

THE SITE & ITS LOCALITY

2.1 THE SITE

The site the subject of this development application is the existing Cobar Mine Workers Village, located on the eastern outskirts of Cobar NSW at 12769 Barrier Highway, Cobar and identified as Lot 991 DP1029946. The subject site is approximately 28 hectares in size.

The subject site boundary is setback approximately 40 metres from the constructed pavement of the Barrier Highway, which runs adjacent to the northern boundary of the site. The mining village is located in the eastern section of the subject site, approximately 130 metres from the northern and eastern site boundaries.

The site is predominantly cleared with some scattered non-significant vegetation.

The mining village currently operates under Cobar Shire Council development consent 2012-LD-0020, dated 28 May 2012, and accommodates a maximum of 119 occupants in 30 accommodation units. Each accommodation unit is self-contained, containing up to four bedrooms, each with en-suite bathrooms. The units measure 14.4 metres in length, 3.3 metres in width and 2.9 metres in height and are sited in four rows south of the approved communal amenities building. One of the units is configured as a three-room unit, with one room being disabled accessible.

In addition to the accommodation units, a communal amenities building comprising kitchen, cool room, freezer and storage, laundry, toilets, first aid station and recreation room is located on the subject site – refer **Drawing A02.**

Three separate on-site wastewater management systems currently treat wastewater produced at the site. One system comprising a 4,500 litre balance tank and eight (8) SK-10 secondary wastewater treatment

systems is located to the east of the accommodation units to service the existing accommodation units. Wastewater from the communal amenities building is serviced by two management systems, located adjacent the building to the north and west.

Figure 1 depicts the mining village within the context of the subject site.

Figure 1: Subject Site (Source: Google Maps)

2.2 THE LOCALITY

The site locality is considered typical of the outskirts of a rural township. The local context is characterised by broad acre farming to the east, north-east and south, and industrial developments to the north-west. Further to the west is the urban areas of the town of Cobar.

The closest residential dwelling is approximately 200 metres north of the site boundary and is separated by the Barrier Highway (Nyngan Road).

Figure 2 depicts the subject site in the context of the surrounding locality.

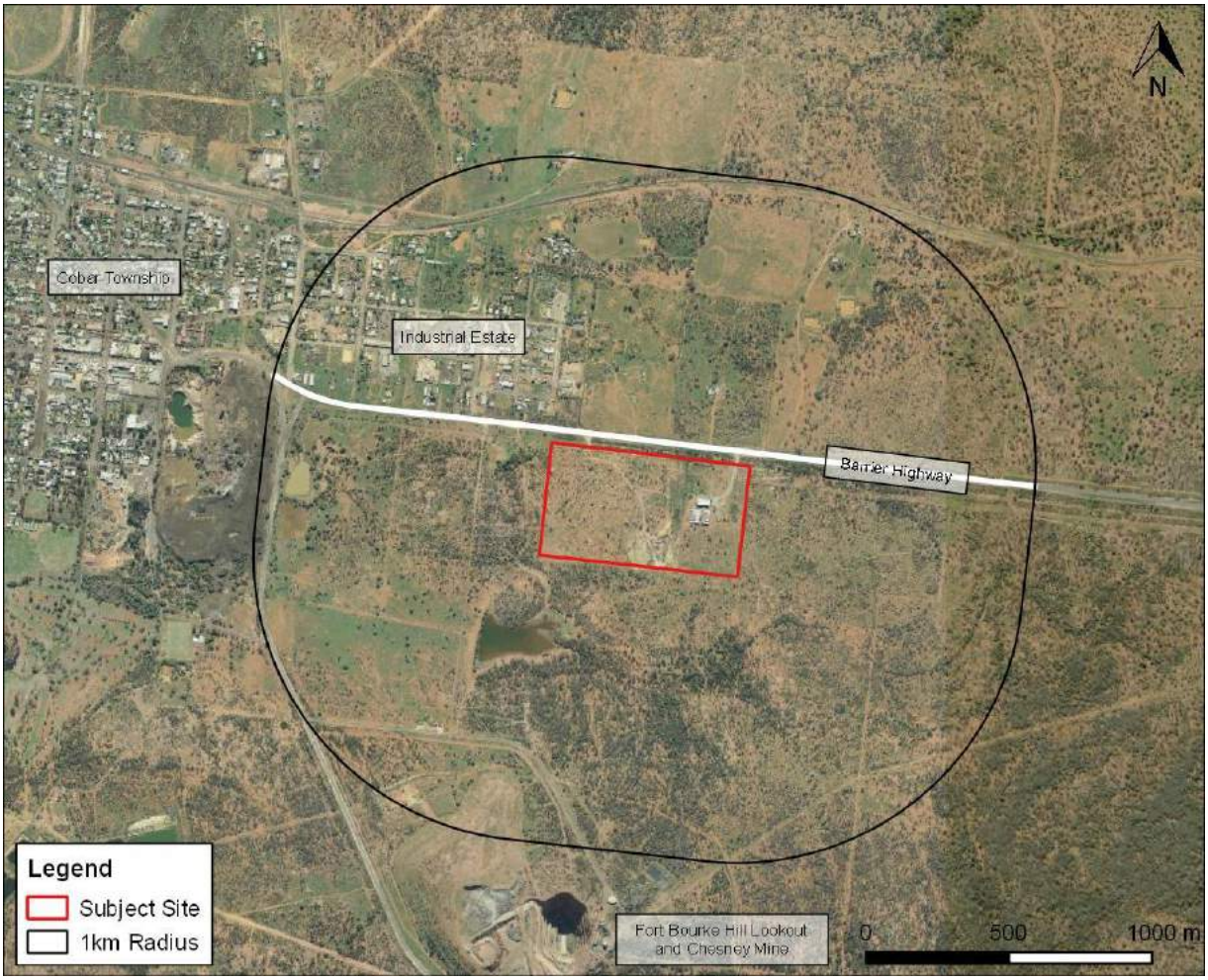

Figure 2: Site Locality (Source: LPI Data)

THE DEVELOPMENT

3.1 DEVELOPMENT DESCRIPTION

This application seeks development consent to increase total accommodation capacity of the mining village to 50 x 4 bedroom accommodation units, with a maximum capacity of 199 residents. Note that one of the existing installed units has a three person capacity due to having been designed to be disabled accessible.

The final arrangement of the accommodation units would be configured as per **Drawing A03**.

The proposed accommodation units would be similar to the current units, as per the attached Minpac drawings.

The units are linked by pathways and each feature a verandah as per **Drawing A07**.

Upgrades or additions to the existing effluent management system to accommodate additional wastewater flows will be undertaken as part of the proposed development. The current on-site wastewater treatment system is able to treat 16,000 L/day. The installation of an additional twenty accommodation units will increase wastewater flows to approximately 20,000 L/day. A detailed effluent management report is attached as **Appendix A**.

Minor internal alterations to the communal amenities building is also proposed as part of this application as reflected in **Drawing A05**. This provides the necessary additional areas to accommodate the additional residents.

The experience of the operators confirms that the current level of car parking provided would be sufficient to address the proposed expanded capacity, and as such no further parking is proposed – refer **Drawing A03** and **Section 5.3**.

Overall operational matters at the site would remain relatively unchanged.

STATUTORY PLANNING FRAMEWORK

4.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

4.1.1 AIMS & OBJECTIVES

In New South Wales (NSW), the relevant planning legislation is the *Environmental Planning and Assessment Act 1979* (EP&A Act). The EP&A Act instituted a system of environmental planning and assessment in NSW and is administered by the Department of Planning & Environment (DP&E). In 2017, the Act was amended to provide a range of updated objects. The objects of the EP&A Act are:

> *(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,*
>
> *(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,*
>
> *(c) to promote the orderly and economic use and development of land,*
>
> *(d) to promote the delivery and maintenance of affordable housing,*
>
> *(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,*
>
> *(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),*
>
> *(g) to promote good design and amenity of the built environment,*
>
> *(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,*
>
> *(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,*
>
> *(j) to provide increased opportunity for community participation in environmental planning and assessment.*

The proposed development is not considered to be antipathetic to the above objects.

4.1.2 SECTION 1.7

Section 1.7 of the EP&A Act requires consideration of Part 7 of the *Biodiversity Conservation Act 2016* (BC Act). Part 7 of the BC Act relates to an obligation to determine whether a proposal is likely to significantly affect threatened species. A development is considered to result in a significant impact in the following assessed circumstances:

Table 4.1 – Section 1.7

Test	Assessment
(a) it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or	Assessments undertaken confirm that there are no threatened species or ecological communities located on the site – refer **Section 5.11**.
(b) the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values, or	As the minimum lot size applying to the site is 1,000 hectares, the relevant clearing threshold for the clearing of native vegetation is 2.0 hectares. Site assessment by a BAM accredited ecologist confirms no significant impacts and no requirement to offset – refer **Section 5.11**.
(c) it is carried out in a declared area of outstanding biodiversity value	The site is not a declared area of outstanding biodiversity value.

Source: Environmental Planning and Assessment Act 1979

On the basis of the above, the development is not considered likely to significantly affect threatened species and therefore a Biodiversity Development Assessment Report is not required to accompany the application for development consent.

4.1.3 SUBORDINATE LEGISLATION

The EP&A Act facilitates the preparation of subordinate legislation, consisting of:

- Environmental Planning Instruments (EPIs) (including State Environmental Planning Policies (SEPP), Local Environmental Plans (LEP), and deemed EPIs); and
- Development Control Plans (DCP).

In relation to the proposed development, the relevant subordinate legislation includes:

- *Cobar Local Environmental Plan 2012*;
- *State Environmental Planning Policy (Infrastructure) 2007*;
- *State Environmental Planning Policy (Rural Lands) 2008;* and
- *State Environmental Planning Policy No. 55 – Remediation of Land.*

The requirements of these are discussed in the following sections.

4.1.4 INTEGRATED DEVELOPMENT

Section 4.46 of the EP&A Act states that development requiring consent and another activity approval is defined as Integrated Development. The proposed development is not classified as Integrated Development on the basis that no additional consents or approvals are required to facilitate the development.

4.2 ENVIRONMENTAL PLANNING INSTRUMENTS

4.2.1 COBAR LOCAL ENVIRONMENTAL PLAN 2012

4.2.1.1 Introduction

The *Cobar Local Environmental Plan 2012* (LEP) is the environmental planning instrument applying to the subject site. The aims of the LEP are:

> *(a) to protect, enhance and conserve agricultural land through the proper management, development and conservation of natural and man-made resources,*
>
> *(b) to encourage a range of housing, employment, recreation and community facilities to meet the needs of existing and future residents of Cobar,*
>
> *(c) to promote the efficient and equitable provision of public services, infrastructure and amenities.*

The proposed development is not antipathetic to these aims. It is specifically compatible with points (b) and (c).

A range of maps have been produced to support the LEP identifying relevant land constraints and details. These are discussed in the following section.

4.2.1.2 Mapping

Table 4.2 – Local Environmental Plan mapping information

Map	Applicability	Discussed
Land application map	Subject site is located within the Cobar Local Government Area	No discussion required
Land zoning map	Subject site is zoned RU1 – Primary Production	Refer **Section 4.2.1.3**
Lot size map	A minimum lot size of 1000 hectares applies to the site	No subdivision is proposed by this application. Therefore the minimum lot size does not apply.
Heritage map	No sites of heritage significance mapped as occurring on or in the vicinity of the subject site	No discussion required
Land reservation acquisition map	Land is not mapped as being reserved for acquisition	No discussion required
Terrestrial Biodiversity map	The subject site is not mapped as containing terrestrial biodiversity.	Refer – **Section 5.11**
Groundwater vulnerability map	The subject site is not located within a groundwater vulnerable area	No discussion required
Watercourse map	No mapped watercourses are located within the subject site	No discussion required
Wetlands map	No wetlands are located within or in the vicinity of the subject site	No discussion required

Source: Cobar Local Environmental Plan 2012

4.2.1.3 Zoning

The subject site is zoned RU1 – Primary Production via the Cobar LEP. The objectives of the RU1 zone are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*

This proposal entails the expansion to existing mine workers accommodation. Mining is permissible with consent in the RU1 zone. The proposed miners accommodation village is currently operating via Council approval DA 2012-LD-0020, approved pursuant to the former Cobar Local Environmental Plan 2001.

Pursuant to the 2001 LEP, a mine workers accommodation village was not a land use listed as either permissible or prohibited in the (then) 1(a) zone that applied to the land. As it was not expressly prohibited, it was permitted as an innominate use.

The mine workers accommodation village was lawfully commenced by reference to approval 2012-LD-0020, as evidenced by the occupation certificate issued by Council.

Since approval was granted via DA 2012-LD-0020, the *Cobar Local Environmental Plan 2012* has been gazetted and, within the RU1 zone, land uses not expressly permitted are now prohibited. As such, a mine workers accommodation village, as a use not expressly permitted, is prohibited.

As the mine workers accommodation village was originally approved as an innominate use in the zone via DA 2012-LD-0020, and as was lawfully commenced, and as the use is now prohibited, the use of the site as a mine workers accommodation village represents an existing use.

Section 4.66 of the EP&A Act states:

> *(1) Except where expressly provided in this Act, nothing in this Act or an environmental planning instrument prevents the continuance of an existing use.*
>
> *(2) Nothing in subsection (1) authorises:*
>
> *(a) any alteration or extension to or rebuilding of a building or work, or*
>
> *(b) any increase in the area of the use made of a building, work or land from the area actually physically and lawfully used immediately before the coming into operation of the instrument therein mentioned, or*
>
> *(c) without affecting paragraph (a) or (b), any enlargement or expansion or intensification of an existing use, or*
>
> *(d) the continuance of the use therein mentioned in breach of any consent in force under this Act in relation to that use or any condition imposed or applicable to that consent or in breach of any condition referred to in section 4.17 (1) (b), or*
>
> *(e) the continuance of the use therein mentioned where that use is abandoned.*
>
> *(3) Without limiting the generality of subsection (2) (e), a use is to be presumed, unless the contrary is established, to be abandoned if it ceases to be actually so used for a continuous period of 12 months.*

By reference to subclause (3), it is considered that the existing use rights remain in effect on the basis that the use has not been abandoned. It is evident that the use has not been abandoned on the basis that the use has continued to operate and the applicant has continued to make representations to Council to maintain and improve the facility, and regularise non-compliances when required.

This application seeks consent to expand or alter the existing use to provide additional accommodation capacity, in the form of placement of an additional 20 accommodation units. No substantive change is proposed to the main amenities building beyond the upgrade of fire protection services and minor changes to amenities. A deemed to satisfy fire protection system in accordance with the Building Code of Australia is not proposed and a performance solution has been prepared with respect to these requirements – refer **Appendix F**. A BCA assessment report is provided as **Appendix E**.

It is permissible to expand, alter or change an existing use pursuant to Division 4.11 of the EP&A Act and Part 5 of the EP&A Regs. Section 4.66(1) of the EP&A Act confirms:

> *Except where expressly provided in this Act, nothing in this Act or an environmental planning instrument prevents the continuance of an existing use.*

Clause 41 of the EP&A Regs states:

> *41 Certain development allowed*
>
> *(cf clause 39 of EP&A Regulation 1994)*
>
> *(1) An existing use may, subject to this Division:*
>
> *(a) be enlarged, expanded or intensified, or*
>
> *(b) be altered or extended, or*
>
> *(c) be rebuilt, or*
>
> *(d) be changed to another use, but only if that other use is a use that may be carried out with or without development consent under the Act, or*
>
> *(e) if it is a commercial use—be changed to another commercial use (including a commercial use that would otherwise be prohibited under the Act), or*
>
> *(f) if it is a light industrial use—be changed to another light industrial use or a commercial use (including a light industrial use or commercial use that would otherwise be prohibited under the Act).*
>
> *(2) However, an existing use must not be changed under subclause (1) (e) or (f) unless that change:*
>
> *(a) involves only alterations or additions that are minor in nature, and*
>
> *(b) does not involve an increase of more than 10% in the floor space of the premises associated with the existing use, and*
>
> *(c) does not involve the rebuilding of the premises associated with the existing use, and*
>
> *(d) does not involve a significant intensification of that existing use.*
>
> *(e) (Repealed)*
>
> *(3) In this clause:*
>
> *commercial use means the use of a building, work or land for the purpose of office premises, business premises or retail premises (as those terms are defined in the Standard Instrument).*
>
> *light industrial use means the use of a building, work or land for the purpose of light industry (within the meaning of the standard instrument set out in the Standard Instrument (Local Environmental Plans) Order 2006).*

Clauses 42 and 43 of the EP&A Regs provides for the enlargement, expansion, intensification, alteration or extension of an existing use.

Clause 45 confirms that development consent is required for any changes of existing uses.

Clause 46 confirms that an existing use may be changed at the same time as they are altered, extended, enlarged or rebuilt.

It is not proposed via this application to change the use of the land.

On the basis that the current operation represents an existing use, and this use has not been abandoned, consent is sought via this application to expand the existing use to provide additional accommodation capacity at the camp. This is permissible subject to Council approval. Justification for approval is provided via this statement and assessment of impacts associated with the expansion is provided in Section 5. Subject to the implementation of recommended mitigation measures, it is anticipated that the proposed development is acceptable in the context of the locality and region.

4.2.2 STATE ENVIRONMENTAL PLANNING POLICY

4.2.2.1 State Environmental Planning Policy (Infrastructure) 2008

The subject site fronts the Barrier Highway, which is Highway No. 8 and is defined as a classified road. Clause 101 of *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) states:

> *(2) The consent authority must not grant consent to development on land that has a frontage to a classified road unless it is satisfied that:*
>
> *(a) where practicable, vehicular access to the land is provided by a road other than the classified road, and*
>
> *(b) the safety, efficiency and ongoing operation of the classified road will not be adversely affected by the development as a result of:*
>
> *(i) the design of the vehicular access to the land, or*
>
> *(ii) the emission of smoke or dust from the development, or*
>
> *(iii) the nature, volume or frequency of vehicles using the classified road to gain access to the land, and*
>
> *(c) the development is of a type that is not sensitive to traffic noise or vehicle emissions, or is appropriately located and designed, or includes measures, to ameliorate potential traffic noise or vehicle emissions within the site of the development arising from the adjacent classified road.*

Access to the site is via an existing approved access driveway that is currently in use by occupants and workers of the existing approved mine workers accommodation facility.

Given the existing access is adequate to accommodate light and heavy vehicle movements, and on the basis that only a minor increase in both vehicle types is predicted for this application, it is not considered that an access upgrade is required.

As noted in **Section 5.3** of this statement, vehicle volumes and tonnage will be considerably less than was occurring with respect to the previous known uses prior to the approval for the mine workers accommodation village.

The expansion of the mining village would not generate smoke or significant levels of dust. Thus the development would not adversely impact on the safety or efficiency of the road.

Further, the closest element of the proposed mining village would be located over 200 metres from the classified road and thus would not be impacted by the operation of the road.

4.2.2.2 State Environmental Planning Policy (Rural Lands) 2008

The *State Environmental Planning Policy (Rural Lands) 2008* (Rural Lands SEPP) was repealed following the gazettal of the *State Environmental Planning Policy (Primary Production and Rural Development) 2019*.

4.2.2.3 State Environmental Planning Policy (Primary Production and Rural Development) 2019

The *State Environmental Planning Policy (Primary Production and Rural Development) 2019* (Primary Production SEPP) aims to:

> *(a) to facilitate the orderly economic use and development of lands for primary production,*
>
> *(b) to reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the protection of native vegetation, biodiversity and water resources,*

(c) to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations,

(d) to simplify the regulatory process for smaller-scale low risk artificial waterbodies, and routine maintenance of artificial water supply or drainage, in irrigation areas and districts, and for routine and emergency work in irrigation areas and districts,

(e) to encourage sustainable agriculture, including sustainable aquaculture,

(f) to require consideration of the effects of all proposed development in the State on oyster aquaculture,

(g) to identify aquaculture that is to be treated as designated development using a well-defined and concise development assessment regime based on environment risks associated with site and operational factors.

A review of the provisions of the Primary Production SEPP confirms there are no express provisions that apply to the proposed development. Further consideration is therefore not required.

4.2.2.4 State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP55) provides a statewide approach to remediation of contaminated land and aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.

Clause 7 of the SEPP No. 55 states that a consent authority must not consent to the carrying of development unless it has considered, among other things, whether the land is contaminated.

Searches of the NSW EPA *List of NSW contaminated sites notified to the EPA* and *Contaminated Land Record* did not identify any contaminated sites at or near the subject site.

In relation to the original DA relating to the land, Envirowest carried out a contamination assessment which confirmed no known instances of contamination at the site – refer **Appendix C**. There has been no other use of the land than the approved use since the contamination assessment was completed, and therefore the findings remain valid.

The obligations of SEPP55 are therefore satisfied.

4.2.3 DEEMED ENVIRONMENTAL PLANNING INSTRUMENTS

There are no deemed environmental planning instruments known to affect the subject site.

4.3 DRAFT ENVIRONMENTAL PLANNING INSTRUMENTS

There are no draft environmental planning instruments known to affect the subject site.

4.4 DEVELOPMENT CONTROL PLANS

There are currently no development control plans (DCP) applicable to the Cobar Shire Council Local Government Area following the repeal of *Cobar Development Control Plan No.2 – 2002* prior to this application.

IMPACTS

5.1 INTRODUCTION

Pursuant to Schedule 1 of the EP&A Regulation, this section of the report outlines the environmental impacts of the proposed development and any measures required to protect the environment or lessen the harm to the environment.

The impacts have been identified through an assessment of the proposed development against the provisions of section 4.15(1)(b) and the former NSW Department of Urban Affairs and Planning's (nd) *Guide to Section 79C*.

5.2 CONTEXT AND SETTING

The local context is characterised by broad acre farming to the east, north-east and south, and industrial developments to the north-west. Further to the west is the urban areas of the town of Cobar.

The subject site has housed the Cobar Mine Workers Village since its approval by Cobar Shire Council (CSC) in 2012. The mining village currently hosts 30 accommodation units and a communal amenities building. The units measure 14.4 metres in length, 3.3 metres in width and 2.9 metres in height and are sited in four rows south of the communal amenities building. The proposed additional 20 accommodation units will be sited immediately south of the existing units.

The land is generally flat with no specific scenic qualities or features that require protection. The site is not restricted by nearby sensitive uses or natural or cultural attributes such as soil characteristics, flora and fauna or heritage items;

Due to the large size of the site, and the comparatively small footprint of the mining village area, the amenity of the surrounding area will not be affected by the expansion of the mining village.

Land immediately adjacent to the site is generally undeveloped. The closest residential receiver to the site is on the northern side of the Barrier Highway, approximately 200 metres to the north. Beyond this, the next closest residential receiver is over 700 metres away. This separation distance means that the mining village expansion is unlikely to give rise to any significant amenity impacts on this residential property.

5.3 ACCESS, TRANSPORT AND TRAFFIC

5.3.1 ACCESS

Entry to the mining village would continue to be via the existing access off the Barrier Highway. The existing access is sealed from the highway to the property gate. The access driveway and car parking facilities are gravel sealed to minimise dust creation and allow for all weather access.

5.3.2 TRANSPORT

Vehicles movements associated with the additional accommodation capabilities will be identical to the existing mining village configuration i.e. daily movements will be limited to daily light and heavy vehicles, such as buses and four wheel drive vehicles, and weekly medium size vehicles movements for delivery and collection of goods.

Due to the status of the majority of workers as fly in/fly out, the majority of the movements from site will continue be in the on-site buses. To accommodate transport needs for the additional 80 mine workers, an additional one to two bus trips per shift in and out of the village would occur. This minor increase in traffic numbers is unlikely to result in any significant impact to local traffic nor require any upgrades or improvements to the existing access.

5.3.3 PARKING

As there are no standards for parking for this type of development, the original application proposed provision of parking on the basis of one space per accommodation unit, together with one space per staff member and visitor parking spaces on the basis of the requirements of the RTA Guide to Traffic Generating Development. This resulted in a total of 40 spaces being proposed. As per **Drawing TP02**, the facility currently provides 40 spaces.

The experience of the operator since the village commenced operating is that the majority of village occupants utilise the bus services and do not use personal light vehicles. Therefore, the amount of parking availability for the development has exceeded the needs of the development. It is further noted that visitor usage levels are very low, and a specific area for visitor parking is not required. The experience of the operator is that the current level of occupancy typically utilises no more than half of the currently available spaces at any one time.

As such, it is therefore not proposed to provide any additional parking spaces at the property. There is ample room available on site in the event additional parking is required in the future and this would be dealt with in conjunction with Council requirements as required.

5.4 PUBLIC DOMAIN

Due to the large size of the site, the relatively small size and consolidated nature of the mining village footprint, and the lack of overlooking properties it is not considered that the proposed expansion of the mining village will result in any adverse impacts on the public domain.

5.5 SERVICING

5.5.1 WATER

Potable water will continue to be supplied from the existing town water supply connection as per the existing arrangement.

5.5.2 POWER

The mining village is connected to the local power grid and this will be augmented to supply power to the proposed accommodation units. Any electrical works will be undertaken by a licensed electrician.

5.5.3 SOLID WASTE

Construction of the proposed accommodation units at the mining village will result in an increase of solid wastes being generated at the site, namely:

- Non-putrescible wastes including glass, paper, cardboard, food packaging etc.,
- Putrescible wastes including food wastes and screening from the onsite wastewater treatment tanks.

It is expected that the additional solid wastes generated will be collected in accordance with existing waste collection methods already implemented at the site.

5.5.4 EFFLUENT

Envirowest Consulting was engaged to undertaken site investigations to determine the suitability of the existing systems to handle increased wastewater flows – refer **Appendix A.** The investigation concluded that with the identified upgrades to the existing systems, wastewater can continue to be disposed of on-site without detrimental impact to the local environment

Three wastewater streams will continue to be produced on-site, namely from the communal recreation facility (inclusive of toilets and kitchen), laundry facilities (within recreation facility) and accommodation units. The proposed expansion will result in an increase of total expected wastewater flows to 24,118 litres per day, based on the following wastewater flow parameters:

- Laundry: 270 litres per day;
- Recreation Facility Toilets and Kitchen: 3, 948 litres per day;
- Accommodation Units: 19,900 litres per day.

5.5.4.1 System Recommendations

To accommodate for the increase in wastewater flows, the following system recommendations are made by Envirowest Consulting:

Communal Amenities Building (Kitchen and Toilets)

Wastewater from the kitchen and toilets within the communal amenities building is currently serviced by a primary treatment tank and grease trap with wastewater applied to a 40 metre absorption trench located to the north west of the amenities building. The existing treatment tank is expected to be suitable for continued use following routine maintenance and desludging. Additional trench length of 230 metres will be required.

A secondary wastewater treatment system with capacity with disposal via surface irrigation is provided as an alternate management option to the above.

Communal Amenities Building (Laundry)

Wastewater produced from the laundry is treated in a two-tank primary treatment system and irrigated to an application to the west of the amenities building. The existing treatment tanks are expected to be suitable for continued use following routine maintenance and desludging.

Disposal of treated wastewater via surface or subsurface irrigation with an irrigation area of 269 square metres is recommended.

Accommodation Units

The current treatment system comprises a 4,500 litre balance tank that flows to 8 separate SK-10 units, each capable of treating up to 2,000 litres per day. The treated wastewater is disposed of via surface irrigation to an area located east of the treatment tanks.

The proposed system will require an additional 4,500 litre balance tank, two 3,500 litre holding tanks and two additional SK-10 units. A pump and dosing system will be required from the holding tanks to ensure even distribution of wastewater to the SK-10 units. This will ensure rotation of wastewater to the application area.

5.5.5 STORMWATER

Existing stormwater management practices will continue to be utilised after installation of the additional units. Stormwater flows will be directed toward the existing dam via a series of contour banks. Roof water will be collected where possible and reused for irrigation or domestic purposes.

Due to the low annual rainfall of the Cobar area, additional stormwater management infrastructure or amendment to existing practices is not considered necessary.

5.6 HERITAGE

5.6.1 NON-INDIGENOUS HERITAGE

A review of the Cobar LEP and the state heritage register reveals no sites of non-indigenous heritage within the the subject site. The nearest item to the site, as identified in Schedule 5 of the LEP includes item I8 "Cobar Pastoral and Mining Technology Museum" located on Nyngan Road approximately 1.7 kilometres west of the subject site.

There are no foreseeable adverse potential impacts on the non-indigenous heritage in the area, given the distance separation from the listed heritage items and the site, and therefore no further investigation is required.

5.6.2 INDIGENOUS CULTURAL HERITAGE

Aboriginal heritage has been assessed previously due to development within the subject site, in particular the statement of environmental effects prepared to support the approved mining village. A search of the Office of Environment Aboriginal Heritage Information Management Systems (AHIMS) undertaken to support the original SEE confirmed no known sites of Aboriginal heritage significance in the vicinity of the site.

For removal of doubt, an updated AHIMS search undertaken on 15 May 2018 confirmed no known sites of Aboriginal heritage significance are located in the vicinity of the site – refer **Appendix B**.

Notwithstanding that preliminary searches of the site have not revealed any indications of Aboriginal heritage on site, should any 'objects' or other Aboriginal heritage features be identified during the course of constructions, work in that area should cease and be cordoned off and the Office of Environment and Heritage and/or a suitably qualified heritage specialist be contacted to discuss how to proceed.

5.7 OTHER LAND RESOURCES

As the land use as a mining village has previously been approved, the loss of primary production land has already been considered and accepted by Council. As such, the impacts associated with the loss of primary production land are considered to be addressed and no further consideration is provided.

The same rationale can be applied in respect of the loss of land for potential mineral exploration or extraction.

5.8 WATER

Surface Water

The subject site lies within the Yanda Creek sub-catchment of the Barwon-Darling Catchment. The closest surface water source to the subject site is Box Creek, located approximately 4 kilometres to the north-west.

A number of mapped drainage channels are present in the locality, however none are located on or directly adjacent the subject site. One farm dam is located in the northern section of the subject site that is used for capture of stormwater during high rainfall events.

The proposed additions to the existing mining village would not adversely impact on the water cycle in terms of water needs or the supply of water due to the separation distance to nearby waterways. Overland flows through the site would not be expected to change by comparison to the current situation.

Groundwater

A review of the NSW Atlas data of Groundwater Bores for the site locality was undertaken and identified that no registered bores are located on or within 500 metres of the subject site. Bores in the greater locality are licensed for stock, domestic and recreational purposes.

No water is proposed to be extracted from groundwater sources for operation of the mining village Irrigation of treated wastewater would be applied to the designated application area at conservative rates to reduce the potential for waterlogging and infiltration to groundwater.

On this basis, no impact to surface or groundwater in the locality is expected to occur as a result of the mining village expansion.

5.9 SOILS

The site is not known to contain any sensitive soil environments.

A review of the Office of Environment and Heritage online eSPADE tool identified the site as being within the Cobar Land System. Red earths and lithosols are dominant soils within the landscape. Limitations of the landscape include watersheeting of ridges, rilling and gullying.

Potential impacts to the soil environment are related to the disturbance of soil to construct the units, and movement vehicles and personnel on the grounds, which has the potential to cause soil erosion, generate dust, and cause sedimentation on site. The potential impacts are not considered to be greater than has occurred with the current mining village configuration.

Erosion and sediment controls would be installed in accordance with the NSW Governments Managing urban stormwater: soils and construction, Volume 1, commonly referred to as "The Blue Book" – refer **Section 5.20.**

The effluent disposal areas will continue to be irrigated at a sustainable rate so as to ensure the long term health of the soil and its vegetative cover; this is discussed in detail in **Section 5.5.4**

5.10 AIR AND MICROCLIMATE

The impact on air quality and microclimate has been considered in previous investigations in support of the approval of the existing mining village. The primary cause of impact on air quality and the

microclimate is emissions from vehicles. To combat this, the applicant will continue to minimise the use of light vehicles in favour of using buses to transport the village occupants to and from the mine site, and into town when necessary.

5.11 FLORA AND FAUNA

An ecological assessment was conducted by Environmental Consultants & Communication throughout the proposed irrigation and firefighting expansion proposal. The ecological assessment is attached as **Appendix D** to this assessment.

The assessment confirmed that the proposal will not significantly affect any listed species, populations, or communities with potential to use habitat in the study area. The assessment addresses the requirements of section 7.3 of the NSW BC Act and the Commonwealth EPBC Act. No further assessment is required, and the proposed works may proceed with caution.

5.12 ENERGY

The proposed expansion would not adversely impact on the usage of energy resources.

The accommodation units are designed to be compatible with the hot climatic conditions of the Cobar area and will utilise energy efficient cooling, lighting and appliances to minimise the burden on energy resources.

5.13 NOISE & VIBRATION

The expansion of the mining village may result in a slight increase in generated noise, however it is not considered that there not will be any significant detrimental impact to any nearby receiver in relation to noise or vibration from the village.

Due to the nature of shift work, it will be in the interests of the mining village occupants to keep noise production to a minimum as typically there will always be off-shift staff sleeping.

5.14 NATURAL HAZARDS

There are no known risks to people, property or the biophysical environment in relation to the use of the site as a mining village. The site is not located within a bush fire prone area, nor is the site flood prone.

On this basis, it is considered that the expansion of the mining village will not increase the risk of natural hazard occurrence.

5.15 TECHNOLOGICAL HAZARDS

The proposed accommodation units would be provided to ensure compliance with the relevant requirements of the Building Code of Australia (BCA) standards. As such, there are no foreseen risk to occupants or the locality by the proposed expansion in regard to any known technological hazard.

A BCA assessment has been provided as **Appendix E**, which identifies a number of non compliances to be addressed or rectified. Matters to be addressed include the absence of a suitable fire protection system. A performance solution is provided via **Appendix F** on the basis that a deemed to satisfy solution

is not proposed. This recommends provision of a stand-alone water supply tank with a capacity of 250,000 kL. This would be located not less than 10 metres from the building. The location of the proposed tank is indicatively identified on **Drawing A03.**. This area has been the subject of site assessment with respect to the AREA flora and fauna assessment at **Appendix D**. On the basis of this reporting, the proposed development would comply with the requirements of the BCA.

A Preliminary Contamination Investigation was undertaken by Envirowest Consulting to support the previous development application for the construction of the mining village in its current form. The investigation concluded that no evidence of contamination was identified and that the site is suitable for habitation purposes – refer **Appendix C**.

5.16 SAFETY, SECURITY AND CRIME PREVENTION

The guidelines prepared by the NSW Department of Urban Affairs and Planning (DUAP 2001) identify four (4) Crime Prevention Through Environmental Design (CPTED) principles to be considered in a Development Application to ensure developments do not create or exacerbate crime risk. These principles are discussed below in relation to the proposed development and include: surveillance, access control, territorial reinforcement, and space management.

5.16.1 SURVEILLANCE

No specific surveillance would be required as part of the proposed expansion. The operators of the mining village would continue to maintain a presence at the site.

5.16.2 ACCESS CONTROL

The mining village is externally fenced as a consequence of former land uses. The fencing limits access to the village to a single entry point off the Barrier Highway.

5.16.3 TERRITORIAL REINFORCEMENT

The mining village is clearly signposted at the entrance from Barrier Highway to ensure that the use of the site is clearly understandable to the public.

5.16.4 SPACE MANAGEMENT

The site would be regularly inspected and maintained to ensure that any degradation of facilities is monitored and corrected.

5.17 SOCIAL IMPACT

5.17.1 INTRODUCTION

In preparing this social impact assessment, regard has been given to the NSW Department Planning and Environment *Social Impact Assessment Guideline for state significant mining, petroleum production and extractive industry development*, September 2017 (SSD Guideline). Whilst not strictly relevant to the subproject, given that it is neither an application seeking consent for a mining, petroleum production and extractive industry development, nor a state significant development, there is some relevance in the recommendations and guidance provided by the document.

The objectives of the SSD Guideline are to:

• provide a clear, consistent and rigorous framework for identifying, predicting, evaluating and responding to the social impacts of State significant resource projects, as part of the overall EIA process

• facilitate improved project planning and design through earlier identification of potential social impacts

• promote better development outcomes through a focus on minimising negative social impacts and enhancing positive social impacts

• support informed decision-making by strengthening the quality and relevance of information and analysis provided to the consent authority

• facilitate meaningful, respectful and effective community and stakeholder engagement on social impacts across each EIA phase, from scoping to post-approval

• ensure that the potential social impacts of approved projects are managed in a transparent and accountable way over the project life cycle through conditions of consent and monitoring and reporting requirements

In relation to modifications the guidelines note they will apply where:

the social impacts associated with the proposed modification are new or different (in terms of scale and/or intensity) to those that were approved under the original consent.

As defined by the SSD Guideline, social impacts are significant events experienced by people as changes in one or more of the following are experienced:

- *way of life, including:*
  - *how people live, for example, how they get around, access to adequate housing*
  - *how people work, for example, access to adequate employment, working conditions and/or practices*
  - *how people play, for example, access to recreation activities*
  - *how people interact with one another on a daily basis*
- *community, including its composition, cohesion, character, how it functions and sense of place*
- *access to and use of infrastructure, services and facilities, whether provided by local, state, or federal governments, or by for-profit or not-for-profit organisations or volunteer groups*
- *culture, including shared beliefs, customs, values and stories, and connections to land, places, and buildings (including Aboriginal culture and connection to country)*
- *health and wellbeing, including physical and mental health*
- *surroundings, including access to and use of ecosystem services, , public safety and security, access to and use of the natural and built environment, and its aesthetic value and/or amenity*
- *personal and property rights, including whether their economic livelihoods are affected, and whether they experience personal disadvantage or have their civil liberties affected*
- *decision-making systems, particularly the extent to which they can have a say in decisions that affect their lives, and have access to complaint, remedy and grievance mechanisms*
- *fears and aspirations related to one or a combination of the above, or about the future of their community.*

As the proposal set forward by this DA seeks to expand the accommodation capacity of the mine workers village, it has the potential to result in new or different social impacts, in terms of scale and/or intensity, to those originally approved. It is therefore appropriate to provide consideration of these matters via this assessment, including recommended measures to manage or ameliorate the impacts.

Social impacts can be either or both:

- Positive or negative;
- Tangible or intangible;
- Direct, indirect or cumulative;
- Quantifiable or qualitative.

Depending on the perspective of the person or group that is impacted, impacts can be experienced very differently. For example, the owner of a local business may see improved trade and increased patronage as a result of a development change, whereas a direct neighbour to the development may experience increased noise or dust impacts. These different perspectives both represent a social impact, one welcome and positive, and the other unwelcome and negative. The capacity and ability to mitigate negative impacts is a factor together with the high level consideration of the benefit conferred by the project, both at a micro and macro level.

In determining this development application, CSC must be satisfied that any negative social impacts associated with the operation are effectively mitigated or managed, and that the positive impacts outweigh any residual negative impacts.

Understanding and Identifying Potential Social Impacts

By reference to the 2017 Guideline, there are a range of methods by which potential social impacts can be identified and understood. These are discussed in the relation to the project in

Table 3 – Identifying social impacts

Methods	Site Specific Response
The scale and nature of the proposed project, its associated activities (including ancillary infrastructure), potential direct impacts, potential indirect impacts that may extend from the project site (for example, transport and logistics corridors, downstream water users) and potential cumulative impacts	The site is currently serviced by the approved amenities building, which has sufficient capacity to accommodate the proposed expansion. Some additional staff may be required, but in reality, the additional occupants would simply be managed by different dining 'shifts' to enable people to eat at different times. No significant changes to the amenities building are required. Existing services and deliveries would continue to service the site, with commensurate increases to order sizes, but would be unlikely to result in any significant increase in deliveries or the like.
Who may be affected by the project, how they are expected to be affected, and their relevant interests, values and aspirations	People affected by the project are likely to be limited to the occupants of the facility. Limited downstream impacts to local residents are predicted on the basis that the facility is well removed from the urban area of town. Noise and similar direct impacts are not predicted (as discussed in **Section 5**).
Any potentially affected built or natural features located on or near the project site or in the surrounding region that have been identified as having social value or importance, including key social infrastructure, facilities and amenities	The environmental impacts of the project are negligible as evidenced by the included and attached assessments, including those from Envirowest and AREA.
Any relevant social trends or social change processes being experienced by communities near the project site and within the surrounding region, for example, trends in availability of rented accommodation, changes to relative employment in different industries,	Pressure on housing is anecdotally understood to be occurring in Cobar, although demographic analysis suggests this is not tangibly demonstrated – see discussion under **Census Data** in this assessment (dwelling occupation rates have dropped in the last

Methods	Site Specific Response
changing land uses over time, population and demographic changes	census period by 4.8%). Notwithstanding, this anecdotal view that housing supply is under pressure is therefore alleviated by providing an alternate and specific form of accommodation that responds to the demands and needs of this particular development sector.
The history of the proposed project and how communities near the project site and within the surrounding region have experienced the project and others like it to date.	The experience of the operators has been that the site operates without impacting surrounding lands. Impacts are localised and contained within the sites. No complaints have been received by the operator. A dedicated complaint handling process is proposed in relation to the expansion to ensure that the community has a means of addressing any concerns they may have directly with the operators. These would be recorded and information supplied to Council on a regular basis.

Census data

In understanding the current social environment within the Cobar Local Government Area (LGA), it is important to consider the changing demographics since the project was originally approved and development, as this assists to define the impacted society.

The original mine village accommodation consent was granted in 2012 and the development commenced soon after. Therefore, the 2011 census data, provides an excellent benchmark for the demographic situation prior to the development commencing, while the 2016 census data provides data since the development was approved. Those persons in resident at the camp on census night 2016 would be reflected in the 2016 figures, although it is presumed that they would have listed their primary place of residence as being their regular place of residence, and not the workers accommodation village. This would therefore

The results, including rates of change, are depicted in **Table 5.4**.

Table 5.4 – 2011 & 2016 Census data

	2011	2016	Rate of change
Recorded Population	4,710	4,647	-1.3%
Recorded visitors on census night	685	583	-14.9%
Male/Female	52.3%/47.7%	51.5%/48.5%	-0.8%/0.8%
Families	1,181	1,121	-0.5%
Employment by sector:			
Primary employment sector	Mining (27.3% of workforce)	Mining (27.9% of workforce)	0.7%
Second highest employment sector	Sheep, beef cattle and grain farming (8.9% of workforce)	Local Government Admin (5.1%	-
Occupied dwellings	1,721	1,638	-4.8%
Total dwellings	2,440	2,451	0.45%
Median income	$582	$706	21.3%

Source: ABS, 2011 & 2016 (Cobar LGA statistical area)

By reference to the above, at the time of the 2016 Australian census, the Cobar LGA had experienced a 1.3% drop in population from the 2011 levels, down from 4,710 in 2011 to 4,647 in 2016. The census also shows that proportion of the workforce employed by the mining sector (being the largest employer by sector in the LGA) has risen by 0.7%.

In 2016, the next largest employment sector is the local government administration centre, accounting for 5.1% of the workforce. This is as compared to 2011, when the next largest sector of the workforce was in the sheep, beef cattle and grain farming sector, accounting for 8.9% of the population. It is possible that this change is reflective of ABS recording methods and that the combined proportion of workers in the farming sector has

The number of dwellings within the town has risen by just 0.45%, while the rate of dwelling occupation has dropped by 4.8%. Conversely, median incomes for individuals over the age of 15 has increased by 21.3%, from $582/week to $706/week.

The development would result in the development of accommodation for up to 199 workers. The current mine accommodation village operating at the site has a capacity of 119, therefore representing a capacity increase of 80. This additional 80 people represents a 1.7% growth in the population of Cobar. This is very close to reversing the level of population decline since 2011.

Whilst the increase in population is very small, and whilst the overall population would, as a result, return to 2011 levels, it is acknowledged that there remains the potential for some impacts to the societal framework of Cobar during this time.

Alternatives Considered

It is relevant to note that the existing and expanded facility is designed to provide accommodation for workers from a range of mining sites within the Cobar district and does not serve one particular mine or mine company. The accommodation arrangements at the village are sought by the mining companies associated with the various mine sites and represent their ongoing workface needs. The village is not a generator of people in its own right, the need for increased capacity at the village is driven by the increase workforce at these mine sites. As these workers need to be accommodated, the alternatives to the village are outlined and discussed in **Table 5.5**.

Table 5.5 – Consideration of alternatives to expansion of mine workers village

Alternatives	Positive	Negative
1. Do nothing	• No change to the current camp arrangements, no additional impacts to the land or community • Existing perceived impacts remain without change • Minor impacts to the environment would not occur	• Workers already coming to region would need to be accommodated elsewhere, putting pressure on housing availability and affordability • Mine companies would need to source other accommodation options, placing increased pressure on traditional forms of tourist and visitor accommodation
2. Accommodate these workers in site specific mine villages, permissible on mine sites as ancillary	• No change to the current camp arrangements, no additional impacts to the subject land	• Additional distance between the villages and town means less flow on benefits as workers do not have the same level of

Alternatives	Positive	Negative
to permitted mining activities	• Minor additional impacts to the environment would not occur	accessibility to local services and shops • Additional distance to towns means the logistics of operating workers villages is more complex, such as in the event of a medical emergency in the village
3. Expand the mine workers village as proposed via this application	• Increases local population • Increased flow on benefits to local shops and services through greater patronage • Increased flow on benefits to local suppliers through larger orders • Economic benefits during construction through employment of local trades • Economic benefits during construction through purchase of local construction supplies	• Population increases are seen as transient persons with limited local linkages • Some increased pressure on local services

On the basis of the above, it is considered that the positive impacts associated with option 3, the adopted option, outweigh the minor impacts associated with the other considered options.

The facility provides accommodation for mine workers similar to many other facilities around Australia. One of the key issues identified in relation to these types of accommodation is the pressure placed on core infrastructure and resources as a result of a sudden upsurge in population associated with the development of a new village where none previously existed. Whilst the non-resident population of workers (so called because their primary place of residence is considered to be elsewhere) places demand on some obvious infrastructure such as sewer and water services, there are also less obvious impacts that must be managed.

The Cobar mine workers accommodation village is somewhat unique in the above context in that it is currently operating at the subject site with a current capacity of 119 and a proposed expansion of capacity by an additional 80 persons. As such, this is not a situation where there will be a sudden upsurge in population, rather a relatively minor increase over and above the current operating capacity. This allows for an excellent understanding of the current situation and the capacity to relatively accurately project how the proposed increase may well manifest itself in the context of pressure on services.

It is the opinion of the operator that the proposed increase would result in relatively minor changes to the status quo and any residual impacts to the community are manageable given the experience of the current operators.

There are a number of areas of potential social impact associated with the proposed expansion and these are considered in the following sections.

Local Employment

It is commonly accepted that the more workers that can be sourced from the local area and/or attracted to permanently relocate to the local area, the stronger the benefits will be for the local community in

the context of any major employer. While this is particularly true of larger mining and prolonged infrastructure construction projects, it is less true of the proposed development, which is not reliant on any one mine or operation, but instead responds to the fluctuating nature of the mining industry. The additional capacity at the would provide for the flexibility to respond to sudden upsurges in demand for accommodation, associated with short term mining projects at particular sites, far more effectively than the traditional property market. This therefore buffers the town from these short term impacts but also provides the benefits through increased local trade and the potential for casual on site employment, for cleaners, kitchen and ground staff.

Further, given the village accommodates workers from a range of mines, and has no particular affiliation to any mining organisation, it is clear that encouraging or proposing a greater proportion of local employment associated with these mining operations is out of the control of the applicant. The applicant is aiming to provide a service to support the mining sector. Current demand at the facility is high, due to a thriving mining industry, driving the need for additional accommodation. The method and nature of employment by the mining companies is not something the applicant can influence.

It is also notable that there is an existing trend, present in many communities throughout Australia, of workers migrating from lower paid industry job sectors to mining jobs. At the point that a worker is engaged and travels to Cobar to work on a mine, or gives up an existing job in the local community to take a job in the local mining sector, that decision has been made. The availability of this accommodation for the end user does not affect the making of that decision. Once engaged to perform a role, it becomes a matter for the mining companies to arrange suitable accommodation for their staff. Again, this is not a matter for the applicant, who is simply responding to a demand in the market. In the absence of this facility, mining companies would be forced to use other forms of accommodation, be it dwellings, forms of tourist and visitor accommodation or other options, which would reduce the availability of these forms of accommodation to the remainder of the public, thereby putting increased pressure on the community. The mine workers village provides a purpose built and appropriate method of short term accommodation for this sector of the workforce and in do so, both provides benefits to the community through increased population, and reduces pressure on housing and other forms of accommodation.

Social Infrastructure Capacity

It is pertinent to understand the capacity of services, facilities and community services to meet the projected increase in population associated with the Proposal.

There has been a large body of work completed looking at impacts associated with the installation of mine workers villages and this has been reviewed to assist with the preparation of this report. A report, commissioned by Isaac Regional Council, and prepared by KPMG, into infrastructure provision issues associated with mine workers accommodation identified several 'touch points' where non-resident workers impact on a local community. The KPMG report focussed on the long term impacts associated with permanent worker camps that account for approximately 50% of the total population of the Isaac Regional Council area. Whilst this proportion is far in excess of the impacts associated with the subject development it is reasonable to expect that the same types of impacts identified via the report would also be experienced in the context of this application, albeit on a far smaller scale.

The KPMG report considered a total of 38 'benchmarks'; 15 of which consist of built infrastructure, such as waste facilities, and 23 which consist of soft infrastructure or services, such as the number of beds in a hospital. **Table 5.6** provides a summary of the KPMG benchmarks, classified into three categories on the level of utilisation by residents and non-residents, being resident only, resident and non-resident – equally used, and resident and non-resident, but not necessarily used by all non-residents. Where the benchmark is considered relevant to this project in the event of increased capacity of the mine workers village, a tick has been placed in the adjacent column (some benchmarks are unticked on the basis that the service is not provided in Cobar, such as a cinema).

Those benchmarks that would be affected in the event the village does not proceed are marked with an asterisk.

Table 5.6 – KPMG Benchmarks

Resident Only		Resident and Non-Resident			
Nursing Home		Ambulance	✓	Supermarket	✓
University		Fire	✓	Courthouse/Magistrates Court	✓
TAFE		Police	✓	Local Government	
High School		Hospital	✓	Cinema*	
Primary School		Pharmacy	✓	Restaurant	✓
Childcare Centre		GP	✓	Post Office	✓
Kindergarten		Nurse	✓	Open Space – general	✓
Grain Receiver Depot		Dentist	✓	Open Space - active	✓
Caravan Park		Hotel/Motel/Guest House	#	Open Space – Passive	✓
Saleyard		Caravan Park	#	Gym	✓
		Non-resident bed	#	Museum/Art Gallery	✓
		Rented Accommodation	#	Private Dwellings	#
		Landfill	✓		
		Main Road	✓		
		Water	✓		
		Waste Water	✓		

Source: Redefining Regional Planning: Managing Change, Measuring Growth (abridged version)

As noted in **Table 5.6**, impacts related to the project could have an impact (either positive or negative) on the services provided within the town. Examples of positive impacts might be increased patronage to local businesses (such as the supermarket, cafés, gym, post office etc), and examples of negative impacts may be a potentially increased burden on services such as police, ambulance and health care services. This is confirmed by the KPMG report, which identified health and emergency services provision to be one area that was undersupplied by reference to the combined impact of resident and non-resident demand.

Given that the work force consists of people living for short term periods, it is considered that key impacts to local services, such as health and the like, would primarily be due to emergency situations, rather than a need for scheduled services.

As a precursor to the lodgement of the original application, and also this subsequent modification, the applicant has begun discussions with local services, including the Council and health and emergency services, to ensure that the level of service requirement for the project is clearly identified and that adequate provision is provided for the life of the project. This approach seeks to ensure the health and safety of their workers and to minimise disruption to the way of life to the resident population.

Given this early consultation with potentially affected services, it is not anticipated that impact to services would be significant during the life of the project.

As noted in the table, sectors where pressure would be expected in the absence of the development of the expanded mine workers village are centred around other forms of accommodation. Without expansion of the mine camp, these other sectors are likely to expect increased pressure, making it more

difficult for tourists and local residents alike to find accommodation when needed. By increasing the supply of accommodation, the town can expect to benefit.

Economic Growth

By providing a regular linkage into town through a regular bus connection, rather than seeking to supply large amounts of communal space on the mine site, local services such as the gym would be expected to receive increase patronage. Whilst there are some negative impacts to this, such as pressure on services, overall, if managed properly, the development would have a positive impact to the town and local proprietors. The injection of customers provides the opportunity for business growth, thereby providing higher quality services to the town in the longer term.

Transport

The facility currently operates to provide services to groups of mine workers, with the majority arriving and departing the facility by bus, both during roster changes and to attend the work sites daily. This reduces the reliance on light vehicles and reduces pressure on the local road network.

A decentralised accommodation approach by the mining companies, ie, using a mix of accommodation types in town, would result in increased traffic on the roads as either buses attend the multiple sites to collect and drop off workers, or workers use personal light vehicles to travel to and from site. By consolidating all workers in one location, reduced trip generation occurs, with commensurate benefits to the broader community. The operators of the site have also found that conservative assessments completed at the project inception stage which assumed high levels of private vehicle ownership and use by occupants has not been realised. Most occupants use the bus services provided by their employers. Therefore, parking and traffic generation levels associated with the site have in fact been lower for the facility than as approved and increase beyond these approved levels is not anticipated in the context of this proposed expansion.

Facility Management

The operator of the facility has existing internal policies, including a Facility Management Plan, to inform all occupants in relation to reasonable expectations for behaviour so as to minimise undesirable social impacts. In the seven years of operation of the facility, significant social issues at the facility have been minimal. A formalised complaint system for external complaints is proposed via this application, discussed later in this response.

Facilities would be provided on site for disabled access. An exemption is sought under Section D3.4 of the BCA to enable a reduced provision of disabled accessible units, on the basis that it is not envisaged that a full complement would be required given that disabled persons are unlikely to be employed in the mining sector workers. Provision for disabled occupants is nonetheless provided, albeit at a lower level than obligated by the BCA.

A first aid station is proposed for first response. In regard to an emergency there is ample manpower and equipment for maintaining a situation until specialists arrive if necessary.

In consideration of the above, the proposed development is not likely to have a significant adverse impact on people's way of life, their culture, or their community.

Location

A potential impact to the locality associated with the increased capacity of the village are changes to the prevailing local amenity in relation to the area around the village.

The existing mine workers accommodation is located on the outskirts of town, which reduces the potential impacts of the community's amenity through effective separation from potentially affected

residential receivers. In order to ensure the enhanced camp is consistent with the amenity of the area, the village would continue to operate in accordance with the existing facilities management plan.

Community Mitigation Measures/Involvement/Feedback

The applicant is committed to managing and operating the workers village in a manner that is acceptable to the community, including being responsive to community comments and complaints.

Within two months of receipt of approval for the facility, the applicant commits to developing and implementing an online submission page to receive any enquiries, suggestions, or complaints from members of the public in relation to activities associated with the mine workers village.

The applicant commits to:

- Acknowledging submissions within 3 days of receipt
- Investigating the details raised via the submission to determine an appropriate response within 5 days of receipt (or such longer period as agreed with the submitter);
- Developing a response to the submission providing a proposed means of resolving the matter for discussion with the submitter within 10 days, including a target timeframe for implementation (or such longer period as agreed with the submitter);
- Implementation of the resolution;
- Feedback to the submitter as to the success of the resolution method including any additional matters that may need to be carried out; and
- A bi-annual report to Council setting out the details of any submissions received, the response developed, the outcome of consultation with the submitter and the outcome of the proposed resolution.

The applicant has no objection to a condition of consent to this effect.

Cumulative Impacts

There are no other accommodation facilities of a similar nature near the subject site or within a reasonable proximity. Therefore, cumulative impacts of this development in concert with other similar developments is not anticipated.

5.17.2 CONCLUSION

Based on the matters discussed in the preceding section, it is considered that the development is unlikely to lead to unreasonable or significant social impacts to the community. In this regard, the following points are noted:

- The facility currently operates lawfully to provide accommodation for up to 119 mine workers from a range of mines in the Cobar area. The proposal seeks to expand this to accommodate 199 workers. The workers village is not involved with the engagement of the mine workers, and simply provides a place of accommodation for these workers. These workers are engaged by the mining companies who run the mines and need to be accommodated within the community. Providing accommodation in the mining workers village reduces the pressure on traditional forms of housing and on forms of tourist and visitor accommodation, both of which would be impacted in the event the expansion did not proceed. The proposal in its own right is unlikely to lead to any change to the demographic structure of the community.
- The assessment at Section 5 of this report demonstrates that the proposal would not lead to any unreasonable or unmanageable environmental impacts that would cause substantial change or disruption to the community. All impacts are minor and/or manageable.

- As mentioned above, the proposal entails simply providing accommodation for workers engaged by the various mining companies operating in the local area. The village operators are not involved in the hiring of workers and have no input into the demographic make up of occupants. All occupants are treated the same and are expected to utilise the site in accordance with the expectation and requirements of their employer. The development is therefore unlikely to result in some individuals or communities being significantly disadvantaged?
- The facility is currently, and would continue, to be operated in line with the site facility management plan, which would ensure that the health, safety, privacy and welfare of all occupants is respected. As the site is well removed from the town urban area, the development is unlikely to result in impacts to the health, safety, privacy or welfare of individuals or communities outside of the camp.
- As discussed above, impacts to local community resources would be minor and generally positive, through increased patronage at local stores and businesses, and positive flow on effects as a result of this. Improved trade leads to improved local employment opportunities and an improved local economy. Any impacts in this regard are therefore anticipated to be positive.

On balance, the social impacts associated with the proposal are considered positive, and those minor residual negative impacts, are manageable.

5.18 ECONOMIC IMPACT

By expanding the existing mining village to accommodate a total of 199 workers, any possible negative impacts on rental affordability in the local area will be minimised.

Residents of the village would continue to frequent local businesses for meals and other basic staples, as required.

The modest expansion of the mining village is therefore considered to create a positive economic impact on the local area.

5.19 SITE DESIGN AND INTERNAL DESIGN

The accommodation units will be sited as set out on **Drawing A03**. As shown, they are to be located in line with the existing accommodation units, with the addition of five units per row.

The layout is considered appropriate to the specific considerations of the site by optimising the installation of services, such as effluent disposal, power and water, thereby minimising the excavation and installation required.

A Performance Solution in relation to provision of facilities for residents of accommodation buildings will also be provided, as well as a Performance Solution in relation to provision of accessible accommodation rooms

5.20 CONSTRUCTION IMPACTS

The accommodation units will consist of prefabricated units which will be transported to the site by semi-trailer. Construction will consist of footings, installation of services and pathways, placement of buildings and development of awnings. The offsite impacts relate to the transportation of the components will be managed by the supplier and the construction contractor.

Minimal on-site impacts are expected as a result of the proposal.

5.21 CUMULATIVE IMPACTS

The proposed expansion of the mining village is unlikely to generate any impacts with the potential to act in unison in terms of:

- individual impacts so close in time that the effects of one are not dissipated before the next (time crowded effects);
- individual impacts so close in space that the effects overlap (space crowded effects);
- repetitive, often minor impacts eroding environmental conditions (nibbling effects); or
- different types of disturbances interacting to produce an effect which is greater or different than the sum of the separate effects (synergistic effects).

CONCLUSION

6.1 SUITABILITY OF THE SITE

The expansion of the Cobar Mine Workers Village at the subject site is a low impact proposal and considered suitable for the following reasons:

- The proposal is compatible with the existing approved land use of the subject site,
- The expansion will increase the accommodation capacity of the mining village, reducing the requirement for daily travel by mine site contractors and thus reducing impacts to the road network,
- Essential services are already provided to the subject site, and can sustainably accommodate the increase in the mining village population without the need for significant upgrades;
- The proposed accommodation units will be sited adjacent to the existing units, therefore not significantly increasing the visible village footprint to passing traffic,
- The site is not restricted by nearby sensitive uses or natural or cultural attributes such as soil characteristics, flora and fauna or heritage items;
- The impacts of the mining village expansion will not detrimentally affect the surrounding land uses.

6.2 CONCLUSION

This Statement of Environmental Effects (SEE) identifies and addressed the environmental issues associated within the proposed expansion of the Cobar Mine Workers Village, located at Lot 991 in DP1029946, Barrier Highway, Cobar NSW.

The proposed development is permissible with consent in the RU1 – Primary Production zone in accordance with the *Cobar Local Environmental Plan 2012* and is not antipathetic to the zone objectives.

The proposed expansion of the mining village to provide a total capacity for 199 residents would not result in any significant adverse environmental impacts, or social or economic impacts in the locality. In this regard, the subject site is considered to be suitable for the proposed development.

REFERENCES

Department of Urban Affairs and Planning (DUAP). nd, *Guide to Section 79C*, NSW Department of Urban Affairs and Planning, Sydney.

Department of Urban Affairs and Planning (DUAP). 2001, *Crime Prevention and the Assessment of Development Applications: Guidelines under section 79C of the Environmental Planning and Assessment Act 1979*, DUAP, Sydney.

Envirowest Consulting Pty Ltd. 2018. *On-Site Effluent Management Study: Pybar Mining Accommodation Village, Lot 991 DP1029946 Barrier Highway, Cobar NSW.*

Drawings

PROPOSED MINING CAMP ACCOMMODATION

BARRIER HIGHWAY, COBAR,

LOT 991 IN DP 1029946

ROVEST HOLDINGS

SCHEDULE OF DRAWINGS

SHEET	TITLE	REV	DATE
ARCHITECTURAL			
A01	**TITLE, DRAWING SCHEDULE & SITE LOCALITY**	**B**	**17/06/2019**
A02	**EXISTING SITE PLAN**	**B**	**17/06/2019**
A03	**PROPOSED SITE PLAN**	**B**	**17/06/2019**
A04	**APPROVED FLOOR PLAN**	**B**	**17/06/2019**
A05	**PROPOSED FLOOR PLAN**	**B**	**17/06/2019**
A06	**TYPICAL SECTION ACCOMMODATION UNIT VERANDAH**	**B**	**17/06/2019**

LOCATION MAP

GENERAL NOTES:

ALL DIMENSIONS GIVEN ARE IN MILLIMETRES (UNLESS SHOWN OTHERWISE) & ARE TO BE CHECKED AND VERIFIED PRIOR TO CONSTRUCTION. DO NOT SCALE DRAWINGS FOR DIMENSIONS. DIMENSIONS WITH ASTERISKS ARE APPROXIMATE ONLY AND ARE TO BE CHECKED AND VERIFIED ON SITE PRIOR TO CONSTRUCTION.

ALL WORK SHOWN ON THE DRAWINGS COMPRISING THE SET SHALL COMPLY WITH THE 'BUILDING CODE OF AUSTRALIA' & THE REQUIREMENTS OF RELEVANT AUTHORITIES & THEIR CONDITIONS OF CONSENT.

ALL WORKMANSHIP & MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE RELEVANT AUSTRALIAN STANDARDS.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS & DOCUMENTATION COMPRISING THE SET INCLUDING THE SPECIFICATION AND OTHER CONSULTANT'S DRAWINGS (WHERE SUPPLIED).

REV.	DATE:	DETAILS:
A	24/07/2018	-
B	02/08/2018	
C	17/06/2019	
D	19/07/2019	

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Nominated Architect: James Buckley, NSW ARB 8504

CLIENT: PYBAR MINING & CIVIL CONTRACTORS

PROJECT: PROPOSED MINING CAMP ACCOMMODATION AT BARRIER HWY, COBAR

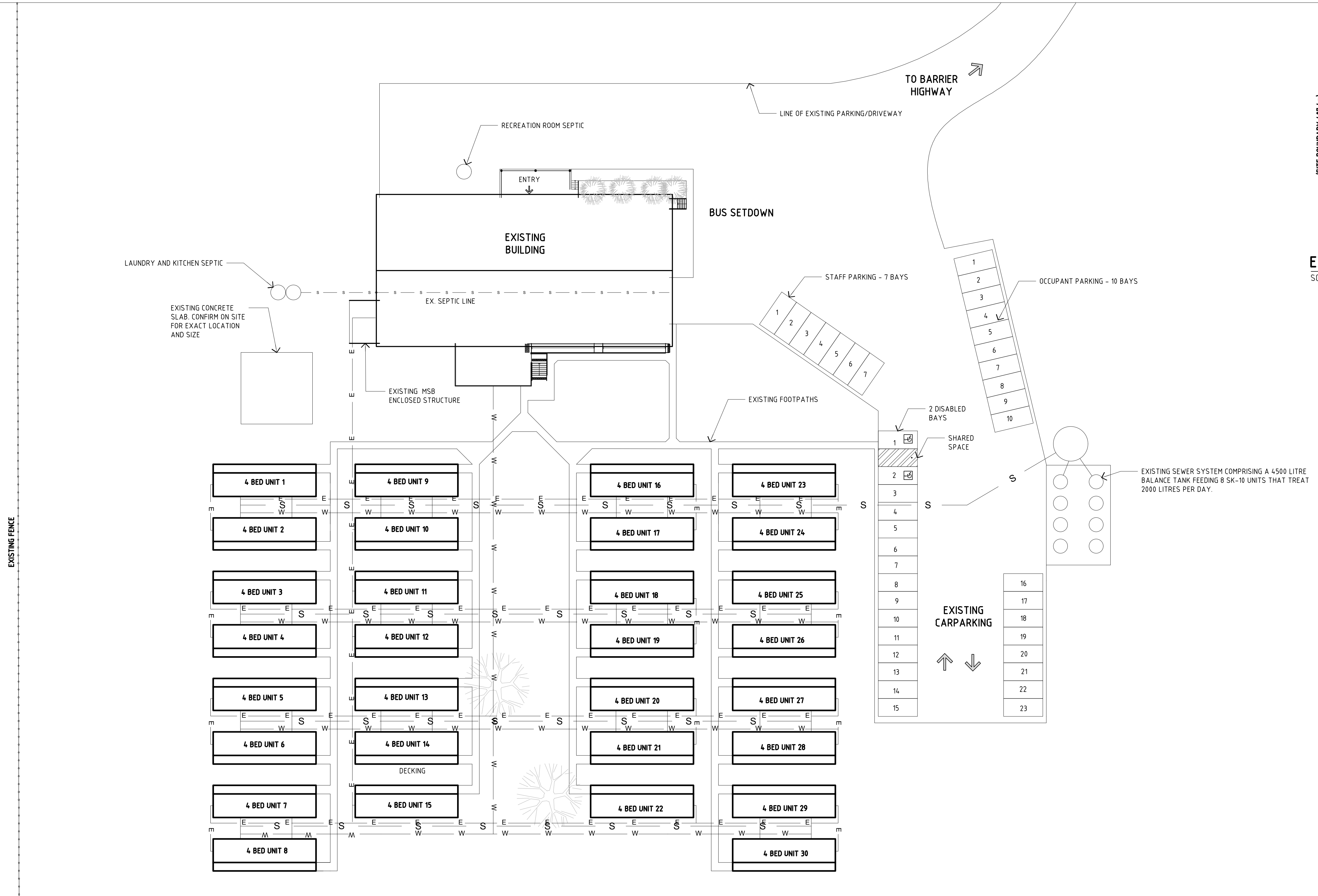
DRAWING TITLE: TITLE, DRAWING SCHEDULE & LOCALITY MAP

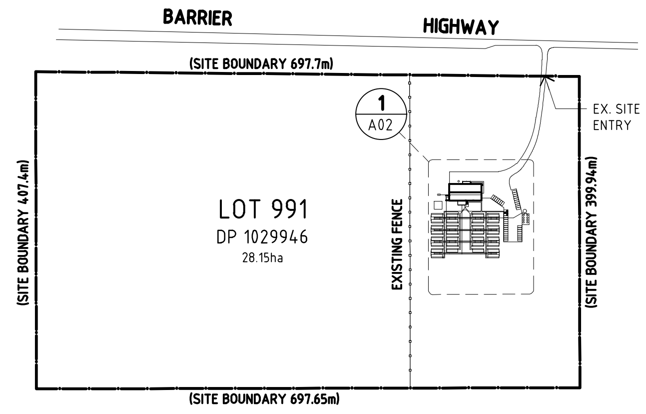
DRAWN:	SCALE AT A1:	SCALE AT A3:
MSB	NTS	NTS

IMAGE SOURCE: DEPARTMENT OF LANDS - SPATIAL INFORMATION EXCHANGE

PROJECT NUMBER: 218322 OUR REF: O:\Survey\Projects\218322\DraftCad\01_ARCHITECTURAL\218322_DSD_A01_A06.dwg

DWG SHEET.: 1 OF 6 | CHECKED: | 03_A01 | D





EXISTING OVERALL SITE PLAN

2 / A02

SCALE 1:5000 (A1); 1:10000 (A3)

NORTH

LEGEND:

EXISTING TRANSPORTABLE UNITS

S — EXISTING SEWER LINE
S — PROPOSED SEWER LINE
E — EXISTING ELECTRICAL LINE
E — PROPOSED ELECTRICAL LINE
W — EXISTING WATER LINE
W — PROPOSED WATER LINE

GENERAL NOTES:

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REV.	DATE:	DETAILS:
A	24/07/2018	-
B	02/08/2018	
C	17/06/2019	
D	19/07/2019	

EXISTING SITE PLAN

1 / A02

SCALE 1:300 (A1); 1:600 (A3)

NORTH

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CLIENT
PYBAR
MINING & CIVIL CONTRACTORS

PROJECT
PROPOSED MINING CAMP ACCOMMODATION AT BARRIER HWY, COBAR

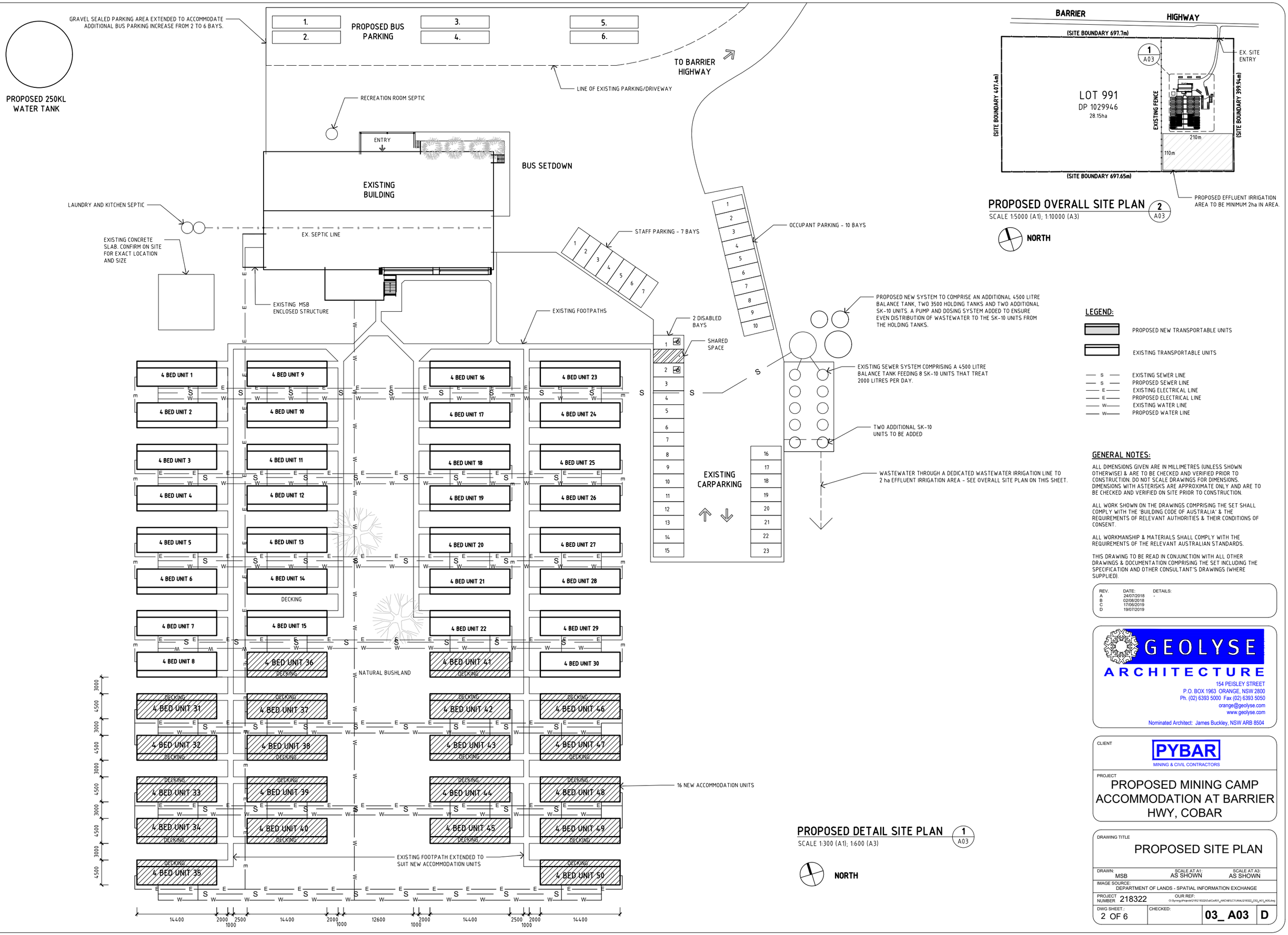
DRAWING TITLE
EXISTING SITE PLAN

DRAWN: MSB | SCALE AT A1: AS SHOWN | SCALE AT A3: AS SHOWN

IMAGE SOURCE: DEPARTMENT OF LANDS - SPATIAL INFORMATION EXCHANGE

PROJECT NUMBER 218322 | OUR REF:

DWG SHEET: 2 OF 6 | CHECKED: | 03_ A02 | D



PROPOSED OVERALL SITE PLAN 2 A03

SCALE 1:5000 (A1); 1:10000 (A3)

NORTH

PROPOSED DETAIL SITE PLAN 1 A03

SCALE 1:300 (A1); 1:600 (A3)

NORTH

LEGEND:

- PROPOSED NEW TRANSPORTABLE UNITS
- EXISTING TRANSPORTABLE UNITS
- S — EXISTING SEWER LINE
- S — PROPOSED SEWER LINE
- E — EXISTING ELECTRICAL LINE
- E — PROPOSED ELECTRICAL LINE
- W — EXISTING WATER LINE
- W — PROPOSED WATER LINE

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CLIENT: PYBAR MINING & CIVIL CONTRACTORS

PROJECT: PROPOSED MINING CAMP ACCOMMODATION AT BARRIER HWY, COBAR

DRAWING TITLE: PROPOSED SITE PLAN

DRAWN: MSB	SCALE AT A1: AS SHOWN	SCALE AT A3: AS SHOWN
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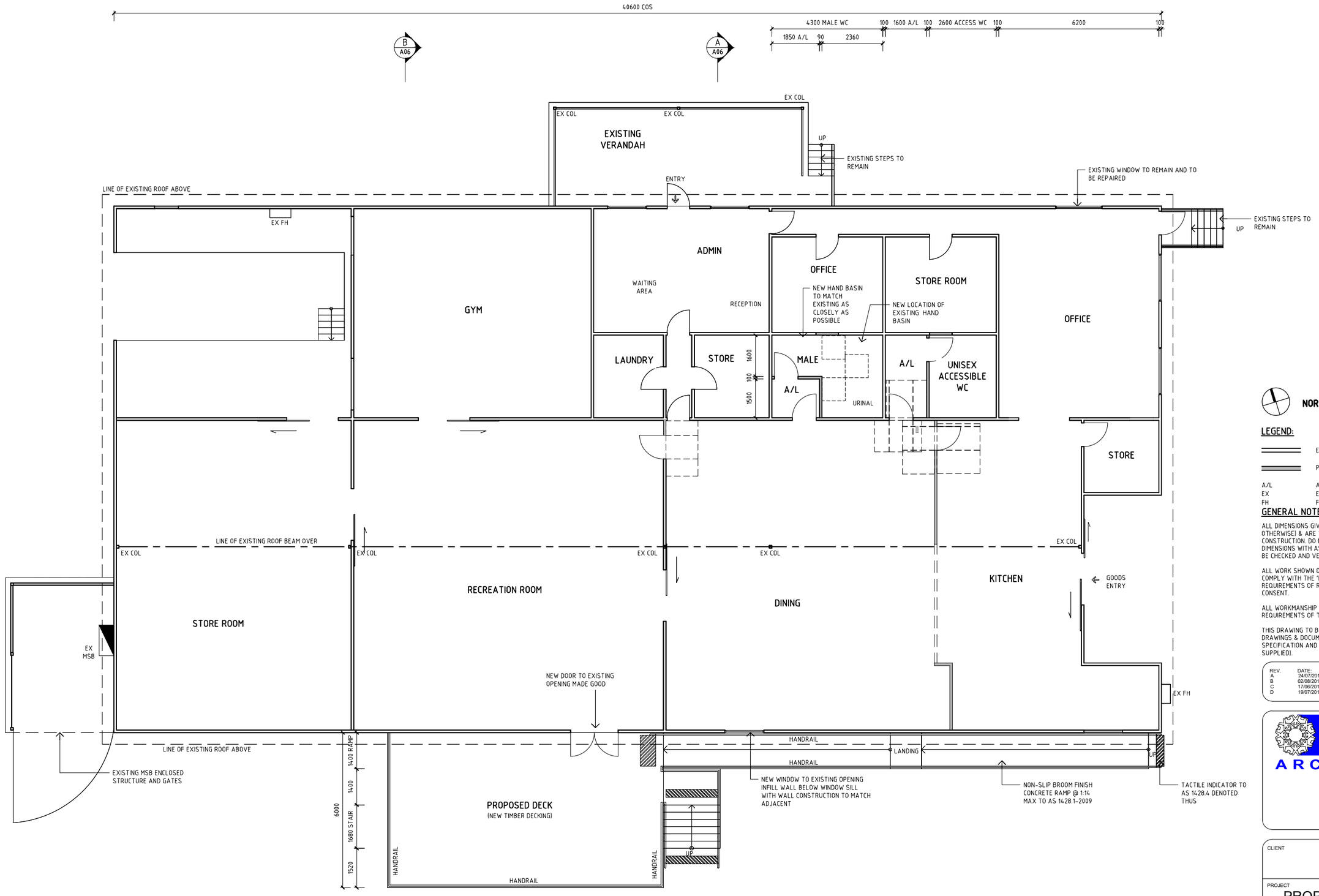

MAIN BUILDING APPROVED FLOOR PLAN

1 / A05

SCALE 1:75 (A1); 1:150 (A3)

NORTH

NORTH

LEGEND:

EXISTING WALL

PROPOSED WALL

A/L	AIR LOCK
EX	EXISTING
FH	FIRE HYDRANT

GENERAL NOTES:

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CLIENT: PYBAR MINING & CIVIL CONTRACTORS

PROJECT: PROPOSED MINING CAMP ACCOMMODATION AT BARRIER HWY, COBAR

DRAWING TITLE: APPROVED FLOOR PLAN

DRAWN: MSB	SCALE AT A1: 1:75	SCALE AT A3: 1:150
IMAGE SOURCE: DEPARTMENT OF LANDS - SPATIAL INFORMATION EXCHANGE		
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DWG SHEET.: 4 OF 6	CHECKED:	03_A04 D

MAIN BUILDING PROPOSED FLOOR PLAN

SCALE 1:75 (A1); 1:150 (A3)

1
A06

LEGEND

EXIT — EMERGENCY EXIT SIGN

EMERGENCY LIGHT

F — PORTABLE FIRE EXTINGUISHER

FHR — FIRE HOSEREEL

NORTH

LEGEND:

EXISTING WALL

APPROVED WALL

PROPOSED WALL

A/L	AIR LOCK
EX	EXISTING
FH	FIRE HYDRANT

GENERAL NOTES:

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DRAWING TITLE
PROPOSED FLOOR PLAN

DRAWN:	SCALE AT A1:	SCALE AT A3:
MSB	1:75	1:150

IMAGE SOURCE:
DEPARTMENT OF LANDS - SPATIAL INFORMATION EXCHANGE

PROJECT NUMBER 218322
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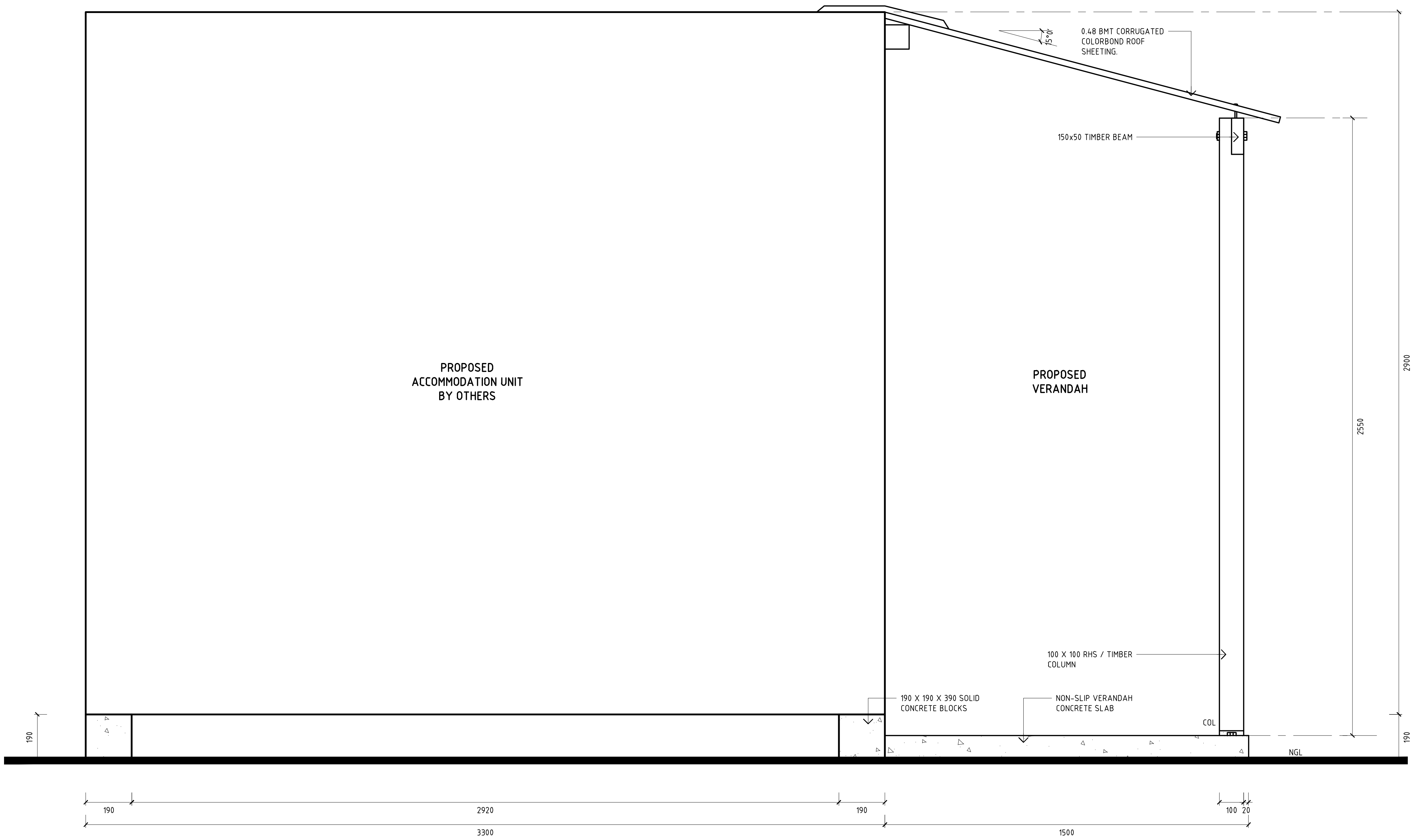

TYPICAL SECTION ACCOMMODATION UNIT VERANDAH

SCALE 1:10 (A1); 1:20 (A3)

ACCOMMODATION UNIT VERANDAH SECTION

1 / A07

SCALE 1:10 (A1); 1:20 (A3)

NOTE:

- VERANDAH POST = 100 X 100 RHS DYNABOLTED TO CONCRETE SLAB
- TOP BEAM = 150 X 50 RHS
- VERANDAH SLAB = 100 MM, 25 MPA WITH SL 72 MESH
- BUILDINGS SITTING ON 190 X 190 X 390 SOLID CONCRETE BLOCKS.
- LEVELED ON CRUSHER DUST

LEGEND:

COL — COLUMN
NGL — NOMINAL GROUND LEVEL

GENERAL NOTES:

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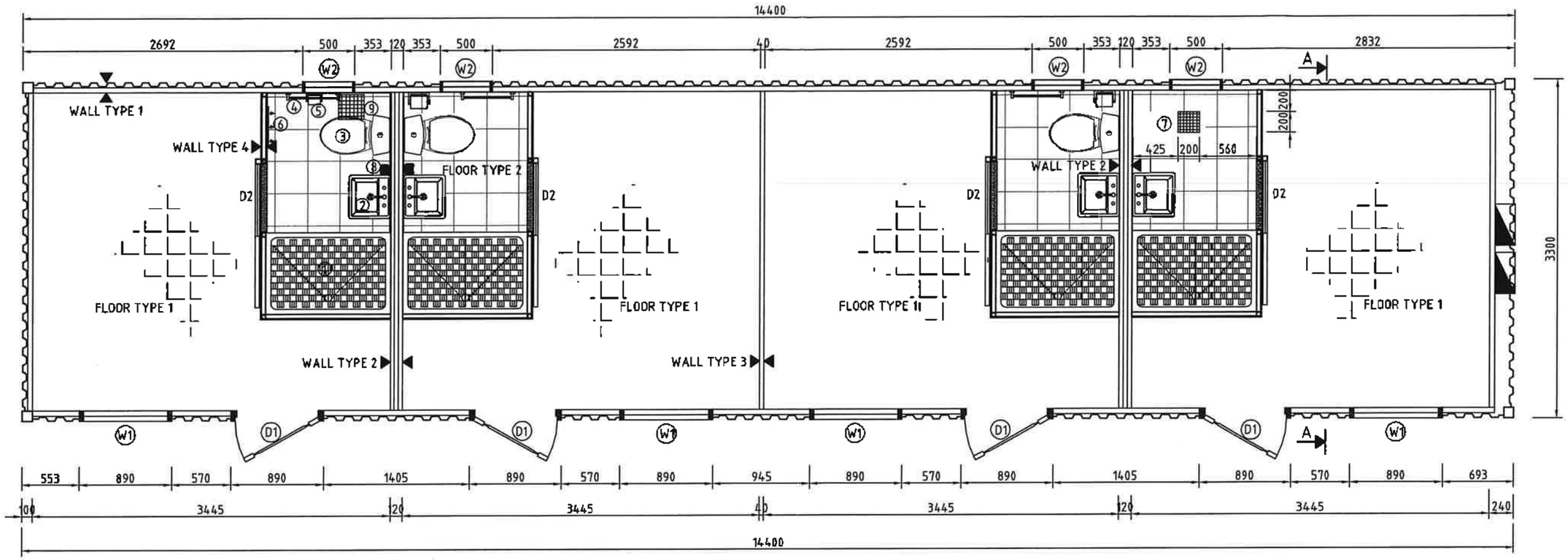
DRAWING TITLE
TYPICAL SECTION ACCOMMODATION UNIT VERANDAH

DRAWN:	SCALE AT A1:	SCALE AT A3:
MSB	1:10	1:20

IMAGE SOURCE:
DEPARTMENT OF LANDS - SPATIAL INFORMATION EXCHANGE

PROJECT NUMBER 218322

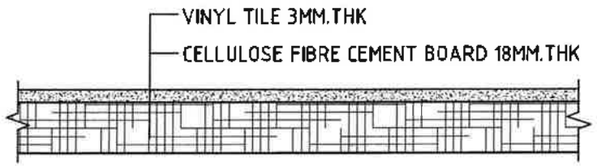
DWG SHEET: 6 OF 6 | CHECKED: | 03_A06 | D



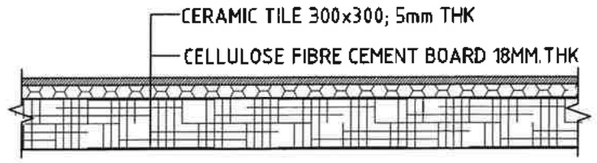
LAYOUT PLAN
SCALE 1:50

EQUIPMENT LIST:

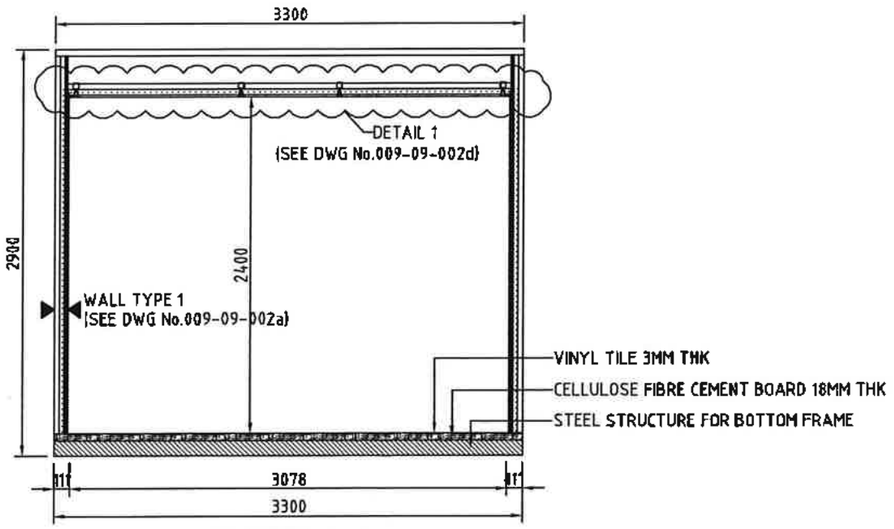
D1. 2150 x 890 EXTERNAL STEEL DOOR
D2. 2040 x 710 INTERNAL HIGH DENSITY FIBREBOARD SLIDING DOOR
W1. 1050 x 890 ALUMINIUM DOUBLE TEMPERED GLAZING SLIDING WINDOW
W2. 350 x 500 TEMPERED GLASS FIXED WINDOW
1. 1200x800 COMPOSITE SHOWER UNIT C/W SHOWER CURTAIN AND SOAP HOLDER
2. HANDBASIN CABINET C/W ACRYLIC PANEL ABOVE AND SHAVING CABINET
3. WATER CLOSET
4. TOWEL RAIL 600 LONG
5. PAPER HOLDER
6. COAT HOOK
7. CEILING EXHAUTED FAN
8. SOAP DISH
9. CEILING EXHAUSTED FAN



DETAIL OF FLOOR TYPE 1 (TYPICAL)
SCALE 1:5



DETAIL OF FLOOR TYPE 2 (TYPICAL)
SCALE 1:5



SECTION A-A
SCALE 1:50

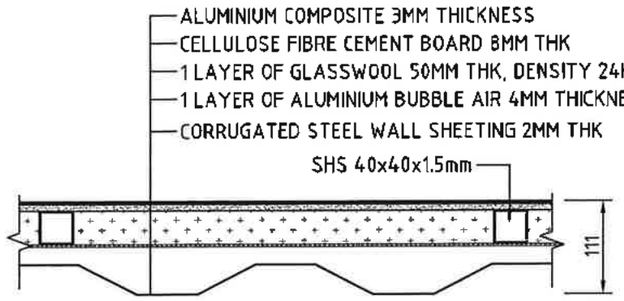
MANUFACTURER:

Minpac Properties Pty Ltd
Address: Unit 2 / 50 Parker Court Pinkenba QLD 4008
Phone 1300 920 360

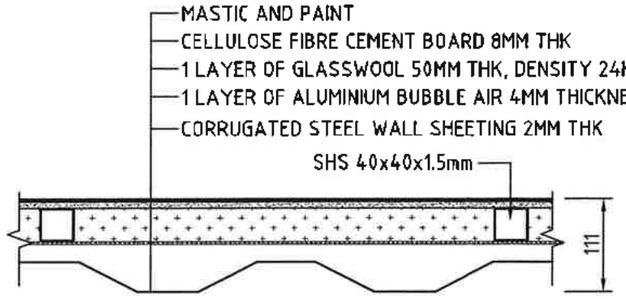
DESIGN EVALUATION AUTHORITIES	APPROVAL OF EMPLOYER

PROJECT: 4 MAN ACCOMMODATION UNIT	JOB CODE: MPP-11-009-12	GENERAL DIRECTOR:	
ITEM: ARCHITECTURE DRAWING	DATE: 19-OCT-2011	PRESIDED BY:	
DRAWING TITLE: LAYOUT PLAN	DWG No.: AR-TLC-009-12-001	DESIGN BY:	
		CHECK BY:	

ISSUED FOR:		Rev. No.	REVISION	DATE
REFERENCE	□	01	REV-00	18-10-2011
PRELIMINARY	■			
YOUR APPROVAL	□			
CONSTRUCTION	□			
REVISED	□			
AS-BUILT	□			



CROSS SECTION



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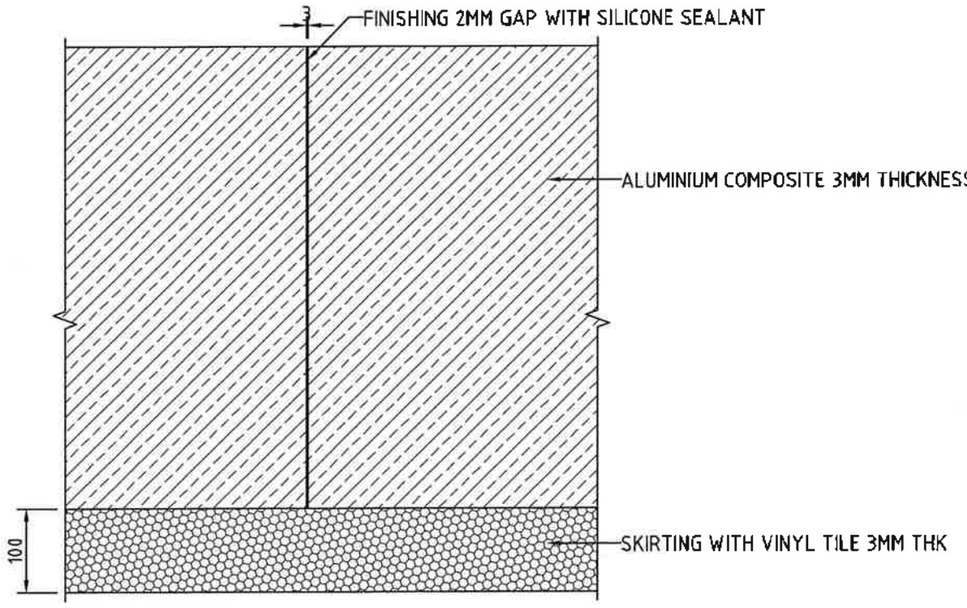
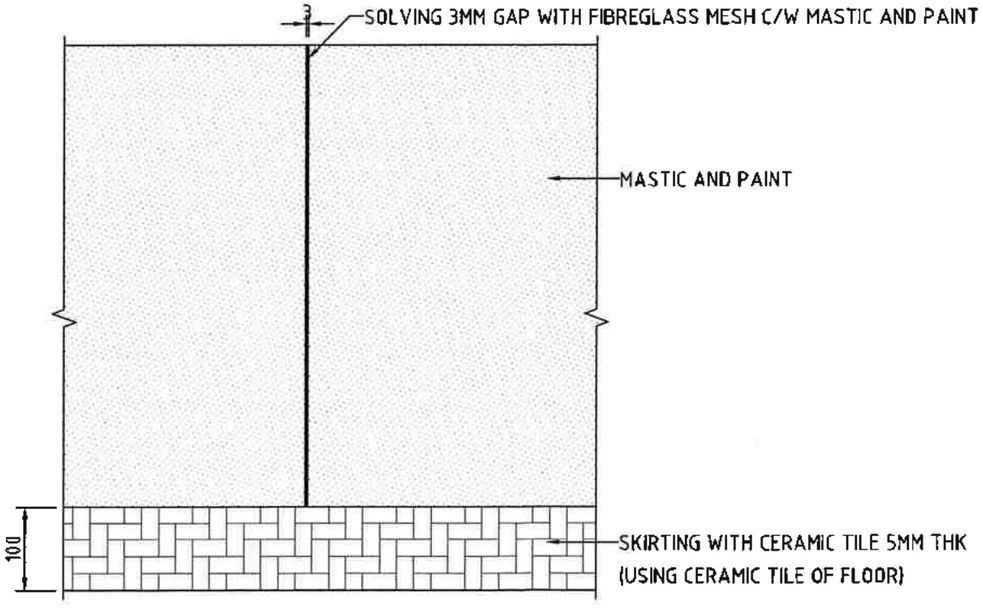


ELEVATION INSIDE VIEW

DETAIL OF WALL TYPE 1 OUTSIDE BATHROOM (TYPICAL)

SCALE 1:10



ELEVATION INSIDE VIEW

DETAIL OF WALL TYPE 1 INSIDE BATHROOM (TYPICAL)

SCALE 1:10

MANUFACTURER:

MINPAC PROPERTIES

Minpac Properties Pty Ltd

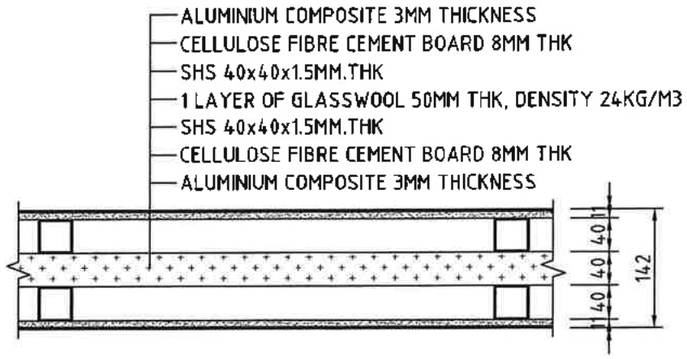
Address: Unit 2 / 50 Parker Court Pinkenba QLD 4008

Phone 1300 920 360

DESIGN EVALUATION AUTHORITIES	APPROVAL OF EMPLOYER

PROJECT: 4 MAN ACCOMMODATION UNIT	JOB CODE: MPP-11-009-12	GENERAL DIRECTOR:	
ITEM: ARCHITECTURE DRAWING	DATE: 18-OCT-2011	PRESIDED BY:	
DRAWING TITLE: TYPICAL DETAILS-SHEET 1	DWG No.: AR-TLC-009-12-002a	DESIGN BY:	
		CHECK BY:	

ISSUED FOR:		Rev. No.	REVISION	DATE
REFERENCE	☐	01	REV-00	18-10-2011
PRELIMINARY	☒			
YOUR APPROVAL	☐			
CONSTRUCTION	☐			
REVISED	☐			
AS-BUILT	☐			



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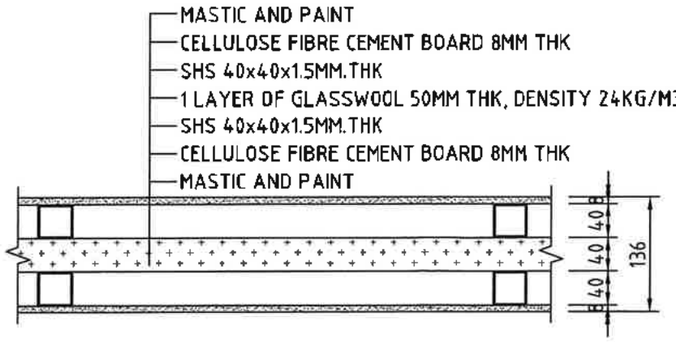

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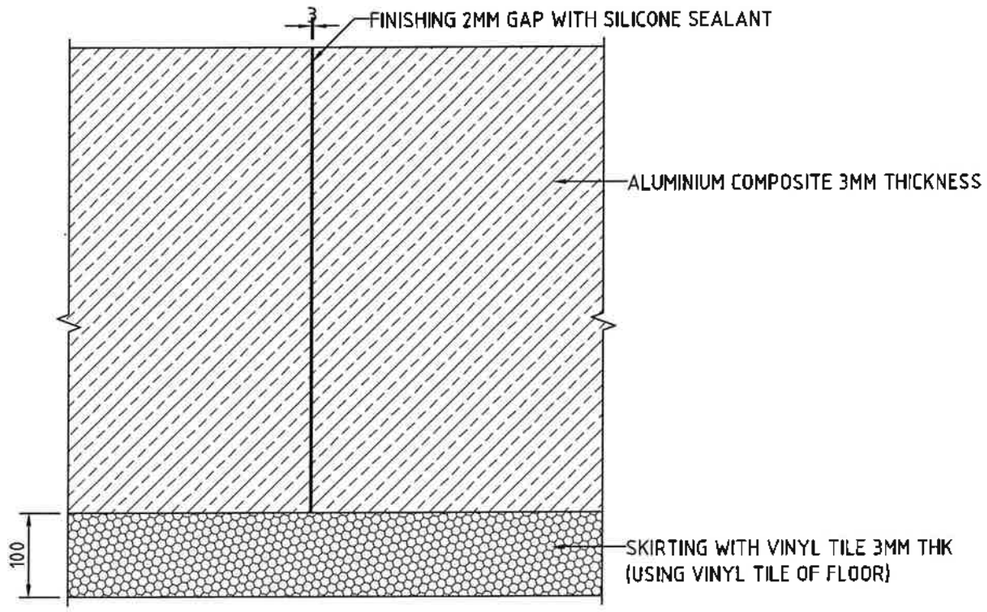
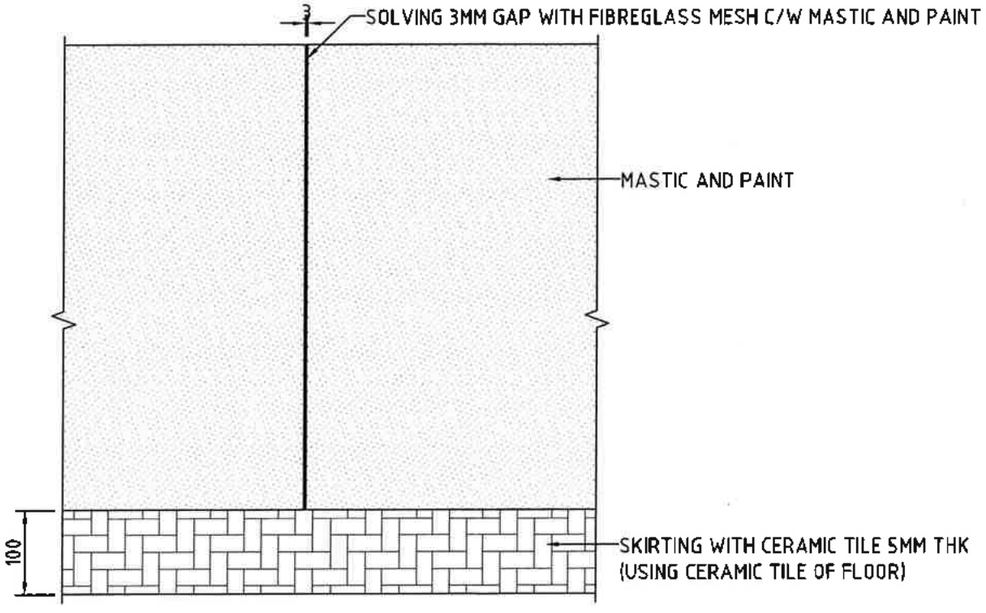


ELEVATION INSIDE VIEW

DETAIL OF WALL TYPE 2 OUTSIDE BATHROOM (TYPICAL)

SCALE 1:10



ELEVATION VIEW

DETAIL OF WALL TYPE 2 INSIDE BATHROOM (TYPICAL)

SCALE 1:10

MANUFACTURER:

Minpac Properties Pty Ltd

Address: Unit 2 / 50 Parker Court Pinkenba QLD 4008

Phone 1300 920 360

DESIGN EVALUATION AUTHORITIES	APPROVAL OF EMPLOYER

PROJECT: 4 MAN ACCOMMODATION UNIT	JOB CODE: MPP-11-009-12	GENERAL DIRECTOR:	
		PRESIDED BY:	
ITEM: ARCHITECTURE DRAWING	DATE: 18-OCT-2011	DESIGN BY:	
DRAWING TITLE: TYPICAL DETAILS-SHEET 2	DWG No.: AR-TLC-009-12-0112b	CHECK BY:	

ISSUED FOR:		Rev. No.	REVISION	DATE
REFERENCE	☐	01	REV-00	18-10-2011
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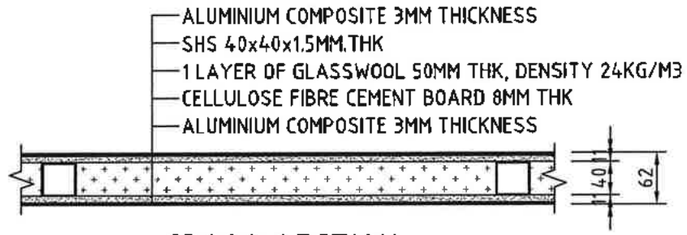
REVISED	☐			
AS-BUILT	☐			



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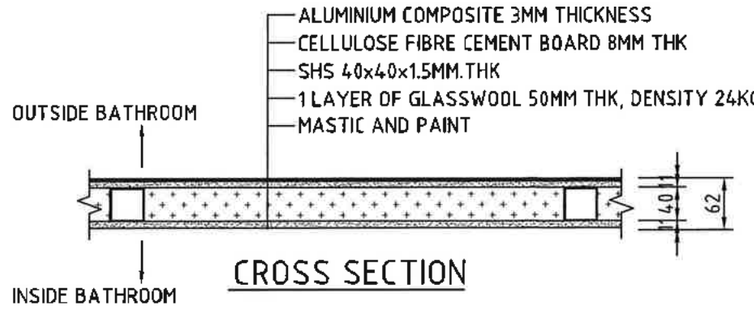

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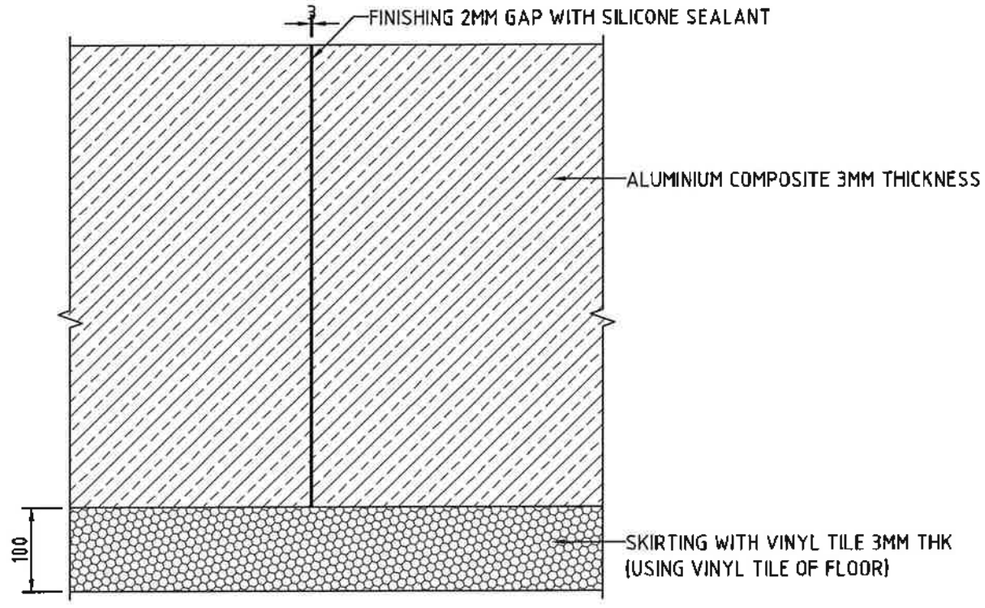
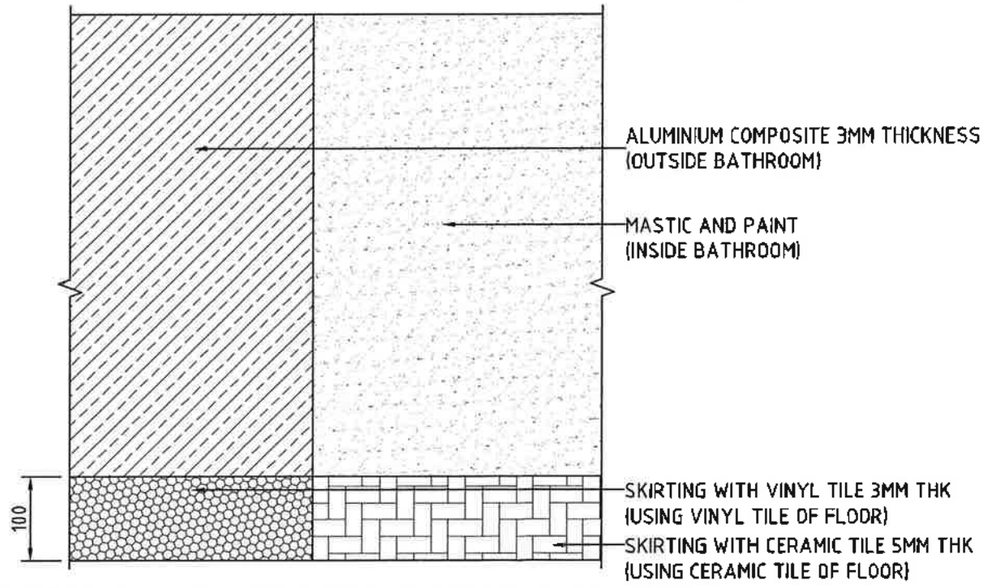


ELEVATION VIEW

DETAIL OF WALL TYPE 3 (TYPICAL)

SCALE 1:10



ELEVATION VIEW (OUTSIDE & INSIDE BATHROOM)

DETAIL OF WALL TYPE 4 (TYPICAL)

SCALE 1:10

MANUFACTURER:

Minpac Properties Pty Ltd

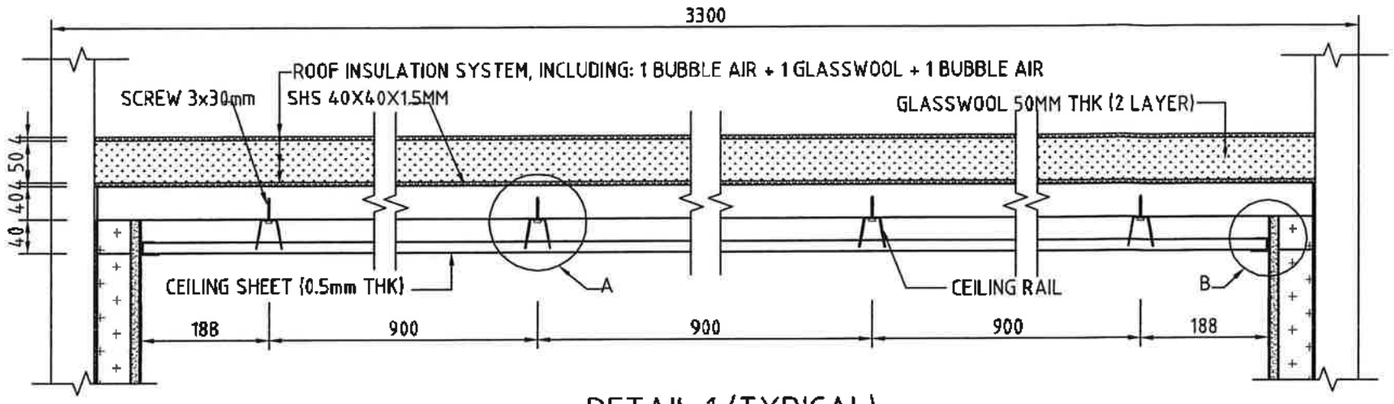
Address: Unit 2 / 50 Parker Court Pinkenba QLD 4008

Phone 1300 920 360

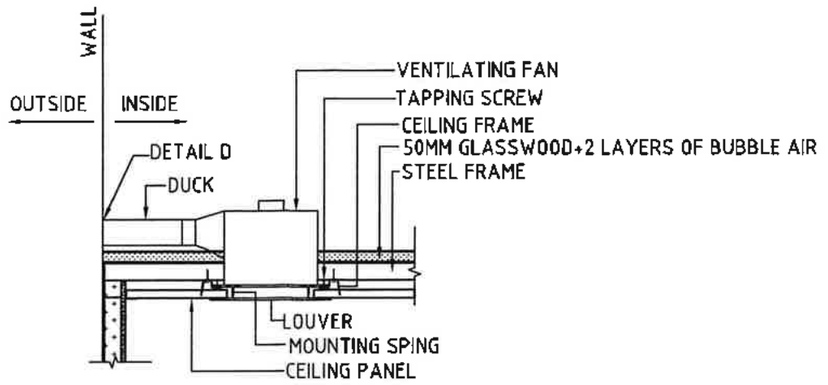
DESIGN EVALUATION AUTHORITIES	APPROVAL OF EMPLOYER

PROJECT: 4 MAN ACCOMMODATION UNIT	JOB CODE: MPP-11-009-12	GENERAL DIRECTOR:		ISSUED FOR:	
ITEM: ARCHITECTURE DRAWING	DATE: 18-OCT-2011	PRESIDED BY:		REFERENCE ☐	
DRAWING TITLE: TYPICAL DETAILS-SHEET 3	DWG No.: AR-TLE-009-12-042c	DESIGN BY:		PRELIMINARY ☒	
		CHECK BY:		YOUR APPROVAL ☐	
				CONSTRUCTION ☐	
				REVISED ☐	
				AS-BUILT ☐	

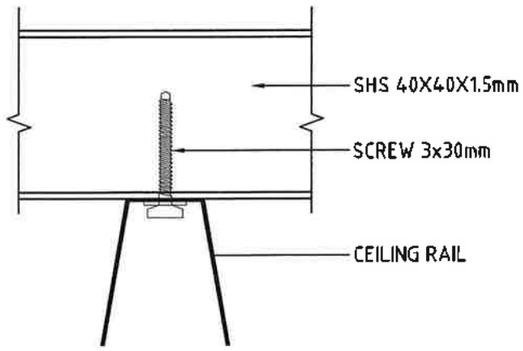
Rev. No.	REVISION	DATE
01	REV-00	18-10-2011



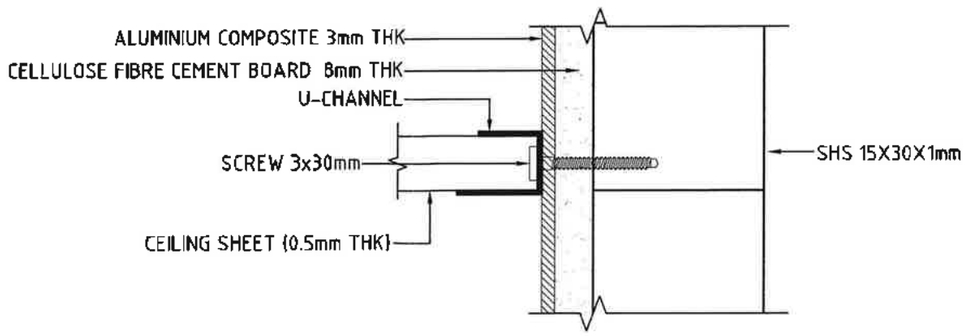
DETAIL 1 (TYPICAL)
SCALE 1:10



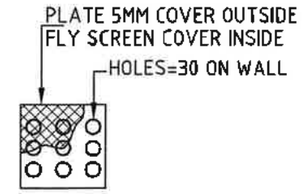
CEILING EXHAUSTED FAN INSIDE BATHROOM
SCALE 1:20



DETAIL A
SCALE 1:2



DETAIL B
SCALE 1:2



DETAIL D
SCALE 1:20

MANUFACTURER:

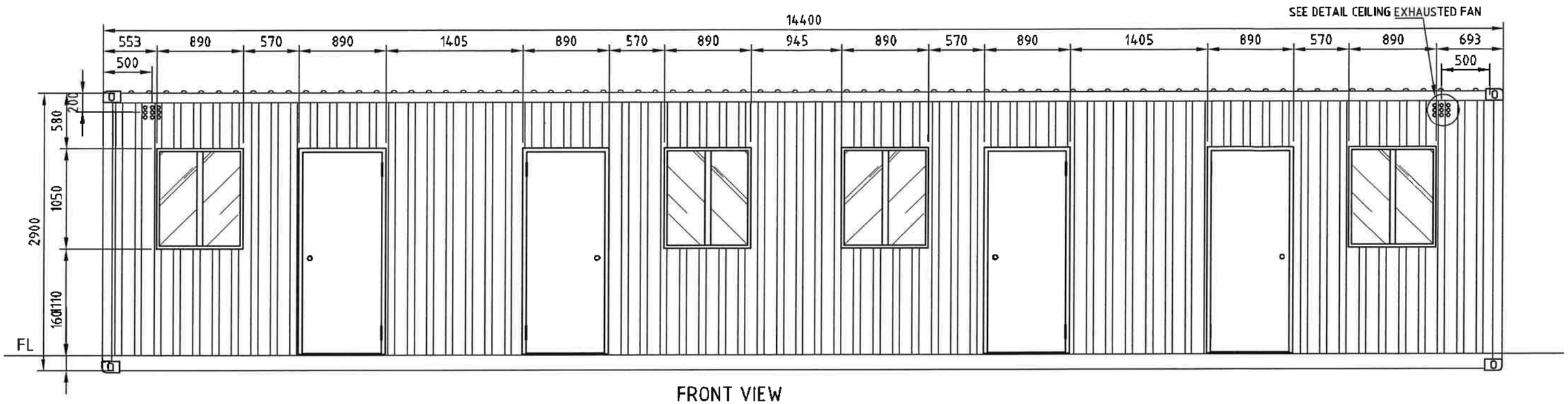
MINPAC PROPERTIES

Minpac Properties Pty Ltd
Address: Unit 2 / 50 Parker Court Pinkenba QLD 4008
Phone 1300 920 360

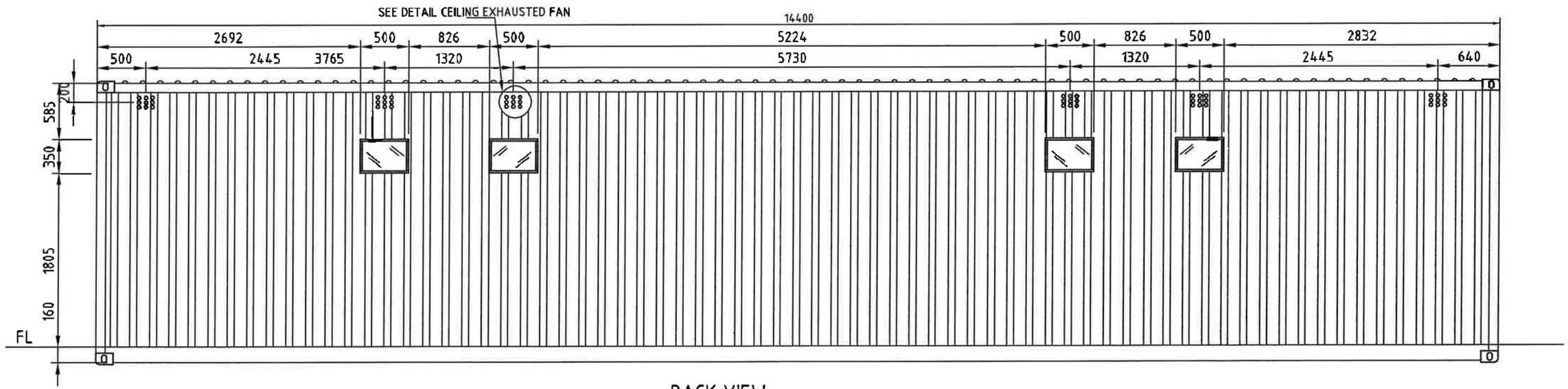
DESIGN EVALUATION AUTHORITIES	APROVAL OF EMPLOYER

PROJECT: 4 MAN ACCOMMODATION UNIT	JOB CODE: MPP-11-009-12	GENERAL DIRECTOR:	
		PRESIDED BY:	
ITEM: ARCHITECTURE DRAWING	DATE: 18-OCT-2011	DESIGN BY:	
DRAWING TITLE: TYPICAL DETAILS-SHEET 4	DWG No.: AR-TLC-009-12-882d	CHECK BY:	

ISSUED FOR:		Rev. No.	REVISION	DATE
REFERENCE	☐	01	REV-00	18-10-2011
PRELIMINARY	☒			
YOUR APPROVAL	☐			
CONSTRUCTION	☐			
REVISED	☐			
AS-BUILT	☐			



FRONT VIEW
SCALE 1:60



BACK VIEW
SCALE 1:60

MANUFACTURER:

Minpac Properties Pty Ltd
Address: Unit 2 / 50 Parker Court Pinkenba QLD 4008
Phone 1300 920 360

DESIGN EVALUATION AUTHORITIES	APPROVAL OF EMPLOYER

PROJECT: 4 MAN ACCOMMODATION UNIT
ITEM: ARCHITECTURE DRAWING
DRAWING TITLE: ELEVATION VIEW

JOB CODE: MPP-11-009-12
DATE: 18-OCT-2011
DWG No.: AR-TLC-M09-12-003

GENERAL DIRECTOR:
PREPARED BY:
DESIGN BY:
CHECK BY:

ISSUED FOR:		Rev. No.	REVISION	DATE
REFERENCE	☐	01	REV-00	18-10-2011
PRELIMINARY	■			
YOUR APPROVAL	☐			
CONSTRUCTION	☐			
REVISED	☐			
AS-BUILT	☐			

Appendix A

ENVIROWEST CONSULTING PTY LTD
ON-SITE EFFLUENT MANAGEMENT
STUDY

On-site effluent management study

Pybar Mining Accommodation Village, Lot 991 DP1029946 Barrier Highway, Cobar NSW

Ref: R12139-2e
Date: 7 June 2018

Envirowest Consulting Pty Ltd ABN 18 103 955 246
• 9 Cameron Place, Orange NSW • Tel (02) 6361 4954 •
• 6/72 Corporation Place, Bathurst NSW • Tel (02) 6334 3312 •
• PO Box 8158, Orange NSW 2800 • Email admin@envirowest.net.au • Web www.envirowest.net.au •

Environmental
Geotechnical
Asbestos
Services

Client:	Pybar Mining & Civil Contractors c/- Geolyse Pty Ltd PO Box 1963 Orange NSW 2800
Assessor:	Dave Langston BNEWS Environmental Scientist
Checked by:	Leah Desborough BNatRes (Hons) Senior Environmental Scientist
Authorising Officer:	Greg Madafiglio PhD Senior Environmental Scientist
Interested authorities:	Cobar Shire Council
Report number:	R12139-2e
Date:	7 June 2018

Summary

Proposed development and situation

The Pybar Mining Camp is located at Lot 991 DP1029946 Barrier Highway, Cobar NSW. Existing infrastructure on the site includes a mining accommodation village with 30 accommodation units and a recreation room containing toilets, kitchen and a small laundry.

An additional 20 accommodation units are proposed for the mining village which will be extended to 50 units with a camp capacity of 199 guests.

The toilets in the recreation room and kitchen sinks are serviced by a primary treatment tank and grease trap with treated wastewater applied to an absorption trench reportedly 40m in length which was upgraded in 2015.

The majority of laundry activities is expected to be conducted off-site (at the respective mine sites). Wastewater produced from the laundry is treated in a two-tank secondary treatment system with unknown irrigation application area. The mining camp contains a small laundry for civilian clothes only. Upgrade of the existing systems servicing the recreational building is required to accommodate the proposed increase in accommodation capabilities.

The accommodation units accommodate four single person rooms with each room containing a toilet, shower and hand basin. Wastewater from the existing thirty accommodation units is gravity fed to a 4,500L balance tank (approx. size) then pumped to eight SK-10 OZZI CLEAN secondary treatment wastewater units. Each unit is capable of treating 2,000L/day. The treated wastewater is disposed via surface irrigation to the land east of the secondary treatment tanks. An upgrade of the existing systems associated with the accommodation units is required to manage wastewater from the proposed additional units.

A site inspection and soil assessment was undertaken on 2 May 2011 when the mining accommodation facility was first proposed. The site was re-inspected on 2 May 2018 for the proposed additional accommodation units. This report describes the site and soil investigation and recommends a suitable effluent treatment and application system.

Objectives

Undertake a site and soil assessment using the Australian Standard 1547:2012, *On-site domestic wastewater management*, the Environment and Health Protection Guidelines, *On-site sewage management for single households* (1998), Department of Urban Affairs and Planning and NSW Health *Septic Tank and Collection Well Accreditation Guideline* as guidelines. Suitable wastewater application systems, sizing and location for the wastewater sources are recommended.

Investigation

A site and soil assessment was undertaken. The existing effluent systems were inspected. A desktop study was conducted using expected wastewater flows and collection of available site information. Boreholes were constructed and soil assessed for parameters to determine suitable application areas and rate of effluent disposal.

Recommended land application and treatment system
The recommended systems are;

Recreation room and kitchen

- **Design flows for the recreational room and kitchen are based on 3,948 litres/day**
- **Absorption or evapotranspiration absorption trench with a length of 270 metres.** The effluent is currently serviced by a reportedly 40m trench that was constructed in 2015. Additional trench length of 230m will be required. The recommended trench width is 0.6m, with a maximum depth of 0.6m, covered by 0.15m of topsoil. Effluent water needs to be evenly distributed across the trench length by use of a holding tank which will automatically and systematically dose wastewater to trench segments. To ensure even water distribution across the entire trench length, trench segments should not exceed 50m and should be a minimum of 1m apart.

- **Treatment system** with a capacity to treat 3,000L per day. The existing treatment tanks are expected to be suitable for continued use following routine maintenance and desludging.

- **Grease trap** to treat wastewater sourced from the kitchen.

OR

- **Surface irrigation with an irrigation area of 3,934 square metres.** The wastewater will be irrigated to lawn or pasture. The wastewater should flow through a dedicated wastewater irrigation line.

- **Secondary wastewater treatment system** accredited by NSW Health with capacity to treat a minimum of 3,948L per day.

Laundry

- **Design flows for the laundry are based on 270 litres/day**
- **Surface or sub-surface irrigation with an irrigation area of 269 square metres.** The wastewater will be irrigated to lawn or pasture. The wastewater should flow through a dedicated wastewater irrigation line.

- **Secondary wastewater treatment system** accredited by NSW Health with capacity to treat a minimum of 300L per day. The existing treatment tanks are expected to be suitable for continued use following routine maintenance and desludging.

Accommodation units

- **Design flows for the accommodation units are based on 19,900 litres/day**
- **Surface irrigation with an irrigation area of 19,900 square metres.** The wastewater will be irrigated to lawn or pasture. The wastewater should flow through a dedicated wastewater irrigation line.

- **Secondary wastewater treatment system** accredited by NSW Health with capacity to treat a minimum of 19,900L per day. The irrigation area should be managed to prevent damage to surface pipes or the pipes buried.

    - The current treatment system comprises a 4,500 litre balance tank that feeds 8 separate SK-10 units that are capable of treating up to 2,000 litres per day. The 8 SK-10 units service one application area.

- The proposed system will require an additional 4,500 litre balance tank, two 3,500 litre holding tanks and two additional SK-10 units. A pump and dosing system will be required from the holding tanks to ensure even distribution of wastewater to the SK-10 units from the holding tanks. This will ensure rotation of wastewater to the application area.

Location
The location of the effluent application area is identified in Appendix 1.

Notes
Construction of the treatment and application systems should be according to AS1547:2012.

Application areas should be signposted and fenced to prevent access by patrons and or animals.

Vegetation should be maintained so roots do not affect trench or irrigation lines.

1. Introduction

1.1 Background

The Pybar Mining Camp is located at Lot 991 DP1029946 Barrier Highway, Cobar NSW. Existing infrastructure on the site includes a mining accommodation village with 30 accommodation units and a recreation room containing toilets, kitchen and a small laundry.

An additional 20 accommodation units are proposed for the mining village which will be extended to 50 units with a camp capacity of 199 guests.

The toilets in the recreation room and kitchen sinks are serviced by a primary treatment tank and grease trap with treated wastewater applied to an absorption trench reportedly 40m in length which was upgraded in 2015. The majority of laundry activities is expected to be conducted off-site (at the respective mine sites). Wastewater produced from the laundry is treated in a two-tank secondary treatment system with unknown application area. The mining camp contains a small laundry for civilian clothes only. Upgrade of the existing systems servicing the recreational building is required to accommodate the proposed increase in accommodation capabilities.

The accommodation units accommodate four single person rooms with each room containing a toilet, shower and hand basin. Wastewater from the existing thirty accommodation units is gravity fed to an approximately 4,500L balance tank then pumped to eight SK-10 OZZI CLEAN secondary treatment wastewater units. Each unit is capable of treating 2,000L/day. The treated wastewater is disposed via surface irrigation to the land east of the secondary treatment tanks. An upgrade of the existing systems associated with the accommodation units is required to manage wastewater from the proposed additional units.

A site inspection and soil assessment was undertaken on 2 May 2011 when the mining accommodation facility was first proposed. The site was re-inspected on 2 May 2018 for the proposed additional accommodation units. This report describes the site and soil investigation and recommends a suitable effluent treatment and application system.

1.2 Scope

A site assessment and soil assessment was undertaken using the Australian Standard 1547:2012, *On-site domestic wastewater management*, the Environment and Health Protection Guidelines, *On-site sewage management for single households* (1998), Department of Urban Affairs and Planning and Department of Urban Affairs and Planning and NSW Health *Septic Tank and Collection Well Accreditation Guideline* as guidelines. Suitable wastewater application systems, sizing and location for the site are recommended.

3. Site identification

3.1 Location

The site is described as Lot 991 DP1029946 Barrier Highway Cobar NSW (Figure 1). The site has an area of approximately 28.15 hectares

3.2 Council area

Cobar Shire Council

3.3 Owner

Pybar Mining & Civil Contractors
1668-1670 Forest Road
Orange NSW 2800

3.4 Development
Proposed 20 additional accommodation units for an existing mining accommodation village. Existing on-site wastewater systems will require upgrades to accommodate the increase in proposed wastewater from the accommodation. Three wastewater sources and systems are proposed.

3.5 Current land-use
The current land-use is a mining accommodation village.

3.6 Local experience of on-site management systems
Three separate systems currently treat wastewater produced at the site. Wastewater from the toilets in the recreation room and kitchen within the recreation building is treated by a primary treatment tank and grease trap with treated wastewater applied to an absorption trench. The trench length is reportedly 40m in length and was upgraded in 2015.

Wastewater produced from the laundry is treated in a two-tank primary treatment system and irrigated in an application to the west of the main building. The application area was unable to be identified.

Wastewater from the existing thirty accommodation units is gravity fed to an approximate 4,500L balance tank then pumped to eight SK-10 secondary treatment wastewater units. The treated wastewater is disposed of via surface irrigation to the land east of the secondary treatment tanks. The wastewater application area is failing due to poor irrigation management and inadequate disposal area size.

4. Site condition and surrounding environment
An assessment of the site was made from a desktop study and two separate field inspections (2011 and 2018). Information for the desktop study was obtained from topographic maps, aerial photographs and database searches.

At the time of the investigation surrounding land-use consisted of native vegetation.

4.1 Topography
The site is a lower slope with a gentle inclination of up to 1% and a predominant westerly aspect.

4.2 Climate
Summers are hot and winters are cool with lower levels of evaporation. Rainfall is distributed evenly throughout the year with an average annual rainfall of 353mm and pan evaporation of 2,403mm (Bureau of Meteorology, Cobar).

4.3 Hydrogeology
4.3.1 Surface water
No dams or drainage lines were identified on the site. Surface water flows on the site are expected to infiltrate or flow into an intermittent drainage line located at greater than 400m south west.

4.3.2 Groundwater
A search of the DPI groundwater database identified no bores within 1km if the site.

4.4 Vegetation
Surface cover on the site consisted of native shrubs and trees including mulga and bimble box.

4.5 Soil type and geology

Geology in the area comprises quartz sandstones, conglomerates and siltstones, shales, phyllites and cherts (Brunker RJ 1967).

5 Investigation methods

A site inspection was undertaken on the 2 May 2012 and 2018. The soil assessment was conducted in 2012. The surface and sub-surface conditions on the site was described from boreholes constructed with a truck mounted drilling rig fitted with an auger. Six boreholes were constructed to a depth of 1.5m or drill refusal due to rock. Figure 1 describes borehole location.

The soil profile was described and samples were collected from all boreholes at representative depths for the determination of physical and chemical properties. Soil physical and chemical properties measurements undertaken included: dispersion, texture, colour, pH and electrical conductivity (salinity). The tests were undertaken by Envirowest Testing Services and presented as Table 4.

Soil electrical conductivity (EC) results of the 1:5 (soil:water suspension) were converted to saturated extracts (ECe). EC values are converted to ECe by using a multiplier factor (Hazelton and Murphy 1992), which is dependent on the soil texture (Table 1). Saline soils are defined as those with an electrical conductivity (ECe) greater than 4 dS/m (Charman and Murphy 2001). Soil salinity ratings and effects on plant growth are presented in Table 2.

Table 1. ECe texture based conversion factors (Charman and Murphy 2001)

Soil texture	Conversion factor
Loamy sand, clayey sand, sand	23
Sandy loam, fine sandy loam, light sandy clay loam	14
Loam, loam fine sandy, silt loam, sandy clay loam	9.5
Clay loam, silty clay loam, fine sandy clay loam	8.6
Sandy clay, silty clay, light clay	7.5
Light medium clay, medium clay, heavy clay	5.8

Table 2. Soil salinity ratings based on ECe readings

Salinity rating	ECe (dS/m)*	Effects on Plants
Non saline (NS)	0-2	Salinity effects negligible
Slightly saline (SS)	2-4	Very salt sensitive plant growth restricted
Moderately saline (MS)	4-8	Salt sensitive plant growth restricted
Highly saline (HS)	8-16	Only salt tolerant plants unaffected
Extremely saline (ES)	>16	Only extremely tolerant plants unaffected

*ECe - Electrical conductivity of a saturated extract

Soil with ECe below 2 dS/m will have negligible effects on plant growth and soil stability. Soil with ECe of between 2 and 4 dS/m may restrict very salt sensitive plant growth. Soil with ECe between 4 and 8 dS/m will restrict the growth of salt sensitive plants.

Samples collected were analysed for dispersion using the Emerson aggregate test. Table 3 details the eight dispersion ratings.

Table 3. Emerson dispersion classes

Class	Description
1	Highly dispersive (slakes, complete dispersion)
2	Moderately dispersive, slakes, some dispersion
3	Slightly dispersive, slakes, some dispersion after remoulding
4	Non-dispersive, slakes, carbonate or gypsum present
5	Non-dispersive, slakes, dispersion in shaken suspension
6	Non-dispersive, slakes, flocculates in shaken suspension
7	Non-dispersive, no slaking, swells in water
8	Non-dispersive, no slaking, does not swell in water

6 Results

6.1 Soil

Description of soil over the site is described in the following sections and summarised in Table 4.

6.1.1 Soil profile

Topsoil on the site comprised red sandy clay loam.

Subsoil was generally yellowish brown to reddish yellow sandy clay and sandy clay loam to clayey sand.

Depth (mm)	Description/date constructed	Sampled (X)	Texture group	Moisture	Emerson aggregate test*	pH (1:5 water)	ECe dS/m
Test hole 1							
0-100	Yellowish red sandy clay loam	X	SCL	M	3	5.7	0.48
100-500	Yellowish brown sandy clay loam with gravel	X	SCL	M	5	7.4	2.09
500-1200	Reddish yellow clayey sand with coarse gravel		CS	M			
1200	End of hole, drill refusal						
Test hole 2							
0-100	Yellowish red fine sandy clay loam with gravel	X	FSCL	M	5	6.1	3.18
100-400	Yellowish brown sandy clay loam with gravel		SCL	D			
400-1000	Reddish yellow clayey sand with gravel	X	CS	D	-	8.0	11.73
1000-1200	White extremely weathered rock			D			
1200	End of hole						
Test hole 3							
0-100	Yellowish red fine sandy clay loam		FSCL	M			
100-300	Yellowish brown sandy gravel		SG	D			
300-900	Reddish yellow gravelly sandy clay	X	GSC	D	3	6.8	1.95
900	End of hole						
Test hole 4							
0-100	Red silty loam	X	ZL	M	5	5.1	0.86
100-300	Yellowish brown sandy gravel		SG	D			
300-900	Strong brown gravelly loam	X	GL	D	5	6.9	5.70
900	End of hole						
Test hole 5							
0-100	Yellowish red fine sandy loam	X	FSL	M	3	5.5	2.38
100-300	Yellowish brown sandy gravel		SG	D			
300-900	Yellowish red gravelly loam	X	GL	D	3	5.8	1.52
900	End of hole						
Test hole 6							
0-100	Yellowish red fine sandy loam		FSL	M			
100-300	Yellowish brown sandy gravel		SG	D			
300-900	Yellowish red gravelly loam		GL	D			
900	End of hole						

M=Moist, D=Dry *1= highly dispersive (slakes, complete dispersion), 2= moderately dispersive (slakes, some dispersion), 3= slightly dispersive (slakes, some dispersion after remoulding), 4= non-dispersive (slakes, carbonate or gypsum present), 5= non-dispersive (slakes, dispersion in shaken suspension) 6= non-dispersive (slakes, flocculates in shaken suspension), 7= non-dispersive (no slaking, swells in water), 8= non-dispersive (no slaking, does not swell in water).

6.1.2 Depth to bedrock
Bedrock was greater than the drilling depth of 0.9m.

6.1.3 Surface rocks, rock outcrops
Scattered shale was identified on surface.

6.1.4 Depth to groundwater
Boreholes were constructed to 0.9m or 1.2m over the site. Shallow groundwater was not observed in any of the boreholes constructed. Indicators of historic shallow groundwater including mottles were not identified in the boreholes.

6.1.5 Coarse fragments
Gravel and sand were observed in the soil profile. The gravel is not a limitation to the application of effluent.

6.1.6 Bulk density
Bulk density was estimated to be moderate to high from field assessment and the land-use history. Bulk density will not limit plant growth. The soil has not been extensively cultivated and no clay pans are located on the site.

6.1.7 pH
The pH was satisfactory in all samples tested and is within the optimum range for plant growth of 4.5 to 8.5. The levels present will not significantly affect the growth of most species. The pH is in the desirable range for plant growth.

6.1.8 Salinity
No salt tolerant vegetation was observed on the site. The electrical conductivity of the soil samples tested in each borehole predominantly ranged from non-saline to moderately saline. One sample collected from borehole 2 at 0.6m was moderately saline.

6.1.8.1 Indicators of salinity
Bare soil
Surface cover was patchy with bare areas across the site.

Salt crystals
No salt crystals were present on site at the time of inspection.

Vegetation indicators
No highly salt tolerant plant species are present on site. Patches of mulga are sparsely located on the site within bare areas of soil and gravel.

Die back
No die back was observed on or surrounding the site.

Effects on buildings
No staining, corrosion or rising damp observed.

Conditions of roads
No evidence of surface undulations or break-up of bitumen on the roads surrounding the site.

6.1.9 Phosphorus sorption
The level of phosphorus sorption in the subsoil was estimated to be 5,000kg/ha. This is in the low range.

Phosphorous sorption of the soil is a limitation to application of effluent. The effluent system will be designed to contain phosphorus within the application area.

6.1.10 Nutrient balance
Nitrogen will be utilised by plant growth and denitrified or absorbed in the soil. The soil has capacity to support active vegetation which will contain nitrogen in the application area.

6.1.11 Cation exchange capacity (CEC)
The CEC is estimated to be low to moderate from the soil types observed on the site. The level of exchangeable cations can be directly related to plant performance and soil characteristics. The levels of exchangeable cations affect soil fertility and stability. The application of nitrogen and phosphorus in the effluent will provide nutrients for plant growth that are naturally deficient in the soil. The soil will provide adequate retention of nutrients for plant growth.

6.1.12 Dispersion
Dispersion was estimated by soil analysis of the Emerson aggregate test. The soil samples were found to be slightly dispersive to non-dispersive.

Soil dispersion can result in soil crushing. The maintenance of vegetation on the application area and the regular application of gypsum will prevent any reduction in infiltration or erosion problems associated with the slightly too moderately dispersive soils. The periodic application of gypsum is recommended.

6.1.13 Soil structure
The soils were assessed to have a moderate soil structure.

7. On-site effluent management
7.1 Slope
Slope is a limitation to application of effluent. Steep slopes can cause greater run-off during wet weather. The application of effluent from absorption trench systems is limited to slopes of 15% or less and for sub-surface irrigation systems of 30% or less. Application area location and system selection prevent slope from limiting the application of effluent on the site. Slopes within the recommended application area are less than 1% and will not be a limitation to any proposed system on site.

7.2 Buffer distances for drainage lines and dams
The proximity of drainage lines and dams restrict the area available for the application of effluent. Application areas need to be a minimum of 40m from drainage lines and dams. No drainage lines or dams were identified within 40m of the recommended application area.

7.3 Buffer distances for bores
The recommended buffer distance for on-site effluent management systems to groundwater bores is 15 to 50m. No bores were identified within 50m of the application area.

7.4 Rock outcrops
Scattered shale was identified on surface.

7.5 Shallow bedrock
Drill refusal on was not encountered at the borehole locations.

7.6 Shading by trees
Site exposure is high. Trees have the potential to impact the application area if not maintained.

7.7 Dispersive soil
The soil was found to be slightly dispersive to non-dispersive. Soil dispersiveness is not a limitation for irrigation systems. The regular application of gypsum is recommended to reduce soil dispersion in the application areas.

7.8 Environmental concerns

Native Plants	None of significance
High water table	Nil
Community water storage	None nearby
Waterway/wetland	None nearby

7.9 Distances to boundary premises, driveways and dwellings
A buffer distance of greater than 20m from boundaries and greater than 6m from buildings and driveways is available and considered sufficient to prevent off-site movement of effluent.

7.10 Available area and reserve area
Approximately 6ha is available for effluent irrigation (Appendix 1). This provides sufficient area for effluent application.

8. Effluent design
8.1 Estimated flows
Three wastewater streams will be produced on-site. The grey wastewater from the small laundry and the kitchen will be treated separately to the septic wastewater from the toilets in the recreational building. The wastewater from the proposed 50 accommodation units will be sourced from amenities within each unit including a toilet, shower and hand basin.

8.1.1 Recreation room
The recreation building has amenities including a kitchen, toilets and small laundry with standard water reduction fixtures including dual flush toilets, aerator faucets fitted to taps and water-conserving automatic washing machines.

The recreation room is proposed to cater for 199 people twice a day (morning and evening meals).

8.1.1.1 Recreation room toilets
Flow rates for the **toilets** in the recreation room are expected to be 9 litres/person/day with an expected usage of 25% equating to **450 litres/day**.

8.1.1.2 Kitchen

Kitchen flow rates are based on flows of 2 litre/person/day and a dishwasher allowance of 1,550 litres per 100 people. Flow rates per day are:

- 199 people x 2 litres/person/day=398 litres/day
- 1,550 litres x 2= 3,100 litres/day
- Total expected wastewater flows from kitchen is 3,498 litres/day

The total wastewater flows to the septic situated to the north of the recreation is **3,498 litres/day**. The application area is currently serviced by a 40m trench.

8.1.3 Laundry

Flow rates for the **laundry** in the recreation room are expected to be 27 litres/person/day with expected use of 5% equating to **270 litres/day**. Usage is expected to be low as only civilian clothes will be washed with restricted washing hours due to work schedules and most site users will bring sufficient civilian clothes for duration they are on-site.

8.1.4 Accommodation units

The accommodation units each have amenities including a toilet, shower and hand basin with standard water reduction fixtures including dual flush toilets, shower-flow restrictors and aerator faucets fitted to taps.

The units will accommodate a maximum of four people per unit (except for one unit accommodating a maximum of 3 people). With a proposed total of 50 units, the capacity of the accommodation units is 199 people. Flow rates are estimated to be 100 litres litres/person/day equating to 19,900 litres/day. **Flow rates for the accommodation units per day is 199 people x 100litres/person/day =19,900 litres/day.**

8.2 Hydraulic balance calculations and nutrient balance

The interactions between soil, climate, topography and the hydraulic and nutrient loadings were modelled based on the design in DUAP (1998). The model provides estimates consistent with more complex models and meets environmental performance objectives.

The parameters used in the model were as follows:

- Wastewater flow from the laundry: 270 litres/day
- Wastewater flow from the recreation room/ kitchen: 3,948 litres/day
- Wastewater flow from the accommodation units: 19,900 litres/day
- Estimated absorption rate of clay loam soils for surface or subsurface irrigation systems is 3.6mm/day for secondary treatment systems
- Estimated absorption rate of clay loam soils for subsurface irrigation systems is 10mm/day for primary treatment systems
- Phosphorus sorption of 5,000kg/ha
- Rainfall data for Cobar: 353mm/year
- Evaporation data for Cobar: 2403.3mm/year

The estimated area required and the wet weather storage requirements are summarised below and in Appendix 3.

Summary table and site limitations

	Absorption trench	Irrigation area	Area
Recreation room/kitchen	Long trench length	Nitrogen	Trench 270m
	Difficulty in getting even wastewater distribution	Retro fit of current system	Irrigation area 3,934m^2
Laundry	Retro fit of current system	Nitrogen	Irrigation area 269m^2
	Cost		
Accommodation units	Retro fit of current system	Nitrogen	Irrigation area 19,900m^2
	Long trench length		
	Cost		

8.3 System recommendation

Based on the site and soil limitations, practicality and cost considerations the following recommendations are made for the treatment and application of effluent. The site has suitable area for on-site effluent application systems after considering the site limitations.

The recommended systems are;

Recreation room and kitchen

- **Design flows for the recreational room and kitchen are based on 3,948 litres/day**
- **Absorption or evapotranspiration absorption trench with a length of 270 metres.** The effluent is currently serviced by a reportedly 40m trench that was constructed in 2015. Additional trench length of 230m will be required. The recommended trench width is 0.6m, with a maximum depth of 0.6m, covered by 0.15m of topsoil. Effluent water needs to be evenly distributed across the trench length by use of a holding tank which will automatically and systematically dose wastewater to trench segments. To ensure even water distribution across the entire trench length, trench segments should not exceed 50m and should be a minimum of 1m apart.

- **Treatment system** with a capacity to treat 3,000L per day. The existing treatment tanks are expected to be suitable for continued use following routine maintenance and desludging.

- **Grease trap** to treat wastewater sourced from the kitchen.

OR

- **Surface irrigation with an irrigation area of 3,934 square metres.** The wastewater will be irrigated to lawn or pasture. The wastewater should flow through a dedicated wastewater irrigation line.

- **Secondary wastewater treatment system** accredited by NSW Health with capacity to treat a minimum of 3,948L per day.

Laundry

- **Design flows for the laundry are based on 270 litres/day**
- **Surface or sub-surface irrigation with an irrigation area of 269 square metres.** The wastewater will be irrigated to lawn or pasture. The wastewater should flow through a dedicated wastewater irrigation line.

- **Secondary wastewater treatment system** accredited by NSW Health with capacity to treat a minimum of 300L per day. The existing treatment tanks are expected to be suitable for continued use following routine maintenance and desludging.

Accommodation units

- **Design flows for the accommodation units are based on 19,900 litres/day**
- **Surface irrigation with an irrigation area of 19,900 square metres.** The wastewater will be irrigated to lawn or pasture. The wastewater should flow through a dedicated wastewater irrigation line.

- **Secondary wastewater treatment system** accredited by NSW Health with capacity to treat a minimum of 19,900L per day. The irrigation area should be managed to prevent damage to surface pipes or the pipes buried.

    - The current treatment system comprises a 4,500 litre balance tank that feeds 8 separate SK-10 units that are capable of treating up to 2,000 litres per day. The 8 SK-10 units service one application area.

    - The proposed system will require an additional 4,500 litre balance tank, two 3,500 litre holding tanks and two additional SK-10 units. A pump and dosing system will be required from the holding tanks to ensure even distribution of wastewater to the SK-10 units from the holding tanks. This will ensure rotation of wastewater to the application area.

8.4 System management

Stormwater diversion systems should be installed to divert clean stormwater flows around the application area.

Secondary treatment systems require regular maintenance to ensure effective operation. Maintenance scheduling should be undertaken in accordance with manufacturers and NSW Health guidelines.

Wastewater should be evenly applied over the application area. Holding tanks may be required to dose systems at periods of peak flows.

Warning signage and fencing should be erected around the application area to restrict access.

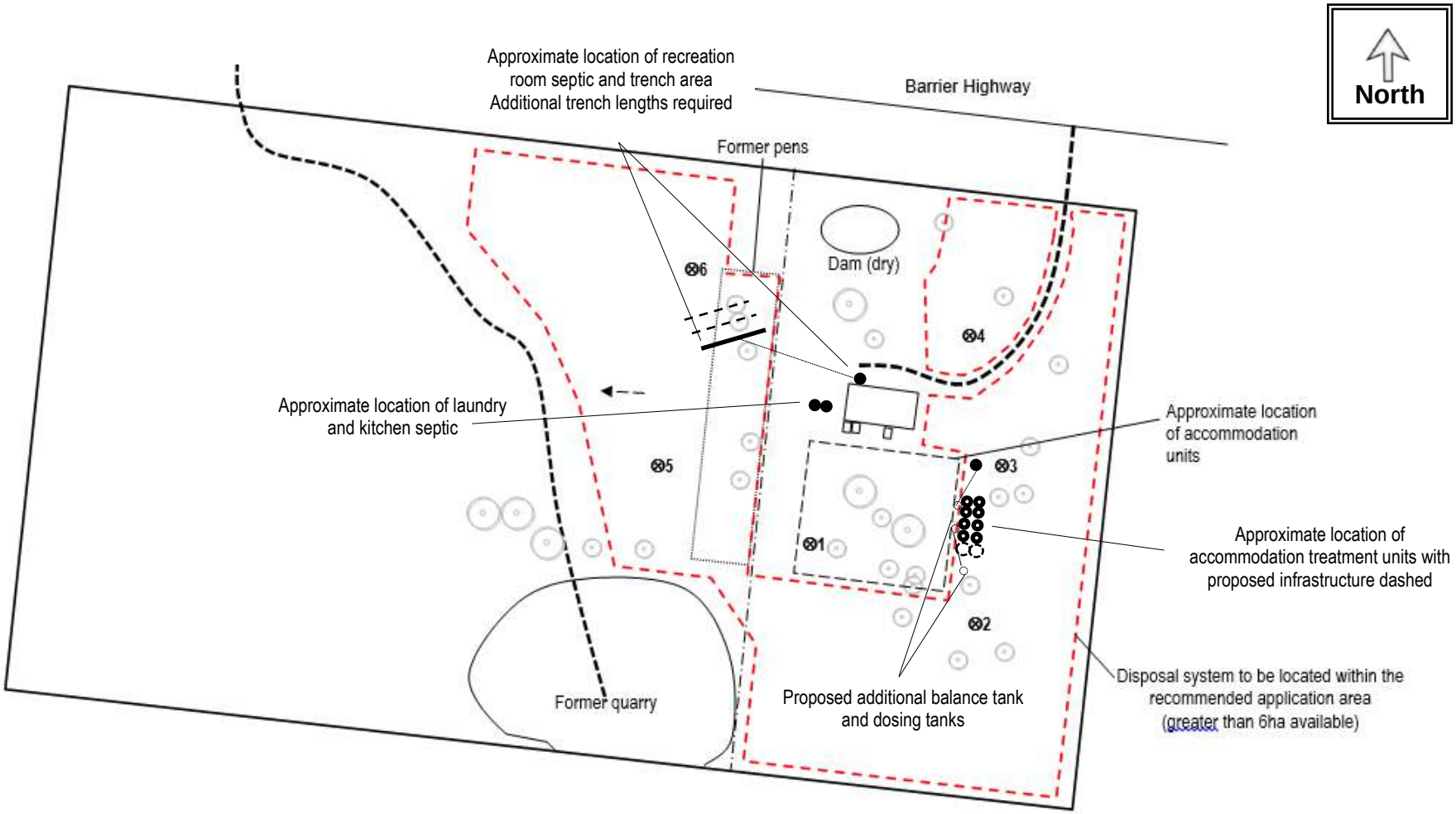
The application area should be restricted access to people and stock as recommended in AS1547:2012 and summarised in Appendix 4.

A maintained grass sward is the recommended vegetation over the irrigation area. Appendix 4 is a checklist of do's and don'ts to ensure correct operation of the wastewater system. Periodic application of gypsum is recommended.

Construction and maintenance of systems should comply with AS/NZ 1547:2012.

9. Report limitations and intellectual property

This report has been prepared for the use of the client to achieve the objectives given the clients requirements. The Australian Standard 1547:2012, *On-site domestic wastewater management*, and the Environment and Health Protection Guidelines, *On-site sewage management for single households* (1998) Department of Urban Affairs and Planning, have been used as guidelines in this report. Where system limitations or uncertainties are known, they are identified in the report. No liability can be accepted for failure to identify conditions or issues which arise in the future and which could not reasonably have been predicted using the scope of the investigation and the information obtained. No guarantee can be made that the wastewater system will achieve all performance criteria because of operational factors and the inherent variable and unpredictable nature of the soil. All components of the wastewater system have a limited life.



Legend

- ⊗ Borehole
- Slope
- ● Current septics/ balance tank
- Tree
- Fence
- ◌ Proposed infrastructure
- Track
- O OZI CLEAN units
- Recommended application area (greater than 6ha available)

Approximate Scale 1: 3700

0 37 74 148m

Appendix 1. Site plan and borehole location		
Lot 991 DP10299646 Barrier Highway, Cobar NSW		
	Envirowest Consulting Pty Ltd	
Job: R12139e	Drawn by: LD	Date: 7/06/2018

Appendix 2. Photographs of the recommended application area

Treatment tank for recreational room

Treatment tank for laundry

Balance tank. SK-10 units in background

Pooling of effluent in application area for accom units

Application area from accommodation

Reported location of trench for kitchen and recreation room. Vegetation maintenance required

Appendix 3a. Monthly water balance to determine the wastewater application area required **(trench) (Rec room/kitchen)**

Design wastewater flow	Q	L/day	3948		0	persons
Design percolation rate	R	mm/wk	70	10	mm/day	
Land area	L	m^2	270			
Effective precipitation	EP		0.9	(10% runoff)		

Parameter	**Symbol**	**Formula**	**Units**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**total**
days in month	D		days	31	28	31	30	31	30	31	31	30	31	30	31	365
Precipitation	P		mm/month	32	35	30	26	28	31	23	29	23	30	29	36	353
Evaporation	E		mm/month	368.9	277.2	251.1	159	96.1	63	71.3	105.4	162	226.3	282	341	2403.3
Crop factor	C		-	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	10.8
Inputs																
Effective Precipitation	EP		mm/month	29.16	31.41	27.27	23.13	25.2	28.08	20.7	26.46	20.7	27	26.46	32.04	317.61
Effluent irrigation	W	QXD/L	mm/month	453.3	409.4	453.3	438.7	453.3	438.7	453.3	453.3	438.7	453.3	438.7	453.3	5337.11
Inputs		P+W	mm/month	482.4	440.8	480.6	461.8	478.5	466.7	474.0	479.7	459.4	480.3	465.1	485.3	5654.72
Outputs																
Evaportranspiration	ET	ExC	mm/month	332.01	249.5	226.0	143.1	86.5	56.7	64.2	94.9	145.8	203.7	253.8	306.9	2163.0
Percolation	B	R/7xD	mm/month	310.0	280.0	310.0	300.0	310.0	300.0	310.0	310.0	300.0	310.0	300.0	310.0	3650.0
Outputs		ET+B	mm/month	642.0	529.5	536.0	443.1	396.5	356.7	374.2	404.9	445.8	513.7	553.8	616.9	5813.0
Storage	S	(EP+W)-(ET+B)	mm/month	-159.6	-88.6	-55.4	18.7	82.0	110.0	99.8	74.9	13.6	-33.4	-88.7	-131.6	
Cumulative storage	M		mm	0.0	0.0	0.0	18.7	100.7	210.7	310.6	385.5	399.0	365.6	277.0	145.4	

Storage	V	largest M	mm	399.0
		Soil storage	mm	368.0
		Storage required	mm	31.0
		VxL/1000	m^3	**8.4**
Application area			m^2	270
Trench length			m	**270.0**
Trench width			m	0.6

	water holding capacity	depth (mm)	Totals(mm)
Topsoil	34%	300	102
Subsoil	38%	700	266
			368

Appendix 3b. Monthly water balance determine the wastewater application area required **(irrigation systems) (Rec room/kitchen)**

Design wastewater flow	Q	L/day	23688	3948	L/person/day	6	persons
Design percolation rate	R	mm/wk	25.2	3.6	mm/day		
Land area	L	m2	2945				
Effective precipitation	EP		0.9	(10% runoff)			

Parameter	**Symbol**	**Formula**	**Units**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**total**
days in month	D		days	31	28	31	30	31	30	31	31	30	31	30	31	365
Precipitation	P		mm/month	32	35	30	26	28	31	23	29	23	30	29	36	353
Evaporation	E		mm/month	368.9	277.2	251.1	159	96.1	63	71.3	105.4	162	226.3	282	341	2403.3
Crop factor	C		-	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	10.8
Inputs																
Effective Precipitation	EP		mm/month	29.16	31.41	27.27	23.13	25.2	28.08	20.7	26.46	20.7	27	26.46	32.04	318
Effluent irrigation	W	QXD/L	mm/month	249.3	225.2	249.3	241.3	249.3	241.3	249.3	249.3	241.3	249.3	241.3	249.3	2936
Inputs		P+W	mm/month	278.5	256.6	276.6	264.4	274.5	269.4	270.0	275.8	262.0	276.3	267.8	281.4	3253
Outputs																
Evaportranspiration	ET	ExC	mm/month	332.01	249.5	226.0	143.1	86.5	56.7	64.2	94.9	145.8	203.7	253.8	306.9	2163
Percolation	B	R/7xD	mm/month	111.6	100.8	111.6	108.0	111.6	108.0	111.6	111.6	108.0	111.6	108.0	111.6	1314
Outputs		ET+B	mm/month	443.6	350.3	337.6	251.1	198.1	164.7	175.8	206.5	253.8	315.3	361.8	418.5	3477
Storage	S	(EP+W)-(ET+B)	mm/month	-165.1	-93.7	-61.0	13.3	76.5	104.7	94.3	69.3	8.2	-38.9	-94.0	-137.1	
Cumulative storage	M		mm	0.0	0.0	0.0	13.3	89.8	194.5	288.8	358.1	366.3	327.4	233.3	96.2	

Storage	V	largest M	mm	366.3
		Soil storage	mm	368.0
		Storage required	mm	-1.7
		VxL/1000	m^3	**-5.0**
Irrigation area			m^2	**2945**

	water holding capacity	depth (mm)	Totals(mm)
Topsoil	34%	300	102
Subsoil	38%	700	266
			368

Appendix 3c. Estimation area requirement from organic matter and nutrient balances **(Rec room/kitchen)**

Estimated effluent flow	(Q)	3948	L/day
Soil depth		1	m

Organic matter balance

BOD (C)	20	mg/L
treated wastewater flow rate (Q)	3948	L/day
critical loading rate of BOD (Lx)	3000	mg/m^2/day
land area required (A)	**26.3**	m^2

Nitrogen balance

nutrient concentration	37	mg/L
treated wastewater flow rate	3948	L/day
critical loading rate of nutrient	50	mg/m^2/day
land area required (A)	**2922**	m^2

Determination of nitrogen critical loading rate

Nitrogen load (kg/year)	53.3	kg/year			
Loss 20% denitrification	42.7	kg/year			
Load to soil	146.0	kg/ha/year	assumed irr. area	2922	m2
Vegetation usage	200.0	kg/ha/year	from table		
Residual (potential leaching)	-54.0	kg/ha/year			

Typical nitrogen uptake (Myers et al. 1984)		
Pastures	300 kg/ha/year	82 mg/m2/day
Pine	350 kg/ha/year	96 mg/m2/day
Eucalypts	180 kg/ha/year	49 mg/m2/day

Phosphorus balance

Phosphorus sorption capacity per metre=			5,000	kg/ha
Phosphorus sorption capacity of profile=			5,000	kg/ha
Soil factor			0.33	
Critical loading=		3 mg/m^2/day		
P concentation*=		12	mg/L	
P adsorbed=	phosphorus sorption capacity x soil factor			
	1650			
	0.165	kg/m^2		
Puptake=	critical loading x days/year x	50	years	
	54750			
	0.0548	kg/m^2		
Pgenerated=	total phosphorus concentration x wastewater volume in		50	years
	8.65E+08			
	865	kg		
	Pgenerated / (Padsorbed + Puptake)			
Land area required	**3934.5**	**m^2**		

Phosphorus sorption

High- 14,400 (900 mg/kg)
Medium- 9,600 (600 mg/kg)
Low- 4,800 (300 mg/kg)

Appendix 3d. Monthly water balance determine the wastewater application area required for **laundry (irrigation systems)**

Design wastewater flow	Q	L/day	270	270	L/person/day	1	persons
Design percolation rate	R	mm/wk	25.2	3.6	mm/day		
Land area	L	m2	34				
Effective precipitation	EP		0.9	(10% runoff)			

Parameter	**Symbol**	**Formula**	**Units**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**total**
days in month	D		days	31	28	31	30	31	30	31	31	30	31	30	31	365
Precipitation	P		mm/month	32	35	30	26	28	31	23	29	23	30	29	36	353
Evaporation	E		mm/month	368.9	277.2	251.1	159	96.1	63	71.3	105.4	162	226.3	282	341	2403.3
Crop factor	C		-	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	10.8
Inputs																
Effective Precipitation	EP		mm/month	29.16	31.41	27.27	23.13	25.2	28.08	20.7	26.46	20.7	27	26.46	32.04	318
Effluent irrigation	W	QXD/L	mm/month	246.2	222.4	246.2	238.2	246.2	238.2	246.2	246.2	238.2	246.2	238.2	246.2	2899
Inputs		P+W	mm/month	275.3	253.8	273.4	261.4	271.4	266.3	266.9	272.6	258.9	273.2	264.7	278.2	3216
Outputs																
Evaportranspiration	ET	ExC	mm/month	332.01	249.5	226.0	143.1	86.5	56.7	64.2	94.9	145.8	203.7	253.8	306.9	2163
Percolation	B	R/7xD	mm/month	111.6	100.8	111.6	108.0	111.6	108.0	111.6	111.6	108.0	111.6	108.0	111.6	1314
Outputs		ET+B	mm/month	443.6	350.3	337.6	251.1	198.1	164.7	175.8	206.5	253.8	315.3	361.8	418.5	3477
Storage	S	(EP+W)-(ET+B)	mm/month	-168.3	-96.5	-64.1	10.3	73.3	101.6	91.1	66.2	5.1	-42.1	-97.1	-140.3	
Cumulative storage	M		mm	0.0	0.0	0.0	10.3	83.6	185.2	276.3	342.5	347.6	305.5	208.4	68.1	

Storage	V	largest M	mm	347.6
		Soil storage	mm	368.0
		Storage required	mm	-20.4
		VxL/1000	m^3	**-0.7**
Irrigation area			m^2	**34**

	water holding capacity	depth (mm)	Totals(mm)
Topsoil	34%	300	102
Subsoil	38%	700	266
			368

Appendix 3e. Estimation area requirement from organic matter and nutrient balances **(laundry)**

Estimated effluent flow	(Q)	270	L/day
Soil depth		1	m

Organic matter balance

BOD (C)	20	mg/L
treated wastewater flow rate (Q)	270	L/day
critical loading rate of BOD (Lx)	3000	mg/m^2/day
land area required (A)	**1.8**	m^2

Nitrogen balance

nutrient concentration	37	mg/L
treated wastewater flow rate	270	L/day
critical loading rate of nutrient	50	mg/m^2/day
land area required (A)	**200**	m^2

Determination of nitrogen critical loading rate

Nitrogen load (kg/year)	3.6	kg/year			
Loss 20% denitrification	2.9	kg/year			
Load to soil	146.0	kg/ha/year	assumed irr. area	200	m2
Vegetation usage	200.0	kg/ha/year	from table		
Residual (potential leaching)	-54.0	kg/ha/year			

Typical nitrogen uptake (Myers et al. 1984)		
Pastures	300 kg/ha/year	82 mg/m2/day
Pine	350 kg/ha/year	96 mg/m2/day
Eucalypts	180 kg/ha/year	49 mg/m2/day

Phosphorus balance

Phosphorus sorption capacity per metre=			5,000	kg/ha
Phosphorus sorption capacity of profile=			5,000	kg/ha
Soil factor			0.33	
Critical loading=		3 mg/m^2/day		
P concentation*=		12	mg/L	
P adsorbed=	phosphorus sorption capacity x soil factor 1650			
	0.165	kg/m^2		
Puptake=	critical loading x days/year x 54750	50	years	
	0.0548	kg/m^2		
Pgenerated=	total phosphorus concentration x wastewater volume in 59130000		50	years
	59	kg		
	Pgenerated / (Padsorbed + Puptake)			
Land area required	**269.1**	**m^2**		

Phosphorus sorption

High- 14,400 (900 mg/kg)
Medium- 9,600 (600 mg/kg)
Low- 4,800 (300 mg/kg)

Appendix 3f. Monthly water balance determine the wastewater application area required **(irrigation systems) (accommodation)**

Design wastewater flow	Q	L/day	19900	100	L/person/day	199	persons
Design percolation rate	R	mm/wk	25.2	3.6	mm/day		
Land area	L	m2	2480				
Effective precipitation	EP		0.9	(10% runoff)			

Parameter	**Symbol**	**Formula**	**Units**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**total**
days in month	D		days	31	28	31	30	31	30	31	31	30	31	30	31	365
Precipitation	P		mm/month	32	35	30	26	28	31	23	29	23	30	29	36	353
Evaporation	E		mm/month	368.9	277.2	251.1	159	96.1	63	71.3	105.4	162	226.3	282	341	2403.3
Crop factor	C		-	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	10.8
Inputs																
Effective Precipitation	EP		mm/month	29.16	31.41	27.27	23.13	25.2	28.08	20.7	26.46	20.7	27	26.46	32.04	318
Effluent irrigation	W	QXD/L	mm/month	248.8	224.7	248.8	240.7	248.8	240.7	248.8	248.8	240.7	248.8	240.7	248.8	2929
Inputs		P+W	mm/month	277.9	256.1	276.0	263.9	274.0	268.8	269.5	275.2	261.4	275.8	267.2	280.8	3246
Outputs																
Evaportranspiration	ET	ExC	mm/month	332.01	249.5	226.0	143.1	86.5	56.7	64.2	94.9	145.8	203.7	253.8	306.9	2163
Percolation	B	R/7xD	mm/month	111.6	100.8	111.6	108.0	111.6	108.0	111.6	111.6	108.0	111.6	108.0	111.6	1314
Outputs		ET+B	mm/month	443.6	350.3	337.6	251.1	198.1	164.7	175.8	206.5	253.8	315.3	361.8	418.5	3477
Storage	S	(EP+W)-(ET+B)	mm/month	-165.7	-94.2	-61.6	12.8	75.9	104.1	93.7	68.8	7.6	-39.5	-94.6	-137.7	
Cumulative storage	M		mm	0.0	0.0	0.0	12.8	88.6	192.7	286.4	355.2	362.8	323.3	228.6	90.9	

Storage	V	largest M	mm	362.8
		Soil storage	mm	368.0
		Storage required	mm	-5.2
		VxL/1000	m^3	**-13.0**
Irrigation area			m^2	**2480**

	water holding capacity	depth (mm)	Totals(mm)
Topsoil	34%	300	102
Subsoil	38%	700	266
			368

Appendix 3g. Estimation area requirement from organic matter and nutrient balances **(accommodation)**

Estimated effluent flow	(Q)	19900	L/day
Soil depth		1	m

Organic matter balance

BOD (C)	20	mg/L
treated wastewater flow rate (Q)	19900	L/day
critical loading rate of BOD (Lx)	3000	mg/m^2/day
land area required (A)	**132.7**	m^2

Nitrogen balance

nutrient concentration	37	mg/L
treated wastewater flow rate	19900	L/day
critical loading rate of nutrient	50	mg/m^2/day
land area required (A)	**14726**	m^2

Determination of nitrogen critical loading rate

Nitrogen load (kg/year)	268.7	kg/year			
Loss 20% denitrification	215.0	kg/year			
Load to soil	146.0	kg/ha/year	assumed irr. area	14726	m2
Vegetation usage	200.0	kg/ha/year	from table		
Residual (potential leaching)	-54.0	kg/ha/year			

Typical nitrogen uptake (Myers et al. 1984)		
Pastures	300 kg/ha/year	82 mg/m2/day
Pine	350 kg/ha/year	96 mg/m2/day
Eucalypts	180 kg/ha/year	49 mg/m2/day

Phosphorus balance

Phosphorus sorption capacity per metre=			5,000	kg/ha
Phosphorus sorption capacity of profile=			5,000	kg/ha
Soil factor			0.33	
Critical loading=		3 mg/m^2/day		
P concentation*=		12	mg/L	
P adsorbed=	phosphorus sorption capacity x soil factor			
	1650			
	0.165	kg/m^2		
Puptake=	critical loading x days/year x	50	years	
	54750			
	0.0548	kg/m^2		
Pgenerated=	total phosphorus concentration x wastewater volume in		50	years
	4.36E+09			
	4358	kg		
	Pgenerated / (Padsorbed + Puptake)			
Land area required	**19832.1**	**m^2**		

Phosphorus sorption

High- 14,400 (900 mg/kg)
Medium- 9,600 (600 mg/kg)
Low- 4,800 (300 mg/kg)

Appendix 4. Checklist for effective management of wastewater systems

Wastewater system

DO

- Check household products for suitability of use with a septic tank.
- Conserve water, prolonged period of high water use can lead to application area failure. For optimum operation, avoid daily and weekly surges in water flows. Spas are not recommended.
- Scrape cooking dishes and plates prior to washing to reduce solid load.
- Maintain the system with regular servicing as per the manufacturer's instructions.

DON'T

- Dispose of excessive solid material, fats, lint or large water volumes into drains.

Land application area

- Construct and maintain diversion drains around the top-side of the application area to divert surface water.
- The application area should be a grassed area, which is maintained at 10-30cm height.
- The area around the perimeter can be planted with small shrubs to aid transpiration of the wastewater.
- Ensure run-off from the roof or driveway is directed away from the application area.
- Periodic application of gypsum may be necessary to maintain the absorptive capacity of the soil.
- **Don't** erect any structures or paths on the land application area.
- **Don't** graze animals on the land application area.
- **Don't** drive over the land application area.
- **Don't** plant large trees that shade the land application area thereby reducing transpiration of water.
- **Don't** let children or pets play on the land application area.
- **Don't** extract untreated groundwater for potable use.

Appendix B

UPDATED AHIMS SEARCH RESULT

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Cobar Mining Camp

Client Service ID : 345117

Claire Mcqueeney

154 Peisley Street
Orange New South Wales 2800

Attention: Claire Mcqueeney

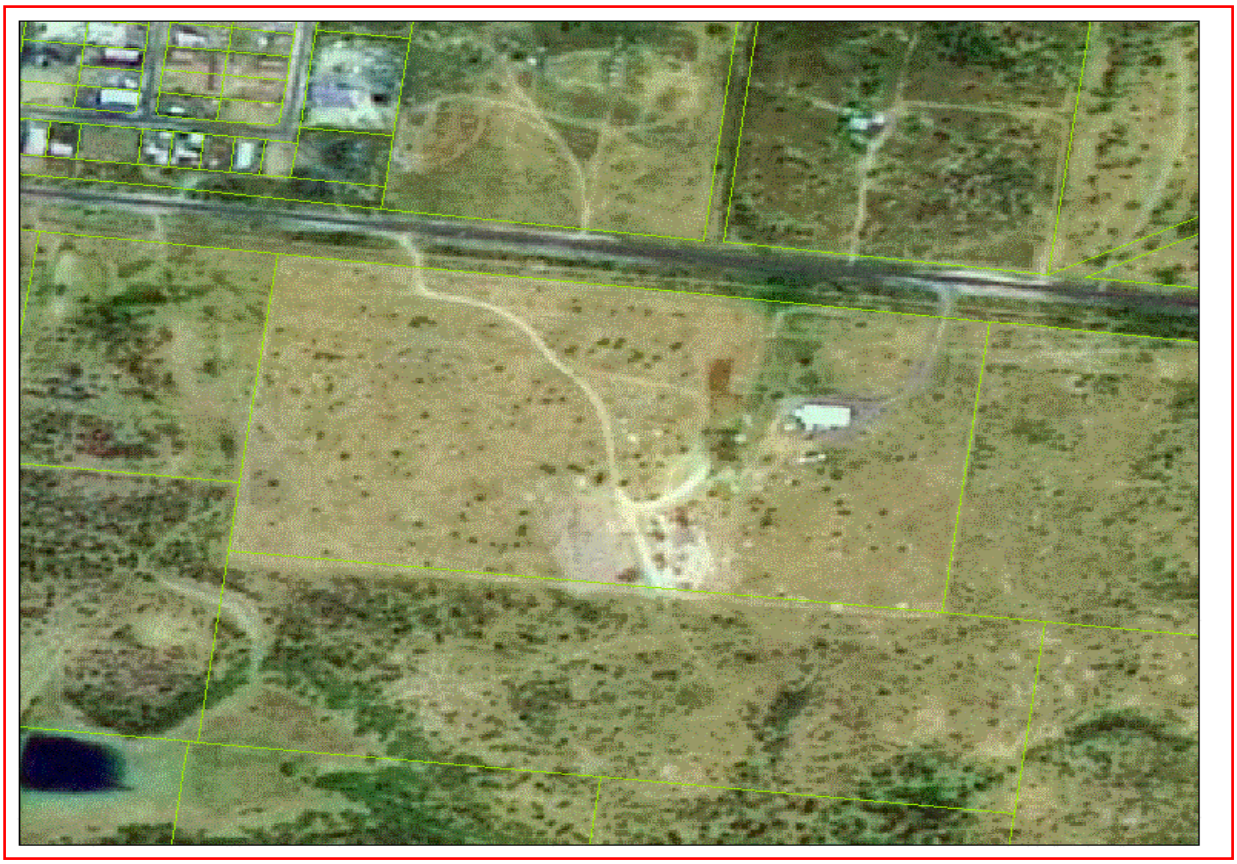
Email: cmcqueeney@geolyse.com

Date: 15 May 2018

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 991, DP:DP1029946 with a Buffer of 200 meters, conducted by Claire Mcqueeney on 15 May 2018.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

Appendix C

CONTAMINATION ASSESSMENT

Preliminary contamination investigation
Former Western Plains Meats abattoir
Lot 991 Barrier Highway, Cobar NSW

Ref: R12139c
Date: 14 May 2012

Envirowest Consulting *Pty Ltd* ABN 18 103 955 246
• 24 William Street, PO Box 8158, Orange NSW 2800 • Tel (02) 6361 4954 •
• Fax (02) 6360 3960 • Email ec@envirowest.net.au • Web www.envirowest.net.au •

Environmental
Geotechnical
Hygienist
Services

Prepared by:	Envirowest Consulting Pty Ltd 24 William Street Orange NSW 2800
Client:	Pybar Mining & Civil Contractors c/- Geolyse Pty Ltd PO Box 1963 Orange NSW 2800
Investigator:	Andrew Ruming BSc Environmental Geologist
Checked by:	Greg Madafiglio CPSS Senior Soil Scientist
Authorised by:	Greg Madafiglio CPSS Senior Soil Scientist
Interested authorities:	Cobar Shire Council
Report Number:	R12139c
Date:	14 May 2012

Executive summary

Background

A new mining accommodation village is proposed for Lot 991 Barrier Highway, Cobar NSW. The village will consist of up to 30 new accommodation modules each with 4 single bedrooms units.

The site was formerly Western Plains Meats abattoir which comprised a processing factory building, holding yards and associated infrastructure. Western Plains Meats abattoir ceased operation in late 2011.

Previous land-use may have resulted in contamination of the site. An investigation of the site is required to determine the soil contamination status, suitability for residential land-use.

Objectives of the investigation

A preliminary site investigation was conducted in accordance with the contaminated land management planning guidelines State Environmental Planning Policy No. 55 (SEPP 55) to determine the soil contamination status.

Investigation

Site inspections were undertaken on 2 and 3 May 2012. Lot 991 has a total area of 28.5 hectares. The investigation area was separated into two main areas. The primary investigation area was the 5 hectare area surrounding the existing building, including a dam located 100m north of the building and the potential locations of the accommodation units. The primary investigation area has an area of approximately 5 hectares. The secondary investigation area was the remainder of the site (23.5 hectares)

The site is the Former Western Plains Meats abattoir which contains a disused abattoir and meat processing building with amenities including toilets, showers, kitchen and washing areas. The site operated as a pet meat abattoir from 2001 to 2011. Prior land-use is unknown but expected to be agricultural.

The redevelopment will be undertaken of the existing building into a kitchen and recreation area for occupants of the accommodation units at the mining village.

A desktop study was undertaken to obtain information of historical land uses. A visual inspection, soil sampling and laboratory analysis program was undertaken for the preliminary investigation.

Boreholes were constructed up to a depth of 4m over the primary investigation area and the profile described. Soil samples were collected from the 0-100mm depth for analysis of BTEXN (benzene, toluene, ethyl benzene, xylene, naphthalene, TPH (C6-C36), arsenic, cadmium, chromium, copper, lead, nickel and zinc.

Four areas of potential contamination were detected in the primary investigation area:

- The area surrounding the existing building
- The possible locations of the accommodation units
- The dam located 100m of the existing building
- A small fill stockpile located 200m south of the building

The remainder of the site (secondary investigation area) was assessed by a walkover and visual inspection. No soil samples were collected for analysis from the secondary investigation area.

Conclusions

No evidence of contamination was identified in the soil from the boreholes. The soil sampling program did not detect elevated levels of the analysed contaminants. The levels of all analytes evaluated were either not detected or below the residential and sensitive land-use thresholds. In conclusion, no contamination was identified in the primary investigation area.

Several waste stockpiles were located in the secondary investigation area. The stockpiles included car bodies, metal scrap, residual building waste, bitumen and wire which is general solid waste. A former quarry was also identified in the area which also contained small fill stockpiles.

Recommendations

No further investigation is necessary and the investigation area is suitable for residential activities.

The waste stockpiles on the site require disposal to a landfill licenced to accept general solid waste.

Contents

page

1. Introduction

A redevelopment of the former Western Plains Meats abattoir at Lot 991 Barrier Highway, Cobar NSW is proposed. The proposed land-use is a mining accommodation village. Previous land-use may have resulted in contamination of the site. An investigation of the site is required to determine the soil contamination status and suitability for residential land-use.

2. Scope of work

Envirowest Consulting Pty Ltd was commissioned by Geolyse Pty Ltd on behalf of Pybar Mining & Civil Contractors to undertake a preliminary contamination investigation, in accordance with the contaminated land management planning guidelines, from the *Contaminated Land Management Act 1997* and the *State Environmental Policy No. 55 (SEPP 55)*, of the former abattoir , Lot 991 Barrier Highway, Cobar NSW. The objective was to identify past potentially contaminating activities, identify potential contamination types, discuss the site condition, provide a detailed assessment of site contamination and assess the need for further investigation.

3. Site identification

Address	Lot 991 Barrier Highway Cobar NSW
Client	Pybar Mining Contractors and Geolyse Pty Ltd
Deposited plans	Lot 991 DP1029946
Australian Map Grid	Zone 55J, E391797m, N6514112m
Locality map	Figure 1
Aerial photograph	Figure 2
Site plan	Figure 3
Photographs	Figure 4
Assessment area	Approximately 5 hectares. The area surrounding the existing building and the location of the proposed accommodation units.

4. Site history

4.1 Zoning

The site is zoned as 1a – General Rural under the Cobar Shire Local Environmental Plan 2001. The site zone under the Cobar Shire Draft Local Environmental Plan 2011 is RU1 – Primary Production.

4.1 Site visit and description

Site inspections and soil sampling were conducted on 2 and 3 May 2012. The site is located on Lot 991 Barrier Highway, Cobar NSW and is a former pet meat processing building, former livestock holding pens and associated infrastructure. The site is approximately 1km out of the town of Cobar in a rural area.

4.3 Land-use

The existing building on the site is currently vacant. A site caretaker accommodates at the site in temporary storage units. No livestock were located in the holding pens.

4.4 Summary of council records

None known.

4.5 Sources of information for historical review and site description

- Information from Pybar Employee, Lindsay Hawke
- Information from site caretaker
- Site inspection 2 and 3 May 2012 by Andrew Ruming of Envirowest Consulting
- Cobar 1:250,000 Geological Sheet
- Aerial photograph 2010
- NSW Office of Environment and Heritage (OEH) records of public notices under the CLM Act 1997
- Cobar Regional Council LEP 2001

4.6 Chronological list of site uses

The building on the site was constructed in 2001 and extended in 2006. The building was used as a kangaroo, goat and ostrich abattoir and meat processing plant until closure in late 2011. The processing plant traded as Western Plains Meats under proprietors FS and GC Carne Pty Ltd. Products included pet meat for domestic and export use. Livestock pens are located to the west of the building. The pens were used to contain goats prior to processing. The remainder of the site is vacant. Few small to medium stockpiles of manure and woodchip stockpiles were observed on the site.

A caretaker is resident on the site in temporary storage units.

The land-use prior to 2001 is expected to be vacant. Several old waste stockpiles were located across the site. Waste material included bitumen, old toilets, iron, metal and old car bodies. A pit expected to be a former gravel quarry is located in the southern section of the site. The pit also contains waste material.

4.7 Buildings and infrastructure

The site contains a factory building which was formerly used as a meat processing plant. The building contains amenities such as washing facilities, bathrooms and a kitchen. Two on-site wastewater management systems are located on the site to manage wastewater from the building. The location and destination of the stormwater infrastructure is not known.

The site contains derelict steel livestock yards which were used in the former land-use processes.

4.8 Potential contaminants

The possible contaminants impacting on the site are from the form abattoir activities. The potential contaminants of concern are heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, zinc and mercury).

Petroleum hydrocarbon contamination is possible during the storage and maintenance of vehicles, fork lifts and other machinery on the site or machines traversing the site. Hydrocarbons from fuels and oils are detected by analytes of TPH (C6-C36) and BTEXN.

4.9 Relevant complaint history
None known.

4.10 Contaminated site register
The site is not listed on the NSW OEH register of contaminated sites.

4.11 Previous investigations
None known.

4.12 Historical use of adjacent land
North – Barrier Highway and rural land-use
South – Rural-residential land-use
East – Rural land-use
West – Rural land-use

No neighbouring land-uses have potential to impact on the contamination status of the site.

4.13 Integrity assessment
The information obtained is accurate as the review records have allowed. The information available is considered sufficient for the purpose of the assessment and believed to be correct by the investigator.

5. Site condition and environment
5.1 Surface cover
The site is characterised by open woodlands and woodlands of bimble box. The bimble box woodlands form communities with mulga. Patches of mulga are sparsely located on the site within bare areas of soil and gravel across gentle slopes of less than 1%. Surface water flows across the bare areas until captured by mulga patches.

5.2 Topography
The topography of the site is a lower slope with an inclination of 1% and westerly aspect.

5.3 Soils and geology
Natural soils from the boreholes constructed were yellowish red to red silty sand over brown, yellow brown and yellow clayey sand, gravelly sand and weathered rock subsoil to the drilling depth of 4 metres.

Erosion was observed due to surface flow over bare areas (sheet erosion).

The Cobar region contains a wide range of soil types. Sands, sandy earths and red earth soils are dominant in the upland areas. The footslopes and lower areas are predominantly colluvial and aeolian (wind deposited) sediments with alluvial sediments associated along streams (Brunker 1967).

The geology on the site is the Cobar Group slate, shale, sandstone and greywacke overlain by quaternary alluvium (Brunker 1967).

5.4 Hydrology
5.4.1 Surface water
Surface water flows west and north across the hard surface cover and into the dam near the existing building. The dam was dry at the time of inspection.

5.4.2 Groundwater

A search of the NSW Natural Resource Atlas located no bores within 1km of the site. Groundwater at the site is expected to be greater than 10m in depth.

5.5 Evidence of contamination checklist

Site layout showing industrial processes	Nil
Sewer and service plans	Underground services are located along the boundary and within the site. The site is not connected to municipal sewer.
Manufacturing processes	Former abattoir and pet meat processing plant located on the site
Underground tanks	None known
Product spills and loss history	None known
Discharges to land, water and air	None known
Disposal locations, presence of drums, wastes and fill materials	Several waste stockpiles are located on the site
Soil staining	Nil
Visible signs of plant stress, bare areas	No plant stress observed in vegetation. Bare areas prevalent due to surface water runoff and gravel hardpan areas inhibiting plant growth.
Odours	Nil
Ruins	Nil
Other	No evidence of mining disturbance was identified in the primary investigation area. A former gravel quarry is located in the southern section of the site.

6. Sampling analysis plan and sampling methodology

6.1. Sampling strategy

A systematic and judgemental sampling strategy was undertaken over the primary investigation area. The primary investigation area was separated into four areas based on land-use. The areas investigated were:

- The area surrounding the existing building
- The possible locations of the accommodation units
- The dam located 100m of the existing building
- A small fill stockpile located 200m south of the building

The secondary area was investigated by a site walkover and visual assessment. No soil samples were collected for analysis from the secondary investigation area.

6.1.1 Sampling design and location

6.1.1.1 Existing building

A systematic sampling strategy was undertaken over the surrounds of the existing building. Eight samples were collected on a 25m grid pattern at a depth of 0 to 100mm.

The samples were combines in groups of four and thoroughly mixed to form two composite samples (PC4 and PC5) for analysis. The samples collected are expected to be representative of the area. The samples were collected on 2 May 2012.

6.1.1.2 Accommodation unit sites

A systematic sampling strategy was undertaken over the area available for construction of the accommodation units. Boreholes were constructed to a depth of 4m in 12 locations. Twelve samples were collected from the boreholes at a depth of 0 to 100mm on a 50m grid pattern. The samples were combined in groups of four and thoroughly mixed to form three composite samples (PC1, PC2, PC3) for analysis. The subsoil (0.1m to 4m) from the boreholes was visually and olfactory assessed for evidence of contamination. The samples collected are expected to be representative of the area. The samples were collected on 2 May 2012.

6.1.1.3 Dam

A judgemental sampling strategy was undertaken at the dam site. One discrete sample (PC6) was collected from the dam base (centre of dam) a depth of 0 to 100mm. The samples were collected on 2 May 2012.

6.1.1.4 Fill stockpile

A judgemental sampling strategy was undertaken at the fill stockpile 200m south of the building. One discrete sample (PC7) was collected from centre of the fill stockpile at a depth of 0 to 100mm. The samples were collected on 2 May 2012.

6.1.2 Sampling density

The sampling density over the surrounds of the building can detect a potential hot spot with a diameter of 10.8m at a 95% level of confidence.

The sampling density over the unit sites can detect a potential hot spot with a diameter of 27m at a 95% level of confidence.

The number of sampling locations is less than the recommended density in the OEH sampling guidelines. However uniform management practices have been undertaken over the site and the soil sampling and laboratory analysis is considered indicative of the primary investigation site as a whole.

6.1.4 Sampling depths

Heavy metals are generally immobile in the soil, and unlikely to be leached from the topsoil. Any heavy metals present are expected to be contained in the 0-100mm soil layer which was the target sampling depth as soil disturbance has not occurred. Any other contaminants are expected to have been deposited to the surface of the soil which should contain the greatest level of any contaminant.

The sampling locations are described in Figure 3.

Schedule of samples collected for laboratory analysis is outlined in Table 1.

Table 1. Schedule of samples and analyses

Sample ID	Sample location (Figure 3)	Depth (mm)	Sample type	Analysis undertaken
PC1	Unit site (south of existing building)	100	Composite	As, Cd, Cr, Cu, Pb, Ni, Zn
PC2	Unit site (east of existing building)	100	Composite	As, Cd, Cr, Cu, Pb, Ni, Zn
PC3	Unit site (west of existing building)	100	Composite	As, Cd, Cr, Cu, Pb, Ni, Zn
PC4	Existing building surrounds	100	Composite	TPH, BTEXN, As, Cd, Cr, Cu, Pb, Ni, Zn
PC5	Existing building surrounds	100	Composite	TPH, BTEXN, As, Cd, Cr, Cu, Pb, Ni, Zn
PC6	Dam	100	Discrete	As, Cd, Cr, Cu, Pb, Ni, Zn
PC7	Fill stockpile	100	Discrete	As, Cd, Cr, Cu, Pb, Ni, Zn

6.2 Analytes

Samples collected from around the building were analysed for TPH (C6-C36), arsenic, cadmium, chromium, copper, lead, nickel, zinc and BTEXN. Samples collected from the unit site areas, dam and fill were analysed for metals.

6.3 Sampling methods

Soil samples were collected from the auger tip using a spade. The soil was transferred to a solvent rinsed glass jar with a teflon lid quickly to minimise volatile vapour loss.

Tools were decontaminated between sampling locations to prevent cross contamination by: brushing to remove caked or encrusted material, washing in detergent and tap water, rinsing in deionised water rinsing with clean tap water and allowing to air dry or using a clean towel.

All sample containers were placed immediately into a cooler containing ice. A chain of custody form accompanied the transport of samples.

7. Quality assurance and quality control

7.1 Sampling design

The sampling program is intended to provide data as to the presence and levels of contaminants.

A systematic and judgemental sampling strategy was undertaken over the investigation area.

A total of five composite samples and two discrete samples were analysed. This sampling density will enable the detection of an area with an elevated concentration on a radius of 10.8m to 27m with a 95% confidence level.

The number and location of samples taken is expected to provide an adequate assurance that the soil samples are representative of the site as a whole.

7.2 Field

The collection of samples was undertaken in accordance with accepted standard protocols (NEPC 1999). Samples collected were analysed for TPH (C10-C36), arsenic, cadmium, chromium, copper, lead, nickel, zinc and OCP.

Sampling equipment was decontaminated between each sampling event. The appropriate storage conditions and duration were observed between sampling and analysis. A chain of custody form accompanied the samples to the laboratory (Appendix 4).

A single sampler was used to collect the samples using standard methods. Soil collected was a fresh sample from a hand shovel. After collection the samples were immediately placed in new glass sampling jars and placed in a cooler. A field sampling log is presented in Appendix 4.

One field duplicate laboratory sample was collected. The duplicate was from the same sampling location and analysed for the same analytes. Additional details on field sampling procedures are presented in Appendix 1.

7.3 Laboratory

Chemical analysis was conducted by ALS Laboratories, Smithfield, which is NATA accredited for the tests undertaken. The laboratories have quality assurance and quality control programs in place, which include internal replication and analysis of spike samples and recoveries.

Method blanks, matrix duplicates and laboratory control samples were within acceptance criteria. The quality assurance and quality control report is presented together with the laboratory report as Appendix 4.

7.4 Data evaluation

The laboratory quality control report indicates the data variability is within acceptable industry limits. The data is considered representative and usable for the purposes of the investigation. Data quality indicators are presented in Appendix 1.

8. Assessment criteria

The proposed land-use is residential. The appropriate assessment criteria is health investigation level A (HILA - residential land-use with access to soil). The health-based investigation levels of contaminants in the soil for HILA for the substances for which criteria are available, are listed in Table 2, as recommended in the NEPC (1999) and by the DEC (2006).

The laboratory results for soil sampling were also assessed against sensitive land-use thresholds (Table 2). No residential thresholds are available for hydrocarbons. The sensitive land-use guidelines for hydrocarbons (EPA 1994) are considered appropriate for this assessment as they are recommended for residential land-use.

The residential land-use and sensitive land-use guidelines are thresholds for protection of the environment and will also provide protection for human health.

Table 2. Assessment criteria for soil samples (mg/kg)

Analyte	Sensitive land-use (EPA 1994)		HILA Residential land-use (DEC 2006)	
	Discrete	**Composite**	**Discrete**	**Composite**
Arsenic		-	100	25
Cadmium		-	20	5
Chromium		-	120,000	30,000
Copper		-	1,000	250
Lead		-	300	75
Nickel		-	600	150
Zinc		-	7,000	1,750
TPH (C6-C9)	65	-	-	-
TPH (C10-C36)	1,000	25	-	-
TPH (C6-C36)	-	-	-	-
Benzene	1	-	-	-
Toluene	1.4[a]/130[b]	-	-	-
Ethylbenzene	3.1[a]/50[b]	-	-	-
Xylene	14[a]/25[b]	-	-	-
Naphthalene	20	5	-	-

[a]protection of the environment, [b]protection of human health

9. Results and discussion

9.1 Surface description

9.1.1 Primary investigation area

The site is contains open woodlands of bimble box with. Patches of mulga are sparsely located within bare areas of soil and gravel across gentle slopes of less than 1%. Surface runoff flows across the bare areas. The vegetation was not stunted and contained no discolouration. Two small trees had died in the former goat pens due to livestock disturbance (ringbarking).

The surface area surrounding the existing building was silty sand topsoil typical of the site with areas of garden beds. No soil staining or evidence of contamination was observed around the building.

The site contained a dam 100m north of the existing building. The dam was dry on the day of assessment. No odour or staining was observed in the base of the dam. Several diversion banks were observed directing surface flow toward the dam.

A small stockpile of soil, manure and woodchip stockpiles was observed approximately 200m south of the existing building.

Disused livestock holding pens were located 60m west of the existing building. The surface of the livestock pens contained manure and woodchips to a depth of 100mm with natural silty sand topsoil below.

No evidence of mining disturbance was observed in the primary investigation area.

9.1.2 Secondary investigation area

The vegetation in the secondary investigation area was open woodland bimble box with mulga. Bare areas due to surface gravel and sheet erosion inhibiting plant growth were observed on the surface.

Several waste stockpiles were located in the secondary investigation area. The stockpiles material was typically incinerated and included car bodies, metal scrap, residual building waste, bitumen and wire. A former quarry was also identified in the area which also contained small fill stockpiles.

9.2 Soil profile

Natural soils on the site consist of yellowish red to red silty sand topsoil over yellow brown to yellow sandy gravel, clayey sand and gravelly clay subsoil to the drilling depth of 4m. The soil was moist to dry with stiff to hard consistency.

No odour, staining was identified in any borehole.

Bore logs of borehole 1 to 3 (typical profile) and soil descriptions are presented in Appendix 3.

9.3 Soil analysis

The levels of all analytes evaluated from the primary investigation area were either not detected or below the residential and sensitive land-use thresholds in all samples collected (Tables 3 and 4).

The soil from the secondary investigation area was typical of the site on a whole and is expected to be similar to the primary site analyte levels.

Table 3. Soil sampling results for hydrocarbons, (mg/kg)

Sample ID	Location	Sample type	TPH C6-C9	TPH C10-C36	TPH C6-C36	Benzene	Toluene	Ethyl-benzene	Xylenes	Naphthalene
PC1	Unit site (south of existing building)	Composite	ND	ND	ND	ND	ND	ND	ND	ND
PC2	Unit site (east of existing building)	Composite	-	ND	ND	-	-	-	-	-
PC3	Unit site (west of existing building)	Composite	ND	ND	ND	ND	ND	ND	ND	ND
PC4	Existing building surrounds	Composite	-	ND	ND	-	-	-	-	-
PC5	Existing building surrounds	Composite	ND	ND	ND	ND	ND	ND	ND	ND
PC6	Dam	Discrete	-	ND	ND	-	-	-	-	-
PC7	Fill stockpile	Discrete	-	ND	ND	-	-	-	-	-
Sensitive land-use threshold (EPA 1994) Discrete sample			*65*	*1000*	*-*	*1*	*1.4[a]/ 130[b]*	*3.1 [a]/ 50[b]*	*14[a]/ 25[b]*	*20*
Sensitive land-use threshold (EPA 1994) Composite sample			*-*	*250*	*-*	*-*	*-*	*-*	*-*	*5*

ND- not detected

Table 4. Soil sampling results for heavy metals (mg/kg)

Sample ID	Location	Sample type	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
PC1	Unit site (south of existing building)	Composite	ND	ND	24	25	12	14	32
PC2	Unit site (east of existing building)	Composite	ND	ND	25	18	10	14	29
PC3	Unit site (west of existing building)	Composite	ND	ND	25	39	24	12	33
PC4	Existing building surrounds	Composite	ND	ND	26	38	17	14	56
PC5	Existing building surrounds	Composite	ND	ND	27	27	10	13	32
PC6	Dam	Discrete	ND	ND	31	74	25	19	67
PC7	Fill stockpile	Discrete	ND	ND	18	26	10	8	64
Residential land-use threshold (DEC 2006) – Discrete samples			*100*	*20*	*120,000*	*1,000*	*300*	*600*	*7,000*
Residential land-use threshold (DEC 2006) – Composite samples			*25*	*5*	*30,000*	*250*	*75*	*150*	*1,750*

ND- not detected

10. Site characterisation

10.1 Environmental contamination

No soil contamination was identified.

10.2 Chemical degradation production

Not applicable as no contamination was identified.

10.3 Exposed population

Not applicable as no contamination was identified.

11. Conclusions and recommendations

11.1 Summary and conclusion

Site inspections were undertaken on 2 and 3 May 2012. Lot 991 has a total area of 28.5 hectares. The investigation area was separated into two main areas. The primary investigation area was the 5 hectare area surrounding the existing building, including a dam located 100m north of the building and the potential locations of the accommodation units. The primary investigation area has an area of approximately 5 hectares. The secondary investigation area was the remainder of the site (23.5 hectares)

The site is the Former Western Plains Meats abattoir which contains a disused abattoir and meat processing building with amenities including toilets, showers, kitchen and washing areas. The site operated as a pet meat abattoir from 2001 to 2011. Prior land-use is unknown but expected to be agricultural.

The redevelopment will be undertaken of the existing building into a kitchen and recreation area for occupants of the accommodation units at the mining village.

A desktop study was undertaken to obtain information of historical land uses. A visual inspection, soil sampling and laboratory analysis program was undertaken for the preliminary investigation.

Boreholes were constructed up to a depth of 4m over the primary investigation area and the profile described. Soil samples were collected from the 0-100mm depth for analysis of BTEXN (benzene, toluene, ethyl benzene, xylene, naphthalene, TPH (C6-C36), arsenic, cadmium, chromium, copper, lead, nickel and zinc.

Four areas of potential contamination were detected in the primary investigation area:

- The area surrounding the existing building
- The possible locations of the accommodation units
- The dam located 100m of the existing building
- A small fill stockpile located 200m south of the building

The remainder of the site (secondary investigation area) was assessed by a walkover and visual inspection. No soil samples were collected for analysis from the secondary investigation area.

No evidence of contamination was identified in the soil from the boreholes. The soil sampling program did not detect elevated levels of the analysed contaminants. The levels of all analytes evaluated were either not detected or below the residential and sensitive land-use thresholds. In conclusion, no contamination was identified in the primary investigation area.

Several waste stockpiles were located in the secondary investigation area. The stockpiles included car bodies, metal scrap, residual building waste, bitumen and wire which is general solid waste. A former quarry was also identified in the area which also contained small fill stockpiles.

11.2 Assumptions in reaching the conclusions

It is assumed the sampling sites are representative of the site. An accurate history has been obtained.

11.3 Extent of uncertainties

The analytical data relate only to the locations sampled. Soil conditions can vary both laterally and vertically and it cannot be excluded that unidentified contaminants may be present. The sampling density surrounding the administration building was designed to detect a 'hot spot' in the field area within a radius of approximately 10.8 to 27 metres and with a 95% level of confidence.

11.4 Suitability for proposed use of the site

The site is suitable for residential activities.

11.5 Limitations and constraints on the use of the site

No constraints are recommended.

11.6 Recommendations

No further investigation is necessary and the investigation area is suitable for residential activities.

The waste stockpiles on the site require disposal to a landfill licenced to accept general solid waste.

12. Report limitations and intellectual property

This report has been prepared for the use of the client to achieve the objectives given the clients requirements. The level of confidence of the conclusion reached is governed by the scope of the investigation and the availability and quality of existing data. Where limitations or uncertainties are known, they are identified in the report. No liability can be accepted for failure to identify conditions or issues which arise in the future and which could not reasonably have been predicted using the scope of the investigation and the information obtained.

The investigation identifies the actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing is interpreted by geologists, engineers or scientists who then render an opinion about overall subsurface conditions, the nature and extent of the contamination, it's likely impact on the proposed development and appropriate remediation measures. Actual conditions may differ from those inferred to exist, because no professional, no matter how well qualified, and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock or time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. It is thus important to understand the limitations of the investigation and recognise that we are not responsible for these limitations.

13. References

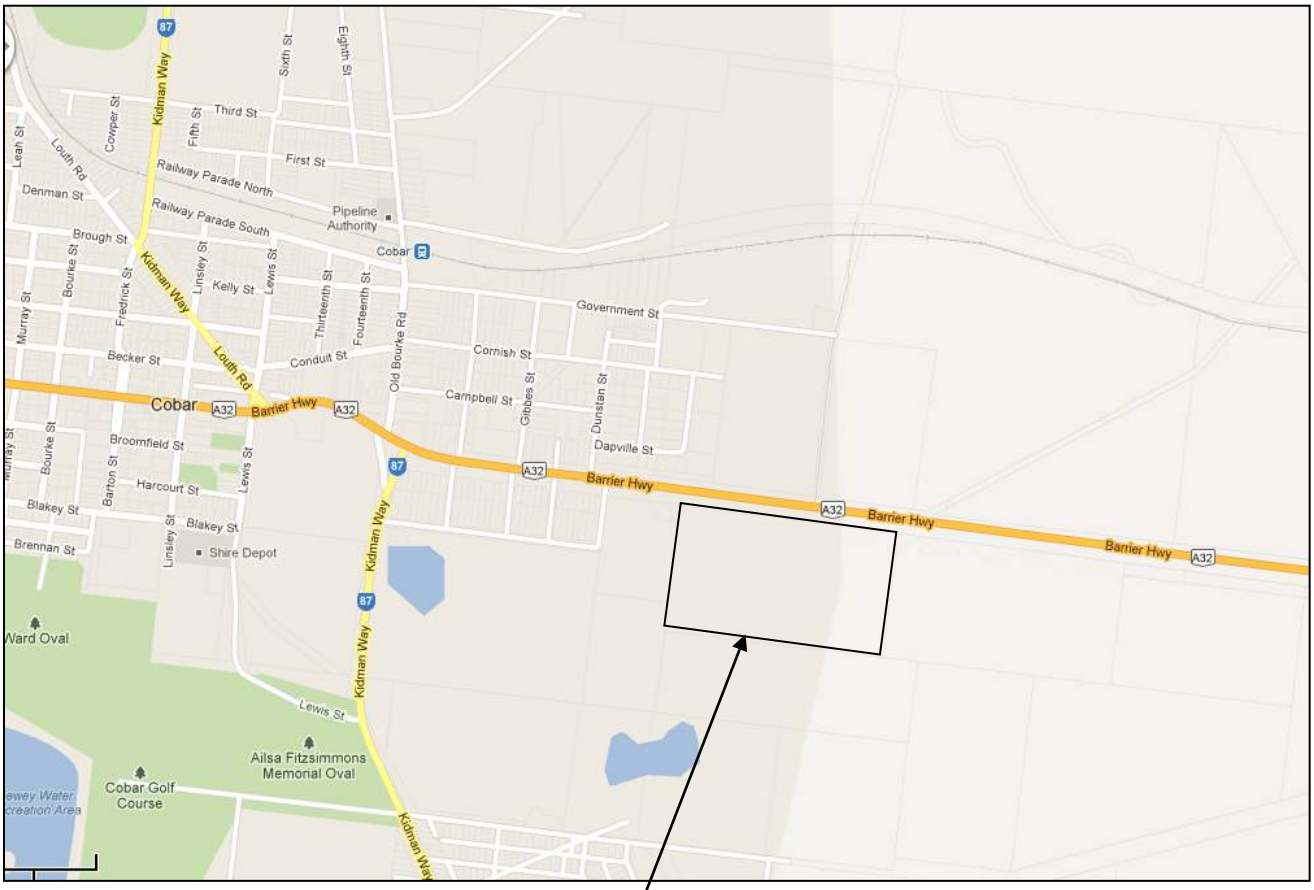
DEC (2006) *Contaminated Sites: Guidelines for the NSW Site Auditors Scheme* (NSW Department of Environment and Conservation, Chatswood)

Environment Protection Authority (1995) *Contaminated sites: Sampling Design Guidelines* (NSW Environment Protection Authority, Chatswood)

National Environment Protection Council (1999) *National Environment Protection (Assessment of Site Contamination) Measure 1999* (National Environment Protection Council Service Corporation, Adelaide)

Brunker, R.J (1967) *Cobar 1:250,000 Geological Sheet SH/55-14* (Geological Survey of New South Wales, Sydney)

North



Site assessed

Figure 1: Locality map	
Lot 991 Barrier Highway, Cobar NSW	
	Envirowest Consulting Pty Ltd
Job: R12139c	Date: 9/05/2012

North

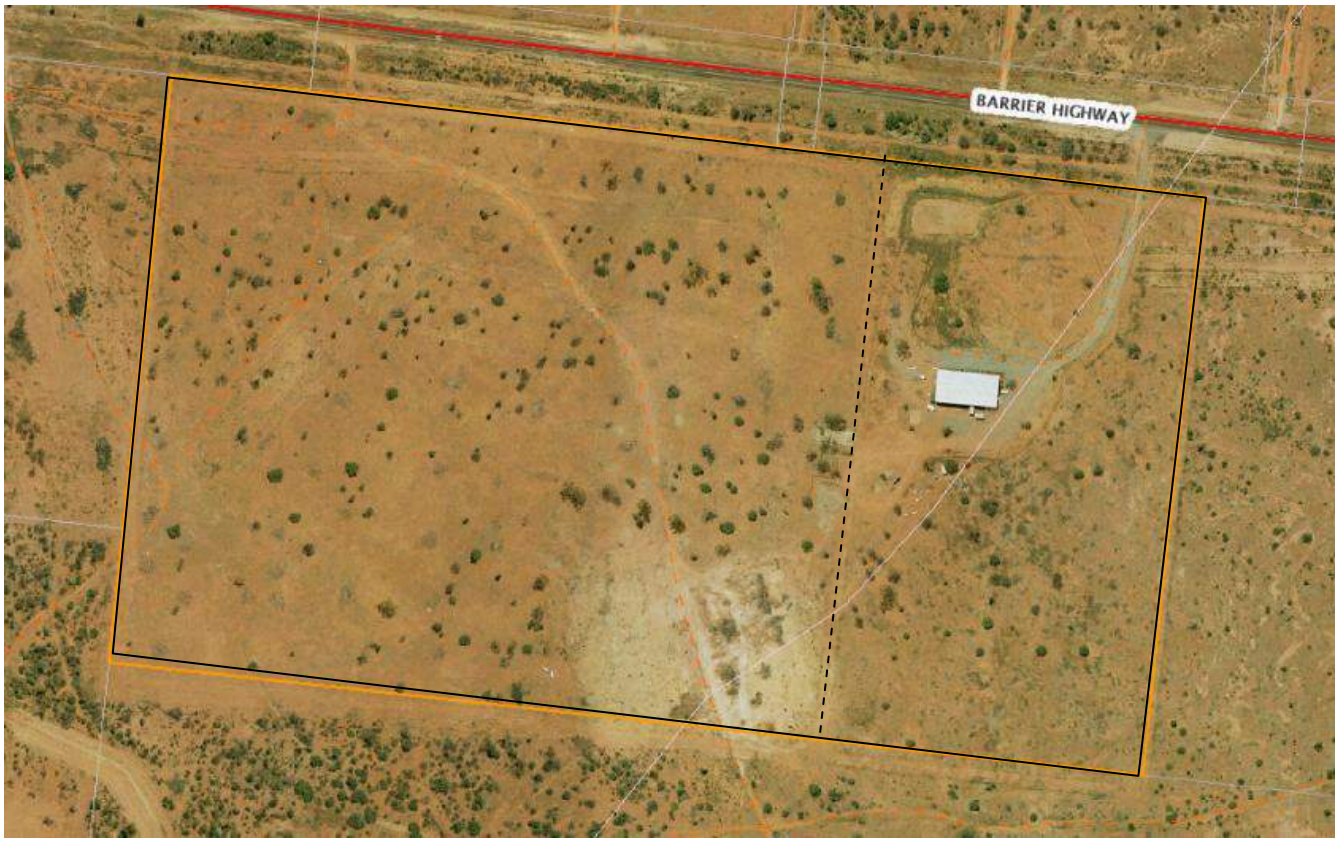
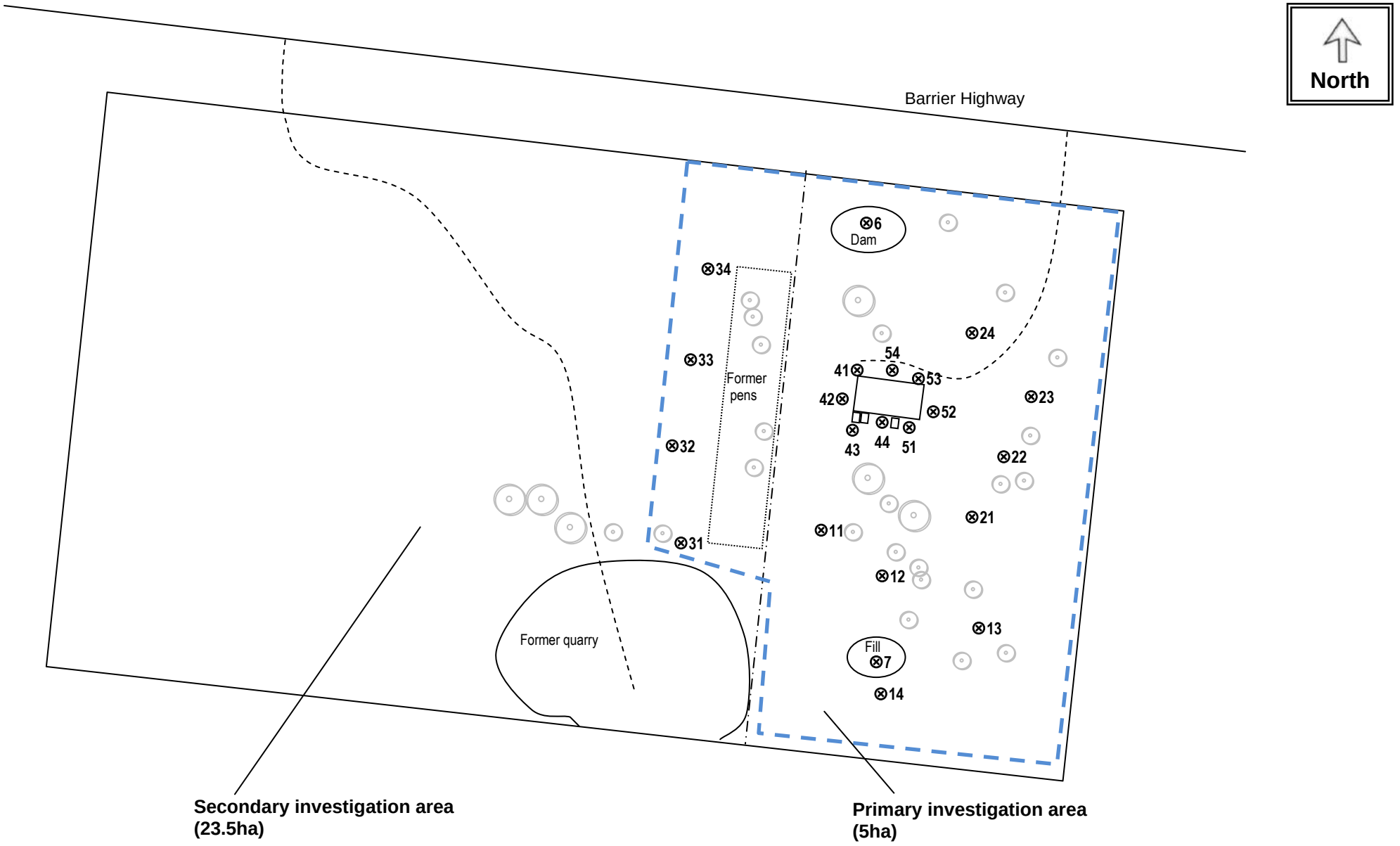


Figure 2: Aerial Photograph		
Lot 991 Barrier Highway, Cobar NSW		
	Envirowest Consulting Pty Ltd	
Job: R12139c	Drawn by: AR	Date: 9/05/2012



Legend

⊗ Boreholes / sampling locations

Tree

Fence

Existing building

Approximate Scale 1: 3,500

0 70 140m

Figure 3: Plan of site and soil sampling locations

Lot 991 Barrier Highway, Cobar NSW

Envirowest Consulting Pty Ltd

Job: R12139c	Drawn by: AR	Date: 9/05/2012

Figure 4. Photographs of the site

Figure 4.1. Looking south toward the existing building

Figure 4.2. Northern side of the existing building

Figure 4.3. Proposed unit site

Figure 4.4. Fill stockpile 200m south of building

Figure 4.5. Bitumen stockpile

Figure 4.6. Waste material stockpile

Appendix 1. Soil sampling protocol

1. Sampling

The samples will be collected from the auger tip, mattock, hand auger or shovel immediately on withdrawal.

The time between retrieval of the sample and sealing of the sample container was kept to a minimum.

The material was collected using single use disposal gloves or a stainless steel spade which represented material which had not been exposed to the atmosphere prior to sampling.

All sampling jars were filled as close to the top as possible to minimise the available airspace within the jar.

2. Handling, containment and transport

Daily sampling activities will be recorded including sampling locations, numbers, observations, measurements, sampler, date and time and weather condition.

The sampling jars will be new sterile glass jars fitted with plastic lid and airtight Teflon seals, supplied by the laboratories for the purpose of collecting soil samples for analysis. Sample containers will be marked indelibly with the sample ID code to waterproof labels affixed to the body of the container.

All samples will be removed from direct sunlight as soon as possible after sampling and placed in insulated containers. Samples were stored in a refrigerator at 4°C prior to transportation to the laboratory in insulated containers with ice bricks in accordance with AS4482.1.

Handling and transportation to the laboratory will be accompanied with a chain of custody form to demonstrate the specimens are properly received, documents, processed and stored.

Maximum holding time for extraction (AS4482.1) are:

Analyte	Maximum holding time
Metals	6 months
Mercury	28 days
Sulfate	7 days
Organic carbon	7 days
OCP, OPP, PCB	14 days
TPH, BTEX, PAH, phenols	14 days

3. Decontamination of sampling equipment

Sampling tools will be decontaminated between sampling locations by

- Removing soil adhering to the sampling equipment by scraping, brushing or wiping
- Washing with a phosphate-free detergent
- Rinsing thoroughly with clean water
- Repeating if necessary
- Dry equipment with disposable towels or air

Appendix 2. Sample analysis, quality assurance and quality control (QA/QC) report

1. Data quality indicators (DQI) requirements

1.1 Completeness

A measure of the amount of usable data for a data collection activity. Greater than 95% of the data must be reliable based on the quality objectives. Where greater than two quality objectives have less reliability than the acceptance criterion the data may be considered with uncertainty.

1.1.1 Field

Consideration	Requirement
Locations and depths to be sampled	Described in the sampling plan. The acceptance criterion is 95% data retrieved compared with proposed. Acceptance criterion is 100% in crucial areas.
SOP appropriate and compiled	Described in the sampling plan.
Experienced sampler	Sampler or supervisor
Documentation correct	Sampling log and chain of custody completed

1.1.2 Laboratory

Consideration	Requirement
Samples analysed	Number according to sampling and quality plan
Analytes	Number according to sampling and quality plan
Methods	EPA or other recognised methods with suitable PQL
Sample documentation	Complete including chain of custody and sample description
Sample holding times	Metals 6 months, OCP, PAH, TPH, PCB 14 days

1.2 Comparability

The confidence that data may be considered to be equivalent for each sampling and analytical event. The data must show little or no inconsistencies with results and field observations.

1.2.1 Field

Consideration	Requirement
SOP	Same sampling procedures to be used
Experienced sampler	Sampler or supervisor
Climatic conditions	Described as may influence results
Samples collected	Sample medium, size, preparation, storage, transport

1.2.2 Laboratory

Consideration	Requirement
Analytical methods	Same methods, approved methods
PQL	Same
Same laboratory	Justify if different
Same units	Justify if different

1.3 Representativeness

The confidence (expressed qualitatively) that data are representative of each media present on the site.

1.3.1 Field

Consideration	Requirement
Appropriate media sampled	Sampled according to sampling and quality plan or in accordance with the EPA (1995) sampling guidelines.
All media identified	Sampling media identified in the sampling and quality plan. Where surface water bodies on the site sampled.

1.3.2 Laboratory

Consideration	Requirement
Samples analysed	Blanks and spikes

1.4 Precision

A quantitative measure of the variability (or reproduced of the data). Is measured by standard deviation or relative percent difference (RPD). A RPD analysis is calculated and compared to the practical quantitation limit (PQL) or absolute difference AD.

- Levels greater than 10 times the PQL the RPD is 50%
- Levels between 5 and 10 times the PQL the RPD is 75%
- Levels between 2 and 5 times the PQL the RPD is 100%
- Levels less than 2 times the PQL, the AD is less than 2.5 times the PQL

Data not conforming to the acceptance criterion will be examined for determination of suitability for the purpose of site characterisation.

1.4.1 Field

Consideration	Requirement
Field duplicates	Frequency of 5%, results to be within RPD or discussion required indicate the appropriateness of SOP

1.4.2 Laboratory

Consideration	Requirement
Laboratory and inter lab duplicates	Frequency of 5%, results to be within RPD or discussion required. Inter laboratory duplicates will be one sample per batch.
Field duplicates	Frequency of 5%, results to be within RPD or discussion required
Laboratory prepared volatile trip spikes	One per sampling batch, results to be within RPD or discussion required

1.5 Accuracy

A quantitative measure of the closeness of the reported data to the true value.

1.5.1 Field

Consideration	Requirement
SOP	Complied
Inter laboratory duplicates	Frequency of 5%. Analysis criterion 60% RPD for levels greater than 10 times the PQL 85% RPD for levels between 5 to 10 times the PQL 100% RPD at levels between 2 to 5 times the PQL Absolute difference, 3.5 times the PQL where levels are, 2 times PQL

1.5.2 Laboratory

Recovery data (surrogates, laboratory control samples and matrix spikes) data subject to the following control limits:

- 60 to 140% acceptable data
- 20-60% discussion required, may be considered acceptable
- 10-20% data should considered as estimates
- 10% data should be rejected

Consideration	Requirement
Field blanks	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Rinsate blanks	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Method blanks	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Matrix spikes	Frequency of 5%, results to be within +/-40% or discussion required
Matrix duplicates	Sample injected with a known concentration of contaminants with tested. Frequency of 5%, results to be within +/-40% or discussion required
Surrogate spikes	QC monitoring spikes to be added to samples at the extraction process in the laboratory where applicable. Surrogates are closely related to the organic target analyte and not normally found in the natural environment. Frequency of 5%, results to be within +/-40% or discussion required
Laboratory control samples	Externally prepared reference material containing representative analytes under investigation. These will be undertaken at one per batch. It s to be within +/-40% or discussion required
Laboratory prepared spikes	Frequency of 5%, results to be within +/-40% or discussion required

2. Laboratory analysis summary

One analysis batch were undertaken over the investigation program. The analysis batch was sampled on 3 May 2012. A total of 8 (including 1 field duplicate) soil samples were submitted for analytical testing.

The samples were analysed at the laboratories of ALS, Smithfield, NSW which is National Association of Testing Authorities (NATA) accredited for the tests undertaken. The analyses undertaken, number of samples tested and methods are presented in the following tables:

Laboratory analysis schedule

Sample id. (sampling location)	Number of samples	Analyses	Date collected	Substrate	Lab report
PC1, PC2, PC3, PC6, PC7, PCA	6	As, Cd, Cr, Cu, Pb, Ni, Zn,	2/4/2012	Soil	ES1210772
PC4, PC5	2	TPH, BTEXN, As, Cd, Cr, Cu, Pb, Ni, Zn,	2/4/2012	Soil	ES1210772

Analytical methods

Analyte	Extraction	Laboratory methods
Metals	USEPA 200.2 Mod	APHA USEPA SW846-6010
Mercury	USEPA 200.2 Mod	APHA 3112
TPH(C6-C9)	USPEA SW846-5030A	USPEA SW 846-8260B
TPH(C10-C36)	Tumbler extraction of solids	USEPA SW 846-8270B
PCB	Tumbler extraction of solids	USEPA SW 846-8270B
OC Pesticides	Tumbler extraction of solids	USEPA SW 846-8270B
BTEX	Tumbler extraction of solids	USEPA SW 846-8260B

3. Field quality assurance and quality control

One field duplicate soil sample was collected for the analysis batch. The frequency was greater than the recommended frequency of 5%. The following table outlines the sample collected and differences in replicate analyses and acceptance limits for replicate analyses.

Field duplicate frequency

Sample id.	Number of samples	Duplicate	Frequency (%)	Date collected	Substrate	Laboratory report
PC1 to PC7, PCA	8	1	12.5	2/4/2012	Soil	ES1210772

Relative percent differences between field duplicates

Laboratory report	Duplicate sample comparison	Analyte	Difference in replicate analyses (%)	Acceptance limits (%)
ES1210772	PC1 and PCA	Arsenic	0	40 or <5 times the PQL
		Cadmium	0	40 or <5 times the PQL
		Chromium	6	40 or <5 times the PQL
		Copper	5	40 or <5 times the PQL
		Nickel	8	40 or <5 times the PQL
		Lead	0	40 or <5 times the PQL
		Zinc	0	40 or <5 times the PQL
		BTEXN	0	40 or <5 times the PQL
		TPH(C10-C36)	0	40 or <5 times the PQL

4. Laboratory quality assurance and quality control

Sample holding times are recommended in NEPM (1999). The time between collection and extraction for all samples was less than the criteria listed below:

Analyte	Maximum holding time
Metals, cyanide, nitrogen, phosphorus	6 months
pH, EC	7 days
OCP, OPP, TPH, PCB, BTEX, PAH	14 days

The laboratory interpretative reports are presented with individual laboratory report. Assessment is made of holding time, frequency of control samples and quality control samples. No significant outliers or non-conformities were identified. The laboratory report also contains a detailed description of preparation methods and analytical methods. Some laboratory matrix spikes recoveries were outside acceptable limits due to poor matrix effects.

The results, quality report, interpretative report and chain of custody are presented in the attached appendix. The quality report contains the laboratory duplicates, spikes, laboratory control samples, blanks and where appropriate matrix spike recovery (surrogate).

5. Data quality indicators (DQI)

5.1 Completeness

A measure of the amount of usable data for a data collection activity (total to be greater than 95%).

The data set was found to be complete based on the scope of work. No critical areas of contamination were omitted from the data set.

5.1.1 Field

Consideration	Accepted	Comment
Locations to be sampled	Yes	In accordance with sampling methodology, described in the report.
Depth to be sampled	Yes	In accordance with sampling methodology
SOP appropriate and compiled	Yes	In accordance with sampling methodology
Experienced sampler	Yes	Environmental scientist
Documentation correct	Yes	Sampling log completed Chain of custody completed

5.1.2 Laboratory

Consideration	Accepted	Comment
Samples analysed	Yes	In accordance with chain of custody and analysis plan
Analytes	Yes	In accordance with chain of custody and analysis plan
Methods	Yes	Analysed in NATA accredited laboratory with recognised methods and suitable PQL
Sample documentation	Yes	Completed including chain of custody and sample results and quality results
Sample holding times	Yes	Metals < 6 months PAH, TPH < 14 days

5.2 Comparability

The confidence that data may be considered to be equivalent for each sampling and analytical event.

The data sets were found to be acceptable.

5.2.1 Field

Consideration	Accepted	Comment
SOP	Yes	Same sampling procedures used and sampled on one date
Experienced sampler	Yes	Experienced environmental scientist
Climatic conditions	Yes	Sampling log
Samples collected	Yes	Suitable size and storage

5.2.2 Laboratory

Consideration	Accepted	Comment
Analytical methods	Yes	Same methods all samples
PQL	Yes	Suitable for analytes
Same laboratory	Yes	ALS Environmental is NATA accredited for the test
Same units	Yes	-

5.3 Representativeness

The confidence (expressed qualitatively) that data are representative of each media present on the site.

The data sets were found to be acceptable.

5.3.1 Field

Consideration	Accepted	Comment
Appropriate media sampled	Yes	Sampled according to sampling and quality plan
All media identified	Yes	Soil sampling media identified in the sampling and quality plan

5.3.2 Laboratory

Consideration	Accepted	Comment
Samples analysed	Yes	Undertaken in NATA accredited laboratory.

5.4 Precision

A quantitative measure of the variability (or reproduced of the data)

The data sets were found to be acceptable.

5.4.1 Field

Consideration	Accepted	Comment
SOP	Yes	Complied
Field duplicates	Yes	Greater than 5% frequency

5.4.2 Laboratory

Consideration	Accepted	Comment
Laboratory duplicates	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Field duplicates (intra and inter laboratory)	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Laboratory prepared volatile trip spikes	Yes	Frequency of 5%, results to be within +/-40% or discussion required

5.5 Accuracy

A quantitative measure of the closeness of the reported data to the true value

The data sets were found to be acceptable.

5.5.1 Field

Consideration	**Accepted**	**Comment**
SOP	Yes	Complied
Field blanks	Yes	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Rinsate blanks	Yes	Frequency of 5%, <5 times the PQL, PQL may be adjusted

5.5.2 Laboratory

Consideration	**Accepted**	**Comment**
Method blanks	Yes	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Matrix spikes	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Matrix duplicates	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Surrogate spikes	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Laboratory control samples	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Laboratory prepared spikes	Yes	Frequency of 5%, results to be within +/-40% or discussion required Results outside limits due to laboratory instrumentation

6. Conclusion

All media appropriate to the objectives of this investigation have been adequately analysed and no area of significant uncertainty exist.

It is concluded the data is usable for the purposes of the investigation.

. **Appendix 3**. Borelogs

Job: 12139 Client: Geolyse Site: Pybar Mining Accommodation Cobar	Borehole No: 11 Location: 55J E391726 N6514024 255m	Sampling method: EVH Auger Drill Logged by: AR Date: 02/05/2012

Depth (m)	Graphic log strata	DESCRIPTION. Soil type/rock, grain size, structure, colour, minor components	Unified symbol	Samples	Moisture	Consistency	Density	Plasticity	Rock description
		SILTY SAND with gravel, red	SM		M	F	M	L	-
0.5		GRAVELLY SAND, pale red	SP		D	VSt	M	L	-
1.0		CLAYEY SAND, yellow	SC		D	VSt	M	VL	-
1.5		Brownish yellow Coarse gravel identified at 1.2 - 1.5m		D		H	M	VL	VH
2.0		End of hole, refusal on hard rock							
2.5									
3.0									
3.5									
4.0									

Soil classification:
Slope/nature of surface: Nil
Ground water: No free water identified in the soil profile
Soil salinity: Nil

Remarks (fill, odour, root holes): Nil

Samples	**Moisture**	**Consistency**	**Density**	**Plasticity**	**Rock strength**
U - undisturbed	*D* - Dry	Shear strength (kPa)	*VL* - very loose	*NP* - non plastic	Point load (mPa)
D - disturbed	*M* - Moist, can be moulded	*VS* - very soft, (<25)	*L* - loose	*T* – trace	*EL* – extremely low (<0.03)
W - water sample	*W* - Wet, free water on hands	*S* – soft (<25-50)	*M* - medium	*VL* – very low	*VL* – very low (<0.1)
B - bulk	*Wp* - plastic limit	*F* – firm (<50-100)	*D* - dense	*L* – low	*L* –low (<0.3)
E - environmental sample	*Wl* - liquid limit	*St* – stiff (<100-150)	*VD* - very dense	*M* – medium	*M* – medium (<1.0)
		VSt - very stiff (<200-300)		*H* – high	*H* – high (<3.0)
		H – hard (>300)		*VH* – very high	*VH* – very high (<10)
					EH – extremely high (>10)

Job: 12139 Client: Geolyse Site: Pybar Mining Accommodation Cobar	Borehole No: 12 Location: 55J E3917285 N6513981 255m	Sampling method: EVH Auger Drill Logged by: AR Date: 02/05/2012

Depth (m)	Graphic log strata	DESCRIPTION. Soil type/rock, grain size, structure, colour, minor components	Unified symbol	Samples	Moisture	Consistency	Density	Plasticity	Rock description
		SILTY SAND with gravel, red	SM		M	F	M	L	-
		GRAVELLY SAND, pale red	SP		D	VSt	M	L	-
0.5									
		CLAYEY SAND, yellow	SC		D	VSt	M	VL	-
1.0									
		Brownish yellow		D					
									DW
1.5		Distinctly weathered rock identified at 1.3 - 1.5m				H	M	VL	VH
		End of hole, refusal on hard rock							
2.0									
2.5									
3.0									
3.5									
4.0									

Soil classification:
Slope/nature of surface: Nil
Ground water: No free water identified in the soil profile
Soil salinity: Nil

Remarks (fill, odour, root holes): Nil

Samples	**Moisture**	**Consistency**	**Density**	**Plasticity**	**Rock strength**
U - undisturbed	*D* - Dry	Shear strength (kPa)	*VL* - very loose	*NP* - non plastic	Point load (mPa)
D - disturbed	*M* - Moist, can be moulded	*VS* - very soft, (<25)	*L* - loose	*T* – trace	*EL* – extremely low (<0.03)
W - water sample	*W* - Wet, free water on hands	*S* – soft (<25-50)	*M* - medium	*VL* – very low	*VL* – very low (<0.1)
B - bulk	*Wp* - plastic limit	*F* – firm (<50-100)	*D* - dense	*L* – low	*L* –low (<0.3)
E - environmental sample	*Wl* - liquid limit	*St* – stiff (<100-150)	*VD* - very dense	*M* – medium	*M* – medium (<1.0)
		VSt - very stiff (<200-300)		*H* – high	*H* – high (<3.0)
		H – hard (>300)		*VH* – very high	*VH* – very high (<10)
					EH – extremely high (>10)

Job: 12139 Client: Geolyse Site: Pybar Mining Accommodation Cobar	Borehole No: 13 Location: 55J E391848 N6513946 257m	Sampling method: EVH Auger Drill Logged by: AR Date: 02/05/2012

Depth (m)	Graphic log strata	DESCRIPTION. Soil type/rock, grain size, structure, colour, minor components	Unified symbol	Samples	Moisture	Consistency	Density	Plasticity	Rock description
		SILTY SAND with gravel, red	SM		M	F	M	L	-
0.5		GRAVELLY SAND, pale red yellowish red							
1.0		CLAYEY SAND, yellow White	SC		D	VSt	M	VL	-
		yellow with coarse gravel				H	M	VL	VH
1.5		End of hole, refusal on hard rock							
2.0									
2.5									
3.0									
3.5									
4.0									

Soil classification:
Slope/nature of surface: Nil
Ground water: No free water identified in the soil profile
Soil salinity: Nil

Remarks (fill, odour, root holes): Nil

Samples	**Moisture**	**Consistency**	**Density**	**Plasticity**	**Rock strength**
U - undisturbed *D* - disturbed *W* - water sample *B* - bulk *E* - environmental sample	*D* - Dry *M* - Moist, can be moulded *W* - Wet, free water on hands *Wp* - plastic limit *Wl* - liquid limit	Shear strength (kPa) *VS* - very soft, (<25) *S* – soft (<25-50) *F* – firm (<50-100) *St* – stiff (<100-150) *VSt* - very stiff (<200-300) *H* – hard (>300)	*VL* - very loose *L* - loose *M* - medium *D* - dense *VD* - very dense	*NP* - non plastic *T* – trace *VL* – very low *L* – low *M* – medium *H* – high *VH* – very high	Point load (mPa) *EL* – extremely low (<0.03) *VL* – very low (<0.1) *L* –low (<0.3) *M* – medium (<1.0) *H* – high (<3.0) *VH* – very high (<10) *EH* – extremely high (>10)

Job: 12139 Client: Geolyse Site: Pybar Mining Accommodation Cobar	Borehole No: 14 Location: 55J E391801 N6513881 257m	Sampling method: EVH Auger Drill Logged by: AR Date: 02/05/2012

Depth (m)	Graphic log strata	DESCRIPTION. Soil type/rock, grain size, structure, colour, minor components	Unified symbol	Samples	Moisture	Consistency	Density	Plasticity	Rock description
		SILTY SAND with gravel, red	SM		M	F	M	L	-
		GRAVELLY SAND, pale red							
0.5		yellowish red							
		CLAYEY SAND, yellow	SC		D	VSt	M	VL	-
1.0		White							
		yellow with medium gravel				VSt	M	VL	H
1.5		GRAVELLY SAND, yellow	SP		D	VSt	M	VL	H XW
		Extremely weathered rock							
2.0									
2.5									
		Brownish yellow				H			VH
3.0									
3.5									
		Distinctly weathered rock							DW
						H			EH
4.0		End of hole, refusal on hard rock							

Soil classification: *Slope/nature of surface*: Nil *Ground water:* No free water identified in the soil profile *Soil salinity*: Nil	*Remarks* (fill, odour, root holes): Nil

Samples	**Moisture**	**Consistency**	**Density**	**Plasticity**	**Rock strength**
U - undisturbed *D* - disturbed *W* - water sample *B* - bulk *E* - environmental sample	*D* - Dry *M* - Moist, can be moulded *W* - Wet, free water on hands *Wp* - plastic limit *Wl* - liquid limit	Shear strength (kPa) *VS* - very soft, (<25) *S* – soft (<25-50) *F* – firm (<50-100) *St* – stiff (<100-150) *VSt* - very stiff (<200-300) *H* – hard (>300)	*VL* - very loose *L* - loose *M* - medium *D* - dense *VD* - very dense	*NP* - non plastic *T* – trace *VL* – very low *L* – low *M* – medium *H* – high *VH* – very high	Point load (mPa) *EL* – extremely low (<0.03) *VL* – very low (<0.1) *L* –low (<0.3) *M* – medium (<1.0) *H* – high (<3.0) *VH* – very high (<10) *EH* – extremely high (>10)

Job: 12139 Client: Geolyse Site: Pybar Mining Accommodation Cobar	Borehole No: 42 Location: 55J E391652 N6514040 255m	Sampling method: EVH Auger Drill Logged by: AR Date: 02/05/2012

Depth (m)	Graphic log strata	DESCRIPTION. Soil type/rock, grain size, structure, colour, minor components	Unified symbol	Samples	Moisture	Consistency	Density	Plasticity	Rock description
0.5		SANDY GRAVEL, rock on surface	GP		D	St	M	VL	H
1.0		GRAVELLY SAND, yellow Extremely weathered rock Coarse gravel identified	SP		D	VSt	M	VL	H XW
1.5		End of hole, refusal on hard rock							
2.0									
2.5									
3.0									
3.5									
4.0									

Soil classification: *Slope/nature of surface*: Nil *Ground water:* No free water identified in the soil profile *Soil salinity*: Nil	*Remarks* (fill, odour, root holes): Nil

Samples	**Moisture**	**Consistency**	**Density**	**Plasticity**	**Rock strength**
U - undisturbed *D* - disturbed *W* - water sample *B* - bulk *E* - environmental sample	*D* - Dry *M* - Moist, can be moulded *W* - Wet, free water on hands *Wp* - plastic limit *Wl* - liquid limit	Shear strength (kPa) *VS* - very soft, (<25) *S* – soft (<25-50) *F* – firm (<50-100) *St* – stiff (<100-150) *VSt* - very stiff (<200-300) *H* – hard (>300)	*VL* - very loose *L* - loose *M* - medium *D* - dense *VD* - very dense	*NP* - non plastic *T* – trace *VL* – very low *L* – low *M* – medium *H* – high *VH* – very high	Point load (mPa) *EL* – extremely low (<0.03) *VL* – very low (<0.1) *L* –low (<0.3) *M* – medium (<1.0) *H* – high (<3.0) *VH* – very high (<10) *EH* – extremely high (>10)

Appendix 4. Soil analysis results – ALS report number ES1210772 and chain of custody form.

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **ES1210772**	Page	: 1 of 5
Client	: **ENVIROWEST CONSULTING**	Laboratory	: Environmental Division Sydney
Contact	: THE RESULTS ADDRESS	Contact	: Client Services
Address	: PO BOX 9158 ORANGE NSW, AUSTRALIA 2800	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ec@envirowest.net.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 63614954	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 63603960	Facsimile	: +61-2-8784 8500
Project	: 12139	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: 12139		
C-O-C number	: 12139	Date Samples Received	: 03-MAY-2012
Sampler	: AR	Issue Date	: 09-MAY-2012
Site	: 12139		
		No. of samples received	: 8
Quote number	: SY/400/11	No. of samples analysed	: 8

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Evie.Sidarta	Inorganic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **EG-005T:LCS recovery for Copper and Zinc falls outside ALS Dynamic Control Limit. However, it is within the acceptance criteria based on ALS DQO. No further action is required.**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: PC1	PC2	PC3	PC4	PC5
				Client sampling date / time: 02-MAY-2012 15:00	02-MAY-2012 15:00	02-MAY-2012 15:00	02-MAY-2012 15:00	02-MAY-2012 15:00
				ES1210772-001	ES1210772-002	ES1210772-003	ES1210772-004	ES1210772-005
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	**6.3**	**8.0**	**8.5**	**10.6**	**14.0**
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	**24**	**25**	**25**	**26**	**27**
Copper	7440-50-8	5	mg/kg	**25**	**18**	**39**	**38**	**27**
Lead	7439-92-1	5	mg/kg	**12**	**10**	**24**	**17**	**10**
Nickel	7440-02-0	2	mg/kg	**14**	**14**	**12**	**14**	**13**
Zinc	7440-66-6	5	mg/kg	**32**	**29**	**33**	**56**	**32**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	<10	<10
C10 - C14 Fraction	----	50	mg/kg	----	----	----	<50	<50
C15 - C28 Fraction	----	100	mg/kg	----	----	----	<100	<100
C29 - C36 Fraction	----	100	mg/kg	----	----	----	<100	<100
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg	----	----	----	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft								
C6 - C10 Fraction	----	10	mg/kg	----	----	----	<10	<10
^ **C6 - C10 Fraction minus BTEX (F1)**	----	10	mg/kg	----	----	----	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	----	----	----	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	----	----	----	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	----	----	----	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg	----	----	----	<50	<50
EP080: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	----	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	----	----	----	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	<0.5	<0.5
EP080: BTEXN								
^ **Sum of BTEX**	----	0.2	mg/kg	----	----	----	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg	----	----	----	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	----	----	----	<1	<1
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	----	**96.4**	**94.9**
Toluene-D8	2037-26-5	0.1	%	----	----	----	**102**	**103**
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	----	**89.7**	**90.3**

Analytical Results

Sub-Matrix: SOIL			Client sample ID	PC6	PC7	PCA	----	----
			Client sampling date / time	02-MAY-2012 15:00	02-MAY-2012 15:00	02-MAY-2012 15:00	----	----
Compound	CAS Number	LOR	Unit	ES1210772-006	ES1210772-007	ES1210772-008	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	**23.7**	**18.4**	**6.2**	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	**31**	**18**	**24**	----	----
Copper	7440-50-8	5	mg/kg	**74**	**26**	**26**	----	----
Lead	7439-92-1	5	mg/kg	**25**	**10**	**14**	----	----
Nickel	7440-02-0	2	mg/kg	**19**	**8**	**15**	----	----
Zinc	7440-66-6	5	mg/kg	**67**	**64**	**32**	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **ES1210772**	Page	: 1 of 6
Client	: **ENVIROWEST CONSULTING**	Laboratory	: Environmental Division Sydney
Contact	: THE RESULTS ADDRESS	Contact	: Client Services
Address	: PO BOX 9158 ORANGE NSW, AUSTRALIA 2800	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ec@envirowest.net.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 63614954	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 63603960	Facsimile	: +61-2-8784 8500
Project	: 12139	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: 12139		
C-O-C number	: 12139	Date Samples Received	: 03-MAY-2012
Sampler	: AR	Issue Date	: 09-MAY-2012
Order number	: 12139		
		No. of samples received	: 8
Quote number	: SY/400/11	No. of samples analysed	: 8

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Evie.Sidarta	Inorganic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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

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

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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA055: Moisture Content (QC Lot: 2290882)									
EN1201651-003	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	18.6	16.1	14.4	0% - 50%
ES1210688-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	63.1	64.2	1.7	0% - 20%
EA055: Moisture Content (QC Lot: 2290883)									
ES1210772-006	PC6	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	23.7	23.6	0.6	0% - 20%
ES1210902-009	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	19.4	19.9	2.5	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 2292064)									
ES1210739-017	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	20	16	21.6	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	12	11	15.6	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	10	10	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	14	14	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	67	60	11.4	0% - 50%
ES1210772-003	PC3	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	25	24	0.0	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	12	12	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	39	38	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	24	24	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	33	34	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2290375)									
ES1210473-008	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES1210951-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2290564)									
ES1210333-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	160	150	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	360	340	5.3	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES1210739-022	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 2290375)									
ES1210473-008	Anonymous	EP080: C6 - C10 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES1210951-001	Anonymous	EP080: C6 - C10 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 2290564)									
ES1210333-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	380	350	8.6	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QC Lot: 2290564) - continued									
ES1210333-001	Anonymous	EP071: >C34 - C40 Fraction	----	100	mg/kg	560	610	9.3	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES1210739-022	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 2290375)									
ES1210473-008	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES1210951-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 2292064)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	93.4	70	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	88.9	83.3	111
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	90.8	89.2	117
EG005T: Copper	7440-50-8	5	mg/kg	<5	32.0 mg/kg	# 89.8	90.1	114
EG005T: Lead	7439-92-1	5	mg/kg	<5	40.0 mg/kg	86.5	85.2	111
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.23 mg/kg	93.9	88.3	116
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	# 88.1	88.9	112
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2290375)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	94.2	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2290564)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	104	59	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	119	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	95.0	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 2290375)								
EP080: C6 - C10 Fraction	----	10	mg/kg	<10	31 mg/kg	97.1	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 2290564)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	105	59	131
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	111	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
		50	mg/kg	----	150 mg/kg	89.3	63	131
EP080: BTEXN (QCLot: 2290375)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	95.2	62	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	95.5	62	128
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	88.2	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	86.4	60	120
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	86.1	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	78.7	62	138

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 2292064)							
ES1210739-017	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	91.4	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	91.2	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	82.6	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	95.1	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	85.1	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	95.3	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	90.1	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2290375)							
ES1210473-008	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	71.0	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2290564)							
ES1210333-001	Anonymous	EP071: C10 - C14 Fraction	----	640 mg/kg	96.6	73	137
		EP071: C15 - C28 Fraction	----	3140 mg/kg	102	53	131
		EP071: C29 - C36 Fraction	----	2860 mg/kg	72.4	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 2290375)							
ES1210473-008	Anonymous	EP080: C6 - C10 Fraction	----	37.5 mg/kg	75.4	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft (QCLot: 2290564)							
ES1210333-001	Anonymous	EP071: >C10 - C16 Fraction	----	850 mg/kg	124	73	137
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	86.0	53	131
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	72.0	52	132
EP080: BTEXN (QCLot: 2290375)							
ES1210473-008	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	73.3	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	77.5	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	73.3	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	75.7	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	71.4	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	74.0	70	130

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1210772**	Page	: 1 of 5
Client	: ENVIROWEST CONSULTING	Laboratory	: Environmental Division Sydney
Contact	: THE RESULTS ADDRESS	Contact	: Client Services
Address	: PO BOX 9158 ORANGE NSW, AUSTRALIA 2800	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ec@envirowest.net.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 63614954	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 63603960	Facsimile	: +61-2-8784 8500
Project	: 12139	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: 12139		
C-O-C number	: 12139	Date Samples Received	: 03-MAY-2012
Sampler	: AR	Issue Date	: 09-MAY-2012
Order number	: 12139		
		No. of samples received	: 8
Quote number	: SY/400/11	No. of samples analysed	: 8

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
PC1, PC2, PC3, PC4, PC5, PC6, PC7, PCA	**02-MAY-2012**	**----**	----	----	**07-MAY-2012**	16-MAY-2012	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
PC1, PC2, PC3, PC4, PC5, PC6, PC7, PCA	**02-MAY-2012**	**08-MAY-2012**	29-OCT-2012	✓	**08-MAY-2012**	29-OCT-2012	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
PC4, PC5	**02-MAY-2012**	**07-MAY-2012**	16-MAY-2012	✓	**08-MAY-2012**	16-JUN-2012	✓
EP080: BTEX							
Soil Glass Jar - Unpreserved (EP080)							
PC4, PC5	**02-MAY-2012**	**07-MAY-2012**	16-MAY-2012	✓	**07-MAY-2012**	16-MAY-2012	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
PC4, PC5	**02-MAY-2012**	**07-MAY-2012**	16-MAY-2012	✓	**07-MAY-2012**	16-MAY-2012	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
PC4, PC5	**02-MAY-2012**	**07-MAY-2012**	16-MAY-2012	✓	**07-MAY-2012**	16-MAY-2012	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	4	40	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	16	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	2	20	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	11	**18.2**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Total Metals by ICP-AES	EG005T	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	**5.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	11	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Total Metals by ICP-AES	EG005T	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	**5.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	11	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Total Metals by ICP-AES	EG005T	1	16	**6.3**	**5.0**	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	**5.0**	**5.0**	✓	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	11	**9.1**	**5.0**	✓	ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2010 Draft) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (1999) Schedule B(3) (Method 506.1)
TPH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EG005T: Total Metals by ICP-AES	2714555-027	----	**Copper**	7440-50-8	89.8 %	90.1-114%	**Recovery less than lower control limit**
EG005T: Total Metals by ICP-AES	2714555-027	----	**Zinc**	7440-66-6	88.1 %	88.9-112%	**Recovery less than lower control limit**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

Chain of Custody Form – Ref 12139

Ref: 12139
Investigator: Envirowest Consulting
24 William Street
PO Box 8158 (postal address)
ORANGE NSW 2800
Telephone: (02) 6361 4954
Facsimile: (02) 6360 3960
Email: ec@envirowest.net.au
Contact Person: Andrew Ruming

Laboratory: Australian Laboratory Services
277 Woodpark Road
SMITHFIELD NSW 2164
Quotation #:
Courier/CN: SY-400-11

Sample ID	Container*	Sampling Date/Time	Sample matrix: Water	Soil	Sludge	Sample preservation: Cool	HNO3/ HCl	Unpre-served	Analysis: ALS Method Code S-1 As, Cd, Cr, Cu, Ni, Pb, Zn	S-4 TPH, BTEX
PC1	A	2/5/12		X		X		X	X	
PC2	A	2/5/12		X		X		X	X	
PC3	A	2/5/12		X		X		X	X	
PC4	A	2/5/12		X		X		X	X	X
PC5	A	2/5/12		X		X		X	X	X
PC6	A	2/5/12		X		X		X	X	
PC7	A	2/5/12		X		X		X	X	
PCA	A	2/5/12		X		X		X	X	

3 Day TAT please

TAT

Environmental Division Sydney
Work Order
ES1210772

Telephone : +61-2-8784 8555

Investigator: I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler name: Andrew Ruming
Date : 2/5/12 Time:

Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date	Time
Andrew Ruming	3/512	17:00	David	4/5	0700

Please return completed form to Envirowest Consulting, *A = 200mL solvent rinsed glass jar with Teflon lined lid, B = 2x40mL vials solvent rinsed Teflon lined septum caps, C 1x500mL glass bottles , solvent rinsed, Teflon lined cap, D= 200mL plastic bottle with nitric acid.

Appendix 5. Field sampling log

Client	Geolyse Pty Ltd
Contact	-
Job number	R12139c
Location	991 Barrier Highway, Cobar NSW
Date	3 May 2012
Investigator(s)	Andrew Ruming
Weather conditions	Fine

Sample id	Matrix	Date	Analysis required	Observations/comments
PC1	Soil	02/05/12	As, Cd, Cr, Cu, Pb, Ni, Zn,	Composite of 11, 12,13,14
PC2	Soil	02/05/12	As, Cd, Cr, Cu, Pb, Ni, Zn	Composite of 21,22,23,24
PC3	Soil	02/05/12	As, Cd, Cr, Cu, Pb, Ni, Zn	Composite of 31,32,33,34
PC4	Soil	02/05/12	TPH(C10-C36),BTEXN , As, Cd, Cr, Cu, Pb, Ni, Zn	Composite of 41,42,43,44
PC5	Soil	02/05/12	TPH(C10-C36),BTEXN , As, Cd, Cr, Cu, Pb, Ni, Zn	Composite of 51,52,53,54
PC6	Soil	02/05/12	As, Cd, Cr, Cu, Pb, Ni, Zn	Dam (borehole 6)
PC7	Soil	02/05/12	As, Cd, Cr, Cu, Pb, Ni, Zn	Fill (borehole 7)
PCA	Soil	02/05/12	As, Cd, Cr, Cu, Pb, Ni, Zn	Duplicate of PC1

Appendix D

Flora and Fauna Assessment

ABN:29 616 529 867
Advanced Regional Environmental Assessments (AREA)

- ✓ Environmental impact assessment, approvals and adulting
- ✓ Preliminary environmental assessment (PEA)
- ✓ Review of environmental factors (REF) & Minor Work REF
- ✓ Ecology assessments & biodiversity offsetting (BAM and Biobanking)
- ✓ Aboriginal & heritage assessments and community walkovers
- ✓ Community engagement
- ✓ Peer review & quote or tender preparation or advice
- ✓ Landscape design and architecture

25 July 2019

Flora and fauna assessment

Mining Accommodation Village, Lot 991 DP1029946 Barrier Highway, Cobar NSW

1 Background

AREA Environmental Consultants & Communication (AREA) was commissioned by Premise to complete a flora and fauna assessment in relation to the proposed expansion of the Cobar Mine Workers Village, located at Lot 991 DP1029946, Barrier Highway, Cobar. The village incorporates an amenities building for the servicing of meals and for recreation as well as accommodation for 119 workers. Premise is currently preparing a development application to expand the village to provide an additional 80 beds of accommodation together with minor changes to the amenities building, provision of an onsite fire water storage tank, bus parking bay and the provision of additional/expanded on site effluent management systems. About 2.5 hectares of native vegetation will be affected by the proposal.

The proposed effluent management systems have been sized via an On-Site Management Study completed by Envirowest Consulting Pty Ltd.

Scope of works will include:

- Installation of an additional 20 four berth accommodation buildings – refer Premise Drawing 218322_03C_A03;
- Installation of a 250,000 litre firefighting water tank – refer Premise Drawing 218322_03C_A03;
- Minor extension of the car parking on site including a bus parking bay to provide additional spaces (Figure 1.5); and
- Installation of various effluent management areas as per the recommendations of the Envirowest report (Figure 1.5).

The installation of the effluent management areas would typically entail the following:

- minor trenching from existing effluent tanks (Figure 2-1) to proposed site location to enable to the laying of the irrigation pipeline
- backfilling trench
- installing sprinkler system
- use of sprinkler system upon completion of installation.

Figure 1-1: Proposed accommodation site

Figure 1-2: Proposed firefigting tank site and bus parking area

This assessment has considered potential impact to listed species, populations and communities and has provided assessments of significance where required in regard to Section 7.3 of the BC Act (see below)

Biodiversity Conservation Act 2016 No 63

Current version for 1 February 2019 to date (accessed 8 March 2019 at 14:12)

Part 7 Division 1 Section 7.3

Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:
  (a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,
  (b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
    (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
    (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,
  (c) in relation to the habitat of a threatened species or ecological community:
    (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and
    (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and
    (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,
  (d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),
  (e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

(2) The Minister may, by order published in the Gazette with the concurrence of the Minister for Planning, issue guidelines relating to the determination of whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. Any such guidelines may include consideration of the implementation of strategies under the Biodiversity Conservation Program.

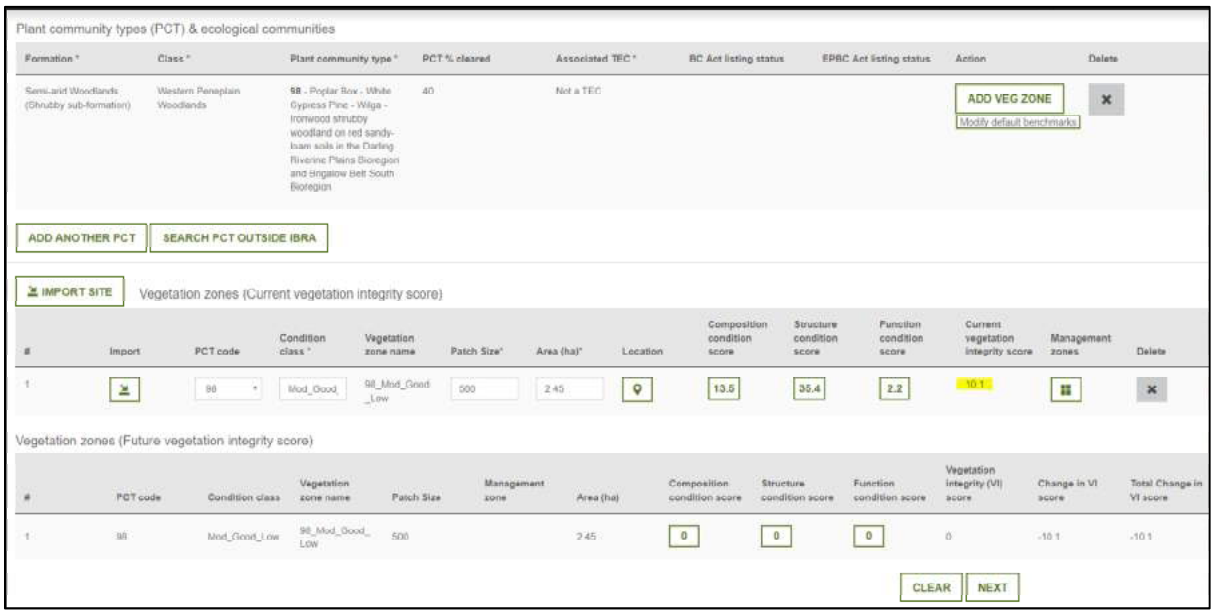
Other consideration under the Act include:

- The impact to vegetation in the study area is 2.45 hectares according to shape files issued with the finalised design detail shown in Figure 1-4.
- As the minimum lot size is 1000 ha or more any impact above two hectares requires a Biodiversity Development Impact Assessment Report (BDAR).
- Data from two BAM (2016) plots collected on the study area was used by an accredited assessor in the BAM Credit Calculator to calculate the vegetation integrity score. The score was 10.1 (see Figure 1-3).
- In Stage 1 of a BDAR s3.1.1.3 states *if a vegetation zone has a vegetation integrity score of <20 where the PCT is not representative of a TEC or associated with threatened species habitat then for that zone:*
  - *assessment of native vegetation is not required beyond s5.4 and*

- *an assessment of threatened species habitat according to Section 6.2 and Paragraphs 6.2.1.4 is not required.*

- In plain English this means if you have collected the essential data you need to populate the BAM CC and run the data and have looked in the area to confirm no threatened species will be affected, then offsetting is not triggered and no further assessment is considered necessary under the BC Act.
- As a result of the above the remainder of this report does not go beyond s5.4 of the BAM.

Figure 1-3: Biodiversity Assessment Method Credit Calculator output shoing the vegegation integrity score



A desktop review and a site assessment were conducted. The site assessment was completed on 21 March 2019 by an AREA ecologist and an AREA archaeological consultant (Table 1-1).

The site assessment findings are presented in this report.

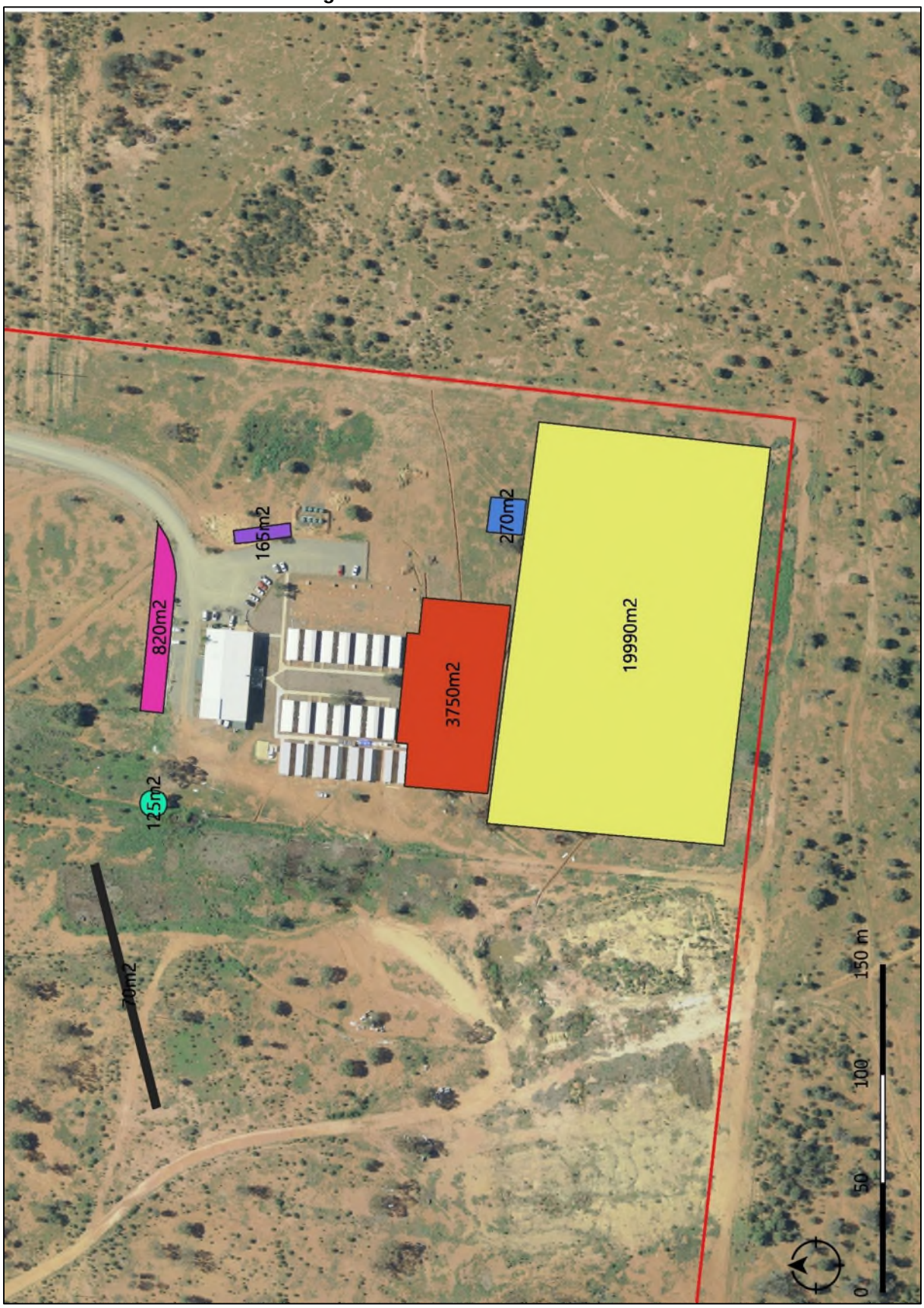
The findings indicate this proposal will not impact a native vegetation community and is very unlikely to impact threatened species or biodiversity/ habitat values given that:

- No trees and two shrubs will be removed by this proposal
- Very little ground cover exists within the proposed development.

AREA determines through desktop study and field survey,

- there will be no significant impact resulting from the proposal
- further impact or biodiversity assessment is determined not to be required in this case.

Figure 1-4: Areas of disturbance



The following AREA personnel were involved in the assessment and completion of this report.

Table 1-1: AREA personnel

Staff member	Qualifications	Role
Dave Sturman Environmental Consultant	• B. Env. Sc. Charles Sturt University • Cert. III Horticulture TAFE • White card – general construction induction card. • RMS-worker on foot training. • Senior First Aid • Chainsaw operator ticket • Confined Space worker and atmospheric monitoring. • Risk assessment training.	Field work (Ecology) Report Writing
Phil Cameron Principal Consultant	• BSc. Major in Biology. Macquarie University • Ass Dip App Sci. University of Queensland • Certified Environmental Practitioner (EIANZ) and practicing member • NSW OEH BioBanking and Bio-certification Assessor: accreditation number 0117 • NSW OEH Biodiversity Assessment Method Assessor: accreditation number BAAS17082 • NSW OEH Scientific License: 101087 • NSW DPI Ethics Approval 17/459 (3) • Practicing member of the NSW Ecological Consulting Association	Field work (Archaeology /Ecology) Certification Project management

2 Desktop assessments

The desktop assessment included review of the databases listed in Table 2-1.

Table 2-1: Database search results summary

Database	Result within 1500m of the proposal	Result indicate need to closer consideration.
NSW Government - Native Vegetation Regulation Map	**No.** (Figure 2-1)	**No.**
NSW Government – Biodiversity Values Map and Threshold Tool.	**No.**	**No.**
NSW Office of Environment and Heritage BioNet Species Sightings database.	One Record of Brolga and One Record of Painted Honeyeater.	**No** Only two records were within 1500 metres of the proposed development and all were outside the boundaries of the proposed development. The development will have no significant impact on these species.
NSW Office of Environment and Heritage threatened species search by IBRA subregion.	An IBRA Bioregion search of the Cobar Peneplains bioregion, Canbelago Downs Subregion produced; 53 fauna, 10 species of flora were predicted to be in the area and four endangered EEC's.	**No.** No vegetation or habitat features will be removed or impacted by the proposal. Evidence of this is provided within the body of this letter.
Plant Community Type/ Vegetation.	Poplar Box- Gum Coolabah- White Cypress Pine Shrubby Woodland mainly in the Cobar Peneplains Bioregion	**No**. No plant communities will be removed or impacted by the proposal. Field survey concluded the vegetation in the subject site was

Database	Result within 1500m of the proposal	Result indicate need to closer consideration.
		The vegetation observed at the subject site was not consistent with this PCT. Evidence of this is provided within the body of this letter.
EPBC Act Protected Matters Report generated with a one kilometre buffer on the project alignment.	Yes for: • Listed Threatened Ecological Communities (1) • Wetlands of International Importance (3) • Listed Threatened Species (10) • Listed Migratory Species (7) • Listed Marine Species (13) • Invasive Species (14) No for all other headings in this report (Appendix).	**No**: Matters raised in this report are either covered during the threatened species analysis or are highly unlikely to be present in the project site, and if they were, they are highly unlikely to be impacted by the proposal.

Figure 2-1: Native Vegetation Regulatory map.

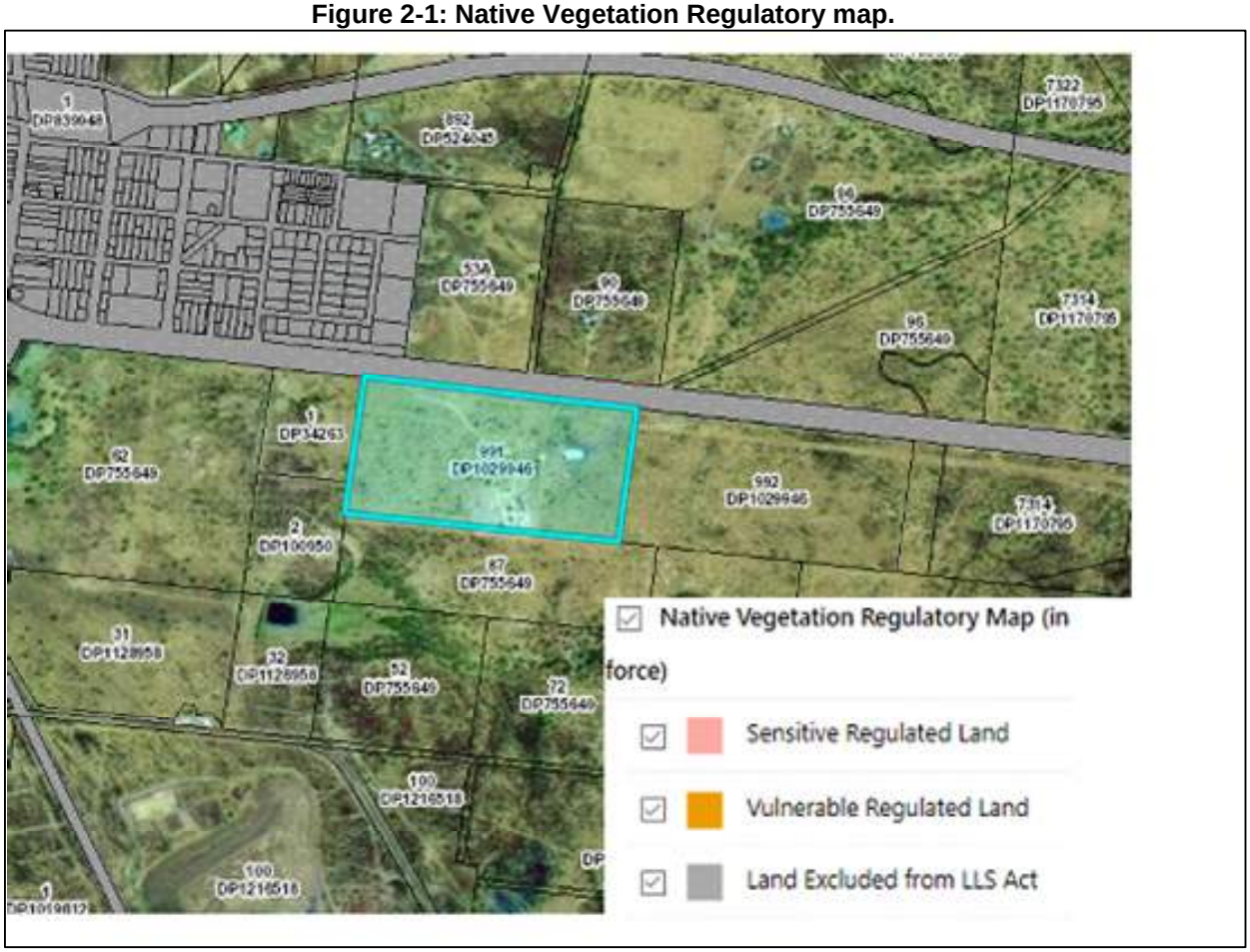
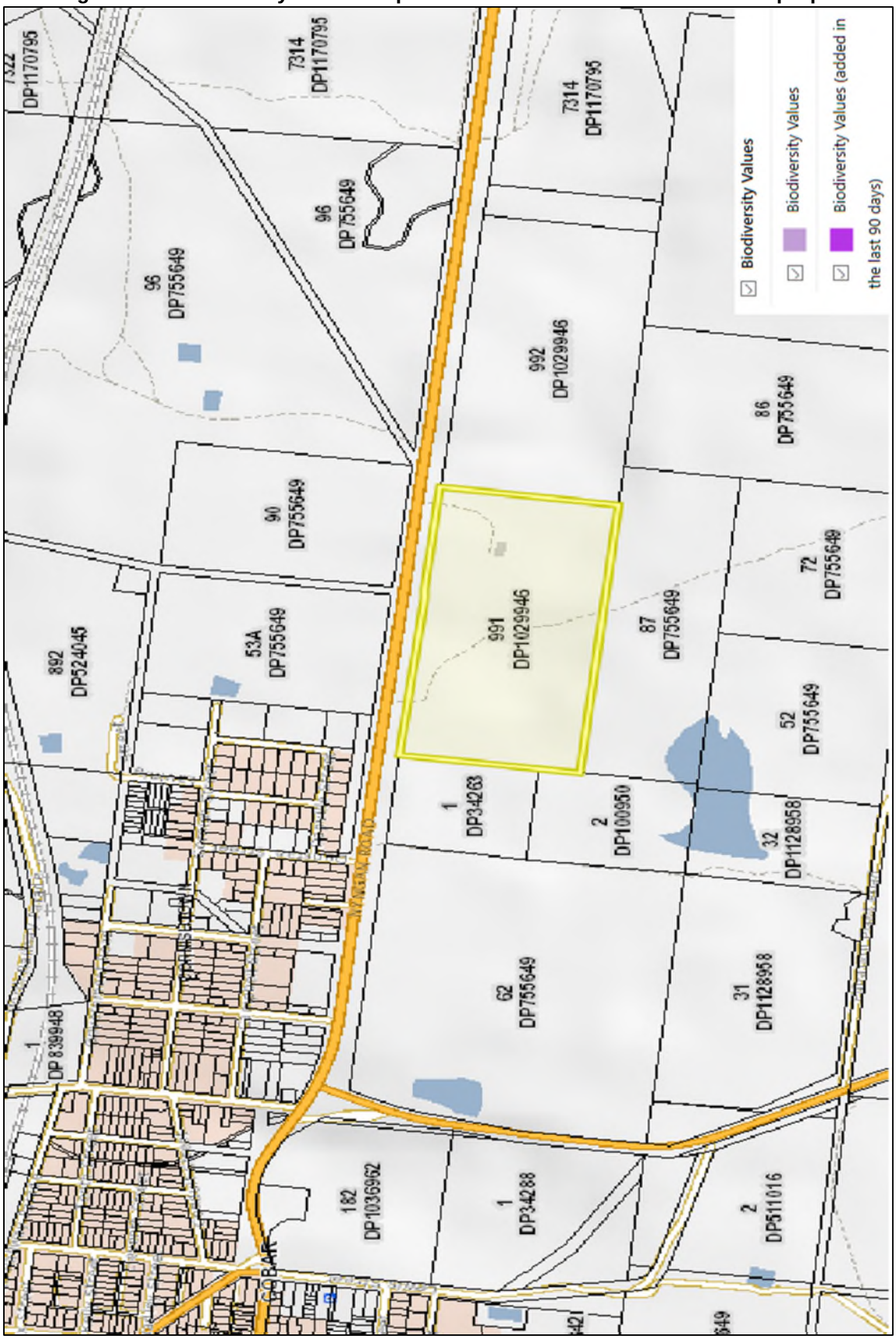
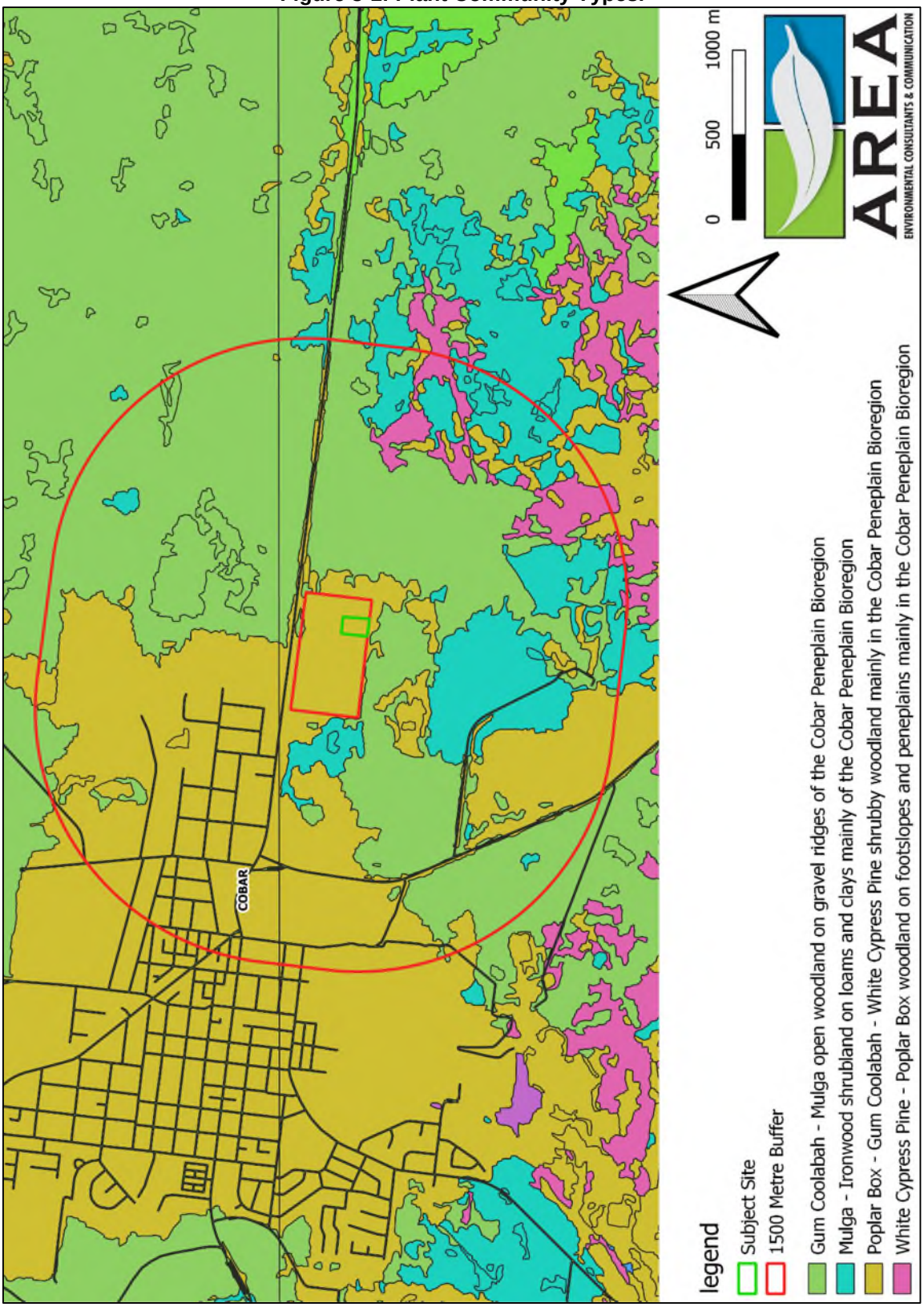


Figure 2-2: Biodiversity Values Map: Yellow line indicates location of the proposal.



3 Vegetation

Figure 3-1: Plant Community Types.



4 Threatened species

Figure 4-1 presents the threatened species sightings as recorded on the OEH BioNet database shown on Table 4-1.

Table 4-1: BioNet Species Sighing Records.

Class Name	Scientific Name	Common Name	NSW Status	Commonwealth Status
Aves	Oxyura australis	Blue-billed Duck	Vulnerable	
Aves	Plegadis falcinellus	Glossy Ibis	P	C
Aves	Hieraaetus morphnoides	Little Eagle	V P	
Aves	Hieraaetus morphnoides	Little Eagle	V P	
Aves	Hieraaetus morphnoides	Little Eagle	V P	
Aves	Hieraaetus morphnoides	Little Eagle	V P	
Aves	Hieraaetus morphnoides	Little Eagle	V P	
Aves	Hieraaetus morphnoides	Little Eagle	V P	
Aves	Hieraaetus morphnoides	Little Eagle	V P	
Aves	Hieraaetus morphnoides	Little Eagle	V P	
Aves	Hieraaetus morphnoides	Little Eagle	V P	
Aves	Falco subniger	Black Falcon	V P	
Aves	Grus rubicunda	Brolga	V P	
Aves	Calidris acuminata	Sharp-tailed Sandpiper	P	C J K (China, Korea and Japan bilateral agreements)
Aves	Tringa nebularia	Common Greenshank	P	C J K
Aves	Tringa stagnatilis	Marsh Sandpiper	P	C J K
Aves	Lophochroa leadbeateri	Major Mitchell's Cockatoo	V P 2	
Aves	Lophochroa leadbeateri	Major Mitchell's Cockatoo	V P 2	
Aves	Lophochroa leadbeateri	Major Mitchell's Cockatoo	V P 2	
Aves	Polytelis swainsonii	Superb Parrot	V P 3	V
Aves	Ninox connivens	Barking Owl	V P 3	
Aves	Merops ornatus	Rainbow Bee-eater	P	J
Aves	Merops ornatus	Rainbow Bee-eater	P	J
Aves	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V P	
Aves	Certhionyx variegatus	Pied Honeyeater	V P	
Aves	Certhionyx variegatus	Pied Honeyeater	V P	
Aves	Certhionyx variegatus	Pied Honeyeater	V P	
Aves	Certhionyx variegatus	Pied Honeyeater	V P	
Aves	Certhionyx variegatus	Pied Honeyeater	V P	
Aves	Grantiella picta	Painted Honeyeater	V P	V
Aves	Grantiella picta	Painted Honeyeater	V P	V
Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V P	
Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V P	
Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V P	
Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V P	
Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V P	

Class Name	Scientific Name	Common Name	NSW Status	Commonwealth Status
Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V P	
Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Vulnerable (V) Protected (P)	
Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V P	
Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V P	
Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V P	
Aves	Daphoenositta chrysoptera	Varied Sittella	V P	
Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	V P	
Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	V P	
Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	V P	
Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	V P	
Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	V P	
Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V P	
Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V P	
Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V P	
Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V P	
Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V P	
Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V P	
Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V P	
Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V P	
Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V P	
Aves	Stagonopleura guttata	Diamond Firetail	V P	
Mammalia	Antechinomys laniger	Kultarr	Endangered (E1) P	
Mammalia	Antechinomys laniger	Kultarr	E1 P	
Mammalia	Antechinomys laniger	Kultarr	E1 P	
Mammalia	Antechinomys laniger	Kultarr	E1 P	
Mammalia	Antechinomys laniger	Kultarr	E1 P	
Mammalia	Onychogalea fraenata	Bridled Nailtail Wallaby	Extinct (E4) P	E
Mammalia	Chalinolobus picatus	Little Pied Bat	V P	
Mammalia	Rattus villosissimus	Long-haired Rat	V P	
Flora	Lepidium monoplocoides	Winged Peppercress	E1	E
Flora	Lepidium monoplocoides	Winged Peppercress	E1	E
Flora	Acacia curranii	Curly-bark Wattle	V	V
Flora	Acacia curranii	Curly-bark Wattle	V	V
Flora	Acacia curranii	Curly-bark Wattle	V	V
Flora	Pterostylis cobarensis	Greenhood Orchid	V P	

Figure 4-1: 10km BioNet Search Results

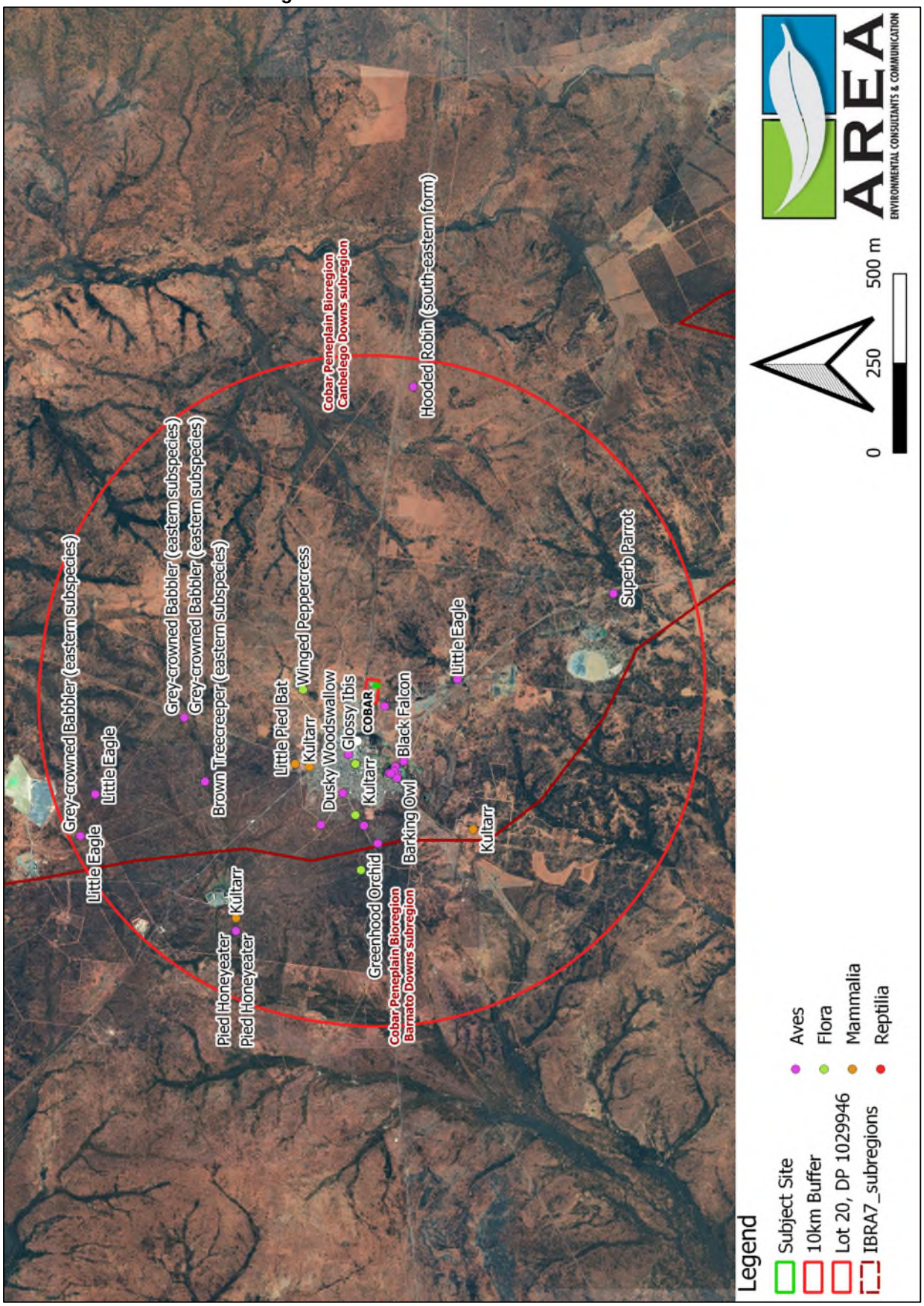


Table 4-2 lists the threatened species predicted to occur in the Cobar Peneplain Bioregion – Canbelago Downs subregion.

Table 4-2: Threatened species predicted search results summary

Type of Species	Number
Animal>Amphibian	1
Animal>Bats	4
Animal>Birds	41
Animal>Mammals	6
Animal>Reptiles	1
Community>Threatened Ecological Communities	4
Flora	10

The subject site was checked for threatened plant and animal species (Table 4-3). None were recorded.

Table 4-3: Survey Effort Summary 1

Subject	Survey effort	Survey completed
Listed fauna predicted to occur in the study area.	• Trees were assessed for size class and presence of hollows and hollows greater than 20cm diameter. • Incidental bird watching.	Yes. Survey is complete. As the study area is small it was entirely assessed. The minimum survey effort required has been met by the assessment
Flora	• A comprehensive flora species list was compiled for the study area • Complete on foot assessment following *NSW Guide to Surveying Threatened Plants 2016* across the study area.	Yes. Survey is complete. As the study area is small it was entirely assessed. The minimum survey effort required has been met by the assessment
Vegetation	• Three BAM plots were completed on the Lot and DP	Yes. Data from two plots (Plots 2 and 3, being the closest to the impact footprint) were used in the BAM CC to calculate the vegetation integrity score.

- No threatened species were observed during the assessment and none are thought to remain undetected.
- The PCT vegegation intergity score was 10.1 (below the threfhold of 20 to trigger a BDAR)
- No tests of significance under the BC Act were implemented for this proposal.

Figure 4-2: Survey Transect

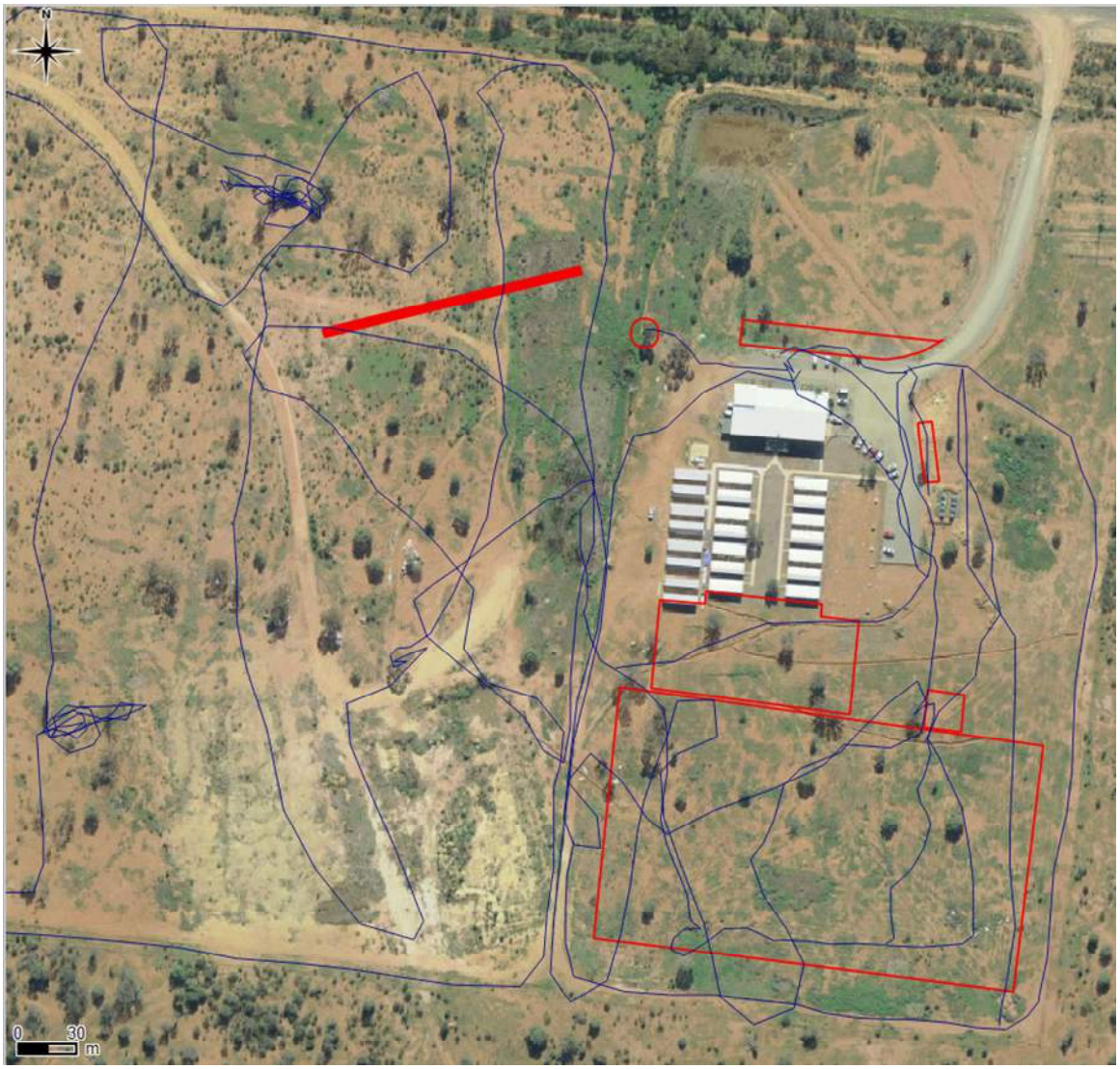


Figure 4-3: Existing Vegetation

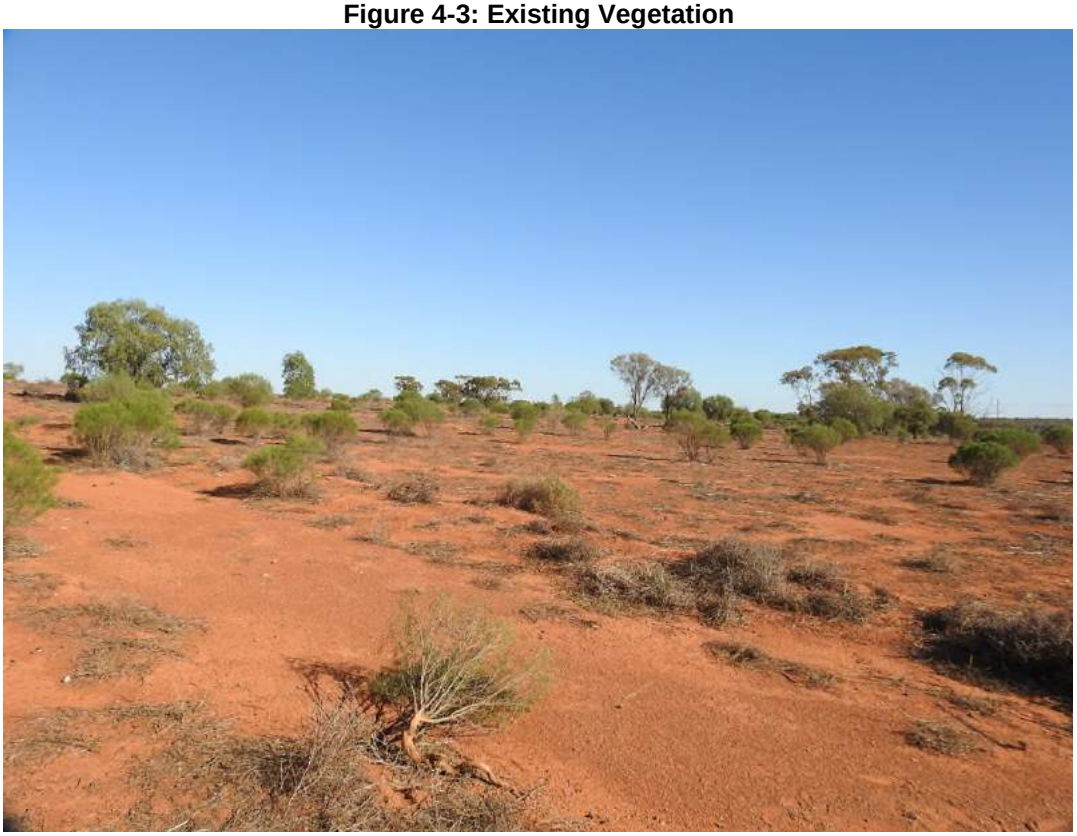


Figure 4-4: Existing Vegetation

5 Matters Protected by the EPBC Act

The EPBC Protected Matters Report, generated with a one kilometre buffer around the proposed subject site. presents matters protected under the EPBC Act which may occur in the one kilometre buffer area. The report generated has been included as Attachment B.

All matters discussed by this report are all either addressed in the assessments of significance, or are unlikely to be on the proposed alignment, and/or are unlikely to be impacted by the proposal.

- One Threatened Ecological Community, Weeping Myall Woodland, was predicted by the EPBC Protected Matters Report. This Ecological Community is not present within the subject site.
- All migratory and marine species detailed in the EPBC Protected Matters Report are unlikely to be present within the subject site and will not be significantly impacted.
- Subject site is located next to a mining village. Anthropological activity and lack of native habitat make it unlikely any significant impact will occur to listed species or communities.
- The proposal is removing virtually no vegetation or habitat features.
- No tests of significance are necessary under the EPBC Act.

6 Key threatening processes

This proposal is in previously disturbed land, on the outskirts Cobar, immediately adjacent to the Mining Village accommodation and is therefore not expected to contribute to any key threatening processes.

7 Conclusion

The proposal will

- not have a significant impact on any threatened species,
- will not impact a native vegetation community and
- will not disrupt or remove habitat features.

No further assessment is recommended for this proposal.

Regards,

Dave Sturman
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We acknowledge Traditional Owners and Custodians and their ancestors

https://areaenvironmental.com.au/

References

Envirowest Consulting Pty Ltd. (2018). *On-site effluent management study Mining Accommodation Village, Lot 991 DP1029946 Barrier Highway, Cobar NSW.* Report Numner R12139-2e, Orange .

8 Appendix A- EPBC Protected Matters Report.

9 Appendix B- IBRA, Cobar Peneplains, Canbelago Downs Subregion Results.

Scientific Name	Common Name	Type Of Species	NSW Status
Crinia sloanei	Sloane's Froglet	Animal>Amphibians	Vulnerable
Chalinolobus picatus	Little Pied Bat	Animal>Bats	Vulnerable
Mormopterus eleryi	Bristle-faced free-tailed bat, Hairy-nosed Freetail Bat	Animal>Bats	Endangered
Nyctophilus corbeni	Corben's Long-eared Bat	Animal>Bats	Vulnerable
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Animal>Bats	Vulnerable
Amytornis striatus	Striated Grasswren	Animal>Birds	Vulnerable
Anseranas semipalmata	Magpie Goose	Animal>Birds	Vulnerable
Ardeotis australis	Australian Bustard	Animal>Birds	Endangered
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Animal>Birds	Vulnerable
Botaurus poiciloptilus	Australasian Bittern	Animal>Birds	Endangered
Burhinus grallarius	Bush Stone-curlew	Animal>Birds	Endangered
Calyptorhynchus lathami	Glossy Black-Cockatoo	Animal>Birds	Vulnerable
Certhionyx variegatus	Pied Honeyeater	Animal>Birds	Vulnerable
Chthonicola sagittata	Speckled Warbler	Animal>Birds	Vulnerable
Cinclosoma castanotum	Chestnut Quail-thrush	Animal>Birds	Vulnerable
Circus assimilis	Spotted Harrier	Animal>Birds	Vulnerable
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Animal>Birds	Vulnerable
Daphoenositta chrysoptera	Varied Sittella	Animal>Birds	Vulnerable
Epthianura albifrons	White-fronted Chat	Animal>Birds	Vulnerable
Falco hypoleucos	Grey Falcon	Animal>Birds	Endangered
Falco subniger	Black Falcon	Animal>Birds	Vulnerable
Geophaps scripta scripta	Squatter Pigeon (southern subspecies)	Animal>Birds	Critically Endangered
Grantiella picta	Painted Honeyeater	Animal>Birds	Vulnerable
Grus rubicunda	Brolga	Animal>Birds	Vulnerable
Haliaeetus leucogaster	White-bellied Sea-Eagle	Animal>Birds	Vulnerable
Hamirostra melanosternon	Black-breasted Buzzard	Animal>Birds	Vulnerable
Hieraaetus morphnoides	Little Eagle	Animal>Birds	Vulnerable
Leipoa ocellata	Malleefowl	Animal>Birds	Endangered
Limosa limosa	Black-tailed Godwit	Animal>Birds	Vulnerable
Lophochroa leadbeateri	Major Mitchell's Cockatoo	Animal>Birds	Vulnerable
Lophoictinia isura	Square-tailed Kite	Animal>Birds	Vulnerable
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Animal>Birds	Vulnerable
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Animal>Birds	Vulnerable
Neophema pulchella	Turquoise Parrot	Animal>Birds	Vulnerable

Scientific Name	Common Name	Type Of Species	NSW Status
Ninox connivens	Barking Owl	Animal>Birds	Vulnerable
Oxyura australis	Blue-billed Duck	Animal>Birds	Vulnerable
Pachycephala inornata	Gilbert's Whistler	Animal>Birds	Vulnerable
Polytelis swainsonii	Superb Parrot	Animal>Birds	Vulnerable
Pomatostomus halli	Hall's Babbler	Animal>Birds	Vulnerable
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Animal>Birds	Vulnerable
Pyrrholaemus brunneus	Redthroat	Animal>Birds	Vulnerable
Rostratula australis	Australian Painted Snipe	Animal>Birds	Endangered
Stagonopleura guttata	Diamond Firetail	Animal>Birds	Vulnerable
Stictonetta naevosa	Freckled Duck	Animal>Birds	Vulnerable
Turnix maculosus	Red-backed Button-quail	Animal>Birds	Vulnerable
Tyto novaehollandiae	Masked Owl	Animal>Birds	Vulnerable
Antechinomys laniger	Kultarr	Animal>Marsupials	Endangered
Dasyurus maculatus	Spotted-tailed Quoll	Animal>Marsupials	Vulnerable
Onychogalea fraenata	Bridled Nailtail Wallaby	Animal>Marsupials	Presumed Extinct
Petrogale penicillata	Brush-tailed Rock-wallaby	Animal>Marsupials	Endangered
Phascolarctos cinereus	Koala	Animal>Marsupials	Vulnerable
Sminthopsis macroura	Stripe-faced Dunnart	Animal>Marsupials	Vulnerable
Antaresia stimsoni	Stimson's Python	Animal>Reptiles	Vulnerable
Artesian Springs Ecological Community in the Great Artesian Basin	Artesian Springs Ecological Community in the Great Artesian Basin	Community>Threatened Ecological Communities	Critically Endangered Ecological Community
Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions	Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions	Community>Threatened Ecological Communities	Endangered Ecological Community
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Community>Threatened Ecological Communities	Endangered Ecological Community
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Community>Threatened Ecological Communities	Endangered Ecological Community
Atriplex infrequens		Plant>Herbs and Forbs	Vulnerable
Lepidium monoplocoides	Winged Peppercress	Plant>Herbs and Forbs	Endangered
Oldenlandia galioides		Plant>Herbs and Forbs	Endangered
Sida rohlenae	Shrub Sida	Plant>Herbs and Forbs	Endangered
Swainsona murrayana	Slender Darling Pea	Plant>Herbs and Forbs	Vulnerable
Diuris tricolor	Pine Donkey Orchid	Plant>Orchids	Vulnerable
Pterostylis cobarensis	Greenhood Orchid	Plant>Orchids	Vulnerable
Acacia curranii	Curly-bark Wattle	Plant>Shrubs	Vulnerable
Bertya opponens	Coolabah Bertya	Plant>Shrubs	Vulnerable
Acacia petraea	Lancewood	Plant>Trees	Endangered

Scientific Name	Common Name	Type Of Species	NSW Status
Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations	Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species	Threat>Disease	Key Threatening Process
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	Threat>Disease	Key Threatening Process
Infection of native plants by Phytophthora cinnamomi	Infection of native plants by Phytophthora cinnamomi	Threat>Disease	Key Threatening Process
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Alteration to the natural flow regime of rivers, streams, floodplains & wetlands.	Threat>Habitat Loss/Change	Key Threatening Process
Anthropogenic Climate Change	Human-caused	Threat>Habitat Loss/Change	Key Threatening Process
Bushrock removal	Bushrock Removal	Threat>Habitat Loss/Change	Key Threatening Process
Clearing of native vegetation	Clearing of native vegetation	Threat>Habitat Loss/Change	Key Threatening Process
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	Ecological consequences of high frequency fires	Threat>Habitat Loss/Change	Key Threatening Process
Loss of Hollow-bearing Trees	Loss of Hollow-bearing Trees	Threat>Habitat Loss/Change	Key Threatening Process
Loss or degradation (or both) of sites used for hill-topping by butterflies	Loss and/or degradation of sites used for hill-topping by butterflies	Threat>Habitat Loss/Change	Key Threatening Process
Removal of dead wood and dead trees	Removal of dead wood and dead trees	Threat>Habitat Loss/Change	Key Threatening Process
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	Threat>Other Threat	Key Threatening Process

Appendix E

BCA Assessment

NATIONAL CONSTRUCTION CODE ASSESSMENT REPORT

Building Code of Australia – Volume One & Two

MINING ACCOMODATION CAMP

Lot 991, DP1029946

Barrier Highway, Cobar

Report No: 131/2019 CO

Revision: 1.0

Date Prepared: 8th February 2019

Executive Summary

This report details the results of an assessment of the Mining Camp Development at Lot 991 Barrier Highway, Cobar undertaken against the relevant, Deemed-to-Satisfy (DtS) provisions of National Construction Code of Australia 2016 – Building Code of Australia Volume One & Two (NCC) as outlined in the report.

The purpose of this report is to assess compliance of the existing Main Building against the DtS provisions of the NCC, to provide commentary on the Building Classification of the Accommodation Buildings and to provide further comments as to how many accessible accommodation rooms are required on-site.

It is to be noted that this assessment has been based on the Plans and Specifications provided by the client as detailed in Appendix A of this report. A number of the compliance issues that have been identified rely on assumptions and interpretations that have been made, as outlined in Section 5 of this report. These matters should be clarified and confirmed prior to construction.

Document Control

Document No.	Revision	Issue Date	Report Details		
131/2019	1.0	08.03.18	**Description:**	NCC Assessment Report	
			Prepared by:	Mr. Neil Diamond BPB No. 0091 (A1)	
			Checked by:	Mr. Travis Stewart BPB No. 0393 (A1)	

Table of Contents

1. Introduction & Purpose

This report details the results of an assessment of the existing Mining Camp at Lot 991, DP 1029946, also known as Lot 991 Barrier Highway, Cobar against the relevant Deemed-to-Satisfy (DtS) provisions of Parts C, D, E of the National Construction Code of Australia 2016 – Building Code of Australia Volume One (NCC), Deemed-to-Satisfy (DtS) provisions of the National Construction Code of Australia 2016 – Building Code of Australia Volume Two (NCC).

The report has been prepared by Pro Cert Group Pty Ltd for Rovest Holdings Pty Ltd to assist in preparation of Construction Certificate Application Documentation.

2. Description of Development

The development that is the subject to the assessment as detailed in this report is as follows:

- Main Building which contains central Administration, Kitchen, Dining, Recreation and Laundry facilities; and
- Accommodation Buildings.

3. Scope and Limitations

3.1 Scope

The scope of this assessment is limited to the assessment of the design documentation referenced in Appendix A of this report.

3.2 Limitations

The following limitations apply to the assessment:

- The works that are the subject of this report are limited to the Plans and other documentation as listed in Appendix A.
- Details in regards to access for people with disabilities have been assessed to the extent of the deemed-to-satisfy provisions of the NCC. The assessment does not consider the requirements for people with disabilities under the provision of the Disabilities Discrimination Act 1992.
- The assessment does not cover the requirements of legislation other than the nominated sections of the EP&A Act which might address building works such as Work Health & Safety, Construction Safety or the like.
- Generally the assessment does not incorporate the detailed requirements of Australian Standards unless specifically noted.
- **This report has been prepared based upon information provided by others. Pro Cert Group Pty Ltd has not verified the accuracy and / or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated into this report as a result.**

3.3 Documentation

The following documentation has been reviewed, referenced and/or relied upon in the preparation of this report:

- National Construction Code 2016 Volume 1 & Volume 2;
- Guide to Volume 1 of the National Construction Code 2016;
- Plans & other documentation as listed in Appendix A.

4. Methodology

The following method of assessment has been used in the preparation of this report:

1. Determine the basic assessment data for the building;
2. Assess the design of the building against the current Deemed-to-Satisfy requirements of Sections C, D and E of the NCC. Establish the status of each clause into the following categories:
    a. Clause is or is not relevant to the proposed work **Applicable or Not Applicable (NA)**;
    b. The proposed work complies with the requirements of the clause **Complies**;
    c. Compliance with the requirements of the clause is unable to be determined from the documentation **Further Information (FI)**. This recommendation in the "Comments" column indicates that further information is required to demonstrate compliance;
    d. Proposed work / existing building does not comply with the requirements of the clause **Does Not Comply (DNC)**. An indication will be provided in the "Comments" column as to the nature of the issue and whether an alternative solution has been proposed to address the issue.
    e. Clause is administrative information only **(Noted)**;
3. Nominate the status of the design against each NCC requirement;
4. Provide comments against each NCC requirement as appropriate.

5. Assessment Data Summary

5.1 Assumptions & Interpretations

It should be noted that a number of issues within the NCC are recognised to be interpretive in nature. Where these issues are encountered interpretations are made that are considered to be within standard industry practice and / or Pro Cert Group Pty Ltd policy formulated in regard of each issue. The following interpretations and assumptions have been made in the preparation of this report:

(a) The external verandahs, stairs & decks of the development have been considered to be Class 10a & 10b parts of the relevant buildings.

(b) The Goods Entry area of the Main Building has not been considered as part of the floor area of the building as this is essentially a covered loading dock with an extended eave overhang and as no materials, goods or waste are stored in this area it is not considered to contribute to the fire load of the building.

5.2 Building Characteristics

The following assessment data has been drawn from the provisions of the NCC and from an assessment of the plans submitted by the client.

5.2.1 Classification

The buildings in their proposed form have been classified in accordance with the requirements of Clause A3.2 & 1.3.2 of the NCC and the building classifications are summarised as follows:

Main Building	
Class	**Description**
5	Offices
6	Kitchen & Dining
9b	Recreation & Gym
10a & 10b	Verandahs & Decks

Accommodation Buildings	
Class	**Description**
1b	Accommodation Building
10a & 10b	Verandahs & Decks

5.2.2 Summary of Construction Determination

The type of construction required for the proposed building works is summarised as follows:

Main Building	
Classification	6, 9b, 10a & 10b
Number of Storeys Contained	1
Rise in storeys	1
Preliminary Type of Construction	C
Floor Area	831 m^2
Volume	3,324 m^3 Approx.
Concessions	N/A
Effective Height	<25m
Final Type of Construction	C
Climate Zone	4

Accommodation Building	
Classification	1b, 10a & 10b
Number of Storeys Contained	1
Rise in storeys	1
Preliminary Type of Construction	-
Floor Area	48 m^2
Volume	N/A
Concessions	Nil
Effective Height	<25m
Final Type of Construction	-
Climate Zone	4

5.2.3 Discussion on Classification of Accommodation Buildings

The accommodation buildings that are located on the site currently and which are understood to also be typical of the accommodation buildings that are proposed to be installed on-site as part of the proposed camp expansion are considered to be either Class 1b or Class 3 buildings based on the description of these classifications as follows:

***Class 1** — one or more buildings, which in association constitute—*

(c) ***Class 1b** —*

(i) a boarding house, guest house, hostel or the like—

(A) with a total area of all floors not exceeding 300 m2 measured over the enclosing walls of the Class 1b building; and

(B) in which not more than 12 persons would ordinarily be resident; or

(ii) 4 or more single dwellings located on one allotment and used for short-term holiday accommodation,

which are not located above or below another dwelling or another Class of building other than a private garage (see Figure 1.3.1, 1.3.2 and 1.3.3).

Class 3:

a residential building, other than a building of Class 1 or 2, which is a common place of long term or transient living for a number of unrelated persons, including—

(a) a boarding house, guest house, hostel, lodging house or backpackers accommodation; or

(b) a residential part of a hotel or motel; or

(c) a residential part of a school; or

(d) accommodation for the aged, children or people with disabilities; or

(e) a residential part of a health-care building which accommodates members of staff; or

(f) a residential part of a detention centre.

In determining the classification that is applicable to the accommodation buildings there are certain key parts to the definitions of the classifications that need to be taken into consideration. In particular the wording of the Class 3 definition states that a Class 3 building is a residential building that is other than a Class 1 or 2. As such the building must first be assessed as to whether it can be considered as a Class 1 or 2 before a Class 3 classification is applied.

It should be noted that Class 2 is not considered applicable in this instance as each room of the accommodation building does not constitute a separate dwelling and Class 2 classifications are applied in instances where Class 1 dwellings are located above or below another dwelling which is not the situation in this case as the buildings are single storey.

When considering the accommodation buildings against the definition of the Class 1b classification it is noted that they would be considered to be equivalent to a hostel type building and the floor area is less than the 300m^2 limit, being 48m^2 (excluding verandah) and where the number of residents is less than the 12 resident limit, being 4 residents (3 in the accessible accommodation building).

As such the individual accommodation buildings are considered able to fit within the criteria that is applicable from the Class 1b classification definition.

A further consideration of whether they can be classified as a Class 1b building is an assessment of the facilities provided within and for the buildings. As the NCC is a performance based document the mandatory requirements of the NCC are contained within the Performance Requirements and the Deemed-to-Satisfy provisions contained within the NCC are one way of satisfying the Performance Requirements.

In relation to facilities it is noted that the applicable Performance Requirement for Class 1 buildings is P2.4.3 which is as follows:

P2.4.3 Facilities

(a) Suitable sanitary facilities for personal hygiene must be provided in a convenient location within or associated with a building, appropriate to its function or use.

*(b) * * * * **

(c) Laundering facilities or space for laundering facilities and the means for sanitary disposal of waste water must be provided in a convenient location within or associated with a building, appropriate to its function or use.

(d) A food preparation facility must be provided which includes—

(i) a means for food rinsing, utensil washing and the sanitary disposal of associated waste water; and

(ii) a means for cooking food; and

(iii) a space for food preparation.

(e) A sanitary compartment must be constructed with sufficient space or other means to enable an unconscious occupant to be removed from the compartment.

Under Part 3.8.3 of the NCC Clause 3.8.3.2 details that if the facilities detailed within the clause are provided for a Class 1 building then Performance Requirement P2.4.3 is satisfied. These facilities are as follows:

3.8.3.2 Required facilities

(a) A Class 1 building must be provided with—

(i) a kitchen sink and facilities for the preparation and cooking of food; and

(ii) a bath or shower; and

(iii) clothes washing facilities, comprising at least one washtub and space in the same room for a washing machine; and

(iv) a closet pan; and

(v) a washbasin.

(b) If any of the facilities in (a) are detached from the main building, they must be set aside for the exclusive use of the occupants of the building.

The provision of these facilities for the accommodation buildings is examined within the following table:

Facility	Comment
Kitchen Sink & Cooking Facilities	No cooking facilities provided within the accommodation buildings. Common dining facilities are provided within the Main Building with meals provided.
Bath or Shower	Shower provided in ensuite of each room.
Clothes washing facilities including washtub	No laundry facilities provided within the accommodation buildings. Common laundry facilities are provided within the Main Building for washing of civilian clothes.
WC	Toilet provided in ensuite of each room.
Washbasin	Washbasin provided in ensuite of each room.

As such based on the above the accommodation buildings have the required facilities required under Clause 3.8.3.2 however it is noted that the laundry facilities provided are communal facilities which consist of three (3) washing machines, three (3) dryers and one (1) laundry tub. The management of the mining camp has advised that these laundry facilities are provided for residents to be able to wash civilian clothes as the washing of all bed linen and work clothes is provided for via an off-site laundry service. As such the residents do have access to laundry facilities for washing of their personal clothes.

It is also noted that in terms of Kitchen facilities the residents do not cook their own food as all meal preparation is undertaken for them within the commercial kitchen and residents dine within the communal dining area.

As such whilst the residents are not provided with their own dedicated laundry or cooking facilities it is considered that they are still provided with adequate facilities which would meet the requirements of Performance Requirement P2.4.3 and as such a Performance Solution in relation to the provision of adequate sanitary facilities would be considered appropriate and that the individual accommodation buildings can be considered to be Class 1b buildings.

5.3 Number of Accessible Accommodation Rooms Required

Under the provisions of Clause D3.1 and following on from the interpretation detailed in this report that they are to be each considered a Class 1b building access is required to and within at least 1 bedroom including associated accessible sanitary facilities of each accommodation building and to the common facilities such as the cooking, laundry, gymnasium, recreation room and dining area.

In this regard the accommodation buildings do not comply with this application of Table D3.1 as currently one accommodation building has an accessible bedroom with accessible sanitary facilities. An alternative application of the provisions of Table D3.1 would be to use the ratios applicable to dwellings used for short term holiday accommodation where each bedroom would be considered to be a dwelling for the purposes of the application of this clause. If this approach were to be taken this would require a Performance Solution and based on the current number of bedrooms being 119 a total of 6 accessible rooms would be required and for the proposed expansion to 199 rooms a total of 9 accessible rooms would be required.

It is noted that Condition 20 of DA 2012/LD-00029 requires that the miners camp accommodation can only be occupied by workers employed by mining industry related companies. As such it may be more appropriate for a Performance Solution to be prepared which demonstrates that the provision of accommodation for people with disabilities would not be necessary within this development given the characteristics of the typical residents that use the facility.

6. Issues Requiring Resolution

6.1 Issues Requiring Amendments to Plans

The matters noted in **BOLD** in the NCC assessment table in the Appendices of this report need to be resolved as part of the formulation of the Construction Certificate Documentation.

It was also noted from the inspection of the main building that the plans of the existing building do not match the layout of the building in relation to the layout of the bathrooms and the walls between the recreation room, snacks & drinks area and dining area and location of the southern deck. In this regard the architectural plans are to be amended to reflect the layout of the main building.

6.2 Performance Solutions Required

The provision of Performance Solutions will be necessary to demonstrate compliance with the relevant Performance Requirements to address some of the non-compliances with the DtS provisions of the NCC as summarised below:

1. A Performance Solution is required to demonstrate that Performance Requirement P2.4.3 is satisfied in relation to provision of adequate facilities for the residents.
2. The Main Building is not provided with a compliant Fire Hydrant system and it is understood that the client does not wish to comply with the Deemed-to-Satisfy provisions of the NCC in relation to this and as such a Fire Engineer has been engaged to prepare a Performance Solution to satisfy the relevant Performance Requirements of the NCC.
3. Performance Solution required in relation to number of accessible rooms and provision of accessible facilities in the Main Building.

7. Statutory Fire Safety Measures

7.1 Fire Safety Measures

The Statutory Fire Safety Measures listed in Appendix D of this report are required to be certified upon completion of any installation / rectification works by the contractor / sub-contractor responsible for the installation of the applicable Fire Safety Measure by issuing a Certificate of Installation for the Fire Safety Measure.

The fire safety measures within the building must be maintained to ensure correct operation at all times the building is occupied, all firefighting equipment should be tagged when tested / inspection and log books kept up-to-date for all smoke detection, warning systems, etc.

An annual fire safety certificate must be submitted to Cobar Shire Council and the NSW Fire Brigade each year indicating satisfactory performance of the fire safety measures contained within the building. The annual fire safety statement should be displayed in a prominent place within the building (i.e. the front counter / reception area).

The correct operation and maintenance of the buildings fire safety measures is critical in affording an adequate level of fire safety for occupants of the building.

7.2 Housekeeping

The ongoing management of the building should ensure good housekeeping procedure. The following matters should be considered by building management:

- Ensure exits and paths of travel to exits remain unobstructed in accordance with the requirements of Clause D1.6;
- Avoid storage of materials in unoccupied areas (i.e. large amount of flammable liquids / combustible materials within storage cupboards);
- Limit storage of flammable / combustible materials to designated and approved areas, and
- Prevent storage of materials that could hinder access to firefighting equipment, (i.e. storage in front of fire extinguishers).

8. Conclusions

Based on the preparation of this report it is considered that subject to resolution of the matters highlighted as being Non-Compliances or requiring Further Information in the NCC Assessment Table in Appendix B the proposed development is capable of meeting the requirements of the NCC as applicable.

It is advised that in the preparation of this report there have been a number of limitations (Section 3), assumptions and interpretations (Section 5) which must be referred to when reading this report.

The following key points are highlighted for consideration in the finalisation of the design documentation:

- Preparation of Performance Solution for Fire Hydrant System;
- Preparation of Performance Solution in relation to provision of facilities for residents of accommodation building;
- Preparation of Performance Solution in relation to provision of accessible accommodation rooms and accessible features within Main Building;
- Other non-compliances and areas of further information as identified within Appendix B NCC Assessment Table to be addressed via detailed design documentation for a Construction Certificate application.

9. Appendix A – Referenced Design Documentation

The following documentation was used in the preparation of this report:

Plan Title	Drawing No.	Rev / Issue	Date
Stamped DA Architectural prepared by Geolyse & Minpac Properties Pty Ltd and approved by Cobar Shire Council Project No 212085 & MPP-11-009-12 & DA No 2012/LD-00020			
Title, Drawing Schedule & Locality Map	01_A01	A	20.04.12
Existing Site Plan	01_A02	A	20.04.12
Proposed Site Plan	01_A03	A	20.04.12
Elevation View	AR-TLC-009-12-003	01	16.10.11
Layout Plan	AR-TLC-009-12-001	01	16.10.11
Architectural prepared by Geolyse Project No 212085			
Title, Drawing Schedule & Locality Map	02_A01	E	28.05.12
Proposed Site Plan Alter. Option	02_A02	E	28.05.12
Existing and Demolition Floor Plan	02_A03	E	28.05.12
Proposed Floor Plan	02_A04	E	28.05.12
Elevations	02_A05	E	28.05.12
Sections	02_A06	E	28.05.12
Typical Section Accommodation Unit Veranda	02_A07	E	28.05.12
Architectural prepared by Geolyse Project No 218322			
Proposed Site Plan Alter. Option	01_A02	E	28.05.12
Architectural prepared by Geolyse Project No 218322			
Title, Drawing Schedule & Locality Map	03_A01	B	02.08.18
Existing Site Plan	03_A02	B	02.08.18
Proposed Site Plan	03_A03	B	02.08.18
Existing and Demolition Floor Plan	03_A04	B	02.08.18
Approved Floor Plan	03_A05	B	02.08.18
Proposed Floor Plan	03_A06	B	02.08.18
Typical Section Accommodation Unit Veranda	03_A07	B	02.08.18
Architectural prepared by Minpac Properties Pty Ltd Project No MPP-11-009-12			
Layout Plan	AR-TLC-009-12-001	01	16.10.11
Typical Details-Sheet 1	AR-TLC-009-12-002a	01	16.10.11
Typical Details-Sheet 2	AR-TLC-009-12-002b	01	16.10.11

Typical Details-Sheet 3	AR-TLC-009-12-002c	01	16.10.11
Typical Details-Sheet 4	AR-TLC-009-12-002d	01	16.10.11
Elevation View	AR-TLC-009-12-003	01	16.10.11
Other Documentation			
Notice of Determination of a Development Application issued by Cobar Shire Council	2012/LD-00029	-	13.07.12
On-site Effluent Management Study prepared by Envirowest Consulting Pty Ltd	R12139-2e	-	07.06.18

10. Appendix B – Detailed Clause by Clause Assessment NCC – Volume 1 – Main Building

The abbreviations outlined below have been used in the following table:

N/A - Not Applicable. (The DTS clause does not apply to the building)

Complies - The building complies with the relevant DTS provision.

FI - Further Information is necessary to establish whether the building complies with the relevant DtS provision.

DNC - Does Not Comply.

Noted - Clause is administrative information only.

Clause	Comment	Status
SECTION C: FIRE RESISTANCE		
Part C1 – Fire Resistance and Stability		
C1.0: Deemed-to-Satisfy Provisions	Noted	Noted
C1.1: Type of construction required	Based on the application of this clause the building is required to be of Type C construction. The fire source features that have been identified in relation to the Main Building are as follows: • Allotment boundary on northern side of Barrier Highway; • Eastern side allotment boundary; • Western side allotment boundary; • Southern rear allotment boundary; • Accommodation buildings located to south of Main Building. Under Specification C1.1 for a Type C building FRL's are only required for this building classification in relation to external building elements and where those elements are exposed to fire source features that are closer than 3m to the building. In this instance there are no fire source features within 3m of the Main Building and as such no FRL are required.	Complies
C1.2: Calculation of rise in storeys	The building has a rise in storeys of one (1).	Noted
C1.3: Buildings of Multiple Classifications	Not applicable as the building is single storey.	N/A
C1.4: Mixed types of construction	Not applicable as the whole building is Type C construction.	Noted
C1.5: Two storey Class 2, 3 or 9c buildings	Not applicable.	N/A
C1.6: Class 4 parts of building	Not applicable as the building does not contain a Class 4 part.	N/A

Clause	Comment	Status
C1.7: Open Spectator Stands	Not applicable.	N/A
C1.8: Lightweight Construction	Not applicable.	N/A
C1.9 Non-combustible building elements	Not applicable as the building is of Type C construction.	N/A
C1.10: Fire Hazard Properties	Fire hazard properties of all new floor coverings, wall and ceiling lining materials, sarkings & any ductwork must comply with the following criteria- <u>Floor linings/coverings</u> • Maximum smoke development rate of 750%-min; • Minimum critical radiant flux of 2.2kW/m^2; and a • a group number complying with Clause 6(b) for any portion of the floor covering that is continued more than 150mm up a wall (ie Group 1 or 2). <u>Wall and Ceiling Linings</u> • have a Smoke Growth Rate Index of not more than 100 or an average specific extinction area less than 250m^2/kg; • Group 1 or 2 in the residential unit. <u>Ductwork</u> • Rigid and flexible ductwork building must comply with the fire hazard properties set out in AS 4254 Parts 1-2012 and 2-2012. <u>Lift Cars</u> N/A <u>NSW 7. Other Materials (State Variation)</u> • Sarking type materials shall have a spread of flame index not exceeding 5. • Other materials or locations and insulation materials other than sarking-type materials shall have a spread-of-flame index of not more than 9 and a smoke developed index of not more than 8 if the Spread-of-Flame Index is more than 5. From the inspection it is not possible to ascertain whether the building elements comply with these fire hazard property requirements and should any building works be undertaken the selection of materials must be undertaken with these fire properties in mind.	Noted
C1.11: Performance of external walls in fire	The building has a rise in storeys of 1 and is not proposed to utilise tilt panel construction.	N/A
C1.12: Blank Clause	Blank clause.	-

Clause	Comment	Status
C1.13 Fire-protected timber: Concession	The concessions of Clause C1.13 do not apply to this building.	N/A
C1.14: Ancillary elements	There are no external walls that are required to be non-combustible.	N/A
Part C2 – Compartmentation & Separation		
C2.0: Deemed-to-Satisfy Provisions	Noted	Noted
C2.1: Application of Part	The requirements of this part are applicable to the building.	Applicable
C2.2: General Floor Area and Volume Limitations	The Main Building Floor Area and Volume is within the floor area and volume limitations for a Type C building of this classification.	Complies
C2.3: Large Isolated Buildings	The subject building complies with the floor area and volume requirements for a Type C building in Clause C2.2.	N/A
C2.4: Requirements for open spaces and vehicular access	The subject building complies with the floor area and volume requirements for a Type C building in Clause C2.2.	N/A
C2.5: Class 9a and 9c buildings	-	N/A
C2.6: Vertical separation of openings in external walls	The building is of Type C construction.	N/A
C2.7: Separation by fire walls	No fire walls are located within the Main Building.	N/A
C2.8: Separation of classifications in the same storey	The building is noted to be of multiple classifications however fire separation between those classifications is not required.	Noted
C2.9: Separation of classifications in different storeys	The building is single storey construction.	N/A
C2.10: Separation of lift shafts	There are no lifts located in the building.	N/A
C2.11: Stairways and lifts in one shaft	There are no stairways or lifts in the building.	N/A
C2.12: Separation of Equipment	No other equipment or services noted within this clause have been noted to be installed within the subject building. ***Any on-site fire pumps required as part of the proposed fire engineering solution are to be separated from the building in accordance with AS2419.1 which would need to be detailed on any plans submitted for approval for those works.***	***FI***

Clause	Comment	Status
C2.13: Electricity supply system	There is no electricity substation located within the building. ***Should the main switchboard be required to support emergency equipment operating in the emergency mode such as pumps for fire hose reels if fire hose reels are relied upon as the sole means of fire protection or fire hydrant booster pumps or control and indicating equipment as defined by this clause then the main switchboard that supports that equipment is required to be fire protected by construction separating it from the remainder of the building with a fire rating of 120/120/120 and any doorway into that enclosure being a self-closing fire rated door not less than -/120/30.*** ***In the case of the main switchboard needing to support emergency equipment as detailed above any electrical conductors located within the building that supply the switchboard are to have a classification in accordance with AS/NZS3013 of not less than WS53w if potentially subject to vehicular damage or otherwise WS52W or be enclosed in a fire rated enclosure rated to an FRL of 120/120/120.*** ***Where emergency equipment is required in a building, all switchboards in the electrical installation, which sustain the electricity supply to the emergency equipment, must be constructed so that emergency equipment switchgear is separated from non-emergency equipment switchgear by metal partitions designed to minimise the spread of a fault from the non-emergency equipment switchgear.*** ***The main switchboard is currently not fire separated from the building and as such details reflecting how compliance with the requirements of the above would be achieved are required to be provided in conjunction with the design documentation for the proposed fire engineering solution for approval as required.***	***FI***
C2.14 Public corridors in Class 2 and 3 buildings	The building Classification is not 2 or 3.	N/A
Part C3 – Protection of Openings		
C3.0: Deemed-to-Satisfy Provisions	Noted	Noted
C3.1: Application of Part	The requirements of this part are applicable to the building.	Applicable
C3.2: Protection of openings in external walls.	There are no external walls that are required to be fire rated under clause C1.1 and as such no openings in external walls are required to be fire protected.	N/A
C3.3: Separation of external walls and associated openings in different fire compartments.	The building is not divided into fire compartments by fire walls and as such the provisions of this clause are not applicable.	N/A
C3.4: Acceptable methods of protection	N/A	N/A

Clause	Comment	Status
C3.5: Doorways in fire walls.	No fire walls are proposed.	N/A
C3.6: Sliding fire doors	There are no sliding fire doors proposed within the building.	N/A
C3.7: Protection of doorways in horizontal exits	There are no horizontal exits proposed within the building.	N/A
C3.8: Openings in fire-isolated exits	There are no fire isolated exits proposed within the building.	N/A
C3.9: Service penetrations in fire isolated exits	There are no fire isolated exits proposed within the building.	N/A
C3.10: Openings in fire-isolated lift shafts	There are no fire isolated lift shafts proposed within the building.	N/A
C3.11: Bounding construction: Class 2, 3 and 4 buildings	The building does not contain a Class 2, 3 or 4 part.	N/A
C3.12: Openings in floors and ceilings for services	***If the requirements of Clause C2.12 & C2.13 are applicable then where any electrical service passes through the ceiling of any enclosure of the main switchboard which is required to be fire rated then that service penetration must be protected either by:*** • ***A shaft that will not reduce the fire performance of the building element that it penetrates. In this regard the shaft would be required to match the FRL or fire resisting construction of the floor; or*** • ***By compliance with a protection method detailed under Clause C3.15.*** ***Details of the method of achieving compliance with this clause will need to be detailed on the plans and documentation submitted for approval.***	***FI***
C3.13: Openings in shafts	The building is of Type C Construction and the requirements of this Clause is not applicable.	N/A
C3.14 ****	Blank Clause	-
C3.15: Openings for service installations	***Where an electrical, electronic, plumbing, mechanical ventilation, air-conditioning or other services penetrates a building element (floor, ceiling or wall) (other than an external wall or roof) that is required to have an FRL with respect to integrity or insulation or a resistance to the incipient spread of fire, that installation must comply with any one of the following:*** ***(a) Tested systems*** ***(i) The service, building element and any protection method at the penetration are identical with a prototype assembly of the service, building element and protection method which has been tested in accordance with AS 4072.1 and AS 1530.4 and has achieved the required FRL or resistance to the incipient spread of fire.***	***FI***

Clause	Comment	Status
	(ii) It complies with (i) except for the insulation criteria relating to the service if - ***(A) the service is a pipe system comprised entirely of metal (excluding pipe seals or the like); and*** ***(B) any combustible building element is not located within 100 mm of the service for a distance of 2 m from the penetration; and*** ***(C) combustible material is not able to be located within 100 mm of the service for a distance of 2 m from the penetration; and*** ***(D) it is not located in a required exit.*** ***(b) Ventilation and air-conditioning - In the case of ventilating or air-conditioning ducts or equipment, the installation is in accordance with AS/NZS 1668.1.*** ***(c) Compliance with Specification C3.15*** ***(i) The service is a pipe system comprised entirely of metal (excluding pipe seals or the like) and is installed in accordance with Specification C3.15 and it -*** ***(A) penetrates a wall, floor or ceiling, but not a ceiling required to have a resistance to the incipient spread of fire; and*** ***(B) connects not more than 2 fire compartments in addition to any fire-resisting service shafts; and*** ***(C) does not contain a flammable or combustible liquid or gas.*** ***(ii) The service is sanitary plumbing installed in accordance with Specification C3.15 and it -*** ***(A) is of metal or UPVC pipe; and*** ***(B) penetrates the floors of a Class 5, 6, 7, 8 or 9b building; and*** ***(C) is in a sanitary compartment separated from other parts of the building by walls with the FRL required by Specification C1.1 for a stair shaft in the building and a self-closing –/60/30 fire door.*** ***(iii) The service is a wire or cable, or a cluster of wires or cables installed in accordance with Specification C3.15 and it -*** ***(A) penetrates a wall, floor or ceiling, but not a ceiling required to have a resistance to the incipient spread of fire; and*** ***(B) connects not more than 2 fire compartments in addition to any fire-resisting service shafts.*** ***(iv) The service is an electrical switch, outlet, or the like, and it is installed in accordance with Specification C3.15.*** ***Any service penetration through the ceiling or walls of any required fire rated enclosure of a main switchboard under Clauses C2.12 & C2.13 that is required to have an FRL will need to be protected in accordance with the requirements noted above if not protected with a shaft as per Clause C3.12.*** ***The method of protection for all services are required to be detailed on the plans and specifications and a test certificate of the products used to achieve compliance must also be submitted with the application for the Construction Certificate.***	

Clause	Comment	Status
C3.16: Construction joints	***Construction joints, spaces and the like in and between building elements required to be fire-resisting with respect to integrity and insulation must be protected in a manner identical with a prototype tested in accordance with AS 1530.4 to achieve the required FRL.*** ***The above requirements do not apply where joints, spaces and the like between fire-protected timber elements are provided with cavity barriers in accordance with Specification C1.13.*** ***Details on the method of protecting any construction joints in the required fire rated building elements (potentially the electrical switchboard enclosure as noted in C2.12 and C2.13) are to be provided on the Construction Certificate plans and documentation.***	***FI***
C3.17: Columns protected with lightweight construction to achieve an FRL	There are no columns in the building that are protected with lightweight construction.	N/A
SECTION D: ACCESS AND EGRESS		
Part D1 – Provision for Escape		
D1.0: Deemed-to-Satisfy Provisions	Noted	Noted
D1.1: Application of Part	The DTS provisions of this part are applicable to the building.	Noted
D1.2: Number of exits required	As the building has an potential calculated occupancy in excess of 50 people the building is required to be provided with at least two (2) exits to comply with the requirements of the clause for the Class 9b parts. The building has four (4) potential exits, as such is considered to comply with the requirements of the clause	Complies
D1.3: When fire-isolated stairways and ramps are required	The proposed stairs are not required to be fire isolated.	N/A
D1.4: Exit travel distances	A building must have no point on a floor of more than 20m from an exit, or a point from which travel in different directions to two (2) exits is available, provide a maximum distance to one of those exits of 40m. ***Based on assessing the exit travel distances within the building to the potential exits it is noted that the travel distances are potentially compliant with the requirements of this clause noting that two alternative exits are required from the Gymnasium and western large Store Room areas due to the travel distances from the further most corners of these spaces to a single exit. To provide for this some changes would be necessary to the building in relation to provision of additional exit signage, modifications to some door latching in the building and provision of an additional exit from the loading dock area as indicated on the plan in Appendix C.***	***DNC***

Clause	Comment	Status
D1.5: Distance between alternative exits	Based on an assessment of the exit travel locations the distances between alternative exits complies with the requirements of this clause.	Complies
D1.6: Dimensions of exits and paths of travel to exits.	The unobstructed height throughout leading to an exit must be not less than 2m, except the unobstructed height of any doorway may be reduced to not less than 1980mm which is noted to be complied with. The total aggregate exit width required to be provided from the building is 1.75m which is considered able to be provided for by the four (4) exits from the building. ***The unobstructed width of the path of travel to an exit in the building must not be less than 1.0m excluding doorways which may be not less than 750mm wide. From the inspection it was noted that the swinging exit doors and swinging doors that are in path of travel to an exit throughout the building, excluding the accessible bathroom doors, do not comply with this requirement as they have a clear opening width, measured from the face of the door leaf to the inside of the door jamb, less than the required 750mm clear opening at 735mm. This could potentially be addressed by the installation of thinner door leafs to the doorway openings as the current door leafs are noted to be made of the same sandwich panel as the walls and would contribute to this non-compliance. If the doorways cannot be made compliant with this requirement this will need to be incorporated within the fire engineering solution for the building.*** Please note that this does not necessarily provide for compliance with the accessibility requirements under Part D3 of the NCC which are discussed further under that section. The width of the internal hallways complies with this clause as they are 1.0m wide. The width of the existing internal stairs from the loading dock floor to the ground level loading dock floor are 1.16m wide between handrails and are compliant in regard to exit width. The width of the external ramp and stairs from the southern deck area are not less than 1.0m wide and are compliant in regard to exit width. The width of the external stairs from the northern deck area are noted to be 1.0m wide and are compliant in regard to exit width. ***The width of the external stairs from the kitchen doorway are noted to be 980mm wide and as such do not comply in relation to the minimum required exit width. Either the stairs will require modification or replacement to comply or form part of the fire engineering solution.***	***DNC***
D1.7: Travel via fire-isolated exits	There are no fire isolated exits proposed or required within the building.	N/A

Clause	Comment	Status
D1.8: External stairways or ramps in lieu of fire-isolated exits	There are no fire isolated exits proposed or required within the building.	N/A
D1.9: Travel by non-fire-isolated stairways or ramps	The travel distance via the internal stairs in the loading dock area are noted to be less than 80m and the discharge point of the stair is not more than 20m from the external doorway and as such comply with this clause.	Complies
D1.10: Discharge from exits	The exit in the southern side of the building that is via the southern ramp and stairs do not discharge directly to areas that are accessed by vehicles and as such these exit points do not require protection. ***The stairs on the northern side of the building from the northern deck and on the eastern side of the building from the kitchen area discharge directly into areas that are accessed by vehicles and as such bollards are to be provided a minimum of 1m from the base of the stairs to prevent them from being blocked by vehicles.*** ***The path of travel from the base of the loading dock stairs to the external loading dock doorway has the potential to become blocked by vehicles using the loading dock. Due to the limited width of the loading dock if a truck were parked in the loading dock it is unlikely that a clear 1.0m path of travel would be available past a truck in that location. As such it is recommended that an additional exit door be installed within the western wall of the loading dock at the level of the elevated floor with a compliant 1.0m wide external landing and stairway as indicated on the mark-up plan in Appendix C.*** It is considered that the path of travel to the road from the open space will comply with the requirements of this clause as it is not obstructed.	***DNC***
D1.11: Horizontal exits	There are no horizontal exits.	N/A
D1.12: Non-required stairways, ramps or escalators	There are no escalators, moving walkways or non-required non fire-isolated stairways or pedestrian ramps within the building.	N/A
D1.13: Number of persons accommodated	Based on Table D1.13(a) the following occupancy for the Main Building has been determined: Kitchen: 2 people Office & Admin: 2 people Dining: 80 people (Based on number of seats) Recreation Room: 50 people Gymnasium: 26 people TOTAL: 160 people	Noted
D1.14: Measurement of distances	Noted	Noted

Clause	Comment	Status
D1.15: Method of measurement	Noted	Noted
D1.16: Plant rooms and lift machine rooms and electricity network substations	N/A	N/A
D1.17: Access to lift pits	N/A	N/A
Part D2 – Construction of Exits		
D2.0: Deemed-to-Satisfy Provisions	Noted	Noted
D2.1: Application of Part	The Deemed-to-Satisfy Provisions of this Part are applicable to the building.	Applicable
D2.2: Fire-isolated stairways and ramps	The internal stair is not required to be fire isolated.	N/A
D2.3: Non-fire-isolated stairways and ramps	The building has a rise in storeys of 1.	N/A
D2.4: Separation of rising and descending stair flights	The stairway is not required to be fire isolated.	N/A
D2.5: Open access ramps and balconies	Open access ramp or balcony is not required for smoke hazard management.	N/A
D2.6: Smoke lobbies	A smoke lobby is not required for smoke hazard management.	N/A
D2.7: Installations in exits and paths of travel	The location of electrical distribution boards are located externally and not within a path of travel to an exit.	N/A
D2.8: Enclosure of space under stars and ramps	None of the stairs are enclosed underneath.	Complies
D2.9: Width of required stairways and ramps	There are no stairs or ramps more than 2m wide.	N/A
D2.10: Pedestrian ramps	***The ramp on the southern side of the building is required to comply with AS1428.1-2009 and whilst the construction of the ramp complies in relation to width, gradient not exceeding 1:14 and distance between landings not exceeding 9m from the site inspection the following non-compliances were noted in relation to the ramp:***	***DNC***

Clause	Comment	Status
	1. The handrails do not provide for compliant horizontal extensions at the top and bottom of the ramp handrails as detailed in the diagram below;	

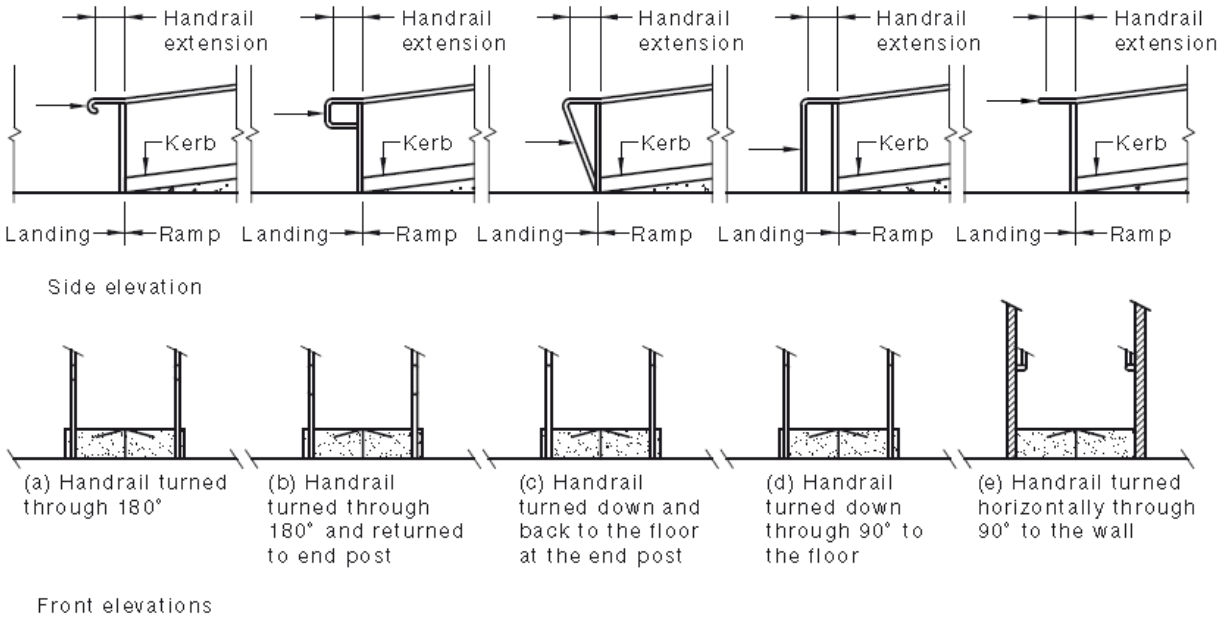


FIGURE 15(A) RAMP HANDRAILS—EXAMPLES OF HANDRAIL TERMINATIONS

Clause	Comment	Status

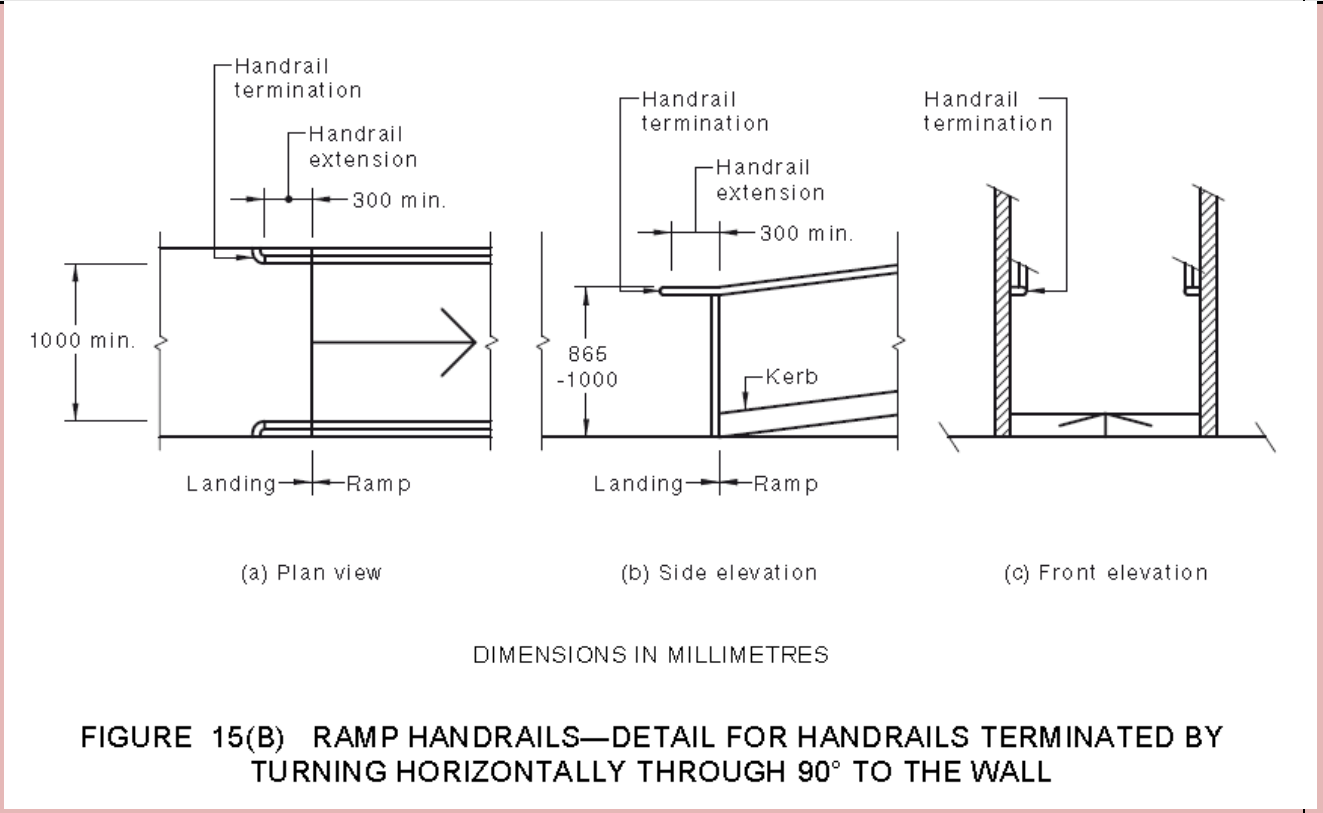
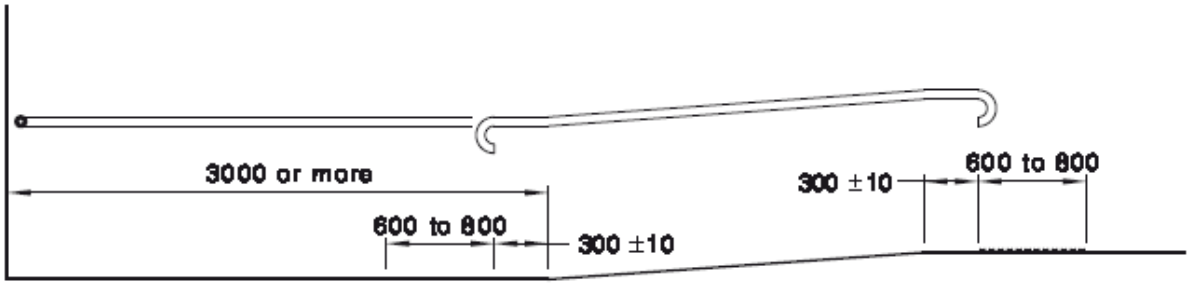


FIGURE 15(B) RAMP HANDRAILS—DETAIL FOR HANDRAILS TERMINATED BY TURNING HORIZONTALLY THROUGH 90° TO THE WALL

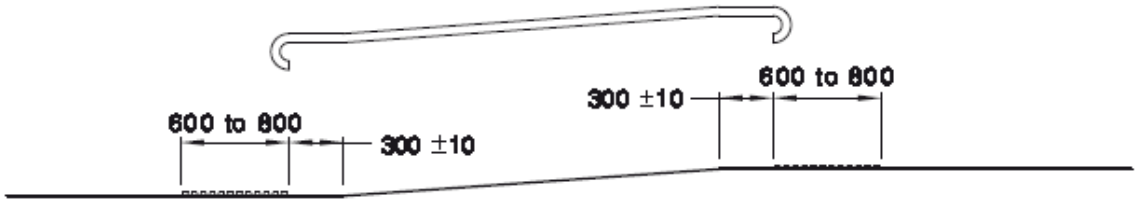
Excerpts from Figure 15(A) & 15(B) of AS1428.1-2009

2. ***The surface of the ramp could not be verified that it would provide a slip resistance rating of P4 or R11 based on the surfacing being timber boards with mesh fixed over the top.***
3. ***The provision of tactile indicators at the top and bottom of the ramp in accordance with AS1428.1-2009 as illustrated in the diagram below noting that the depth of tactiles required at the top and bottom of the ramp is 600mm.***

Clause	Comment	Status



(b) Side elevation where top of ramp leads to an open area and the bottom landing is enclosed, 3000 or more wide and/or handrail is discontinuous



(c) Side elevation where top and bottom of ramp leads to an open area

DIMENSIONS IN MILLIMETRES

FIGURE 2.3(B) WARNING INDICATORS—RAMPS

Excerpt from Figure 2.3(B) of AS1428.4.1-2009

It is recommended that the handrail of the ramp, ramp surface and tactile indicators be upgraded to achieve compliance with the requirements of this clause if it is to be a requirement that the building be accessible. Refer to comments under D3.1 for further commentary on this matter.

Clause	Comment	Status
D2.11: Fire-isolated passageways	There are no fire isolated passageways in the building.	N/A
D2.12: Roof as open space	Exits from the building do not lead to the roof.	N/A
D2.13: Goings and risers	***The external kitchen stairs, external northern deck stairs, external southern deck stairs and internal loading dock stairs for the building are subject to the following requirements:*** *1. No more than 18 risers in one flight; (complies)* ***2. Going (G), Riser (R) and quantity/slope (2R+G) to be as follows:*** *a. Going = 240 < G < 355 (complies)* ***b. Riser = 115 < R < 190 (complies with exception of first riser of southern deck stair which was measured to be 195mm)*** *c. Slope = 550 < 2R+G < 700 (complies)* ***3. Goings and Risers to be constant throughout each flight except a variation between adjacent risers or goings of not more than 5mm is permitted and the difference between the largest and smallest riser or going must be not more than 10mm in a flight; (complies with exception of southern deck stairs where top riser from deck to stair is more than 5mm higher than other stair risers)*** *4. Risers are not to have gaps between them that would allow a 125mm sphere to pass through; (not applicable as stairs do not exceed 1m in height)* ***5. Treads to have a surface with a slip resistance of P4 or R11 or to have nosings with a slip resistance of P4 when tested to AS4586-2013. (Slip resistance of stairs could not be confirmed and it is recommended that non-slip nosing strips be provided to all stairs having a slip resistance of P4 as they are external stairs and the stairs in the loading dock area may become wet due to there being no external door in the loading dock area).*** The above comments exclude the stairs from the door in the northern wall of the loading dock which do not comply with these requirements and are not 1m wide and are not provided with a landing or compliant handrails. Based on advice from the client these stairs are not used.	***DNC***
D2.14: Landings	Landings are not required within the stairs of the building to limit the number of risers in any stair flight under this clause. Landings provided in stairs to meet other clauses such as Clause D2.15 are required to meet the requirements of this clause in relation to slip resistance.	Noted
D2.15: Thresholds	The threshold of the external doors are required to be not more than 190mm above the finished surface of the ground or any landing outside the doorway. From the inspection it is noted that the existing external stairs (excluding external northern loading dock stairs and the internal loading dock stairs are provided with landings which meet the requirements of this clause as they are not more than 190mm below the threshold of the door. ***Slip resistance of the stair landings could not be confirmed and it is recommended that non-slip nosing strips be provided to the nosing of all landings having a slip resistance of P4 as they are external stairs***	***DNC***

Clause	Comment	Status
	and the stairs in the loading dock area may become wet due to there being no external door in the loading dock area. ***In relation to the recommended additional exit door located in the western wall of the loading dock area this door would be required to be provided with a stairway that has a landing at the top which is not more than 190mm below the threshold of the door.***	
D2.16: Barriers to prevent falls	The floor surface of the southern deck and associated stair and ramp are less than 1m above the surrounding ground level as such the requirements of this clause are not applicable. The floor surface of the kitchen stairs and landing is less than 1m above the surrounding ground level as such the requirements of this clause are not applicable. ***The floor surface of the north-eastern corner of the deck/verandah located on the northern side of the building was measured to be 1m above the ground level below. The existing balustrade on this deck does not meet the requirements of this clause which is that the balustrade is required to be 1m high from the surface of the deck and there must be no gap in the balustrade that would allow a 125mm diameter sphere to pass through. In this regard there are two options for dealing with this non-compliance which are either to upgrade the balustrade to a compliant balustrade or raise and shape the ground levels around the north-eastern corner so that the floor level of the deck is not 1m or more above that ground surface. Should the balustrade be upgraded via the use of stainless steel wires then compliance with the additional requirements for these types of balustrades under this clause are required to be achieved.*** The requirements of this clause are not applicable to the loading dock area or the goods entry are to the dining hall as it is considered to be equivalent to a loading dock when the door is open and used for deliveries.	***DNC***
D2.17: Handrails	The requirement to provide handrails to the stairs of the building under this clause are not applicable as the stairs provide a change in elevation of less than 1m including the stairs to the deck on the northern side of the building.	N/A
D2.18: Fixed platforms, walkways, stairways and ladders	There are no fixed platforms, walkways, stairways or ladders proposed within the building.	N/A
D2.19: Doorways and doors	The exit doors from the building are noted to be swinging doors with the exception of the door in the southern wall of the building leading onto the southern deck. This is considered to be permissible as a sliding door as the opening force for this door would not exceed 110N. The requirements of this clause are not applicable to the internal doors of the building which are doors in a path of travel to an exit.	Complies
D2.20: Swinging doors	The swinging exit doors of the building comply with this clause as they swing outwards from the building.	Complies
D2.21: Operation of latch	A door in a required exit, forming part of a required exit or in the path of travel to a required exit must be readily openable without a key from the side that faces a person seeking egress, by—	***DNC***

Clause	Comment	Status
	(i) a single hand downward action on a single device which is located between 900 mm and 1.1 m from the floor and if serving an area required to be accessible by Part D3— (A) be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch; and (B) have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35 mm and not more than 45 mm; or (ii) a single hand pushing action on a single device which is located between 900 mm and 1.2 m from the floor. It is noted that the requirements of this clause are applicable to all doors in the building including internal doors that are in a path of travel to an exit with the exception of the sanitary compartment doors. ***From the inspection it is noted that the external and internal swinging exit door latches comply with the requirements of this clause with the exception of the northern external door of the Admin room which has a lever type handle but the handle is not a D-shaped lever that would prevent a hand from slipping from the handle during use. To rectify this non-compliance the door handle of this door is to be replaced with a D-shaped lever handle such as those installed to other doors in the facility.*** ***The latching of the external sliding door does not comply with the requirements of this clause as the door is capable of being locked and require the use of a key to open the door. In this instance as the facility is never locked based on advice from the client the locking mechanism of the sliding door including screen door is to be removed and the latch modified so that the doors are openable without having to operate a handle or alternatively provision of a D-lever type handle to operate the door latch and open the door in one action is required.*** ***The latching of the sliding door between the large western storeroom and the recreation room is not compliant with the requirements of this clause as the door is locked via a padlock located on the outside of the door. It is required that this door be provided with a door latch that complies with this clause.*** The requirements of this clause are not considered to be applicable to the roller door that separates the dining room from the kitchen area as this door has not been considered to be a doorway in a path of travel to an exit from either the kitchen or dining room.	
D2.22: Re-entry from fire-isolated exits	No fire isolated exits are required.	N/A
D2.23: Signs on doors	There are no doors that are required to be provided with signs under this clause.	N/A
D2.24: Protection of openable windows	There are no areas where the floor level is more than 4m above the surface beneath.	N/A

Clause	Comment	Status
D2.25: Timber stairways: Concession	There are no fire isolated stairways within the building.	N/A
Part D3 – Access for People with a Disability		
D3.0: Deemed-to-Satisfy Provisions	Noted	Noted
D3.1: General Building Access Requirements	***Under the provisions of Table D3.1 access is required to all areas of the building normally used by the occupants. From the inspection it is noted that the following non-compliances are present within the Main Building in relation to provision of access for people with disabilities in accordance with Part D3 of the NCC:*** ***1. The external doorway widths into the Admin room from the deck/verandah area does not provide for a compliant 850mm wide clear door opening. This would require modification of the doorway and door leaf to provide for a wider doorway and provision of compliant D-lever door hardware;*** ***2. The internal doorway widths and circulation spaces of the Admin room, Laundry, Office, Kitchen, Storerooms and associated hallways do not comply with AS1428.1-2009 as the doorway widths will not provide for 850mm clear doorway openings and the hallway widths will not provide for compliant wheelchair circulation spaces. This would require modification to hallway walls and doorways to provide for compliant circulation spaces and doorway widths throughout these areas in accordance with AS1428.1-2009;*** ***3. The widths of the hallway leading from the recreation room to the laundry, office and admin area does not comply with AS1428.1-2009 in relation to providing for compliant circulation spaces for wheelchair turning areas. This would require modification to the hallway walls and doors to provide for compliant circulation spaces;*** ***4. The internal and external doors within the building do not provide for the 30% luminance contrast around doors required under AS1428.1-2009. This would require either painting of the door leave a contrasting colour to the wall or painting/marking of a 50mm wide strip around all doorways in a colour that contrasts with both the wall and door colour;*** ***5. The door hardware of the internal sliding doors in the building does not comply with AS1428.1-2009. This would require installation of compliant D-handle door hardware which complies with Aws1428.1-2009;*** ***6. The entrance into the building from the southern deck area which forms the entrance to the building from the accommodation buildings does not provide compliant entry into the building as the door hardware of the sliding door does not comply with AS1428.1-2009. This would require modification of the door hardware of the sliding door and screen door to comply with AS1428.1-2009;*** ***7. The sliding door provided at the entrance of the building from the southern deck area does not comply with AS1428.1-2009 in relation to the tolerance of gaps in paths of travel due to the sliding door track. This would necessitate removal and replacement of the door with a different type of sliding door or with a compliant swing door set;***	***DNC***

Clause	Comment	Status
	8. The roller door between the kitchen and dining room does not comply with AS1428.1-2009 as roller doors are not permitted on accessible paths of travel under the standard. This would require removal and replacement of the roller door with either a compliant swing door or sliding door set. ***9. There are various light switches and other building controls which are mounted outside the range permitted under AS1428.1-2009 not being between 900mm and 1100mm above the floor level. This would require relocation of the switches and building controls to be within the height range required under AS1428.1-2009;*** ***10. There is no provision for an accessible carparking space with shared zone as required by Clause D3.5. This would require the construction of a compliant paved, linemarked carparking space and shared zone with bollard compliant with AS2890.6-2009 with accessible spaces being provided at a ratio of 5% of total carparking spaces required to be accessible (based on percentage of total number of accessible bedrooms to total number of bedrooms);*** ***11. There is no continuous accessible path of travel from the carparking area to the principle pedestrian entry of the building which is considered to be the entrance to the Admin area as this is the area to which residents first visit to check in and obtain keys. This would require the provision of a paved path, compliant ramp to the northern verandah/deck and provision of a step ramp and landing from the verandah/deck floor level to meet the door threshold level of the Admin entry door;*** ***12. The ramp that provides access to the southern deck does not comply with AS1428.1-2009 as detailed under Clause D2.10. This would require modification of the ramp handrails, tactiles etc as detailed under that clause;*** ***13. The distance between accessible entrances into the building does not comply with this clause if compliant access is provided into the Admin area and if the existing southern side entry is made compliant as the distance between these two entries is more than 50m. This would require the installation of an additional pedestrian entry between these two entries that is not more than 50m from one of the exiting entry points with an associated ramp.*** ***14. The stairs that provide access to the northern verandah/deck and the southern deck areas, to the external kitchen door and within the loading dock area do not comply with AS1428.1-2009 as they are not provided with compliant handrails on both sides of the stairs with the required 300mm horizontal extension at the top and bottom of the handrails, solid stair risers instead of the open risers, tactile indicators at the top and bottom of the stairs, 30% luminance contrasting strips to the nosings of the stair treads and landing nosing. This would require modification of the stairs and handrails to provide for compliance with AS1428.1-2009;*** ***15. Signage in accordance with Specification D3.6 & AS1428.1-2009 is required to be provided to identify:*** ***a. Accessible sanitary facilities with tactile and braille signage;*** ***b. The location of accessible entrances to the building if any entrance is not accessible such as the external kitchen entry with directional signage;*** ***c. Exit Doors with "Exit Level 1" or "Exit Level Ground" tactile and braille signage;*** ***This would require the installation of additional compliant signage within and around the building;***	

Clause	Comment	Status
	As detailed under Section 5.3 of this report Condition 20 of DA 2012/LD-00029 requires that the miners camp accommodation can only be occupied by workers employed by mining industry related companies and as such instead of carrying out extensive modifications to the main building to provide for compliant access for people with disabilities there is considered to be potential for a Performance Solution to be prepared which demonstrates compliance with the Performance Requirements based on the characteristics of the user group that uses the facility.	
D3.2: Access to Buildings	An accessway must be provided to a building required to be accessible— (i) from the main points of a pedestrian entry at the allotment boundary; and (ii) from another accessible building connected by a pedestrian link; and (iii) from any required accessible carparking space on the allotment. In relation to (i) given the location of the site which is on a highway and on the outskirts of Cobar there is no footpath at the front of the site providing pedestrian entrance to the site and as such the provisions of this part of the clause are not considered applicable. ***In relation to (ii) it is noted that concrete paths are provided from the accommodation building that contains the accessible room however this path of travel does not comply with AS1428.1-2009 due to the gradient of the ramp, ramp handrail, turning space circulation spaces not complying with AS1428.1-2009. This would require modification of the ramp and paths of travel to achieve compliance with AS1428.1-2009.*** ***In relation to (iii) there is currently no accessible parking space provided on the site and there is no continuous accessible path of travel to the building from the parking area. This would require creation of an accessible parking space and continuous accessible path of travel to both the northern and southern building entries.*** ***Access for people with disabilities is required through 50% of entrances including the principal pedestrian entrance which is not currently provided as access via a compliant ramp is not provided to the Admin area and the deck on the southern side of the building is not compliant.*** ***The distance between accessible entrances into the building does not comply with this clause if compliant access is provided into the Admin area and if the existing southern side entry is made compliant as the distance between these two entries is more than 50m. This would require the installation of an additional pedestrian entry between these two entries that is not more than 50m from one of the exiting entry points with an associated ramp.*** **As detailed under Clause D3.1 an alternative to providing for compliance with these requirements is to the development of a Performance Solution.**	***DNC***

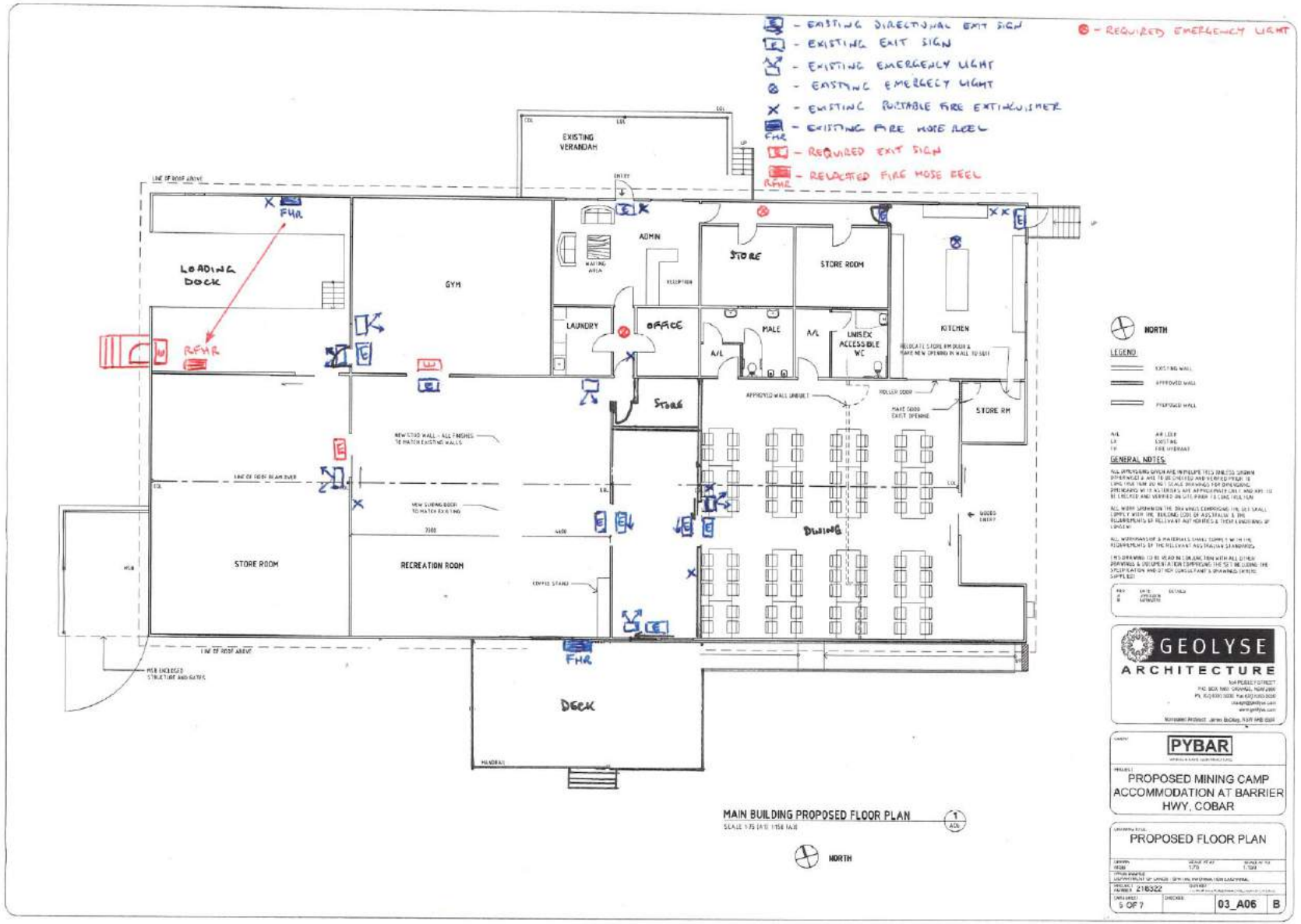
Clause	Comment	Status
D3.3: Part of building to be accessible	***As detailed under D3.1 the ramp and stairs of the building do not comply with AS1428.1-2009 and require modification to achieve compliance.*** ***As detailed within Clause D3.1 there are non-compliances in the building in relation to doorway circulation spaces and provision for adequate wheelchair turning spaces in hallways.*** **As detailed under Clause D3.1 an alternative to providing for compliance with these requirements is to the development of a Performance Solution.** There are noted to be no carpet floor coverings within the building.	***DNC***
D3.4: Exemptions	***Any areas in the building which are proposed not to be accessible for people with disabilities are to be documented via a detailed Access Exemption Request report prepared by a suitably qualified building consultant or access consultant.***	***FI***
D3.5: Accessible Carparking	***Accessible carparking spaces are required for the building and as detailed under Clause D3.1 an accessible parking space and shared zone is not provided.*** ***The accessible parking space and shared zone are required to comply with the requirements of AS/NZS2890.6-2009.*** **As detailed under Clause D3.1 an alternative to providing for compliance with these requirements is to the development of a Performance Solution.**	***DNC***
D3.6: Signage	***Signage in accordance with Specification D3.6 & AS1428.1-2009 is required to be provided to identify:*** • ***Accessible sanitary facilities with tactile and braille signage;*** • ***The location of accessible entrances to the building if any entrance is not accessible such as the external kitchen entry with directional signage;*** • ***Exit Doors with "Exit Level 1" or "Exit Level Ground" tactile and braille signage;*** ***This would require the installation of additional signage in and around the building to achieve compliance.*** **As detailed under Clause D3.1 an alternative to providing for compliance with these requirements is to the development of a Performance Solution.**	***DNC***
D3.7: Hearing augmentation	The building is not provided with an inbuilt amplification system.	N/A
D3.8: Tactile indicators	***Tactile indicators are required to be installed at the top and bottom of the ramp and all stairs in accordance with this clause and AS1428.4.1-2009 which are not currently provided at the stairs and the southern ramp installation does not comply as detailed under D3.1 and D2.10.*** **As detailed under Clause D3.1 an alternative to providing for compliance with these requirements is to the development of a Performance Solution.**	***DNC***

Clause		Comment	Status
D3.9	Wheelchair seating spaces in Class 9b assembly buildings.	The building does not contain any fixed seating.	N/A
D3.10	Swimming Pool	There is no swimming pool proposed within the development.	N/A
D3.11	Ramps	The ramp does not exceed a height of more than 3.6m and there are no overlapping landings.	N/A
D3.12	Glazing on an accessway	The requirements of this clause are complied with as the glazed sliding door on the southern side of the building is provided with a full width visual indicator strip in compliance with this clause.	Complies
SECTION E: SERVICES AND EQUIPMENT			
Part E1 – Fire Fighting Equipment			
E1.0:	Deemed-to-Satisfy Provisions	Noted	Noted
E1.3:	***Fire hydrants***	***As the floor area of the whole building exceeds 500m^2 the building is required to be protected by a fire hydrant system which is not currently provided on-site.*** ***It is understood that a fire engineering based Performance Solution will be prepared to deal with this non-compliance with the DtS provisions of the NCC.***	***DNC***
E1.4:	**Fire hose reels**	**As the floor area of the whole building exceeds 500m^2 the building is required to be protected by a fire hose reel system. It is noted that there are two fire hose reels located to service the building and that subject to the fire hose reel in the loading dock area being relocated as indicated on the mark-up plan contained in Appendix C it is considered that compliant fire hose reel coverage would be available to the building. However it is to be noted that this would be subject to confirmation of the coverage and that the installation will meet the pressure and flow requirements of AS2441-2005 by a hydraulic engineer.**	**FI**
E1.5:	Sprinklers	A sprinkler system is not required to service the building.	N/A
E1.6:	**Portable fire extinguishers**	**Should the switchboard in the building be required to become an emergency services switchboard as a result of the installation of fire hydrant or hose reel pumps or installation of control & indicating equipment that rely on the switchboard for their electrical supply then portable fire extinguishers will be required to be installed at the switchboard to cover Class AE or E fire risks.** It is noted that portable fire extinguishers are installed in the commercial kitchen area which are serviced and maintained by Western Fire & Safety and as such are assumed to be compliant with the requirements of this clause to cover Class F fire risks.	**FI** Complies

Clause	Comment	Status
	As fire hose reels are provided for the building and flammable liquids in excess of 50 litres are not stored within the building the provision of additional portable fire extinguishers is not required although it is noted that portable fire extinguishers are installed throughout the building and which are serviced and maintained by Western Fire & Safety.	
E1.7 Blank clause	This clause has deliberately left blank.	-
E1.8 Fire control centres	A fire control centre is not required for the building.	N/A
E1.9: Fire precautions during construction	Not applicable as no construction works proposed.	N/A
E1.10: Provisions for special hazards	It is considered that there are no special hazards associated with the building with the exception of the lack of a fire hydrant system which is understood to be proposed to be dealt with via a fire engineering Performance Solution.	N/A
Part E2 – Smoke Hazard Management		
E2.0: Deemed-to-Satisfy Provisions	Noted	-
E2.1: Application of Part	This part is applicable to the subject building.	-
E2.2: General Requirements	Whist the building contains a Class 9b part, being the Recreation Room & Gymnasium, the air-conditioning in the building is provided by individual split systems that would have a flow rate that is less than 1000L/s and as such there is no requirement to provide for a smoke detection system within the building to initiate automatic shut-down of the air-conditioning systems under NSW Table E2.2b.	N/A
E2.3: Provision for special hazards	It is considered that there are no special hazards associated with the building.	N/A
Part E3 – Lift Installations		
E3.0: Deemed-to-Satisfy Provisions	A lift is not proposed or required to be installed in the proposed building.	N/A
Part E4 – Visibility in an Emergency, Exit Signs and Warning Systems		
E4.0: Deemed-to-Satisfy Provisions	Noted	Noted
E4.1: Blank clause	-	-
E4.2: Emergency lighting requirements	Based on the provisions of this clause Emergency lighting is required to be installed in the building.	***DNC***

Clause	Comment	Status
	From the inspection it is noted that emergency lighting is installed throughout the building with the exception of the hallway between the laundry and office and the hallway outside the storerooms between the Admin and Kitchen areas. Subject to installation of additional emergency lighting in these areas and certification that the existing emergency lighting complies with AS2293.1-2005 it is considered that the building will comply with this clause.	
E4.3: Measurement of distance	Distances, other than vertical rise, must be measured along the shortest path of travel whether by straight lines, curves or a combination of both.	Noted
E4.4: Design and operation of emergency lighting	***Emergency lighting is installed in the building however it could not be determined that the installed emergency lighting complies with AS2293.1-2005 which would require verification from an electrician. Subject to this confirmation the building will comply with this clause.***	***FI***
E4.5: Exit signs	Exit signs are required to be installed in the building under the provisions of this clause and it is noted that exit signs are installed above exit doors from the building. ***Based on the recommendation under Clause D1.4 an additional exit sign is required to be installed above the proposed new exit door location in the western wall of the loading dock area as detailed on the mark-up plan contained in Appendix C.***	***FI***
NSW E4.6: Direction signs	Directional exit signs are required to be provided within the building due to the layout of the building and it is noted that directional exit signs are installed above doors in a path of travel to an exit in compliance with this clause. ***Based on the recommendations under Clause D1.4 additional directional exit signs are required to be installed as detailed on the mark-up floor plan above the doorway from the gymnasium leading into the recreation room and above the doorway from the storeroom leading into the recreation room.***	***DNC***
E4.7: Class 2 & 3 buildings and Class 4 parts: Exemptions	The building does not contain a Class 2, 3 or 4 part.	N/A
E4.8: Design and operation of exit signs	***Exit signs are installed in the building however it could not be determined that the installed exit signs complies with AS2293.1-2005 which would require verification from an electrician. Subject to this confirmation the building will comply with this clause.*** ***The exit sign over the external kitchen door was noted not to be operational at the time of the inspection and requires repair.***	***FI*** ***DNC***
E4.9: Emergency warning and intercommunication systems	An EWIS is not required for the subject building.	N/A

11. Appendix C – Main Building Floor Plan Mark-up



12. Appendix D – Statutory Fire Safety Measures

The following comprises a **Preliminary** Schedule of Statutory Fire Safety Measures that are seen as required / proposed to be installed in the existing buildings based on the assessment against the DtS provisions of the NCC. The proposed Performance Solution will change this list:

Main Building		
ESSENTIAL FIRE SAFETY MEASURES REQUIRED	**STANDARD OF PERFORMANCE (To be achieved by fire safety measure)**	**LOCATION**
Portable Fire Extinguishers	AS 2444 – 2001; E1.6 and Table E1.6 of NCC 2016	Kitchen
Fire Hose Reels	Clause E1.4 of NCC 2016 and AS2441-2005	External on Southern Wall & Internal in Loading Dock
Fire Hydrant	Clause E1.3 of NCC 2016 and AS2419.1-2005	External
Emergency Lighting	Clauses E4.2 & E4.4 of NCC 2016 and AS2293.1-2005	Throughout
Exit Signs	Clauses E4.5 & E4.8 of NCC 2016 and AS2293.1-2005	Above exit doors
Directional Exit Signs	Clauses NSW E4.6 & E4.8 of NCC 2016 and AS2293.1-2005	Above doorways in paths of travel to exits

Accommodation Buildings		
ESSENTIAL FIRE SAFETY MEASURES REQUIRED	**STANDARD OF PERFORMANCE (To be achieved by fire safety measure)**	**LOCATION**
Smoke Alarms	Clauses 3.7.2.2 & 3.7.2.4 of NCC 2016 and AS3786-2014 and Interconnection to Between Smoke Alarms	Bedrooms
Lighting to Assist Evacuation	Clause 3.7.2.5 of NCC 2016	Bedrooms
Fire Hose Reels	AS2441-2005	External

NOTE: Fire Hose Reels are not a required fire safety measured under the NCC for Class 1b buildings but have been installed onsite and as such should be maintained so that they perform in accordance with the relevant Australian Standard.

Appendix F

PERFORMANCE SOLUTION

Holmes Fire

Holmes Fire LP

Level 2, 414 Kent Street, Sydney, NSW 2000
Level 8, 757 Ann Street, Fortitude Valley, QLD 4006

holmesfire.com

FIRE ENGINEERING BRIEF

To:	Brendan Rouse	Rovest Holdings Pty Ltd	Project: 137245
	David Walker	Geolyse Pty Ltd	
	Neil Diamond	Procert	
From:	Nick Schraffenberger and Michael Prag		
Date:	18 June 2019		Version: A
Subject:	Pybar Mining Camp – Lot 991 Barrier Highway, Cobar, NSW		

1 INTRODUCTION

The purpose of this Fire Engineering Brief (FEB) is to outline the fire engineering process for the subject project and establish and agree the fire safety needs of the project with the relevant stakeholders, namely the client (Rovest Holdings Pty Ltd), the project manager and architect (Geolyse), and the approval authority (Procert).

The goal is to achieve acceptance of the scope of work, critical input factors and acceptance criteria before detailed design commences. Stakeholder comments will then be incorporated into the Fire Engineering Report as necessary. The requirements of all interested parties are thereby established and incorporated into the proposed fire safety strategy. This brief therefore covers both the client liaison for an understanding of their objectives, and also any necessary technical considerations for Building Code of Australia, 2019 Volume One (BCA)[1] compliance.

This is a concise FEB that is provided to set down the basis on which the fire safety analysis will be undertaken, as per the intent of the International Fire Engineering Guidelines[2]. The issues of non-compliance with the Deemed-to-Satisfy Provisions of the BCA relate to the egress width and hydrant water supply.

This report is based on revision B of the drawings prepared by Geolyse on 2 August 2018.

2 BUILDING DESCRIPTION

The project relates to the proposed refurbishment of the existing mining accommodation camp located at Lot 991 Barrier Highway, Cobar, NSW. The development comprises of a main building which incorporates an administration area, kitchen, dining, recreation, and laundry facilities as well as several other nearby accommodation buildings.

The general description of the building under the Deemed-to-Satisfy Provisions of the BCA, is as indicated in Table 2-1.

Table 2-1: BCA General Description

BCA Clause	Description
A1.0 Effective Height	0 m

[1] Australian Building Codes Board, *National Construction Code 2019*, *Volume 1*, Building Code of Australia, Class 2 to Class 9 Buildings. Australian Building Codes Board, CAN, Australia, 2019.

[2] National Research Council of Canada; International Code Council, United States of America; Department of Building and Housing, New Zealand; and Australian Building Codes Board, *International Fire Engineering Guidelines*, *Edition 2005*, Australian Building Codes Board, 2005.

<table>
<tr><th colspan="2">BCA Clause</th><th>Description</th></tr>
<tr><td>A6.3</td><td>Classification</td><td>Class 6 – Retail
Class 9b - Assembly</td></tr>
<tr><td>C1.1</td><td>Type of Construction Required</td><td>Type C</td></tr>
<tr><td>C1.2</td><td>Rise in Storeys</td><td>1, with 1 contained</td></tr>
<tr><td>C2.2</td><td>Floor Area and Volume Limitations</td><td>
<table>
<tr><td></td><td>Class 9b</td><td>Class 6</td></tr>
<tr><td>Maximum floor area:</td><td>3,000 m^2</td><td>2,000 m^2</td></tr>
<tr><td>Maximum volume:</td><td>18,000 m^3</td><td>12,000 m^3</td></tr>
</table>
Maximum fire compartment = 831 m^2
These size limitations for the fire compartments are not exceeded.
Building area = 831 m^2
</td></tr>
<tr><td>D1.13</td><td>Occupant Load</td><td>
<table>
<tr><th>Area</th><th>Number of occupants</th><th>Basis for estimation</th></tr>
<tr><td>Gym / Recreation Room</td><td>54</td><td>BCA Table D1.13 of the BCA, for a gym, being 3 m^2 per person</td></tr>
<tr><td>Dining Room</td><td>100</td><td>Based on number of fixed seats</td></tr>
<tr><td>Back of House and Kitchen</td><td>18</td><td>BCA Table D1.13 of the BCA, for a kitchen/office/laundry, being 10 m^2 per person</td></tr>
<tr><td>Store Room and Loading Dock</td><td>6</td><td>BCA Table D1.13 of the BCA, for storage, being 30 m^2 per person</td></tr>
<tr><td>Total</td><td>178</td><td>Assumptions listed Above</td></tr>
</table>
</td></tr>
</table>

3 NON-COMPLIANCES AND PROPOSED SOLUTIONS

Table 3-1 notes the non-compliances to be addressed and the corresponding concept design requirements for each issue.

Table 3-1: Description of Non-Compliances and Design Requirements

Issue	BCA Clause	Non-compliance	Concept Design Requirements
1	D1.6(b)	Egress Width	▪ The external stair leading from the kitchen is to provide at least 950 mm of clear width. ▪ The doors are to provide at least 735 mm of clear width.

Issue	BCA Clause	Non-compliance	Concept Design Requirements
2	E1.3, AS 2419.1-2005	Hydrant Water Supply	▪ The building is to be provided with fire hydrant system complying with AS2441-2005 with the exception that the tank be designed to have a capacity of 250,000 L in lieu of the required 288,000 L. ▪ A sign is to be provided at the suction point of the tank stating: "WATER CAPACITY NOT SUFFICIENT FOR TWO HYDRANTS FLOWING FOR FOUR HOURS"

4 DESIGN BASIS

To clarify the overall objectives of the project, Table 4-1 identifies the basis upon which the design will be undertaken.

Table 4-1: Design Objective and Acceptance Criteria

Design Objective	Acceptance Criteria
Legislative	
Compliance with the legislative requirements of the BCA	Performance Requirements of the BCA, refer to Section A.1 to A.2
Extent of assessment	Extent of assessment is limited to the identified non-compliances only.
Referral to Fire & Rescue NSW	Not required by Clause 144 of the Environmental Planning and Assessment Regulation due to the fire compartment size being less than 2,000 m² and the building size being less than 6,000 m².
Involvement of a competent fire safety practitioner	The Fire Engineering Report will be written or reviewed by a competent fire safety practitioner as required by Clause 144A of the Environmental Planning and Assessment Regulation.
Construction Review	Recommended
Client Specific (beyond legislative requirements)	
Property protection and business continuity (subject building)	No identified additional issues from client. Please note that Deemed-to-Satisfy compliant solutions and Performance Solutions do not provide an absolute level of safety for protection from fire for occupants or property.
Egress for persons with disabilities	No additional objectives to that of the Disability Discrimination Act.
Peer Review	Not required
Extent or availability of insurance	No additional objectives
Multiple simultaneous fires	No additional objectives
Explosions, arson, malicious acts, or terrorism	No additional objectives
Flexibility for future use	No additional objectives

5 CONSTRUCTION REQUIREMENTS

The works that will be proposed within the Fire Engineering Report are to be completed prior to issue of an Occupation Certificate, as per the EP&A Regulations.

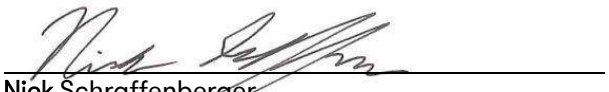
To ensure the works that will be proposed within the Fire Engineering Report are appropriately completed, it is recommended that Holmes Fire be engaged to undertake inspections of the building prior to issue of the Occupation Certificate.

A visual inspection of the active and passive measures, in addition to witnessing of active systems, will be required to be undertaken. Certification will be required from designers, suppliers and installers confirming compliance with the requirements of the Fire Engineering Report. Holmes Fire will provide a detailed list of the inspection, witnessing and certification requirements prior to commencing construction inspections.

6 STAKEHOLDER ACCEPTANCE

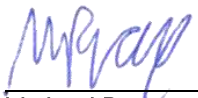
Please respond in writing to Holmes Fire as soon as possible with any comments in relation to this FEB. Comments are required from the stakeholders demonstrating that they understand the contents of this FEB.

Written By:



Nick Schraffenberger
Fire Engineer
BS (Fire Protection)

Reviewed By:



Michael Prag
Fire Engineer
GradDip (FireSafetyEng), BEMech, DipEngPrac

Appendix A Proposed Performance Solutions

A.1 Issue 1: Egress Width

Egress Width Summary	
Relevant BCA Clause	**D1.6(b)(i)**
Deemed-to-Satisfy Non-Compliance	The stairs are required to achieve a width of 1,000 mm. The external stair leading from the kitchen only provides 980 mm of clear width as shown in Figure A-1. The doors are required to achieve a width of 750 mm. There are several doors which only provide 735 mm of clear width.

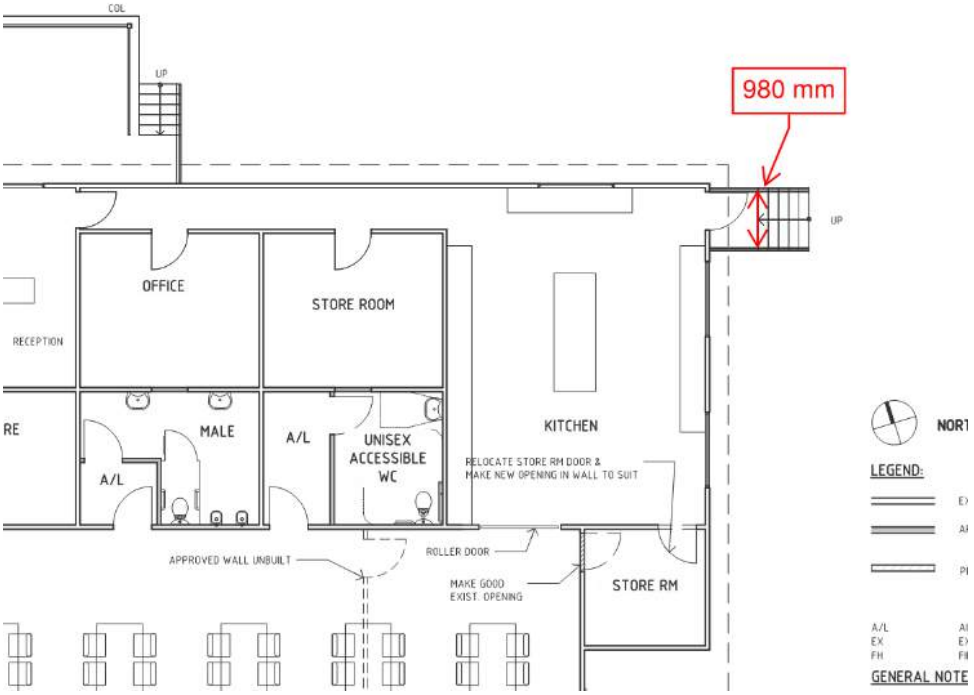


Figure A-1:Stairs Leading from Kitchen with Unobstructed Width Less than 1 m

Relevant BCA Performance Requirement	DP4 and DP6
Assessment method	Clause A2.2(1)(a) 'complies with the Performance Requirements'. Clause A2.2(2)(b)(ii) 'other verification methods'.
Method of analysis	An absolute approach is to be undertaken. In this approach, the results of the subject analysis are matched, using the agreed acceptance criteria, against the Performance Requirements without comparison to Deemed-to-Satisfy designs by way of a deterministic quantitative assessment
Subsystems	E (occupant evacuation and control) and F (Fire Services intervention).
Acceptance criteria	Adequate exit dimensions is to be provided to allow for occupant egress and fire fighter intervention.
Design tools for fire modelling	Not applicable

Egress Width Summary	
Design tools for egress modelling	Not applicable
Design fires	A single fire will be assumed to occur in one location at one time only. Multiple fires are not considered. Fires are anticipated to initially be smouldering, developing to a flaming fire. Should occupant intervention not extinguish the fire, it is assumed that flashover may occur in the area of fire origin. For this assessment, fires are assumed to occur anywhere within the building.
Occupant parameters	Anthropometric data in relation to maximum shoulder and hip width for occupants and fire brigade to be considered.
Sensitivity	Not applicable
Redundancy	Not applicable
Uncertainty	Not applicable
Factors of safety	Not applicable
Proposed solution	It will be demonstrated by use of anthropometric data, that the widths of the external stair leading from the kitchen and the numerous doors throughout the subject building are not expected to impede occupant egress nor fire brigade intervention activities when utilising this stair and the doorways.
Outline of schedule of works	▪ The external stair leading from the kitchen is to provide at least 950 mm of clear width. ▪ The doors are to provide at least 735 mm of clear width.

A.2 Issue 2: Hydrant System Water Capacity

Hydrant System Water Capacity Summary	
Relevant BCA Clause	**E1.3(b)(i), AS 2419.1-2005 Clause 4.2**
Deemed-to-Satisfy Non-Compliance	The main building is required to be provided with a fire hydrant system in accordance with AS 2419.1-2005 which requires that sufficient water capacity be provided to allow for four hours of continuous firefighting based on two hydrants flowing. It is proposed to provide an onsite water storage tank with a reduced water capacity.
Relevant BCA Performance Requirement	EP1.3
Assessment method	Clause A2.2(1)(a) 'complies with the Performance Requirements'. Clause A2.2(2)(b)(ii) 'other verification methods'.
Method of analysis	An absolute approach is to be undertaken. In this approach, the results of the subject analysis are matched, using the agreed acceptance criteria, against the Performance Requirements without comparison to Deemed-to-Satisfy designs by way of a deterministic qualitative assessment.
Subsystems	F (Fire Services intervention)
Acceptance criteria	The fire brigade is to be provided with adequate means to undertake appropriate intervention strategies.
Design tools for fire modelling	Not applicable
Design tools for egress modelling	Not applicable
Design fires	A single fire will be assumed to occur in one location at one time only. Multiple fires are not considered. Fires are anticipated to initially be smouldering, developing to a flaming fire. Should occupant intervention not extinguish the fire, it is assumed that flashover may occur in the area of fire origin. For this assessment, fires are assumed to occur anywhere within the building.
Occupant parameters	Not applicable
Sensitivity	Not applicable
Redundancy	Not applicable
Uncertainty	Not applicable
Factors of safety	Not applicable

Hydrant System Water Capacity Summary	
Proposed solution	It will be demonstrated that upon arrival to the site, the fire brigade will be provided with sufficient means to safely access and connect to the water tank. It will also be demonstrated that given the size of the compartment and anticipated fuel loads, it is expected that a single hydrant flowing would be capable of extinguishing majority of fires. Similarly, it will be shown that two hydrants flowing for over three hours would be capable of extinguishing majority of fires. In the rare event that the hydrant system is not capable of extinguishing the fire, it will be shown that there is a low likelihood of fire spread to other buildings.
Outline of schedule of works	▪ The building is to b provided with fire hydrant system complying with AS 2419.1-2005 with the exception that the tank be designed to have a capacity of 250,000 L in lieu of the required 288,000 L. ▪ A sign is to be provided at the suction point of the tank stating: "WATER CAPACITY NOT SUFFICIENT FOR TWO HYDRANTS FLOWING FOR FOUR HOURS"