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## Statement of Environmental Effects

Maari Ma Wilcannia Health Clinic  
Bonney Street  
Wilcannia NSW 2836

(Our Reference: 32342-PR01\_A)  
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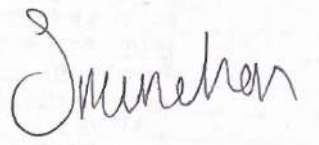
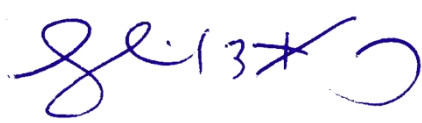


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<b>Report Title:</b>	Statement of Environmental Effects
<b>Project Name:</b>	Maari Ma Wilcannia Health Clinic
<b>Client:</b>	Troppo Architects (for Maari Ma Health Aboriginal Corporation)
<b>Project No.</b>	32342
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# 1 INTRODUCTION

## 1.1 Background

Barnson Pty Ltd has been engaged by Troppo Architects to prepare information in support of a Development Application (DA) for the Maari Ma Wilcannia Health Clinic at Lot 2, 3, and 4 DP 1201089 and Lot 111 DP 1201028, Bonney Street, Wilcannia NSW 2836 (Hereby referred to as the Subject Site).

The Subject Site is located in the Township of Wilcannia and has a property area of approximately 4,952m<sup>2</sup>. The Subject Site does not contain any existing buildings and is directly adjacent the Wilcannia Hospital. A reclassification of the land from *Community Land (Water Supply)* to *Operational Land (Community Health Facility)* was required for the construction to be considered compliant.

Maari Ma is an Aboriginal Community Controlled Health Organisation providing a range of health services with an emphasis on Aboriginal health to communities in western New South Wales. Services they provide include primary health care, community programs and a range of Indigenous health support services. Maari Ma has established links with other health service providers and works closely with these organisations.

The proposed development includes a new primary health care facility with associated car parking, ambulance and drop off areas, “Keeping Well” Section; nerve centre; “Healthy Start” Centre; entry deck and elders’ deck; community/ gathering areas, and associated landscaping throughout the Subject Site.

The Subject Site is zoned R1 General Residential pursuant to the provisions under the *Central Darling Local Environmental Plan 2012* (the LEP). The proposed development is defined as a ‘Health Services Facility’, which is permissible with consent within the R1 Zone.

This application consists of:

- One (1) electronic pdf copy of this written statement, including plans.

## 1.2 Proponent

The proponent for the DA is Maari Ma.

## 1.3 Consultant

Barnson Pty Ltd

Jim Sarantzouklis

Riverview Business Park

Unit 1, 36 Darling Street

Dubbo NSW 2830

## 2 EXISTING ENVIRONMENT

### 2.1 Location and Title

The Subject Site of this application is Lots 2, 3 and 4 DP 1201089 and Lot 111 DP 1201028, Bonney Street, Wilcannia NSW 2836. Please refer to **Appendix A** for Deposited plan details. The site is located on the south-western side of Bonney Street which connects to Ross Street as shown in **Figure 1**.



Source: (NSW Government Spatial Services, 2021)

**Figure 1 – Site Location**

The Subject Site has an approximate area of 4,952m<sup>2</sup> and has direct frontage to Bonney Street. The rear of the site is bounded by the Darling River; the north-west of the lot adjoins residential developments and to the south-east is the Wilcannia Multi-Purpose Service Hospital.

In terms of native title rights Central Darling Shire Council believe it is not a consideration over free hold land therefore no further investigation was carried out on this matter.

The site is currently devoid of any built constructions, however, there is an abundance of scattered vegetation and unsealed dirt vehicular tracks as shown in **Figure 2**. Refer also to **Plates 1-2** for photos of the site and surrounding locality.



Source: (NSW Government Spatial Services, 2021)

**Figure 2 – Site Aerial**



**Plate 1 – View of the subject site from Bonney Street**





**Plate 2 – View of Ross Street in a north-west direction, Bonney Street can be seen to the west**

## **2.2 Land Use**

The subject site has been historically used as an access point to the Darling River water pump, located in the water pump shed on the adjacent lot (Lot 1 DP 1159318). The site is primarily made up of vegetation and unformed gravel roads. The land is owned by the Central Darling Shire Council and is primarily used for ‘water supply’, thus the requirement to reclassify the land use to enable the development. The locality sits adjacent the banks of the Darling River and is in close vicinity to the existing Wilcannia Hospital, golf club and residential development.

## **2.3 Topography**

The subject site is relatively flat throughout before a steep fall being part of the Darling River-bank. Refer to the Survey Plan in **Appendix B**.

## **2.4 Flora and Fauna**

The Subject Site has recorded tracts of vegetation scattered throughout the majority of the site. A Flora and Fauna Impact Assessment was undertaken by Eco logical Australia. They identified two main Plant Community Types and their significance is briefly addressed in the extract below:

- PCT 39 *Coolabah- River Coobah- Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion,*

- PCT 40 Coolabah open woodland wetland with chenopod/grassy ground cover on grey and brown clay floodplains

*Both of these PCTs are associated, in part, with the Threatened Ecological Communities (TECs) Coolabah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penepplain and Mulga Lands Bioregions listed as Endangered under the BC Act and EPBC Act and the Artesian Springs Ecological Community in the Great Artesian Basin which is listed as Critically Endangered under the BC Act and Endangered under the EPBC Act. However, assessment of these PCTs against the listing criteria for these TECs determined that these PCTs did not meet the criteria required for being considered as TECs, and therefore no TECs are present within the study area.*

Refer to **Appendix C** for the full Flora and Fauna Impact Assessment.

### **2.4.1 Arborist**

The subject site was investigated by a suitably qualified arborist Danny Draper of Urban Tree Management on 23 February, 2021. The arborist identified a black box tree (TN1) centrally located on the site which was considered significant. The subsequent report concludes that TN1 should be retained and protected, as recommended. Refer to **Appendix D** for arborist report.

## **2.5 Natural Hazards**

### **2.5.1 Bushfire**

The Subject Site has been mapped as being located within bushfire prone land pursuant to the Central Darling Local Environmental Plan 2012 (the LEP) and the NSW Planning Portal.

The site is identified as containing Category 3 Vegetation and Vegetation Buffer on the Bush Fire Prone Land Map as shown in **Figure 3** below.

Barnson Pty Ltd undertook a Bush Fire Assessment Report (BFAR) to accompany the Development Application. The BFAR addresses the current environment and potential impacts. Refer to BFAR in **Appendix E**.



Figure 3 – Bush Fire Prone Land Map

### 2.5.2 Flood Prone Land

The subject site adjoins the Darling River and therefore is subject to flooding when river levels rise. There is minimal information available relating to flood planning levels however, based off contemporary anecdotal evidence from local sources, the adjoining Wilcannia Hospital which was built in 1879 has not been subject to flooding from the Darling River in the past 50 years. Therefore, the Finished Floor Level (FFL) of the Hospital is considered an appropriate guide in lieu of an adopted flood planning level for the site.

The Maari Ma clinic has a proposed of RL 77.42m AHD, which shall match the FFL of the adjoining existing hospital.

Refer also to Flood Planning Letter by Barnson Pty Ltd, in **Appendix E**.

### 2.6 Noise Environment

Measurement of background noise levels within the Subject Site and its surrounding locality have not been taken. The subject site is currently vacant and is in a locality characterised by mixed landuses including the Hospital; residential; open space; the Golf course and clubhouse. A site inspection by Barnson planner on 11 March 2021. The general noise activities within the locality are attributable to vehicles along Ross Street and to a lesser extent the Hospital.

## 2.7 Services

All services including reticulated water supply, sewerage, electricity and telecommunication infrastructure are available to the site. New connections shall be established to support the site and proposed development thereon.

## 2.8 Access and Traffic

The subject site has a direct frontage to Bonney Street which is an unformed road connected to Ross Street. Ross Street is a sealed two-way road improved with kerb and guttering.

There are existing vehicular tracks traversing the site.

## 2.9 Heritage

The subject site is not identified as containing any heritage listed items under the State Heritage Register or under Schedule 5 of the *Central Darling Local Environmental Plan 2012* (the LEP).

According to Schedule 5 of the LEP, there are several heritage items in proximity to the subject site including the following:

- The Hospital: 1-7 Ross Street (Lot 1 DP 1122572),
- Steam Engines and Old Wilcannia Water Tower: 6-8 Ross Street (Part of Lot 7308 DP 1179888),
- The Wilcannia Golf Club: 25-29 Ross Street (Lot 4 DP 588539).

Barnson approached Eco Logical Australia (ELA) to carry out an Aboriginal Heritage Due Diligence assessment to identify any Aboriginal sites and/or sensitive landforms which may indicate the presence of significant sites that may need further assessment. The relevant heritage databases located 113 Aboriginal Sites and 1 Aboriginal Place within a 5km radius, however, did not find any of significance adjacent or within the subject land. A site inspection by an archaeologist identified a potential significant tree on the riverbank within the boundaries of the site (noting that it is not TN1 reported by the arborist). The assessment report recommended that the tree be retained and protected. Refer to the Aboriginal Due Diligence in **Appendix G**.

### 3 PROPOSED DEVELOPMENT

The proposed development involves the construction of a health services facility (Maari Ma Health Clinic) at Lot 2, 3, and 4 DP 1201089 and Lot 111 DP 1201028, Bonney Street, Wilcannia NSW 2836.

The proponent Maari Ma intends to provide professional medical and wellbeing support services to the community of Wilcannia and its surrounding localities, in a safe and modern environment.

The proposed new development consists of car parking, ambulance and drop off areas; “Keeping Well” Section; nerve centre; “Healthy Start” Section; entry deck and elders deck; community and gathering areas with associated landscaping throughout.

The Maari Ma clinic has a proposed of RL 77.42m AHD, which shall match the FFL of the adjoining existing hospital.

It is intended that the health clinic be open for visitation between the hours of 9am to 5pm, Monday to Friday.

There shall be at least twelve (12) full time staff, with an array of visiting doctors and medical personnel (GPs; midwives; dieticians; speech therapists, paediatricians and pharmacists to name a few) offering services at various frequency ranging from 1 day a week to a quarterly visit.

Additional details of the proposed development are as follows:

- The Nerve centre includes; two (2) patient/accessible toilets, play net, waiting areas and associated decking, bench seating, reception area and staff offices,
  - Proposed floor area of approximately 200.6m<sup>2</sup> plus 56.6m<sup>2</sup> of associated decking;
- The Healthy Start section includes; staff meeting room with associated decking and BBQ, three (3) consult rooms, staff amenities, accessible toilets and storage,
  - Proposed floor area of approximately 130.7m<sup>2</sup> plus 33m<sup>2</sup> of associated decking;
- The Keeping Well Section includes; three (3) consult rooms, two (2) treatment rooms, a mental health room, accessible toilet and backup generator
  - Proposed floor area of approximately 130.7m<sup>2</sup> ;
- Two (2) corridors- “East Link” and “West Link” that connect each section of the Health Clinic;
- Fifteen (15) associated car spaces which includes two (2) accessible car spaces located near the front access ramp and pick up/drop off area;
- An ambulance parking area;
- Ramped entrance and stairwell entrance to provide for access;
- Landscaping is incorporated which includes extensive use of twenty-one (21) native species, associated walkways, and a fire pit;
- The consolidation of the existing lots;

- Erosion and sediment control measures are to be implemented during construction; and
- Stormwater is to be directed into a proposed table drain located near the community gathering/ weir lookout.

Refer to development Plans in **Appendix H** and Civil drawings in **Appendix I**.

## 4 LAND USE ZONING

The subject site is zoned R1 General Residential Zone pursuant to the provisions under the *Central Darling Local Environmental Plan 2012 (LEP)*. The proposed development is most appropriately classified as a 'health services facility'. According to the LEP a 'health services facility' is defined as a:

*"... building or place used to provide medical or other services relating to the maintenance or improvement of the health, or the restoration to health, of persons or the prevention of disease in or treatment of injury to persons, and includes any of the following-*

- (a) A medical centre,*
- (b) Community health services facilities,*
- (c) Health consulting rooms,*
- (d) Patient transport facilities, including helipads and ambulance facilities,*
- (e) Hospital."*

A *health services facility* is permissible with consent in the zone table as 'Any other development not specified in item 2 or 4'.

The permissibility of the proposed development is assessed in terms of the heads of consideration in Section 4.15 of the *Environmental Planning & Assessment Act 1979*, which incorporates consideration of the LEP, and the objectives and permissible uses outlined in the R1 General Residential zone, as outlined in **Section 5** of this report.

## 5 PLANNING CONSIDERATIONS

### 5.1 Biodiversity Conservation Act 2016

#### 5.1.1 Is the development likely to significantly affect threatened species?

Clause 7.2 of the *Biodiversity Conservation Act 2016* (BC Act) identifies the following circumstances where a development is likely to significantly affect threatened species:

- (a) *it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or*
- (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*
- (c) *it is carried out in a declared area of outstanding biodiversity value.*

Each of these is addressed below.

##### 5.1.1.1 Section 7.3 Test

To determine whether a development is likely to significantly affect threatened species or ecological communities, or their habitats, the following is to be taken into account in accordance with Section 7.3 of the BC Act:

- (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.*



**Comment:** The site is located within an existing urban area and adjoins the Darling River. An investigation by Eco Logical Australia identified two (2) Plant Community Types (PCTs) were mapped within the study area:

- PCT 39 Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains. Mainly in the Darling Riverine Plains Bioregion,
- PCT 40 Coolabah open woodland wetland with chenopod/grassy ground cover on grey and brown clay floodplains.

Both of these PCTs are associated, in part, with the Threatened Ecological Communities (TECs) Coolabah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions listed as Endangered under the BC Act and EPBC Act and the Artesian Springs Ecological Community in the Great Artesian Basin which is listed as Critically Endangered under the BC Act and Endangered under the EPBC Act. However, assessment of these PCTs against the listing criteria for these TECs determined that these PCTs did not meet the criteria required for being considered as TECs, and therefore no TECs are present within the study area.

Refer to Flora and fauna Assessment in **Appendix C**.

Therefore, the proposed development is unlikely to significantly affect threatened species or ecological communities, or their habitats.

### 5.1.1.2 Section 7.4 Test

Section 7.4 of the BC Act states:

- (1) *Proposed development exceeds the biodiversity offsets scheme threshold for the purposes of this Part if it is development of an extent or kind that the regulations declare to be development that exceeds the threshold.*
- (2) *In determining whether proposed development exceeds the biodiversity offsets threshold for the purposes of this Part, any part of the proposed development that involves the clearing of native vegetation on category 1-exempt land (within the meaning of Part 5A of the Local Land Services Act 2013) is to be disregarded.*

**Comment:** The proposed development does not exceed the biodiversity offsets threshold as explained below:

*Based on the preliminary designs, the proposed impact area for the development is approximately 2,701m<sup>2</sup> consisting of 521m<sup>2</sup> of existing vehicle tracks and 2,179m<sup>2</sup> of native vegetation (42m<sup>2</sup> of PCT 39 and 2,137m<sup>2</sup> of PCT 40). The clearing of native vegetation within the boundaries associated with the development is considered below the clearing threshold for the minimum lot size associated with the zoned locality (minimum lot size is 800m<sup>2</sup> which is associated with a clearing threshold of less than 0.25ha). Considering the proposed clearing is below the threshold, it will not trigger an entry into the NSW Biodiversity Offsets Scheme. Additionally, there are no trees that are considered mature or significant that will be cleared.*

Refer to Flora and fauna Assessment in **Appendix C**.

### 5.1.1.3 Declared Area of Outstanding Biodiversity Value

The proposed development shall not impact on any areas mapped under the NSW Biodiversity Values Map.

## 5.1.2 Biodiversity Development Assessment Report

As outlined in **Section 5.1.1**, the proposed development is not likely to significantly affect threatened species as defined by Section 7.2 of the BC Act. Refer also to Flora and Fauna Assessment Report in **Appendix C**.

## 5.2 Fisheries Management Act 1994

### 5.2.1 Applicability

The Fisheries Management Act 1994 (FM Act) applies to:

- (a) *in relation to all waters that are within the limits of the State, and*
- (b) *except for purposes relating to a fishery, or a part of a fishery, that is to be managed in accordance with the law of the Commonwealth pursuant to an arrangement under Division 3 of Part 5 and except for purposes prescribed by paragraph (d)—in relation to any waters of the sea not within the limits of the State that are on the landward side of waters adjacent to the State that are within the Australian fishing zone, and*
- (c) *for purposes relating to a fishery, or a part of a fishery, that is managed in accordance with the law of the State pursuant to an arrangement under Division 3 of Part 5—in relation to any waters to which the legislative powers of the State extend with respect to that fishery, whether pursuant to section 5 of the Coastal Waters (State Powers) Act 1980 of the Commonwealth or otherwise, and*
- (d) *for purposes relating to recreational fishing activities engaged in otherwise than by use of a foreign boat (other than recreational activities prohibited or regulated under a plan of management determined under section 17 of the Commonwealth Act)—in relation to any waters to which the legislative powers of the State extend with respect to such activities.*

**Comment:** The subject site is mapped as Key Fish Habitat under the FM Act (DPI 2020). Eco Logical identified the following species as potentially being relevant, however concluded that due to the lack of appropriate habitat they were unlikely to be present:

*Four (4) aquatic species and one (1) aquatic species population listed under the FM Act were identified during the data review as being recorded or having potential habitat with 10 km of the study area. These species included:*

- *Western population of Olive Perchlet (*Ambassis agassizii*)*
- *Silver Perch (*Bidyanus bidyanus*)*
- *Trout Cod (*Maccullochella macquariensis*)*
- *Murray Cod (*Maccullochella peelii*)*
- *Darling River Snail (*Notopala sublineata*)*

*A likelihood of occurrence assessment was undertaken for these species. Due to the absence of aquatic habitat within the study area, it was determined that these species do not have potential to occur within the study area; however, potential habitat is present immediately adjacent to the study area within the Darling River.*

Eco Logical outline mitigation measures that can be employed to minimise any fish impacts during the construction or operational stages of the Project.

Refer to Flora and Fauna Assessment in **Appendix C**.

### **5.2.2 Is the development likely to significantly affect threatened species, population or ecological community?**

Section 221ZV of the FM Act requires the following matters to be taken into consideration to determine whether a proposed development or activity is likely to significantly affect threatened species, populations or ecological communities (unless it is carried out in critical habitat):

- (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 population, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,*
- (c) 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,*
- (d) in relation to the habitat of a threatened species, population 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 threatened species, population or ecological community in the locality,*
- (e) whether the proposed development or activity is likely to have an adverse effect on any critical habitat (either directly or indirectly),*
- (f) whether the proposed development or activity is consistent with a Priorities Action Statement,*

(g) *whether the proposed development constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

*The assessment guidelines under section 220ZZA apply to the determination of whether any such proposed development or activity is likely to significantly affect threatened species.*

**Comment:** The proposal is unlikely to affect threatened (fish) species, population/s or communities. Refer to Flora and Fauna Assessment in **Appendix C**.

## 5.3 Environmental Planning & Assessment Act 1979

### 5.3.1 Application of Biodiversity Conservation Act 2016 & Fisheries Management Act 1994

Section 1.7 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) identifies that Part 7 of the BC Act and Part 7A of the FM Act relate to the operation of the EP&A Act in relation to the terrestrial and aquatic environment. These Acts are addressed in **Sections 5.1** and **5.2** of this report respectively.

## 5.4 Environmental Planning & Assessment Act 1979

### 5.4.1 Evaluation

Section 4.15 of the EP&A Act (as amended) requires the Council to consider various matters in regard to the determination of the Development Application.

*In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application:*

- (a) *The provisions of:*
  - (i) *any environmental planning instrument, and*
  - (ii) *any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and*
  - (iii) *any development control plan, and*
  - (iiia) *any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and*
  - (v) *the regulations (to the extent that they prescribe matters for the purposes of this paragraph), and*
  - (v) *any coastal zone management plan (within the meaning of the Coastal Protection Act 1979), that apply to the land to which the development application relates,*
- (b) *The likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality;*
- (c) *The suitability of the site for the development,*

- (d) Any submissions made in accordance with this act or the regulations,
- (e) The public interest.

The proposed development has been designed with consideration to the following matters, as outlined below.

## 5.5 Environmental Planning Instruments

### 5.5.1 State Environmental Planning Policies (SEPPs)

While there are a number of SEPPs that apply to the subject land and development thereon, there will be no significant implications in terms of the requirements of the SEPPs that will apply to the proposed development. The following SEPPs are considered:

### 5.5.2 SEPP No.55 - Remediation of Land

Clause 7 of *State Environmental Planning Policy No.55 – Remediation of Land* (SEPP 55) requires Council to consider the following before granting consent to a DA:

- (a) it has considered whether the land is contaminated, and
- (b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and
- (c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

**Comment:** The subject site does not appear to have been subject to any of the industries and materials listed in Appendix A of the *Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land* (NSW Department of Urban Affairs and Planning & Environment Protection Authority, 1998) or generally any contaminating type activities. Additionally, Barnson undertook a Preliminary Site Investigation (PSI) to determine the probability of contamination within the Subject Site. It was concluded that the site appears suitable for the proposed use and recommended that stockpiled fill and minor material be removed prior to works commencing.

Refer to PSI in **Appendix J**.

### 5.5.3 Central Darling Local Environmental Plan 2012

#### 5.5.3.1 Land Use Table

The Subject Site is zoned R1 General Residential Zone pursuant to the *Central Darling Local Environmental Plan 2012* (The LEP). The objectives of the R1 zone are:

- To provide for the housing needs for the community,
- To provide for a variety of housing types and densities,

- *To enable other land uses that provide facilities or services to meet the day to day needs of residents,*
- *To minimise land use conflict between land uses on land within the zone and land uses on land within adjoining zones.*

**Comment:** The development is for a ‘health services facility’, which is a permissible land use in the R1 General Residential Zone. It is considered that the proposal generally meets the objectives of the zone, in that it shall provide an essential service to meet the day to day needs of residents within the locality and surrounds.

### **5.5.3.2 Clause 5.10 - Heritage Conservation**

Clause 5.10 Heritage Conservation applies to the proposed development as heritage items are in proximity to the subject site. The relevant sub-clauses are addressed below:

#### ***(4) Effect of proposed development on heritage significance***

*The consent authority must, before granting consent under this clause in respect of a heritage item or heritage conservation area, consider the effect of the proposed development on the heritage significance of the item or area concerned. This subclause applies regardless of whether a heritage management document is prepared under subclause (5) or a heritage conservation management plan is submitted under subclause (6).*

**Comment:** The subject site is in proximity to heritage items including - The (Wilcannia) Hospital; Steam Engines and Old Wilcannia Water Tower and Wilcannia Golf Club. The proposed building footprint is to be well setback from Ross Street at the end of Bonney Street and will not physically impact on any of the listed heritage items. Further due to the setback only partial views of the Hospital and to a lesser extent the tower are available from the site. The proposed design does not attempt to mimic the heritage items each having a distinct appearance rather the objective is to provide a modern, functional and sustainable development.

#### ***(5) Heritage assessment***

*The consent authority may, before granting consent to any development—*

- (a) on land on which a heritage item is located, or*
- (b) on land that is within a heritage conservation area, or*
- (c) on land that is within the vicinity of land referred to in paragraph (a) or (b), require a heritage management document to be prepared that assesses the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item or heritage conservation area concerned.*

**Comment:** The proposal is unlikely to cause any significant impact on nearby heritage items, and therefore the preparation of a specific heritage management document is not considered necessary.

### 5.5.3.3 Clause 5.21 - Flood Planning

The subject site is mapped as being partly within the Flood Planning Area. Clause 7.1 of the LEP states that consent cannot be granted for development in a flood planning area unless the consent authority is satisfied that:

(1) *The objectives of this clause are as follows—*

- (a) *to minimise the flood risk to life and property associated with the use of land,*
- (b) *to allow development on land that is compatible with the flood function and behaviour on the land, taking into account projected changes as a result of climate change,*
- (c) *to avoid adverse or cumulative impacts on flood behaviour and the environment,*
- (d) *to enable the safe occupation and efficient evacuation of people in the event of a flood.*

(2) *Development consent must not be granted to development on land the consent authority considers to be within the flood planning area unless the consent authority is satisfied the development—*

- (a) *is compatible with the flood function and behaviour on the land, and*
- (b) *will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties, and*
- (c) *will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood, and*
- (d) *incorporates appropriate measures to manage risk to life in the event of a flood, and*
- (e) *will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.*

(3) *In deciding whether to grant development consent on land to which this clause applies, the consent authority must consider the following matters—*

- (a) *the impact of the development on projected changes to flood behaviour as a result of climate change,*
- (b) *the intended design and scale of buildings resulting from the development,*
- (c) *whether the development incorporates measures to minimise the risk to life and ensure the safe evacuation of people in the event of a flood,*
- (d) *the potential to modify, relocate or remove buildings resulting from development if the surrounding area is impacted by flooding or coastal erosion.*

(4) *A word or expression used in this clause has the same meaning as it has in the Considering Flooding in Land Use Planning Guideline unless it is otherwise defined in this clause.*

(5) *In this clause—*

*Considering Flooding in Land Use Planning Guideline means the Considering Flooding in Land Use Planning Guideline published on the Department's website on 14 July 2021.*

*flood planning area has the same meaning as it has in the Floodplain Development Manual.*

*Floodplain Development Manual means the Floodplain Development Manual (ISBN 0 7347 5476 0) published by the NSW Government in April 2005.*

**Comment:** The proposed development considers past flood behaviour in the area. It is intended to raise structures to a minimum floor height of RL 77.42m AHD to match floor height of existing nearby hospital building. It is recommended that structural supports be engineered to withstand the equivalent of a 1% AEP flood event.

In terms of effect on the riparian environment it is considered that the proposed buildings have been setback sufficiently to ensure minimal impact on the banks and associated vegetation.

In terms of evacuation, it should be noted that appropriate warning is available to exit the site in the event of a flood, and that the use is not habitable in that patients and staff do not stay overnight which might make evacuation problematic.

Refer to Flood Planning advice in **Appendix F**.

#### **5.5.3.4 Clause 6.1 - Earthworks**

Clause 6.1, 'Earthworks' applies to the proposed development as earthworks are included as part of development works. The proposed site building footprint is relatively flat and minimal earthworks will be required mainly for driveways and footings. There shall be little disruption or detrimental effect on existing drainage patterns, soil stability or the like.

High salt levels can be appear in groundwater and the Darling River Systems, however salinity is unlikely to be an issue for the subject site due to groundwater depth and the proposed design where buildings are raised above the natural surface.

Finally, it is recommended that appropriate erosion and sediment controls are undertaken on the site during development works to prevent or reduce any soil erosion that would occur onsite.

#### **5.5.3.5 Clause 6.3 - Development on river front areas**

The subject site adjoins the Darling River. Clause 6.3 is addressed as follows:

*(1) The objectives of this clause are as follows—*

- (a) to support the natural migration of the river channel, including riverine processes,*
- (b) to protect and improve the bed and bank stability of rivers,*
- (c) to maintain or improve the water quality of rivers,*
- (d) to protect the amenity, scenic landscape values and cultural heritage of rivers,*
- (e) to protect public access to riverine corridors,*



*(f) to conserve and protect riverine corridors, including wildlife habitat.*

*(2) Development consent may be granted to development on land in a river front area only for the following purposes—*

*(a) boat building and repair facilities, boat launching ramps, boat sheds, charter and tourism boating facilities or marinas,*

*(b) the extension or alteration of an existing building that is wholly or partly in the river front area if the extension or alteration will be located no closer to the river bank than the existing building,*

*(c) environmental protection works,*

*(d) extensive agriculture or intensive plant agriculture,*

*(e) environmental facilities, recreation areas or recreation facilities (outdoor),*

*(f) water recreation structures.*

*(3) Development consent must not be granted for a purpose specified in subclause (2) unless the consent authority is satisfied of the following—*

*(a) that the development will contribute to achieving the objectives for the zone in which the land is located,*

*(b) that the appearance of the development, from both the river and adjacent river front area, will be compatible with the surrounding area,*

*(c) that the development is not likely to cause environmental harm such as—*

*(i) pollution or siltation of the river, or*

*(ii) an adverse effect on surrounding uses, marine habitat, wetland areas, fauna or flora habitats, or*

*(iii) an adverse effect on drainage patterns,*

*(d) that the development will only cause minimal visual disturbance to the existing landscape,*

*(e) that continuous public access, and opportunities to provide continuous public access, along the river front and to the river will not be compromised,*

*(f) that any historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the land on which the development is to be carried out and of surrounding land will be maintained.*

*(4) In this clause—*

*bed, of a river, means the whole of the soil of the channel in which the river flows, including the portion—*

*(a) that is alternatively covered or left bare with a rise or fall in the supply of water, and*

*(b) that is adequate to contain the river and its average or mean stage without reference to extraordinary freshets in the time of flood or to extreme droughts.*

*river means the Darling River.*

*river bank means the limit of the bed of a river.*

*river front area means land in Zone RU1 Primary Production that is within 100 metres of the highest bank of the river*

**Comment:** The subject site is not considered river front area as defined in this clause as it is within an R1 zone. Notwithstanding the proposed design does consider minimising any potential impact to the riverbank and ensuring public access are maintained for the enjoyment of the riverine environment.

#### **5.5.3.6 Clause 6.4 - Essential Services**

Clause 6.4 'Essential Services' applies to the proposed development. All services including reticulated water supply, electricity, onsite pump out system to sewerage line, telecommunications and stormwater management shall be connected to the site.

Refer to Civil Plans in **Appendix I** of this report.

### **5.6 Draft Environmental Planning Instruments**

No draft Environmental Planning Instruments are applicable to the subject site or development.

### **5.7 Development Control Plan No. 1**

There are no known Development Control Plans that apply to this development.

### **5.8 Any Planning Agreement entered into**

No Planning Agreements entered into are known to exist in relation to the development or site.

### **5.9 Any Matters Prescribed by the Regulations**

For the purposes of Section 4.15(1)(a)(iv) of the EP&A Act, Clause 92 of the *Environmental Planning and Assessment Regulations 2000* (EP&A Regulations) specifies the additional matters a consent authority must take into consideration when determining a DA.

It is proposed to comply with the deemed to satisfy provisions of the National Construction Code (the BCA).

## 5.10 Any Likely Impacts of the Development

### 5.10.1 Context & Setting

The Subject Site is vacant land located in an urban area within proximity of residential land-uses and the related Wilcannia Hospital.

The proposed development has a generous front setback (from Ross Street) and is compatible with the existing streetscape and land uses in the locality. In terms of scale the proposed single storey modular style development is considered appropriate and overshadowing a non-issue.

The proposal shall incorporate some side boundary and internal fencing, however shall maintain public access to a newly landscaped Community Gathering/Darling River weir lookout area.

Refer to Development Plans in **Appendix H**.

### 5.10.2 Access and Parking

The subject site is located adjacent to Ross Street which is a wide sealed road with kerb and gutter and Bonney Street which is gravelled.

Traffic generation shall consist mainly of staff car vehicle movements; the occasional ambulance movement and trips from the Maari Ma 10-seater bus. Maari Ma employ a driver and provide a pick-up and drop off service for members of the Wilcannia community who do not have access to private transport. This service operates daily. Based on current movements associated with a similar service it is estimated the proposal shall generate 20 movements per day. The existing road network should continue to handle the expected movements, particularly in light of the proposed road and crossover improvements for Bonney Street to a more formalized road delineated as shown on Development Plans in **Appendix H**. Further details on Bonney Street upgrade can be provided with Construction Certificate application.

The Central Darling Shire Council does not have specific requirements for the carparking required of a 'health services facility' within the LGA. The RMS Traffic Generating Development Guidelines also does not specifically provide a standard rate of provision for car parking, however, does provide an estimate of parking requirements for a similar use that of an 'extended hour medical centre' being 4 car spaces for 100m<sup>2</sup> gross floor area (GFA). Therefore, based on a proposed GFA of approximately 400m<sup>2</sup> (total enclosed area minus foyers and amenities) a total of 16 spaces will be required. The following car parking will be made available with the proposed development.

- Twelve (12) car spaces, are proposed on land
- Two (2) accessible car parks located directly in front of the reception area,
- Two (2) parks in the form of a 'drop off' zone.

The total number of proposed car parking spaces thus equals the number of spaces required and satisfies the standard approach taken.

The proposed bus service and spaces likely to be available in Ross Street should also be taken into consideration when assessing car parking requirements, in which case the number of spaces being constructed is likely to exceed what shall be required.

### **5.10.3 Air & Microclimate**

The proposed development shall generate some air pollution, particularly dust generation from the proposed works on the site. The incidence of air pollution can be reduced by using appropriate equipment; employment of good work practise and utilising a water spray, especially in conditions where dust is likely to be a nuisance.

### **5.10.4 Noise**

The proposed construction works shall generate some noise impacts in the locality. The likelihood of noise becoming offensive can be minimised by adopting good work practise and adhering to construction hours as required by Council.

Given the proposed weekday hours of operation and the locality already featuring a health facility (Wilcannia Hospital), the resulting activities area is unlikely to result in any significant noise impact from the Maari Ma Health Clinic.

The proposed gathering space is conveniently located between the River and proposed buildings thus providing an appropriate buffer to adjoining residential development which is likely to minimise any potential noise impact.

### **5.10.5 Waste**

#### **During Construction**

Construction materials are able to be stored wholly within the site prior to removal for recycling or disposal. Construction materials waste will be removed from the site to an approved waste management facility.

#### **During Occupation**

General and non-recyclable waste and recyclable materials are able to be disposed of and collected by Council's normal waste collection service.

Currently Maari Ma have a contract with the Far West Local Health District (FWLHD) where operational waste such as medical waste and sharps, are collected at the hospital site and disposed of along with general FWLHD waste in a secure facility located at the hospital site awaiting pick up by contractors. It is intended for Maari Ma to maintain this waste management arrangement.

Refer also to Maari Ma Primary Health Care Service, Wilcannia Operational Summary in **Appendix K**.

## 5.10.6 Safety, Security & Crime Prevention

### 5.10.6.1 Introduction

The former Department of Urban Affairs and Planning prepared the *Crime prevention and the assessment of development applications: Guidelines under section 4.15 of the Environmental Planning and Assessment Act 1979* (CPTED Guidelines). The guidelines identify that:

*Crime prevention through environmental design (CPTED) seeks to influence the design of buildings and places by:*

- *increasing the perception of risk to criminals by increasing the possibility of detection, challenge and capture*
- *increasing the effort required to commit crime by increasing the time, energy or resources which need to be expended*
- *reducing the potential rewards of crime by minimising, removing or concealing 'crime benefits'*
- *removing conditions that create confusion about required norms of behaviour.*

The guide identifies four basic principles that are used in assessing development applications to ensure that developments do not create or exacerbate crime risk. These principles are:

- surveillance
- access control
- territorial reinforcement
- space management.

Each of these principles is addressed below in relation to the proposed development.

### 5.10.6.2 Surveillance

The Guide identifies that the *attractiveness of crime targets can be reduced by providing opportunities for effective surveillance, both natural and technical* (Department of Urban Affairs and Planning, 2001). It further states that:

*Good surveillance means that people can see what others are doing. People feel safe in public areas when they can easily see and interact with others. Would be offenders are often deterred from committing crime in areas with high levels of surveillance. From a design perspective, 'deterrence' can be achieved by:*

- *clear sightlines between public and private places*
- *effective lighting of public places*
- *landscaping that makes places attractive, but does not provide offenders with a place to hide or entrap victims (Department of Urban Affairs and Planning, 2001).*

In terms of natural surveillance, the development shall generally provide the following:

- Sight lines from health care facility units to the adjacent car parks and access points from the street. There are no structures in this area that would significantly obscure views.
- Provision of effective lighting around buildings, driveways, pedestrian pathways and car parking areas to ensure night time visibility.
- Landscaping of the site that has been designed to avoid potential entrapment areas.

The measures outlined above are considered to provide for appropriate natural surveillance for the development and its locality.

### 5.10.6.3 Access Control

In relation to access control, the guide states:

*Physical and symbolic barriers can be used to attract, channel or restrict the movement of people. They minimise opportunities for crime and increase the effort required to commit crime.*

*By making it clear where people are permitted to go or not go, it becomes difficult for potential offenders to reach and victimise people and their property. Illegible boundary markers and confusing spatial definition make it easy for criminals to make excuses for being in restricted areas (Department of Urban Affairs and Planning, 2001).*

The guide identifies that effective access control can be achieved by creating:

- *landscapes and physical locations that channel and group pedestrians into target areas*
- *public spaces which attract, rather than discourage people from gathering*
- *restricted access to internal areas or high-risk areas (like carparks or other rarely visited areas). This is often achieved through the use of physical barriers (Department of Urban Affairs and Planning, 2001).*

In terms of access, the development shall provide the following:

- The facility shall have a clear pedestrian entrance in its frontage.
- Windows have been provided adjacent to front doors for staff to view approaches.
- Fencing shall be constructed along site boundaries.
- The design of the proposed development shall allow for general surveillance of common areas.
- The communal areas should be visible.

The measures outlined above are considered to provide for appropriate access control for the development and its locality.

### 5.10.6.4 Territorial Reinforcement

In terms of territorial reinforcement, the guide notes:

*Community ownership of public space sends positive signals. People often feel comfortable in, and are more likely to visit, places which feel owned and cared for. Well used places also reduce opportunities for crime and increase risk to criminals.*

*If people feel that they have some ownership of public space, they are more likely to gather and to enjoy that space. Community ownership also increases the likelihood that people who witness crime will respond by quickly reporting it or by attempting to prevent it. Territorial reinforcement can be achieved through:*

- *design that encourages people to gather in public space and to feel some responsibility for its use and condition*
- *design with clear transitions and boundaries between public and private space*
- *clear design cues on who is to use space and what it is to be used for. Care is needed to ensure that territorial reinforcement is not achieved by making public spaces private spaces, through gates and enclosures (Department of Urban Affairs and Planning, 2001).*

In terms of territorial reinforcement, the development shall provide the following:

- The development has been designed to make it clear what is private and public space.
- The driveway and car parking areas shall receive passive surveillance from certain buildings within the site.

The measures outlined above are considered to provide for appropriate territorial reinforcement for the development and its locality.

#### **5.10.6.5 Space Management**

The guide notes that space management is linked to the principle of territorial reinforcement, in ensuring that sites are appropriately utilised and well cared for. Specifically,

*Space management strategies include activity coordination, site cleanliness, rapid repair of vandalism and graffiti, the replacement of burned out pedestrian and car park lighting and the removal or refurbishment of decayed physical elements (Department of Urban Affairs and Planning, 2001).*

In terms of space management, the development will provide the following:

- The communal areas of the site shall be well maintained.
- Any damaged elements of the site would be rapidly repaired or removed.
- External fixtures would be well secured to minimise their ability to be used to cause damage.

The measures outlined above are considered to provide for appropriate space management for the development and its locality.

#### **5.10.6.6 Conclusion**

As outlined above, the proposed development has been designed and shall employ measures that are consistent with the CPTED (Crime Prevention Through Environmental Design) principles. Overall, the development is considered to be appropriately designed to minimise opportunities for crime. It is considered that the development would not unreasonably create or aggravate crime risk.

#### **5.10.7 Social & Economic Impacts in the Locality**

The proposal is considered to be an appropriate use of the site in a suitable location for the following reasons:

- It supports the range and scope of health services needed by the community and provided by Maari Ma in a modern facility;
- It provides construction employment opportunities;
- It provides ongoing operational employment opportunities; and
- It provides a welcoming community space.

The proposed development is anticipated to provide a positive social and economic impact in the locality and surrounding region by providing much needed community support for people in the Wilcannia area and surrounds.

#### **5.11 Suitability of the Site for the Proposed Development**

The suitability of the site for the proposed development has been addressed in the above sections of this report. There are no prohibitive constraints posed by adjacent developments. There does not appear to be any zoning, planning or environmental matters that should hinder the proposed development of the site. In this regard, it can be concluded that the proposal fits into the locality and the site attributes are conducive for the development.

#### **5.12 The Public Interest**

The proposal is unlikely to create any negative impacts on the amenity of the area and is therefore deemed to be positive in terms of the public interest.

Refer also to Maari Ma's aims and objectives seeking to build a more accessible health system for Aboriginal people outlined in the Operational Summary in **Appendix K**.



## 6 CONCLUSION

It is recommended that the proposed health services facility on Lot 2, 3, and 4 DP 1201089 and Lot 111 DP 1201028, at Bonney Street, Wilcannia NSW 2836 be supported on the following grounds:

- The proposal is considered acceptable in terms of the provisions of Section 4.15 of the *Environmental Planning and Assessment Act 1979*;
- The proposal is permissible with consent and consistent with the relevant development standards and provisions of the *Central Darling Local Environmental Plan 2012*;
- The proposed development is not anticipated to generate any adverse impacts in the locality;
- The proposed development is considered suitable for the site and its surrounds; and
- The proposal shall support social and economic growth both during construction and operational phase and provide a much-needed modern health care facility for the region.

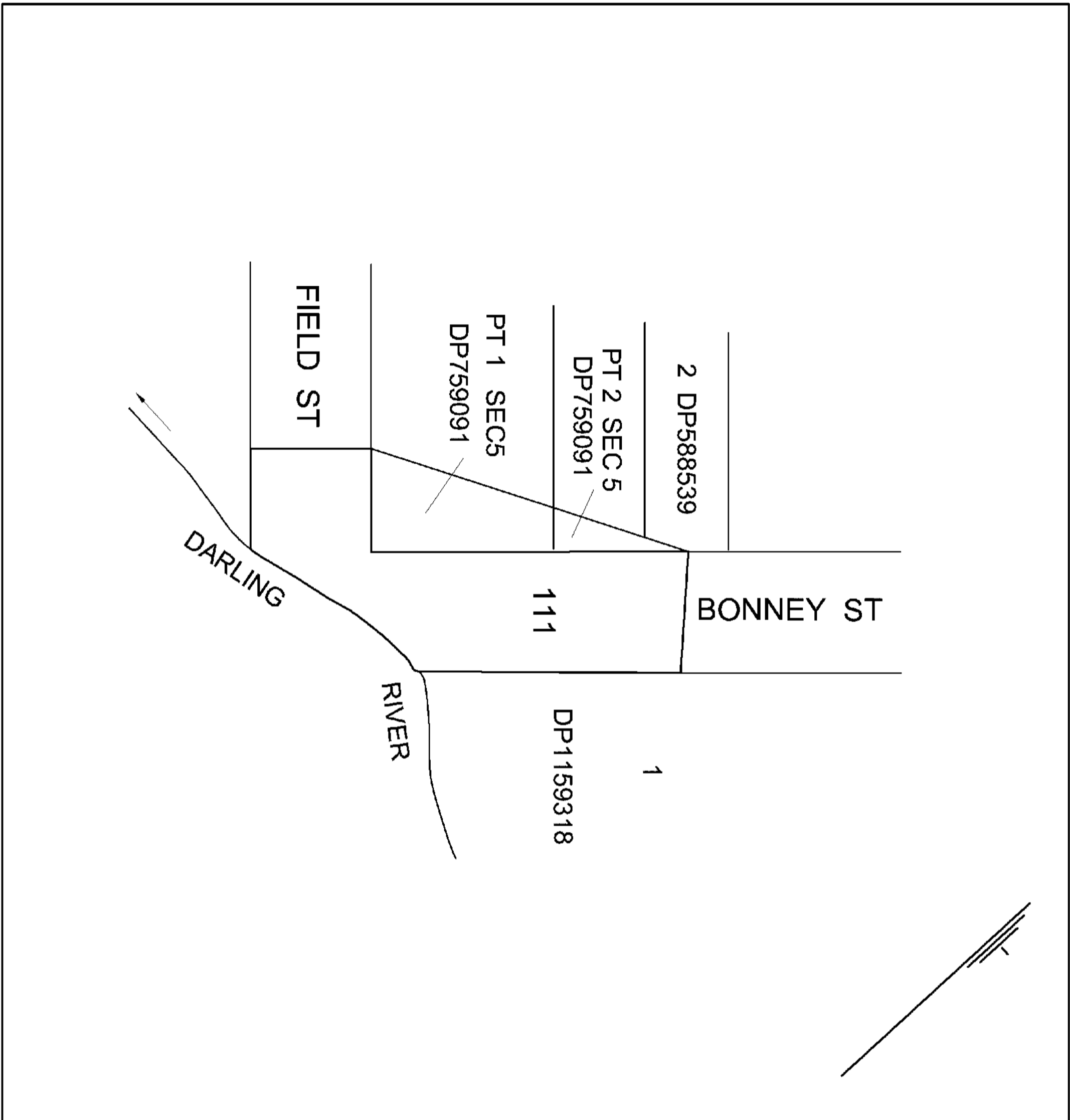
## 7 REFERENCES

Central Darling LEP 2012

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## Appendix A - Deposited Plans



# DP 1201028

Registered:  18.9.2014

Title System: OLD SYSTEM

Purpose: LIMITED FOLIO CREATION

Ref. Map: TOWN WILCANNIA ( 45 )

Last Plan: DP432375

C.A. 172629

PLAN OF LAND COMPRISED IN

GOVT GAZ DATED 12.4.1946

FOLS 912-913

Lengths are in metres. Reduction Ratio - NTS

Sheet 1 of 1 sheets

L.G.A.: CENTRAL DARLING

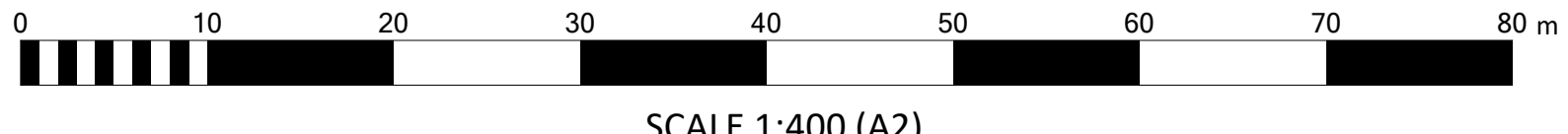
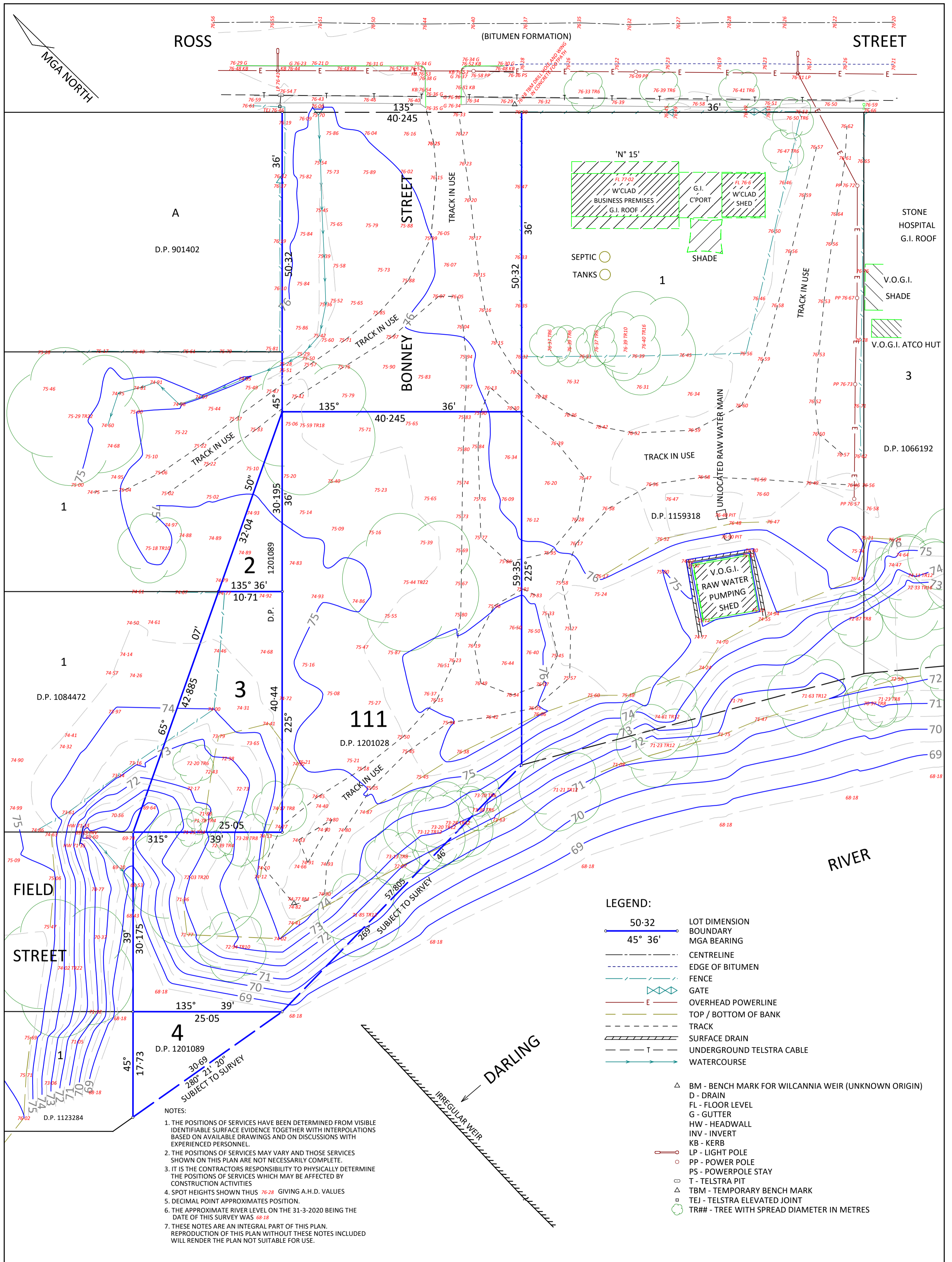
LOCALITY: WILCANNIA

PARISH: WILCANNIA

COUNTY: YOUNG

THIS PLAN WAS PREPARED SOLELY TO IDENTIFY THE LAND IN THE ABOVE DEED AND THE BOUNDARIES HAVE NOT BEEN INVESTIGATED BY THE REGISTRAR GENERAL  
 THIS PLAN IS NOT A CURRENT PLAN IN TERMS OF S.7A CONVEYANCING ACT 1919.

## Appendix B - Survey Plan




SCALE 1:400 (A2)

DETAIL SURVEY AT BONNEY STREET, WILCANNIA FOR PROPOSED MEDICAL CLINIC

LENGTHS ARE IN METRES	<b>GRAHAM F. HOWE</b> REGISTERED SURVEYOR PH/FAX 08 8087 3660 515 WYMAN LANE, BROKEN HILL P.O. BOX 317 N.S.W. 2880	SIGNED:	
SCALE 1:400 (A2)		31-3-2020	T19-8D

## **Appendix C - Flora and Fauna Impact Assessment**

A decorative background element on the left side of the page, consisting of a stylized topographic map with contour lines in shades of green and grey.

# Maari Ma Wellbeing Centre, Wilcannia Flora and Fauna Impact Assessment

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**Barnson Pty Ltd**

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## DOCUMENT TRACKING

<b>Project Name</b>	Maari Ma Wellbeing Centre, Wilcannia Flora and Fauna Impact Assessment
<b>Project Number</b>	17477
<b>Project Manager</b>	Rebecca Croake
<b>Prepared by</b>	Rebecca Croake
<b>Reviewed by</b>	Dr Cheryl O'Dwyer, Rachel Murray
<b>Approved by</b>	Rachel Murray
<b>Status</b>	<b>Final</b>
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Template 2.8.1

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## Abbreviations

Abbreviation	Definition
ADD	Aboriginal Due Diligence
Barnson Pty Ltd	Barnson
BC Act	<i>Biodiversity Conservation Act 2016</i>
BS Act	<i>Biosecurity Act 2015</i>
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
ELA	Eco Logical Australia
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection Biodiversity Conservation Act 1999</i>
FFIA	Flora and Fauna Impact Assessment
FM Act	<i>Fisheries Management Act 1995</i>
IBRA	Interim Biogeographic Regionalisation for Australian
LEP	Local Environment Plan
LGA	Local Government Area
LLS	Local Land Service
MNES	Matters of National Environmental Significance
NSW	New South Wales
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PMST	Protected Matters Search Tool
TEC	Threatened Ecological Community

## Executive Summary

Eco Logical Australia (ELA) was engaged by Barnson Pty Ltd (Barnson) to undertake a Flora and Fauna Impact Assessment (FFIA) for the proposed Maari Ma Wellbeing Centre located south west of Bonney Street, Wilcannia, NSW. The proposed works involve the construction of buildings, roads and associated landscaping on Lot 2 DP 1201089, Lot 111 DP 1201028, Lot 4 DP 1201089 and Lot 3 DP 1201089.

Works associated with the construction of the Maari Ma Wellbeing Centre is hereafter referred to as the 'Project'. Based on preliminary designs, the proposed impact area for the Project is approximately 2,701 m<sup>2</sup> consisting of 521 m<sup>2</sup> of existing vehicle tracks and 2,179 m<sup>2</sup> of native vegetation. A larger study area of approximately 5,000 m<sup>2</sup> was surveyed to allow for finalisation of construction plans. The existing vehicle tracks will be upgraded as part of the Project and have therefore been included within impact calculations.

This report has been compiled in accordance with Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), and as per the requirements of Part 7 of the NSW *Biodiversity Conservation Act 2016* (BC Act). Relevant Matters of National Environmental Significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were also assessed within this report.

The biodiversity values of the study area were identified through a comprehensive data review and ecological field surveys. The data review included searches of relevant threatened species registers and background information, while field surveys involved vegetation validation and mapping, targeted flora surveys, opportunistic fauna surveys and threatened fauna habitat assessment.

Two (2) Plant Community Types (PCTs) were mapped within the study area:

- PCT 39 *Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains Manly in the Darling Riverine Plains Bioregion,*
- PCT 40 *Coolabah open woodland wetland with chenopod/grassy ground cover on grey and brown clay floodplains.*

Both of these PCTs are associated, in part, with the Threatened Ecological Communities (TECs) *Coolabah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penepplain and Mulga Lands Bioregions* listed as Endangered under the BC Act and EPBC Act and the *Artesian Springs Ecological Community in the Great Artesian Basin* which is listed as Critically Endangered under the BC Act and Endangered under the EPBC Act. However, assessment of these PCTs against the listing criteria for these TECs determined that these PCTs did not meet the criteria required for being considered as TECs, and therefore no TECs are present within the study area.

The Project will involve clearing 42 m<sup>2</sup> of PCT 39 and 2,137m<sup>2</sup> of PCT 40 (total clearing of native vegetation 2,179 m<sup>2</sup>). The clearing of native vegetation associated with the Project is below the clearing threshold for the minimum lot size associated with the Project (the minimum lot size is 800 m<sup>2</sup> which has an associated clearing threshold of > 0.25 ha) and, as such, does not trigger entry into the Biodiversity Offsets Scheme under the BC Act. Additionally, the Project will not impact on any areas mapped on the Biodiversity Values Map.

A total of 19 threatened species listed under the BC Act and 15 threatened species listed under the EPBC Act were identified from the data review as being recorded or having potential habitat within a 10 km radius of the study area. A likelihood of occurrence was undertaken for these species which determined that potential habitat is present for ten (10) threatened fauna species and one (1) threatened flora species listed under the BC Act and one (1) threatened fauna species and one (1) threatened flora species listed under the EPBC Act. Assessments of significance were undertaken for these species under BC Act and EPBC Act provisions. No threatened flora or fauna species were recorded within the study area during field survey. Given this, and the small size of the proposed area of impact, assessments of significance concluded that the Project will not result in a significant impact to threatened fauna or flora species.

Five (5) threatened entities listed under the NSW *Fisheries Management Act 1995* (FM Act) have the potential to occur in the adjacent Darling River. The study area is mapped as Key Fish Habitat under the FM Act (DPI 2020). However, the implementation of impact mitigation measures will result in no impact to these threatened entities.

Mitigation measures have been proposed to ensure that potential impacts associated with the Project are avoided, minimised and contained. This flora and fauna assessment should be read in conjunction with the Aboriginal Due Diligence (ADD) report also undertaken by ELA for the Project (ELA 2021).

The Project is not likely to significantly affect the environment, including threatened species or ecological communities, or their habitats. Additionally, the Project is not likely to have a significant impact on any matters of national environmental significance or the environment on Commonwealth land for the purposes of the EPBC Act.

# 1. Introduction

## 1.1. Project description

Eco Logical Australia (ELA) was engaged by Barnson Pty Ltd (Barnson) to undertake a Flora and Fauna Impact Assessment (FFIA) for the proposed Maari Ma Wellbeing Centre located south west of Bonney Street, Wilcannia, NSW. The works involve the construction of buildings, roads and associated landscaping on Lot 2 DP 1201089, Lot 111 DP 1201028, Lot 4 DP 1201089 and Lot 3 DP 1201089 (the study area) as shown in **Figure 1** below.

Works associated with the construction of the Maari Ma Wellbeing Centre are hereafter referred to as the Project. Based on preliminary designs, the proposed impact area for the Project is approximately 2,701 m<sup>2</sup> consisting of 521 m<sup>2</sup> of existing vehicle tracks and 2,179 m<sup>2</sup> of native vegetation. Existing vehicle tracks will be upgraded as part of the Project with these tracks incorporated within the total impact area calculations. A larger study area of approximately 5,000 m<sup>2</sup> was surveyed to allow for finalisation of construction plans as shown in Figure 2 below.

## 1.2. Study area

The study area comprises of previously cleared vehicle tracks, a section of riparian vegetation along the Darling River and remnant floodplain vegetation as shown in **Figure 2** below. The study area is located within the Darling Central Shire Council Local Government Area (LGA) in the Far West of NSW. The study area is also located within the Darling Riverine Plains Interim Biogeographic Regionalisation for Australia (IBRA) Region and Wilcannia Plains IBRA Subregion.



Figure 1: Study area context





Figure 2: Impact area

### 1.3. Report objectives

The key objectives of this report are to:

- Provide a description of the ecological values present within the study area, including the identification of threatened species, populations (or their habitat) and ecological communities that have the potential to occur in the study area.
- Determine and assess the significance of any impacts associated with the proposed Project upon threatened species, populations and ecological communities listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and / or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), in accordance with Section 7.3 of the BC Act and / or the *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* under the EPBC Act (DPIE 2013).
- Provide a series of impact mitigation strategies for implementation as part of the proposed Project.

### 1.4. Legislative context

Relevant legislation is outlined in **Table 1**.

**Table 1: Legislative context**

Legislation	Outline
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	The EPBC Act aims to protect MNES including wetlands of international importance, threatened species and communities, and listed migratory species. An action that may or is likely to have a significant impact on MNES should be referred to the Commonwealth to determine whether it is a Controlled Action that requires approval from the Commonwealth. Two (2) MNES have the potential to occur on or near the study area. This report has assessed impacts to MNES and concludes that the development is not likely to have a significant impact on MNES.
<i>Environmental Planning and Assessment Act 1979</i> (EP&A Act)	Part 5 of the EP&A Act applies to activities requiring consent. A determining authority must consider to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity. Where relevant, assessments of significance for impacts to threatened species and endangered ecological communities (EECs) must be prepared in accordance with Part 5 of the Act and the report addresses the relevant requirements of s228 of the <i>Environmental Planning and Assessment Regulation 2000</i> .
<i>Biodiversity Conservation Act 2016</i>	The purpose of the BC Act is to Maintain a healthy and productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. Ten (10) threatened entities listed under the BC Act have the potential to occur on or near the study area. This report has assessed impacts to these species and concludes that the development is not likely to have an impact upon these species or their habitat.
<i>Biodiversity Conservation Regulation 2017</i>	Section 7.2 of the <i>Biodiversity Conservation Regulation 2017</i> sets out threshold levels for when the Biodiversity Offsets Scheme will be triggered. The threshold has two elements: <ul style="list-style-type: none"> <li>• whether the amount of native vegetation being cleared exceeds an area threshold</li> <li>• whether the impacts occur on an area mapped on the Biodiversity Values Map published by the Environment Agency Head.</li> <li>• Whether significant impacts are likely.</li> </ul>

Legislation	Outline
	<p>The Project will involve clearing a maximum of 2,179 m<sup>2</sup> of native vegetation (<b>Section 3.1</b>; 42m<sup>2</sup> of PCT 39 and 2,137 m<sup>2</sup> of PCT 40) which is below the clearing threshold for the minimum lot size associated with the Project (the minimum lot size is 800 m<sup>2</sup> which has an associated clearing threshold of &gt; 2,500 m<sup>2</sup>).</p> <p>The Project will not impact on any areas mapped on the Biodiversity Values Map (<b>Appendix D</b>).</p> <p>No significant impacts are likely.</p>
<p><i>Fisheries Management Act 1995 (FM Act)</i></p>	<p>The FM Act provides for the protection, conservation, and recovery of threatened species defined under the Act. It also makes provision for the management of threats to aquatic threatened species, populations and ecological communities defined under the FM Act, as well as the protection of fish and fish habitat in general.</p> <p>Five (5) threatened entities listed under the FM Act have the potential to occur in the adjacent Darling River. The study area is mapped as Key Fish Habitat under the FM Act (DPI 2020; <b>Appendix D</b>). However, the implementation of impact mitigation measures will result in no impact to these threatened entities.</p>
<p><i>Biosecurity Act 2015 (BS Act)</i></p>	<p>The BS Act provides a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers. Whilst the Act provides for all biosecurity risks, implementation of the Act for weeds is supported by Regional Strategic Weed Management Plans developed for each region in NSW. Appendix 1 of the <i>Western Regional Strategic Weed Management Plan</i> (LLS 2017) identifies the priority weeds for control at a regional scale.</p> <p>One (1) priority weed, <i>Lycium ferocissimum</i> (African Boxthorn) was identified within the study area.</p>
<p><i>State Environment Planning Policy (Koala Habitat Protection) 2021</i></p>	<p>The <i>State Environment Planning Policy (Koala Habitat Protection) 2021</i> does not apply to the project as the Central Darling Shire LGA is not listed in Schedule 1 of the <i>State Environment Planning Policy (Koala Habitat Protection) 2021</i>.</p>

## 2. Methodology

### 2.1. Literature and data review

The following documents and database searches were reviewed in conjunction with data collected during the field survey:

- Commonwealth EPBC Act Protected Matters Search Tool (PMST) (DAWE 2021a)
- NSW BioNet (Wildlife Atlas) Search for threatened species, populations and ecological communities that may have previously been recorded and are listed under the NSW BC Act (DPIE 2021a)
- NSW Biodiversity Values Map (DPIE 2021b)
- NSW BioNet Vegetation Classification database (DPIE 2021c)
- Threatened Species Profiles (OEH 2021)
- Atlas of Living Australia online database (ALA 2021)
- Department of Primary Industries (DPI) Key Fish Habitat Mapping (DPI 2021)
- Aerial imagery
- *Central Darling Shire Council Local Environment Plan (LEP) 2012* (NSW Government 2012)

**Appendix A** identifies the threatened flora, fauna and threatened ecological communities (TECs) returned by the database searches. A likelihood of occurrence table is also provided.

Likelihood of occurrence was determined by reviewing records of the area returned by the database searches, consideration of habitat available and habitat quality and using expert knowledge of species' ecology.

Five (5) terms for the likelihood of occurrence of species are used, as defined below:

- 'yes' = the species was or has been previously recorded within the study area
- 'likely' = medium to high probability that a species utilises the study area
- 'potential' = suitable habitat exists for a species, but there is insufficient information to categorise the species as likely or unlikely to occur
- 'unlikely' = a very low to low probability that a species utilises the study area
- 'no' = habitat within the study area and immediately adjacent to the study area is non-existent or otherwise unsuitable for a species

### 2.2. Field survey

The field survey was undertaken by ELA Ecologist Rebecca Croake on 7 April 2021. A range of methodologies were implemented during the field survey to both identify and assess the impact of the Project on ecological values within the study area.

#### 2.2.1. Vegetation mapping

Native vegetation occurring within the study area was mapped to NSW Plant Community Types (PCTs) using the dominant species within each stratum present at the time of survey and data pertaining to landscape position, soil type and geology.

Vegetation within the study area was mapped during the field survey using Collector for ArcGIS. Data was collected to make an assessment on the following:

- Vegetation condition
- PCT number and description using BioNet Vegetation Classification database (DPIE 2021)
- Assessment against the listing criteria for TECs listed under the BC Act and / or the EPBC Act.

### 2.2.2. Threatened flora surveys

A total of four (4) threatened flora species were identified from the data review as being recorded or having potential habitat within a 10km radius of the study area. These species include:

- *Calotis moorei* (a Burr-daisy)
- *Atriplex infrequens* (A saltbush)
- *Austrostipa metatoris*
- *Solanum karsense* (Menindee Nightshade)

The entire study area was traversed on foot, with opportunistic searches undertaken for these species. A full list of flora species recorded within the study area during the field survey is provided in **Appendix B**.

### 2.2.3. Threatened fauna surveys

A total of 21 threatened fauna species listed under the BC Act and / or the EPBC Act were identified from the data review as being recorded within or having potential to occur within a 10 km radius of the study area. These species are presented in **Appendix A**. A further five (5) aquatic species listed under the FM Act were identified from the data review as recorded or having potential habitat within the section of the Darling River adjacent to the study area (DPI 2021) (**Appendix A**).

Habitat for potentially occurring threatened fauna species was assessed across the entire study area, with incidental observations of all fauna species recorded during the field survey. A list of all fauna species recorded during the field survey is provided in **Appendix B**.

## 2.3. Impact assessment – FM Act listed species

The FM Act provides for the protection, conservation, and recovery of threatened species defined under the Act. It also makes provision for the management of threats to aquatic threatened species, populations and ecological communities defined under the FM Act, as well as the protection of fish and fish habitat in general.

The study area is mapped as Key Fish Habitat under the FM Act (DPI 2020). The extent of Key Fish Habitat within the study area is provided in **Appendix D**.

Four (4) aquatic species and one (1) aquatic species population listed under the FM Act were identified during the data review as being recorded or having potential habitat with 10 km of the study area. These species included:

- Western population of Olive Perchlet (*Ambassis agassizii*)
- Silver Perch (*Bidyanus bidyanus*)
- Trout Cod (*Maccullochella macquariensis*)

- Murray Cod (*Maccullochella peelii*)
- Darling River Snail (*Notopala sublineata*)

A likelihood of occurrence assessment was undertaken for these species. Due to the absence of aquatic habitat within the study area, it was determined that these species do not have potential to occur within the study area; however, potential habitat is present immediately adjacent to the study area within the Darling River.

Implementation of impact mitigation measures detailed in **Section 4.3** below will allow for no impacts to occur to these species during the construction or operational stages of the Project.

## 2.4. Impact assessment – BC Act listed species

Under Section 7.3 of the BC Act, an assessment of significance of impacts is required for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species, TECs or their habitat.

A total of 21 BC Act listed threatened entities were identified from the data review as being previously recorded or having potential habitat within 10 km from the study area. This included four (4) threatened flora species, 15 threatened fauna species and two (2) TECs.

A likelihood of occurrence assessment was undertaken for these threatened entities (**Appendix A**) which determined that ten (10) threatened fauna species, one (1) threatened flora species and two (2) TECs listed under the BC Act have potential to occur within the study area. An assessment of significance was undertaken for these threatened entities in accordance with Section 7.3 of the BC Act. The BC Act assessment of significance is provided in **Appendix E**.

## 2.5. Impact assessment – EPBC Act listed species

The EPBC Act Administrative Guidelines on Significance sets out ‘Significant Impact Criteria’ that area to be used to assist in determining whether a proposed action is likely to have a significant impact on MNES (DPE 2013). Matters listed under the EPBC Act as being of national environmental significance are as follows:

- Listed threatened species and ecological communities
- Listed migratory species
- Wetlands of International Importance
- The Commonwealth marine environment
- World Heritage properties
- National heritage places
- Nuclear actions

Specific ‘Significant Impact Criteria’ are provided for each MNES above, and with separate criteria provided for species listed as endangered, vulnerable and migratory (within the ‘listed threatened species and ecological communities’ matter).

A total of 15 threatened entities listed under the EPBC Act were identified from the data review as being previously recorded or having potential habitat within 10 km from the study area. This included three (3) threatened flora species, 12 threatened fauna species and two (2) TECs.

A Likelihood of Occurrence assessment was undertaken for these listed species and ecological communities and is detailed in **Appendix A** and determined that one (1) threatened flora species and (1) threatened fauna species listed under the EPBC Act have potential to occur within the study area. An assessment of significance was undertaken for these threatened entities and is detailed in **Appendix F**.

## 3. Results

### 3.1. Vegetation communities

Aerial imagery and regional vegetation mapping assessed as part of the data review indicated that the study area consisted of shrubland / open woodland present within the north of the study area and riparian vegetation present along the Darling River, with existing vehicular tracks present throughout the study area. This vegetation pattern was confirmed during the field survey which identified two (2) PCTs, as shown in **Table 2** and **Figure 3** below. These PCTs are discussed further in **Sections 3.1.1** and **3.1.2** below.

**Table 2: PCTs mapped within the study area**

PCT number	PCT name	Vegetation formation and class	Area (m <sup>2</sup> ) within study area	Area (m <sup>2</sup> ) within impact area
39	<i>Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains Manly in the Darling Riverine Plains Bioregion</i>	Semi-arid Woodlands (Grassy sub-formation) – North-west Floodplain Woodlands	1,833	42
40	<i>Coolabah open woodland wetland with chenopod/grassy ground cover on grey and brown clay floodplains</i>	Semi-arid Woodlands (Grassy sub-formation) – North-west Floodplain Woodlands	2,608	2,137
<b>Total native vegetation</b>			<b>4,441</b>	<b>2,179</b>
Vehicular tracks			521	521
<b>Total area</b>			<b>4,962</b>	<b>2,700</b>

Both PCT 39 and PCT 40 are associated, in part, with the *Coolabah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penepplain and Mulga Lands Bioregions* listed as Endangered under the BC Act and EPBC Act and the *Artesian Springs Ecological Community in the Great Artesian Basin* which is listed as Critically Endangered under the BC Act and Endangered under the EPBC Act. Assessments against the listing criteria undertaken in **Sections 3.1.1** and **3.1.2** below determined that the areas of PCT 39 and PCT 40 within the study area do not meet the listing criteria, and as such, no TECs are present within the study area.





Figure 3: PCT mapping

### 3.1.1. PCT 39 Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains Manly in the Darling Riverine Plains Bioregion

The study area contains 1,833 m<sup>2</sup> and the impact area, 42 m<sup>2</sup> of PCT 39 Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains Manly in the Darling Riverine Plains Bioregion which occurs as riparian vegetation adjacent to the Darling River and extend along a drainage line present in the south west of the study area.

Consistent with the PCT description, the overstorey consists of *Eucalyptus coolabah* (Coolabah) and *Eucalyptus camaldulensis* (River Red Gum). The midstorey species consist of *Acacia stenophylla* (River Cooba), *Duma florulenta* (syn. *Muehlenbeckia florulenta*; Lignum) and *Geijera parviflora* (Wilga). Groundcover species consisted of *Paspalidium jubiflorum* (Warrego Grass) and *Einadia nutans* subsp. *nutans* (Climbing Saltbush). Site photos of PCT 39 are provided in Figure 4 and Figure 5 below.

At the time of survey, exotic species richness and associated groundcover was very low. The exotic herb species *Tribulus terrestris* (Cathead) contributed less than 5% to overall groundcover. Signs of disturbance including vehicular tracks and rubbish were present throughout PCT 39 within the study area. PCT 39 within the study area is in moderate condition. *Lycium ferocissimum* (African Boxthorn), which is listed as a priority weed in the *Western Regional Strategic Weed Management Plan 2017-2022* (LLS 2017) was present throughout PCT 39.



Figure 4: *Acacia stenophylla*, *Duma florulenta* and *Geijera parviflora* midstorey within PCT 39 with *Eucalyptus coolabah* canopy (right background).



Figure 5: *Eucalyptus coolabah* and *Eucalyptus camaldulensis* canopy within PCT 39 (background; PCT 40 in foreground).

PCT 39 is associated with the BC Act and EPBC Act TEC *Coolabah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions*. In accordance with the NSW Scientific Committee final determination and the Commonwealth EPBC Act Conservation Advice, this TEC occurs characteristically on grey, self-mulching clays (DPIE 2021d; DAWE 2011). Soil within the study area is comprised of red brown earths. Given the absence of grey, self-mulching clays, the area of PCT 39 within the study area does not meet the listing criteria for *Coolabah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions*.

PCT 39 is also associated with the BC Act and EPBC Act listed TEC *Artesian Springs Ecological Community in the Great Artesian Basin*. This TEC occurs where artesian water emerges at the surface through fault-lines in the overlying rock and produce mounds from the salts and sediments as the water evaporates (DPIE 2021e, NSW Scientific Committee 2001). No artesian springs were identified during the field survey. As such, no areas of PCT 39 within the study area meet the listing criteria for this TEC.

### 3.1.2. PCT 40 *Coolabah open woodland wetland with chenopod/grassy ground cover on grey and brown clay floodplains*

The study area contains 2,608m<sup>2</sup> and the impact area, 2,137m<sup>2</sup> of PCT 40 *Coolabah open woodland wetland with chenopod/grassy ground cover on grey and brown clay floodplains* which occurs on the alluvial clay floodplain in the north east of the study area.

Consistent with the PCT description, the overstorey consists of widely spaced *Eucalyptus coolabah*. Midstorey consists of *Atriplex nummularia* (Old Man Saltbush), *Rhagodia spinescens* (Thorny Saltbush) and *Myoporum montanum* (Western Boobialla). Midstorey cover was variable across PCT 40; however, was generally less than 30% projected foliage cover. Groundcover consists of species *Enteropogon acicularis* (Curly Windmill Grass), *Cynodon dactylon* (Couch) and *Sporobolus caroli* (Fairy Grass). Site photos of PCT 40 are provided in Figure 6 and Figure 7 below.

At the time of survey, exotic species richness and associated groundcover was very low. The exotic herb species *Tribulus terrestris* (Cathead) contributed less than 5% to overall groundcover. Signs of disturbance including vehicular tracks, rubbish and a small area of building ruins were present throughout PCT 40 within the study area. PCT 40 within the study area is in moderate condition. The priority weed species *Lycium ferocissimum* was also present throughout PCT 40.



Figure 6: *Rhagodia spinescens* and *Atriplex nummularia* midstorey within PCT 40, with *Eucalyptus coolabah* in background



Figure 7: *Enteropogon acicularis*, *Cynodon dactylon* and *Sporobolus caroli* groundcover within PCT 40, with scattered *Rhagodia spinescens* and *Atriplex nummularia* and *Eucalyptus coolabah* in background

PCT 40 is associated with the BC Act and EPBC Act EEC *Coolabah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions*. In accordance with the NSW Scientific Committee final determination, this EEC occurs on grey, self-mulching clays (DPIE 2021d, DAWE 2011). Soil within the study area is comprised of red brown earths. Given the absence of

grey, self-mulching clays, the area of PCT 40 within the study area does not meet the listing criteria for *Coolabah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penneplain and Mulga Lands Bioregions*.

PCT 40 is also associated with the BC Act and EPBC Act listed TEC *Artesian Springs Ecological Community in the Great Artesian Basin*. This TEC occurs where artesian water emerges at the surface through fault-lines in the overlying rock and produce mounds from the salts and sediments as the water evaporates (DPIE 2021e, NSW Scientific Committee 2001). No artesian springs were identified during the field survey. As such, no areas of PCT 40 within the study area meet the listing criteria for this TEC.

### 3.2. Threatened flora

No threatened flora species listed under the BC Act and / or the EPBC Act were identified during the field survey. A summary of habitat suitability for threatened flora within the study area is provided in Table 3. A likelihood of occurrence assessment (**Appendix A**) for threatened flora species within the study area determined that *Atriplex infrequens* has potential to occur within the study area. An assessment of significance was undertaken for this species.

**Table 3: Flora habitat suitability summary**

Threatened species	Suitable habitat present	Habitat assessment
<i>Atriplex infrequens</i>	Yes	<i>Atriplex infrequens</i> is associated with broad drainage tracts, clay flats and possibly occasionally inundated habitats, similar to those within the study area. Very little ecological information is available for this species. <i>Atriplex infrequens</i> is associated with PCT 39 and PCT 40 (OEH 2021).  The field survey was undertaken outside the recommended survey period for this species (November to February).
<i>Austrostipa metatoris</i>	No	<i>Austrostipa metatoris</i> grows in association with <i>Eucalyptus populneus</i> , <i>Eucalyptus intertexta</i> and <i>Callitris glaucophylla</i> all of which were not recorded within the study area. Furthermore, <i>Austrostipa metatoris</i> is not associated with PCT 39 or PCT 40 (OEH 2021).
<i>Calotis moorei</i>	No	The study area contains unsuitable soil type for <i>Calotis moorei</i> which grows in sandy soil. Furthermore, <i>Calotis moorei</i> is not associated with PCT 39 or PCT 40 (OEH 2021).
<i>Solanum karsense</i>	No	<i>Solanum karsense</i> grows in occasionally flooded depressions on heavy grey clays with a high self-mulching surface. The study area contains unsuitable habitat for <i>Solanum karsense</i> as soil within the study area was not self-mulching. Furthermore, <i>Solanum karsense</i> is not associated with PCT 39 or PCT 40 (OEH 2021).

A full list of flora species identified in the study area during the field survey is provided in **Appendix B**. Threatened flora species records returned by the database search within a 10 km radius of the study area is provided in **Figure 8**.



Figure 8: Threatened flora

### 3.3. Threatened fauna

A total of 24 threatened fauna species were identified from the data review as being recorded or having potential habitat within a 10 km radius of the study area.

Upon review of the literature and historical records for these species, as well as field habitat assessment, ten (10) of these species were deemed as potentially occurring within the study area, and included:

- Stimson's Python (*Antaresia stimsoni*)
- Red-tailed Black-Cockatoo (inland subspecies; *Calyptorhynchus banksii samueli*)
- Spotted Harrier (*Circus assimilis*)
- Brown Treecreeper (eastern subspecies; *Climacteris picumnus*)
- Grey Falcon (*Falco hypoleucos*)
- Painted Honeyeater (*Grantiella picta*)
- White-bellied Sea-eagle (*Haliaeetus leucogaster*)
- Black-breasted Buzzard (*Hamirostra melanosternon*)
- Little Eagle (*Hieraaetus morphnoides*)
- Major Mitchell's Cockatoo (*Lophochroa leadbeateri*)

Potential habitat for these species within the study area is of low to moderate quality, due to the high level of disturbance and the absence of records both within the study area and within higher quality habitat present in areas immediate outside of Wilcannia, such as the Paroo – Darling National Park, and continuous remnant riparian and floodplain woodland along the Darling River to the north and south of the study area.

No threatened fauna species were recorded during the field survey.

Habitat features recorded within the study area and the associated threatened fauna groups which have potential to utilise this habitat is detailed in Table 4.

**Table 4: Habitat features present within the study area and associated threatened fauna usage**

Threatened fauna group	Habitat feature	Usage type
Diurnal and nocturnal birds, microbats, reptiles and arboreal mammals	Hollow bearing tree	Shelter and nesting / roosting
	Groundcover	Shelter, nesting and foraging habitat
	Midstorey and overstorey	Shelter, nesting and foraging habitat
Diurnal birds	<i>Lysiana exocarp</i> (Mistletoe)	Shelter, nesting and foraging habitat
Aquatic fauna	Darling River	Shelter, spawning and foraging habitat

The field survey identified one hollow bearing tree within the study area, which contains three small hollows (50 to 100mm in diameter) and two (2) medium hollows (100 – 200 mm in diameter) (Figure 9). No nests were identified within the study area. This hollow bearing tree is not proposed to be removed.

*Lysiana exocarp* (Mistletoe) was recorded on *Acacia stenophylla* at a density of approximately 10 individuals per hectare within PCT 39; however, no mistletoe species of the Loranthaceae genus *Amyema*, which are the preferred feeding feed source for the Painted Honeyeater were recorded.

A full list of fauna species opportunistically recorded in the study area during the field survey are presented in **Appendix B**. Historical threatened fauna species records returned by the database search within 10 km of the study area is shown in **Figure 10** below.



Figure 9: Habitat features





Figure 10: Threatened fauna

## 4. Impact assessment

### 4.1. Impacts to vegetation and threatened flora

The proposed Project will result in the removal of approximately 2,179 m<sup>2</sup> of native vegetation (Table 2 above). The proposed Project will not impact upon any TECs or threatened flora species. No mature trees are proposed to be removed as part of the Project.

The likelihood of occurrence determined that *Atriplex frequens* has potential to occur within the study area; however, assessments of significance under both the BC Act (**Appendix E**) and EPBC Act (**Appendix F**) determined that the Project will not result in a significant impact to this species.

### 4.2. Impacts to threatened fauna

No threatened fauna species have been recorded historically or during field surveys within the study area. Despite this, potential low-quality habitat for ten (10) threatened fauna species occurs within the study area.

Assessments of Significance were carried out for each of these species under both the BC Act (**Appendix E**) and EPBC Act (**Appendix F**) provisions. Given the absence of records and the low quality of potential habitat present at the site, along with the large areas of higher quality habitat present within the surrounding area and immediately adjacent to the site (i.e. upstream and downstream of the Darling River), these assessments concluded that the Project will not result in a significant impact to threatened fauna species.

### 4.3. Impact mitigation

Recommended mitigation measures to ensure potential impacts of the proposed works are contained and avoided include the following:

- The disturbance limit for the Project should be clearly delineated using temporary fencing, ropes and/or flagging tape
- Sediment fences should be installed prior to construction to mitigate against the effects of sedimentation into the Darling River and to minimise erosion.
- Minimise the potential for the establishment and spread of weeds within and adjacent to the proposed Project area through the restriction of vehicle access and requirements for the washdown of vehicles, machinery and footwear. All equipment, footwear and clothing should be free from mud, dirt and vegetation debris prior to entry and leaving the proposed work area.
- Consult the Aboriginal Heritage Due Diligence Assessment (ELA 2021) prepared in conjunction with this flora and fauna impact assessment report, prior to and during the proposed works.

## 5. Conclusion

This flora and fauna impact assessment was undertaken in accordance with Part 5 of the EP&A Act and in accordance with Part 7 of the BC Act. Relevant MNES listed under the EPBC Act were also assessed within this report. The biodiversity values of the study area were identified through a comprehensive data review and ecological field surveys. The data review included searches of the relevant threatened species databases, whilst the field survey included vegetation validation, vegetation mapping, targeted flora surveys, opportunistic fauna surveys and threatened fauna habitat mapping.

The study area (approximately 5,000 m<sup>2</sup>) is comprised of 4,441m<sup>2</sup> of native vegetation (1,833m<sup>2</sup> of PCT 39 and 2,608m<sup>2</sup> of PCT 40) and 521 m<sup>2</sup> of existing vehicle tracks. Based on preliminary designs, the proposed impact area for the Project is approximately 2,701 m<sup>2</sup> consisting of 521 m<sup>2</sup> of existing vehicle tracks and 2,179 m<sup>2</sup> of native vegetation (42m<sup>2</sup> of PCT 39 and 2,137m<sup>2</sup> of PCT 40).

Assessments of significance were undertaken for ten (10) fauna species and one (1) species listed as threatened under the BC Act and undertaken for one (1) fauna species and one (1) flora species listed under the EPBC Act (**Appendix E** and **Appendix F**). Due to the absence of records within the study area, and the proposed impact area, and the presence of suitable habitat for these species upstream and downstream of the Darling River, as well as in areas surrounding the study area, the assessments of significance concluded that the Project will not result in a significant impact to these threatened fauna or flora species.

Additionally, the Project will not impact on any area mapped on the NSW Biodiversity Values Map (DPIE 2020). No TECs listed under the BC Act and / or the EPBC Act were identified during the field survey.

The total impacts to native vegetation will be approximately 2,179 m<sup>2</sup>. As such, the Project is below the associated clearing threshold and does not trigger entry into the NSW Biodiversity Offsets Scheme.

Mitigation measures have been proposed to ensure that potential impacts associated with the Project are avoided, minimised and contained.

## 6. References

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## Appendix A Likelihood of occurrence

Table 5: Likelihood of occurrence – terrestrial fauna

Class	Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution, habitat and ecology	Distribution overlaps	Habitat quality present	Species known to occur in region	Species known to occur on site	Likelihood of occurrence	Habitat on site directly or indirectly impacted	Impact Assessment Required
Aves	<i>Actitis hypoleucos</i>	Common Sandpiper		M	Summer migrant. In NSW, widespread along coastline and also occurs in many areas inland. Coastal wetlands and some inland wetlands, especially muddy margins or rocky shores. Also estuaries and deltas, lakes, pools, billabongs, reservoirs, dams and claypans, mangroves. Breeds in Eurasia, uncommon summer migrant to Australia (August to May). Some overwinter.	Yes	None	Yes	No	No		No
Aves	<i>Amytornis modestus</i>	Thick-billed Grasswren (eastern subspecies)	E4A	V	In NSW, known only from the Packsaddle area. May still occur at other locations in Upper Western Region. Saltbush, cottonbush, bluebush and nitre-bush areas on sandy plains or depressions in gibber; also along watercourses in clumps of cane grass The nest is deep and loosely-made, shaped either like a cup, half-dome or dome; located on or near the ground in a clump of cane grass, within the foliage of low shrub or in flood debris, and constructed of dead grasses, twigs and dry bark strips. Forages on the ground and under or around bushes for a wide variety of seeds, berries and invertebrates	No	Marginal	No	No	No		No
Aves	<i>Apus pacificus</i>	Fork-tailed Swift		M	Recorded in all regions of NSW. Riparian woodland., swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes. Non-breeding visitor to all states and territories of Australia, arriving from its breeding grounds in Siberia around October, and departing in April. The species is thought to be highly mobile within Australia, moving across the country in search of food. They probably roost aerially.	Yes	None	Yes	No	Unlikely	No	No
Aves	<i>Ardea alba</i>	Great Egret		M	Widespread, occurring across all states/territories and a vagrant on Lord Howe and Norfolk Island. Swamps and marshes, grasslands, margins of rivers and lakes, salt pans, estuarine mudflats and other wetland habitats. Mostly forages in shallow to moderately deep water for fish, insects, crustaceans, molluscs, frogs, lizards, snakes and small birds and mammals. In NSW, most breeding colonies are located in the Darling Riverine Plains region and the Riverina region. Breeding sites are located in wooded and shrubby swamp. The breeding season generally extends from November to April.	Yes	Marginal	Yes	No	No	-	No
Aves	<i>Ardea ibis</i>	Cattle Egret			Widespread and common across NSW. Grasslands, wooded lands and terrestrial wetlands. Uses predominately shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora. The Cattle Egret often forages away from water on low lying grasslands, improved pastures and croplands. It is commonly found amongst livestock.	Yes	None	Yes	No	No		No
Aves	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper		M	Summer migrant. Widespread in most regions of NSW, especially in coastal areas, but sparse in the south-central Western Plain and east Lower Western Regions. Shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. Breeds Arctic Siberia, summer migrant to Australia August-April. Some overwinter. Forage in wetlands or intertidal mudflats, inundated vegetation of saltmarsh, grass or sedges, sewage ponds. Roosting occurs at the edges of wetlands, on sandy beaches, stony shores or on rocks in water.	Yes	None	Yes	No	No		No
Aves	<i>Calidris melanotos</i>	Pectoral Sandpiper		M	Summer migrant to Australia. Widespread but scattered in NSW. East of the Great Divide, recorded from Casino and Ballina, south to Ulladulla. West of the Great Divide, widespread in the Riverina and Lower Western regions. Shallow fresh to saline wetlands, including coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands	Yes	None	Yes	No	No		No

Class	Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution, habitat and ecology	Distribution overlaps	Habitat quality present	Species known to occur in region	Species known to occur on site	Likelihood of occurrence	Habitat on site directly or indirectly impacted	Impact Assessment Required
					Breeds in northern Russia and North America, migrates to non-breeding areas in South America. Recorded in Australia from September to June.							
Aves	<i>Calyptorhynchus banksii samueli</i>	Red-tailed Black-Cockatoo (inland subspecies)	V		Watercourses and overflows of the Darling, Paroo, Bogan, Macquarie and Barwon Rivers extending along the Darling River from Wentworth in the south to Bourke and thence through to Brewarrina in the north. It extends east to Walgett and perhaps Boggabilla on the Barwon and south through to the Macquarie Marshes. Eucalyptus forest and woodlands, especially along watercourses. Also grasslands, scrublands, wetlands and vegetation on floodplains.	Yes	Marginal	Yes	No	Potential	Yes	Yes
Aves	<i>Circus assimilis</i>	Spotted Harrier	V		Found throughout the Australian Mainland, except in densely forested or wooded habitats, and rarely in Tasmania. Grassy open woodland, inland riparian woodland, grassland, shrub steppe, agricultural land and edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. Preys on terrestrial mammals (e.g. bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion.	Yes	Marginal	Yes	No	Potential	Yes	Yes
Aves	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V		From eastern through central NSW, west to Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. Eucalypt woodlands and dry open forest. Up to 80% of the diet is comprised of ants. Also feeds on other invertebrates (including spiders, insects larvae, moths, beetles, flies, hemipteran bugs, cockroaches, termites and lacewings), nectar from Mugga Ironbark (Eucalyptus sideroxylon) and paperbarks, and sap, along with lizards and food scraps. Hollows in standing dead or live trees and tree stumps are essential for nesting. The species breeds in pairs or co-operatively in territories which range in size from 1.1 to 10.7 ha.	No	None	Yes	No	Potential	Yes	No
Aves	<i>Falco hypoleucos</i>	Grey Falcon	E1		Arid and semi-arid zones. In NSW, found chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Shrubland, grassland and wooded watercourses, occasionally in open woodlands near the coast, and near wetlands. Preys primarily on birds, especially parrots and pigeons; reptiles and mammals are also taken. Utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring.	Yes	Marginal	Yes	No	Potential	Yes	Yes
Aves	<i>Gallinago hardwickii</i>	Latham's Snipe		M	Migrant to east coast of Australia, extending inland west of the Great Dividing Range in NSW. Freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands. Non-breeding migrant to Australia, arriving between July-November from its breeding grounds in Japan and far-eastern Russia, and departing by late February. It feeds in mud or in very shallow water with low, dense vegetation. Roosting occurs on the ground near or in foraging areas beside or under clumps of vegetation, among dense tea-tree, in forests, in drainage ditches or plough marks, among boulders, or in shallow water if cover is unavailable.	Yes	None	Yes	No	No		No
Aves	<i>Grantiella picta</i>	Painted Honeyeater	V	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas. Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	Yes	Marginal	Yes	No	Potential	Yes	Yes

Class	Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution, habitat and ecology	Distribution overlaps	Habitat quality present	Species known to occur in region	Species known to occur on site	Likelihood of occurrence	Habitat on site directly or indirectly impacted	Impact Assessment Required
Aves	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V		Distributed along the coastline of Mainland Australia and Tasmania, extending inland along some of the larger waterways, especially in eastern Australia.  Freshwater swamps, rivers, lakes, reservoirs, billabongs, saltmarsh and sewage ponds and coastal waters. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest and urban areas.  The breeding season extends from June to January (or sometimes February) in southern Australia. Breeding habitat is usually close to water but may occur up to a kilometre away. Nests are Manly located in tall open forest or woodland, but sometimes in other habitats such as dense forest, closed scrub or in remnant trees on cleared land. The White-bellied Sea-Eagle feeds opportunistically on a variety of fish, birds, reptiles, mammals and crustaceans, and on carrion and offal.	Yes	Marginal	Yes	No	Potential	Yes	Yes
Aves	<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	V		Areas receiving less than 500 mm rainfall from north-western NSW and north-eastern SA to the east coast at about Rockhampton, then across northern Australia south almost to Perth.  Inland habitats, including timbered watercourses, grasslands and sparsely timbered woodlands.  Mostly preys on reptiles, small mammals, birds, including nestlings, carrion and large eggs. Breeds from August to October near water in a tall tree. The stick nest is large and flat and lined with green leaves. Normally two eggs are laid.	Yes	Marginal	Yes	No	Potential	Yes	Yes
Aves	<i>Hieraetus morphnoides</i>	Little Eagle	V		Throughout the Australian Mainland, with the exception of the most densely forested parts of the Dividing Range escarpment.  Open eucalypt forest, woodland or open woodland, including she-oak or Acacia woodlands and riparian woodlands of interior NSW.  Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	Yes	Marginal	Yes	No	Potential	Yes	Yes
Aves	<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	V		In NSW, occurs across the arid and semi-arid inland, as far east as Bourke and Griffith, and sporadically even further east.  Wide range of treed and treeless inland habitats, always within easy reach of water.  Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres.	Yes	Marginal	Yes	No	Potential	Yes	Yes
Aves	<i>Motacilla flava</i>	Yellow Wagtail		M	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA.  Swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns.  Breeds Europe to Siberia and west Alaska, Regular summer migrant to Australia (November-April).	No	None	No	No	No		No
Aves	<i>Oxyura australis</i>	Blue-billed Duck	V		Widespread in NSW but is most concentrated in the southern Murray-Darling Basin area.  Coastal and inland wetlands and swamps.  Blue-billed Ducks usually nest solitarily in Cumbungi over deep water between September and February. Young birds disperse in April-May from their breeding swamps in inland NSW to non-breeding areas on the Murray River system and coastal lakes. They feed on the bottom of swamps eating seeds, buds, stems, leaves, fruit and small aquatic insects such as the larvae of midges, caddisflies and dragonflies.	Yes	None	Yes	No	No		No
Aves	<i>Pezoporus occidentalis</i>	Night Parrot	E4	E	Presumed extinct	No	None	No	No	No	-	No



Class	Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution, habitat and ecology	Distribution overlaps	Habitat quality present	Species known to occur in region	Species known to occur on site	Likelihood of occurrence	Habitat on site directly or indirectly impacted	Impact Assessment Required
Aves	<i>Rostratula australis</i>	Australian Painted Snipe	E1	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Swamps, dams and nearby marshy areas Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally, occurs from September to December. Forages nocturnally on mudflats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	Yes	None	Yes	No	No		No
Mammalia	<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	V	Distribution coincides approximately with the Murray Darling Basin; the Pilliga Scrub region is the distinct stronghold for this species. Mallee, <i>Allocasuarina luehmannii</i> (bulloke) and box eucalypt- dominated communities, especially box/ironbark/cypress-pine vegetation. Roosts in tree hollows, crevices, and under loose bark. Slow flying agile bat, utilising the understorey to hunt non-flying prey - especially caterpillars and beetles - and will even hunt on the ground. Mating takes place in autumn with one or two young born in late spring to early summer.	No	Marginal	No	No	No		No
Reptilia	<i>Antaresia stimsoni</i>	Stimson's Python	V		In NSW, occurs in north-west from Bourke and Gundabooka National Park in the east to Broken Hill and Wilcannia in the south. Arid and semi-arid environments including rock outcrops, sandy plains and dune fields, woodlands, shrublands and hummock grasslands. Rocky outcrops provide caves and deep crevices, and tree-lined watercourses provide numerous low hollows and fallen trees. They forage at night with adults feeding on small mammals (especially bats), birds, geckoes and other lizards, whilst juveniles take geckoes and skinks.	Yes	Marginal	Yes	No	Potential	Yes	Yes

Table 6: Likelihood of occurrence - flora

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution, habitat and ecology	Distribution overlaps	Habitat quality present	Species known to occur in region	Species known to occur on site	Likelihood of occurrence	Habitat on site directly or indirectly impacted	Impact Assessment Required
<i>Atriplex infrequens</i>	A saltbush	V	V	<p>Confined to the NSW far western plains.</p> <p>Broad drainage tracts, clay flats and possibly occasionally inundated habitats.</p> <p>Flowering time has not been recorded; however, seeding is recorded in December. Very little ecological information is available for this species so it's critical habitat components can only be speculated.</p>	Yes	Good	Yes	No	Likely	Yes	Yes
<i>Austrostipa metatoris</i>	A spear-grass	V	V	<p>Most records occur in the Murray Valley. Scattered records also occur in central NSW including Lake Cargelligo, east of Goolgowi, Condobolin and south west of Nymagee.</p> <p>Sandhills, sand ridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils.</p> <p>Associated species include <i>Eucalyptus populnea</i>, <i>E. intertexta</i>, <i>Callitris glaucophylla</i>, <i>Casuarina cristata</i>, <i>Santalum acuminatum</i> and <i>Dodonaea viscosa</i>. Flowers in response to rain. It is not known if fire plays a role in the ecology of this species.</p>	Yes	None	No	No	No. Not found during field assessment	No	No
<i>Calotis moorei</i>	A burr-daisy	E		<p>The species is confined to NSW and is known from only four populations in NSW, the type locality north-west of Louth near the homestead of Mt Mulyan sheep station, west of Wilcannia, around the Menindee area and an old record at Zara Station near Deniliquin.</p> <p><i>Calotis moorei</i> grows in sandy soil and appears to be associated with <i>Acacia</i> woodlands and chenopod shrublands.</p>	Yes	None	No	No	No. Not found during field assessment	No	No
<i>Solanum karsense</i>	Menindee Nightshade	V	V	<p>Endemic to NSW and restricted to the far south-western plains, extending up the Darling River to the Menindee and Wilcannia districts. Manly restricted to the area between the Darling and Lachlan Rivers</p> <p>Occasionally flooded depressions with heavy soil. Also sandy floodplains and ridges and in calcareous soils, red sands, red-brown earths and loamy soils.</p> <p>Flowers chiefly in spring. This species is ephemeral in nature, appearing following rainfall events. It also tolerates disturbance and will often appear after such activities as grading, ploughing and flooding for irrigation. A clonal species recorded as common to locally abundant in most populations. It can form small colonies of several hundred plants, to large spreading colonies found over an area of 8-12000 hectares</p>	Yes	None	No	No	No Not found during field assessment	No	No

Table 7: Likelihood of occurrence – aquatic fauna

Class	Scientific Name	Common Name	FM Act Status	EPBC Act Status	Distribution	Distribution overlaps	Habitat quality present	Species known to occur in region	Species known to occur on site	Likelihood of occurrence	Habitat on site directly or indirectly impacted	Impact Assessment Required
Actinopterygii	<i>Ambassis agassizii</i>	Western population of Olive Perchlet	E2		This population is now found only at a few sites in the Darling River drainage. Rivers, creeks, ponds, and swamps. They are usually found in slow-flowing or still waters, often near overhanging vegetation or amongst logs, dead branches, and boulders. Often congregate around large woody debris (snags) and vegetation during the day but disperse during the night to feed on micro-crustaceans and insects, including larvae. Males and females reach sexual maturity in one year. Spawning occurs in November and December, when water temperatures reach about 23°C. Females release adhesive eggs about 0.7mm in diameter amongst aquatic vegetation.	Yes	None	Yes	No	No		No
Actinopterygii	<i>Bidyanus bidyanus</i>	Silver Perch	V	CE	Murray-Darling basin; now mostly stocked fish which generally have not established reproducing populations. The most abundant remaining natural population occurs in the central Murray River downstream of Yarrawonga Weir as well as several of its anabranches and tributaries. Other self-sustaining populations reported from the McIntyre and Macquarie Rivers in northern NSW. Fast-flowing, open waters, especially where there are rapids and races; however, will also inhabit warm, sluggish water with cover provided by large woody debris and reeds. They are omnivorous, feeding on small aquatic insects, molluscs, earthworms, and green algae. Males reach sexual maturity at three years of age, when around 25 cm in length, and females at five years, when around 29 cm. Adults migrate upstream in spring and summer to spawn. Juveniles also sometimes move upstream in response to rising water temperatures and levels. Females can shed 300,000 or more semi-buoyant eggs of about 2.75 mm in diameter. The eggs develop in a few days to become feeding larvae that drift downstream.	Yes	None	Yes	No	No		No
Actinopterygii	<i>Maccullochella macquariensis</i>	Trout Cod	E1	E	Endemic to the southern Murray-Darling river system, including the Murrumbidgee and Murray Rivers, and the Macquarie River in central NSW. Found in relatively fast currents, especially in fairly deep water close to the bank, and often congregate around large woody debris (snags). They are carnivores, preying mainly on other fishes as well as crustaceans and aquatic insects. Trout cod reach sexual maturity at 3-5 years, when approximately 35cm (males) or 43cm (females) in length, and 0.75 to 1.5kg in weight. They form pairs and spawn during spring and early summer.	Yes	None	Yes	No	No		No
Actinopterygii	<i>Maccullochella peelii</i>	Murray Cod		V	Throughout most of the Murray Darling Basin with the exception of some localised extinctions. Some translocated populations exist outside the species' natural distribution in impoundments and waterways (Cataract Dam and the Nepean River system in NSW). Clear rocky streams to slow flowing, turbid rivers and billabongs. Frequently found in the Man river channel and larger tributaries; also, in floodplain channels when they contain water. The Murray Cod reaches sexual maturity at 4 to 5 years of age and at 2 to 3 kg in weight. The species migrates upstream prior to spawning in late spring and early summer when the water reaches a temperature of between 16-21°C. The Murray Cod is the top predator of Australia's inland rivers. Cod are carnivorous, typically feeding on spiny crayfish, yabbies and shrimps.	Yes	None	Yes	No	No		No
Gastropoda	<i>Notopala sublineata</i>	Darling River Snail	E4A		The Darling River Snail was once common and widely distributed in the Darling River and its tributaries. The species is now restricted to a few populations in irrigation pipes near Bourke, Brewarrina and Walgett. The Darling River Snail is a medium-sized (20-25mm) freshwater snail with a round shell that ends in a conical spire.	Yes	None	Yes	No	No		No
Actinopterygii	<i>Ambassis agassizii</i>	Western Olive Perchlet	E2		Olive Perchlets are a small native fish that occur in both eastern (coastal) and western (Murray-Darling) drainages, but these populations may be genetically distinct. The western population of the Olive Perchlet was once widespread throughout the Murray-Darling system of South Australia, Victoria, western New South Wales	Yes	None	Yes	No	No		No

Class	Scientific Name	Common Name	FM Act Status	EPBC Act Status	Distribution	Distribution overlaps	Habitat quality present	Species known to occur in region	Species known to occur on site	Likelihood of occurrence	Habitat on site directly or indirectly impacted	Impact Assessment Required
					and southern Queensland. This population has suffered a serious decline and is now found only at a few sites in the Darling River drainage.							

Table 8: Likelihood of occurrence - TEC

Community Name	TSC Act Status	EPBC Act Status	Description	TSC listing equivalent	Distribution overlaps	Habitat quality present	Species known to occur in region	Species known to occur on site	Likelihood of occurrence	Habitat on site directly or indirectly impacted	Impact Assessment Required
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	E	E	<p>Semi-arid to humid subtropical woodland where <i>Eucalyptus coolabah</i> subsp. <i>coolabah</i> (Coolibah) and/or <i>Eucalyptus largiflorens</i> (Black Box) are the dominant canopy species and where the understorey tends to be grassy. Other tree species may occur in the tree canopy but are not dominant, including <i>Acacia salicina</i> (Cooba), <i>Acacia stenophylla</i> (River Cooba), <i>Casuarina cristata</i> (Belah), <i>Eremophila bignoniiflora</i> (Eurah), <i>Eucalyptus camaldulensis</i> (River Red Gum) and <i>Eucalyptus populnea</i> (Bimble Box).</p> <p>The mid or shrub layer may or may not be present. Ground cover lifeforms typically comprise native graminoids, other herbs, chenopods and other low shrubs that are typically under 50 cm tall.</p> <p>It is associated with the floodplains and drainage areas of the Darling Riverine Plains and the Brigalow Belt South bioregions.</p> <p>Found on the grey, self-mulching clays of periodically waterlogged floodplains, swamp margins, ephemeral wetlands, stream levees, drainage depressions and Gilgai.</p>	Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions	Yes	Low	Yes	No	No	No	No
Artesian Springs Ecological Community in the Great Artesian Basin	CE	E	<p>Naturally restricted to the artesian springs of the Great Artesian Basin in north-western NSW. The springs occur where artesian water emerges at the surface through fault-lines in the overlying rock and produce mounds from the salts and sediments as the water evaporates. The vegetation within the community frequently consists of sedges or similar vegetation, however, trees and shrubs may be adjacent to the springs or nearby</p> <p>Occurs at the edges of the Great Artesian Basin. Mostly found in Queensland and South Australia, however, a few occur in the Mulga Lands, Darling Riverine Plains and Cobar Peneplain Bioregions of New South Wales.</p>	NA	Yes	Low	Yes	No	No.	No	No

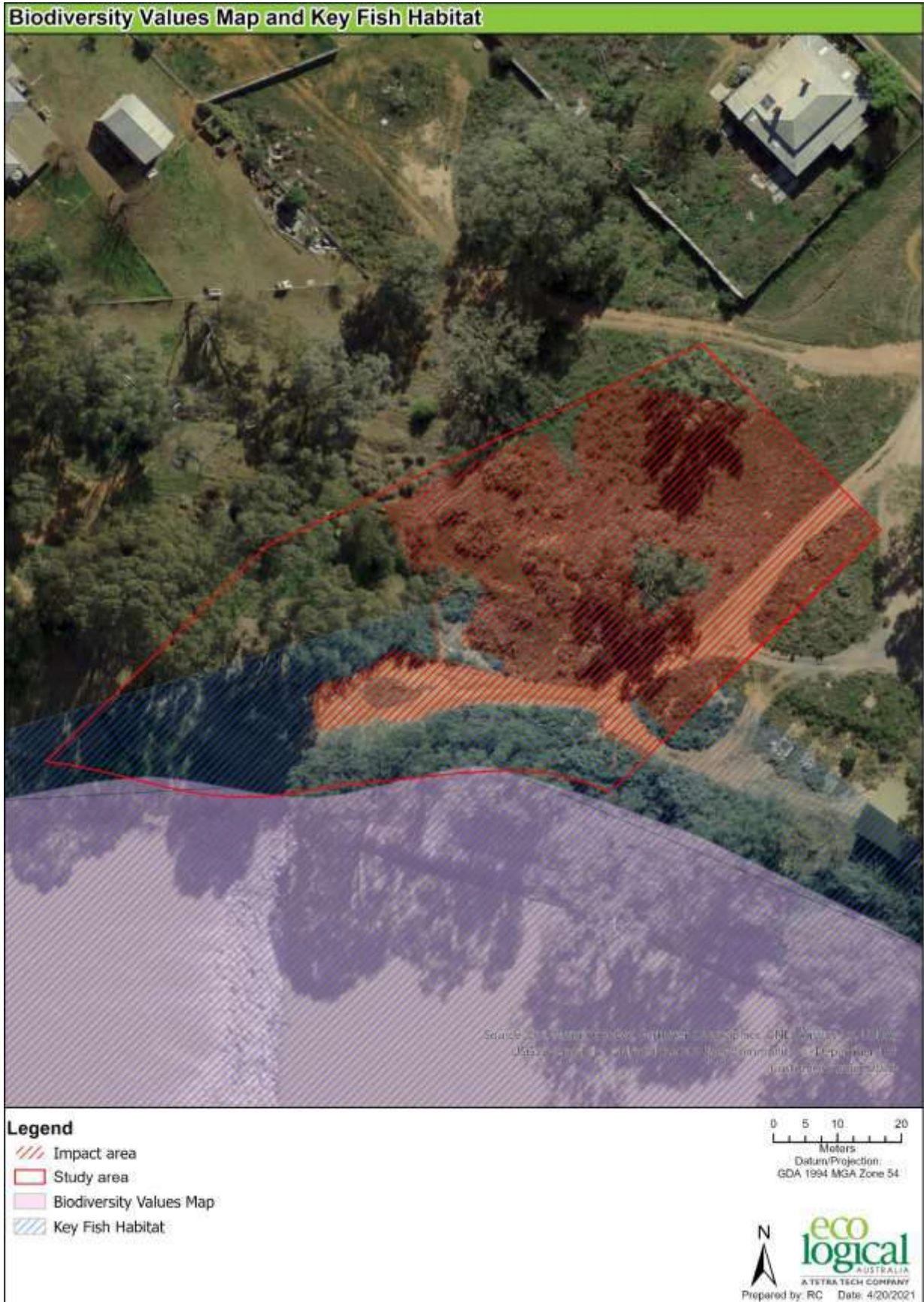
## Appendix B Flora species list

Scientific name	Common name
<i>Acacia stenophylla</i>	River Cooba
<i>Atriplex nummularia</i>	Old Man Saltbush
<i>Aurostipa bigeniculata</i>	
<i>Boerhavia dominii</i>	Tar vine
<i>Chloris ventricosa</i>	Tall Windmill Grass
<i>Cynodon dactylon</i>	Couch
<i>Dactyloctenium radulans</i>	Button Grass
<i>Duma florenta</i>	Lignum
<i>Einadia nutans</i>	Climbing Saltbush
<i>Enchylaena tomentosa</i>	Ruby Saltbush
<i>Enteropogon acicularis</i>	Curly Windmill Grass
<i>Eucalyptus camaldulensis</i>	River Red Gum
<i>Eucalyptus coolabah</i>	Coolabah
<i>Geijera parviflorum</i>	Wilga
<i>Lycium ferocissimum</i>	African Boxthorn
<i>Lysiana exocarpi</i>	Mistletoe
<i>Minuria cunninghamii</i>	
<i>Paspalidium jubiflorum</i>	Warrego Grass
<i>Portulaca oleracea</i>	Pigface
<i>Rhagodia spinescens</i>	Thorny Saltbush
<i>Rumex sp.</i>	
<i>Rytidosperma sp.</i>	Wallaby Grass
<i>Salsola australe</i>	
<i>Sclerolaena divaricata</i>	Copper Burr
<i>Senna artemisioides</i> var. <i>zygophylla</i>	
<i>Senna artemisioides</i> var. <i>coriacea</i>	
<i>Sida sp.</i>	
<i>Sporobolus caroli</i>	Fairy Grass
<i>Tetragona tetragonioides</i>	Warrigal Greens
<i>Tribulus terrestris</i>	Cathead
<i>Vittadinia cuneata</i>	Fuzzweed

## Appendix C Fauna species list

Common name	Scientific name
Australian Magpie	<i>Gymnorhina tibicen</i>
Australian Ringneck	<i>Barnardius zonarius</i>
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>
Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>
House Sparrow	<i>Passer domesticus</i>
Magpie lark	<i>Grallina cyanoleuca</i>
Noisy miner	<i>Manorina melanocephala</i>
Superb Fairy Wren	<i>Malurus cyaneus</i>
Willy wagtail	<i>Rhipidura leucophrys</i>
Yellow-plumed Honeyeater	<i>Lichenostomus ornatus</i>

## Appendix D Biodiversity Values Map and Key Fish Habitat





## Appendix E BC Act assessment of significance

Under Section 7.3 of the NSW BC Act, the test of significance is to be considered for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. This test has been applied to species listed under the BC Act that are considered to be potentially impacted by the proposed Project.

Species that have been assessed against the test of significance were identified through the development of the Likelihood of Occurrence (**Appendix A**). The following species have been assessed below:

- Stimson's Python (*Antaresia stimsoni*)
- Red-tailed Black-Cockatoo (inland subspecies; *Calyptorhynchus banksii samueli*)
- Spotted Harrier (*Circus assimilis*)
- Brown Treecreeper (eastern subspecies; *Climacteris picumnus*)
- Grey Falcon (*Falco hypoleucos*)
- Painted Honeyeater (*Grantiella picta*)
- White-bellied Sea-eagle (*Haliaeetus leucogaster*)
- Black-breasted Buzzard (*Hamirostra melanosternon*)
- Little Eagle (*Hieraetus morphnoides*)
- Major Mitchell's Cockatoo (*Lophochroa leadbeateri*)
- *Atriplex infrequens*

The following questions are to be considered for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened flora and fauna, 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, in relation to the habitat of a threatened species or ecological community:
- 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.

The BC Act Assessment of Significance is detailed in Table 9. No endangered ecological communities will be impact upon by the proposed Project, so question b. is not applicable. No areas of declared outstanding biodiversity value have been mapped within the study area and the proposed Project will not directly or indirectly impact upon any declared area of outstanding biodiversity value, as such question d. has also been addressed.

**Table 9: Assessment of Significance for BC Act listed species**

Species	A	C	E	Conclusion
Threatened woodland birds: <ul style="list-style-type: none"> <li>Red-tailed Black-Cockatoo (inland subspecies)</li> <li>Painted Honeyeater</li> <li>Major Mitchell's Cockatoo</li> <li>Black-breasted Buzzard</li> <li>Brown Treecreeper (eastern subspecies)</li> </ul>	<p>The study area provides low quality potential habitat for threatened nesting woodland birds. Due to the absence of records and the low quality of potential habitat within the study area, combined with the presence of higher quality habitat in the surrounding area, it is unlikely that the proposed Project will adversely affect the life cycles of these species such that local populations are likely to be placed at risk of extinction.</p>	<p>The proposed Project will likely result in the clearing of a maximum 2,179 m<sup>2</sup> of potential foraging and nesting habitat for these species. Due to the small extent of the proposed disturbance footprint, the already disjunct nature of the potential habitat and the mobile nature of these species, the proposed Project is unlikely to result in habitat fragmentation detrimental to the long-term survival of these species in the locality. The study area provides low quality potential habitat with higher quality habitat present in areas surrounding the study area. Additionally, the absence of records from the study area indicates that the removal of this habitat is unlikely to affect the long-term survival of these species in the locality.</p>	<p>The proposed Project constitutes one key threatening process relevant to these species, Clearing of native vegetation. Due to the small scale (maximum 2,179 m<sup>2</sup>) and low quality of potential habitat for these highly mobile species, it is unlikely that the proposed Project will increase the impact of this key threatening process on these species.</p>	<p>After considering the previous questions, it has been determined that the proposed Project is unlikely to have a significant impact on the threatened woodland bird species assessed.</p>
Threatened birds of prey: <ul style="list-style-type: none"> <li>Grey Falcon</li> <li>Little Eagle</li> <li>Spotted Harrier</li> <li>White-bellied Sea-Eagle</li> </ul>	<p>The study area provides low quality potential habitat for threatened birds of prey. Due to the absence of records and the absence of nests recorded during the field survey within the study area, and the low quality of potential habitat within the study area, combined with the</p>	<p>The proposed Project will likely result in the clearing of a maximum of 2,179 m<sup>2</sup> of potential foraging and breeding habitat for these species. It is highly unlikely that suitable nest for either species will be impacted by the proposed Project</p>	<p>The proposed Project constitutes one key threatening process relevant to these species, Clearing of native vegetation. Due to the small scale (maximum 2,179 m<sup>2</sup>) and low quality of potential habitat for these highly mobile species, it is unlikely that the</p>	<p>After considering the previous questions, it has been determined that the proposed Project is unlikely to have a significant impact on the threatened birds of prey species assessed.</p>

Species	A	C	E	Conclusion
	presence of higher quality habitat in the surrounding area, it is unlikely that the proposed Project will adversely affect the life cycles of these species such that local populations are likely to be placed at risk of extinction.	as no nests were recorded during the field survey. Due to the small extent of the proposed disturbance footprint, the already disjunct nature of the potential habitat and the mobile nature of these species, the proposed Project is unlikely to result in habitat fragmentation detrimental to the long-term survival of these species in the locality. The study area provides low quality potential foraging habitat, with higher quality habitat present in areas surrounding the study area. Additionally, the absence of records from the study area indicates that the removal of this habitat is unlikely to affect the long-term survival of these species in the locality	proposed Project will increase the impact of this key threatening process on these species.	
<i>Atriplex infrequens</i>	The study area provides low quality potential habitat for threatened <i>Atriplex infrequens</i> . Due to the absence of records and the low quality of potential habitat within the study area, combined with the presence of higher quality habitat in the surrounding area, it is unlikely that the proposed Project will adversely affect the life cycles of this species such that local populations	The proposed Project will likely result in the clearing of a maximum 2,179m <sup>2</sup> of potential habitat for this species. Due to the small extent of the proposed disturbance footprint and the already disjunct nature of the potential habitat, the proposed Project is unlikely to result in habitat fragmentation detrimental to the long-term survival of these species in the	The proposed Project constitutes one key threatening process relevant to these species, Clearing of native vegetation. Due to the small scale (maximum 2,179 m <sup>2</sup> ) and low quality of potential habitat for this species, it is unlikely that the proposed Project will increase the impact of this key threatening process on these species.	After considering the previous questions, it has been determined that the proposed Project is unlikely to have a significant impact on <i>Atriplex infrequens</i> .

Species	A	C	E	Conclusion
	<p>are likely to be placed at risk of extinction.</p>	<p>locality. The study area provides low quality potential habitat with higher quality habitat present in areas surrounding the study area. Additionally, the absence of records from the study area indicates that the removal of this habitat is unlikely to affect the long-term survival of these species in the locality.</p>		

## Appendix F EPBC Act Assessment of Significance

The EPBC Act Administrative Guidelines on Significance set out ‘Significant Impact Criteria’ that are to be used to assist in determining whether a proposed action is likely to have a significant impact on matters of national environmental significance. Matters listed under the EPBC Act as being of national environmental significance include:

- Listed threatened species and ecological communities
- Listed migratory species
- Wetlands of International Importance
- The Commonwealth marine environment
- World Heritage properties
- National Heritage places
- Nuclear actions

Specific ‘Significant Impact Criteria’ are provided for each matter of national environmental significance except for threatened species and ecological communities in which case separate criteria are provided for species listed as critically endangered, endangered and vulnerable under the EPBC Act.

The ‘vulnerable species’ Significant Impact Criteria have been applied to the Painted Honeyeater (*Grantiella picta*) as shown in Table 10 and to *Atriplex infrequens* as shown in **Table 11**.

**Table 10: Assessment of Significance for the EPBC Act listed Painted Honeyeater**

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
<b>Lead to a long-term decrease in the size of an important population of a species</b>	Due to the absence of records and the low quality of potential habitat within the study area, combined with the presence of higher quality habitat in the surrounding area, it is unlikely that the proposed Project will lead to a long-term decrease in the size of an important population of this species
<b>Reduce the area of occupancy on an important population</b>	Given the absence of records and the low quality of potential habitat within the study area, combined with the small scale of the proposed Project, it is unlikely that the area of occupancy of an important population will be reduced
<b>Fragment an existing important population into two or more populations</b>	The study area provides low quality potential habitat with higher quality habitat present in areas surrounding the study area. Additionally, the absence of records from the study area indicates that the removal of this habitat is unlikely to affect the long-term survival of these species in the locality. Due to the small extent habitat within the study area (2,179 m <sup>2</sup> ), the already disjunct nature of the potential habitat and the highly mobile nature of these species, it is unlikely that an existing important population will be split into two or more populations.
<b>Adversely affect habitat critical to the survival of the species</b>	No habitat critical to the survival of this species has been declared. Given the absence of records and the low quality of potential habitat within the study area, combined with the small scale of the disturbance footprint, it is unlikely that the

<b>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</b>	
	proposed Project will adversely impact upon the survival of this species.
<b>Disrupt the breeding cycle on an important population</b>	Given the absence of records and the low quality of potential habitat within the study area, combined with the small scale of the disturbance footprint, it is unlikely that the proposed Project will disrupt the breeding cycle of an important population.
<b>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</b>	Given the absence of records and the low quality of potential habitat within the study area, combined with the small scale of the disturbance footprint and the presence of large areas of higher quality habitat in the areas surrounding Wilcannia, it is unlikely that the proposed Project will result in a decline of the species.
<b>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</b>	No harmful invasive species are expected to become established in areas of potential habitat for this species as a result of the proposed Project. Mitigation measures have also been proposed to limit the potential spread and/or introduction of invasive species.
<b>Introduce disease that may cause the species to decline, or</b>	No disease that may cause this species to decline is likely to be introduced by the proposed Project
<b>Interfere substantially with the recovery of the species.</b>	After considering the above statements, the proposed Project is unlikely to interfere with the future recovery of the Painted Honeyeater.

**Table 11: Assessment of Significance for the EPBC Act listed *Atriplex infrequens***

<b>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</b>	
<b>Lead to a long-term decrease in the size of an important population of a species</b>	Due to the absence of records and the low quality of potential habitat within the study area, combined with the presence of higher quality habitat in the surrounding area, it is unlikely that the proposed Project will lead to a long-term decrease in the size of an important population of this species
<b>Reduce the area of occupancy on an important population</b>	Given the absence of records and the low quality of potential habitat within the study area, combined with the small scale of the proposed Project, it is unlikely that the area of occupancy of an important population will be reduced
<b>Fragment an existing important population into two or more populations</b>	The study area provides low quality potential habitat with higher quality habitat present in areas surrounding the study area. Additionally, the absence of records from the study area indicates that the removal of this habitat is unlikely to affect the long-term survival of these species in the locality. Due to the small extent habitat within the study area (2,179m <sup>2</sup> ) and the already disjunct nature of the potential habitat, it is unlikely that an existing important population will be split into two or more populations.
<b>Adversely affect habitat critical to the survival of the species</b>	No habitat critical to the survival of this species has been declared. Given the absence of records and the low quality of

**An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:**

potential habitat within the study area, combined with the small scale of the disturbance footprint, it is unlikely that the proposed Project will adversely impact upon the survival of this species.

**Disrupt the breeding cycle on an important population**

Given the absence of records and the low quality of potential habitat within the study area, combined with the small scale of the disturbance footprint, it is unlikely that the proposed Project will disrupt the breeding cycle of an important population.

**Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline**

Given the absence of records and the low quality of potential habitat within the study area, combined with the small scale of the disturbance footprint and the presence of large areas of higher quality habitat in the areas surrounding Wilcannia, it is unlikely that the proposed Project will result in a decline of the species.

**Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat**

No harmful invasive species are expected to become established in areas of potential habitat for this species as a result of the proposed Project. Mitigation measures have also been proposed to limit the potential spread and/or introduction of invasive species.

**Introduce disease that may cause the species to decline, or**

No disease that may cause this species to decline is likely to be introduced by the proposed Project

**Interfere substantially with the recovery of the species.**

After considering the above statements, the proposed Project is unlikely to interfere with the future recovery of the *Atriplex infrequens*.





## Appendix D - Arborist

**REPORT:**

**ARBORICULTURAL IMPACT  
ASSESSMENT**

**Maari Mia Wilcannia Clinic  
&  
Wellbeing Centre  
Lots 2, 3 & 4 DP1201089 &  
Lot 111 DP 1201028, Bonney Street  
Wilcannia NSW**

Prepared 5 March 2021  
Reference 23037

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## SUMMARY and CONCLUSIONS

This report considers 1 tree, Tree 1 *Eucalyptus largiflorens* – Black Box (*the tree*), located within Lot 111 DP 1201028, Bonney Street, Wilcannia NSW as part of a site being developed including adjoining Lots 2, 3 and 4 DP1201089 Bonney Street, Wilcannia (*the site*) by the development and construction of the Maari Mia Wilcannia Clinic and Wellbeing Centre.

### Statutory Considerations

The site is located in the Central Darling Shire Council (CDSC) Local Government Area (LGA) and *the tree* requires consideration for protection subject to development under the following planning instrument.

**Central Darling Local Environmental Plan 2012** The Central Darling Local Environmental Plan 2012 (CDLEP2012) is the local environmental planning legislation that applies to the Central Darling Shire Council area.

**PLAN OF MANAGEMENT (PoM)– Lots 2, 3 and 4 DP 1201089, and Lot 111 DP 1201028, Bonney Street Wilcannia**, Issue A, February 2020, Central Darling Shire Council.

*“The Local Government Act 1993 (the ‘Act’) requires all Council-owned land to be classified as either ‘Community’ land or ‘Operational’ land. Land classified as ‘Community’ land is to be managed and used in accordance with an adopted Plan of Management.”*

### The Development Of Community Land Lots (PoM)

*“The land Lots 2, 3 and 4 DP 1201089, and Lot 111 DP 1201028, Bonney Street Wilcannia are owned and managed by the Central Darling Shire Council. The current use of the land is for general community use – water supply. The proposed development and use for this land will continue to be general community use but primarily be for the purpose of – Health Draft Plan of Management Report – Community lands – Lots 2,3 and 4 DP1201089 and Lot 111 DP 1201028 Bonney Street, Wilcannia.”*

*“Services facility - community health facility. as authorised by the Plan of Management and other applicable statutory provisions. All buildings on the land will be permitted to be used for the purpose of a community health facility.”*

### **Environmental Planning and Assessment Act 1979 (EP&A Act)**

*“The EP&A Act establishes the statutory planning framework or basis for environmental and land use planning and the development consent process for the use and development of land within New South Wales. Section 4.15 of Part 4 of the EP&A Act outlines the factors that must be considered when a development application is assessed. These include:*

- *Any environmental planning instrument;*
- *Any draft environmental planning instrument that has been placed on public exhibition and details of which have been notified to the consent authority;*
- *Any development control plan;*
- *The Regulations;*
- *The likely impacts of the development, including environmental impacts on both the natural and built environment, and social and economic impacts on the locality;*
- *The suitability of the site for the development;*
- *Any submissions made in accordance with the Act or the Regulations; and*
- *The public interest.”*

*“The likely impacts of the development, including environmental impacts on both the natural and built environment, and social and economic impacts on the locality”* This point applies to the remnant tree on *the site* as part of the natural environment, the subject of this report.

### 3.5 Aboriginal Cultural Significance (PoM)

*“The Central Darling Shire Council (Wilcannia, Menindee, Ivanhoe, White Cliffs, Tilpa area) is located in the country of the Paakantji, Barkindji and the Ngiyampaa people, the Council wish to acknowledge the traditional owners of the land.*

*The community land covered within this Plan of Management is not currently identified as having Aboriginal significance and have not been declared under section 84 of the National Park and Wildlife Act 1974, however, any areas of Aboriginal significance that may be discovered are covered by this Plan of Management.”*

The subject tree contains a basal wound to the south with advanced occlusion and deep wound margins indicative of likely Aboriginal cultural origin and therefore of Aboriginal Cultural Significance.

### **Central Darling Local Environmental Plan 2012 (CDLEP2012)**

*“The land use zone permits certain uses of the land, where the land use zone does not permit the current land use or activity on the land a planning proposal to amend the Central Darling Local Environmental Plan 2012 is required. The lots subject to this Plan of Management has the following land use zone: Central Darling Local Environmental Plan 2012 Zone R1 General Residential*

#### 1 Objectives of zone

- *To provide for the housing needs of the community.*
- *To provide for a variety of housing types and densities.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residents.*
- *To minimise land use conflict between land uses on land within the zone and land uses on land within adjoining zones.*

**Note:** *the proposed use of the land for “Health Services facility - community health facility” is not a prohibited use therefore, may be approved through the development application process to assess the merits of the health services facility – Maari Ma Community Health Clinic.”*

### **Biodiversity Values Map and Threshold Tool (NSW Government, DPIE)**

The site is not represented on the Natural Resources Sensitivity Land Map (Appendix G, Tree Location Plan, 3 of 3) although adjacent to the Darling River which is represented on the map.

The recommendations made in this report are subject to approval by the consent authority.

### **Tree Assessment**

The tree/s assessed are numbered and their genus, species and common name included in Appendix F - Tree Assessment. Tree numbers are marked on Appendix G – Tree Location Plan.

#### **Removal**

No trees the subject to this report are proposed to be removed.

#### **Retention**

Tree 1 (1 tree) is to be retained and protected. The tree has dead branches that may require pruning and some crown projection may require pruning to clear for access for building construction. A wire cable was observed constricting a structural branch in the lower crown to south and the cable is to be removed.

#### **No Encroachment**

N/A

### Minor or No Encroachment

This does not apply to the subject tree as encroachment is >10% of the radial area of the Tree Protection Zone. Whereas, encroachment per AS4970 (2009) Section 3, 3.3.2 *Minor Encroachment* is from development works within <10% of the radial area of the Tree Protection Zone.

### Major Encroachment

Tree 1 (1 tree) is to be retained and will be subject to a major encroachment as per AS4970 (2009) Section 3, 3.3.3 *Major Encroachment* from development works within >10% of the radial area of the Tree Protection Zone. The TPZ encroachment is approximately 15% which should be sustainable subject to the application of the tree protection works per the Tree Protection Plan (Appendix H) and will be mitigated by the use of *tree sensitive* pier footing for buildings and pedestrian ramps and to a lesser extent by unitary pavers as footpaths near the tree. There is no encroachment into the Structural Root Zones (SRZ) of the retained tree. Much of the soil around the tree appears to be uneven and some is expected to be aeolian sand with natural grade concealed. Therefore excavation for paths north of the tree may have a reduced impact depending on the finished levels and subject to *tree sensitive* excavation.

The retention and protection of Tree 1 provides amenity and screening of views within the site subject to some minor pruning and other minor remedial works. The tree has an almost occluded trunk wound which is considered to have been historically modified by Aboriginal cultural activities and therefore is significant as an Aboriginal Scarred Tree. The Tree Protection Zone (TPZ) setbacks and protection specifications for *the tree* provided in Appendix H - Tree Protection Plan are satisfactory to retain and protect *the tree*.

### Tree Significance

Determined by using the Tree Significance - Assessment Criteria of the *IACA Significance of a Tree, Assessment Rating System (STARS)*© (IACA, 2010), Appendix A. The trees are rated, High, Medium or Low. The number of trees in each category is summarised in Table 1.0. The STARS significance rating of each individual tree is shown in Appendix F – Tree Assessment.

**Table 1.0** Tree Significance – summary of trees in different categories using the Significance of a Tree, Assessment Rating System (STARS)© (IACA, 2010).

Significance Scale	High	Medium	Low
Number of trees in each category	1	0	0

### Tree Retention Value

Determined by using the Retention Value – *Sustainable Retention Index Value (SRIV)*© (IACA, 2010), Appendix D. The trees are rated, High, Medium, Low or Remove. The number of trees in each category is summarised in Table 2.0. The SRIV retention rating of each individual tree is shown in Appendix F – Tree Assessment.

**Table 2.0** Retention Value - summary of trees in different categories using the Sustainable Retention Index Value (SRIV)© (IACA, 2010).

Retention Value	High Priority for Retention	Medium Consider for Retention	Low Consider for Removal	Remove Priority for Removal
Number of trees in each category	1	0	0	0

### Tree Protection Setbacks

Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) setbacks are based on Australian Standard AS4970 2009 Protection of trees on development sites, Section 3 Determining the protection zone of the selected trees, see Appendices B and D, respectively. Approved building works should be no closer, including excavation, than the dimensions stated above, save for

AS4970(2009) sec. 3.3 Variations to the TPZ, 3.3.2 Minor Encroachment - *If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ; and sec 3.3.3 Major Encroachment - If the proposed encroachment is greater than 10% of the area of the TPZ or inside the SRZ the project arborist must demonstrate that the tree(s) would remain viable. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.*" The trees requiring TPZ and SRZ protection setbacks are shown in a table in the Tree Protection Plan.

## 1.0 INTRODUCTION

Urban Tree Management © has prepared this report for Troppo Architects 28 East Terrace, Adelaide, South Australia 5000. The land is located in Central Darling Shire Council (CDSC) Local Government Area (LGA) and the tree is protected subject to the Central Darling Local Environmental Plan 2012 (CDLEP2012) and the Plan of Management (PoM)– Lots 2, 3 and 4 DP 1201089, and Lot 111 DP 1201028, Bonney Street Wilcannia (Central Darling Shire Council, 2020).

It is proposed to redevelop the land and construct the Maari Mia Wilcannia Clinic and Wellbeing Centre. This will include the retention and protection of the 1 tree at *the site* and its incorporation into the building and landscaping works for the project. Minor encroachment will be mitigated by the application of *tree sensitive* piers for the building and pedestrian access ramp and hand excavation to determine root location for the pedestrian pavement at the drop off zone. Some minor crown pruning for building clearance for safe working access and remedial works may be required, see (Appendix H - Tree Protection Plan) but is expected to be sustainable by the tree.

Danny Draper (*the author*) attended Lot 111 DP 1201028, Bonney Street, Wilcannia NSW (*the site*) on Tuesday 23 February 2021 and *the tree* and its growing environment were examined by a Visual Tree Assessment (VTA) (Mattheck & Breloer, 1994) conducted from the ground for the development works at *the site* (Appendix F – Tree Assessment).

The site is subject to a Plan of Management and this report and any works recommended herein, that require approval from the consenting authority are provided to form part of that development application process and its Consent Conditions. The Tree Location Plan (Appendix G) and Tree Protection Plan (Appendix H) are to be included into and used in conjunction with the set of plans for the site.

The aims and objectives of this report are to detail and comply with the tree protection requirements specified in AS4970 (2009) *Protection of trees on development sites*, after the undertaking of the Preliminary Tree Assessment AS4970 sec. 2.3.2, and Preliminary Arboricultural Report AS4970 sec. 2.3.3 (which may be combined); Development Design and Review Report AS4970 sec. 2.3.4, prior to the undertaking of an Arboricultural Impact Assessment (AIA) Report AS4970 sec. 2.3.5. Where the other reports have not been undertaken the AIA Report will broadly endeavour to identify and assesses the condition of the subject tree/s; determine the impact of development on the subject tree/s; provide recommendations for retention or removal of the subject tree/s; provide specifications for protection of tree/s to be retained, and provide recommendations for replacement tree/s where appropriate. The information in this extensive report is intended to provided tree management and protection through all stages of development.

The tree/s are indicated in Appendix G – Tree Location Plan. This report has relied upon the following plan/s and documents:

- Roof Plan (further reduced), Job No.: 480, Scale 1:200 @ A3, Dwg No.: 02, prepared by Troppo Architects 28 East Terrace, Adelaide, South Australia 5000, t. +61 8 8232 9696.
- Detail Survey at Bonney Street, Wilcannia for Proposed Medical Clinic, Scale 1:400 @ A2, Reference T19-8D, date 13/02/2020 prepared by Graham F. Howe Registered surveyor, 515 Wyman Lane, Broken Hill NSW 2880, t. 08 8087 3660.
- Central Darling Local Environmental Plan 2012 (2013 EPI 33), Land Zoning Map – Sheet LZN\_006A.
- Biodiversity Values Map



## METHODOLOGY

### **Note: Individual methodologies applied as applicable.**

- 2.1 The method of assessment of tree/s applied is adapted from the principles of Visual Tree Assessment (VTA) (Mattheck & Breloer, 1994), undertaken from the ground, which considers and includes:
1. Tree health and subsequent stability, both long and short term
  2. Sustainable Retention Index Value (SRIV) Version 4 (IACA, 2010) ©
  3. Hazard potential to people and property
  4. Amenity values
  5. Habitat values
  6. Significance – Significance of a Tree, Assessment Rating System (STARS) (IACA, 2010) ©
- 2.2 Tree Assessment - This assessment is undertaken using standard tree assessment criteria for each tree based on the values above and is implemented as a result of at least one comprehensive and detailed site inspection to undertake a visual tree assessment of each individual tree, or stand of trees, or a representative population sample. See Appendix F – Tree Assessment.
- 2.3 Any dimensions recorded as averages, or by approximation are noted accordingly.
- 2.4 This report adopts Australian Standard AS4970 (2009) *Protection of trees on development sites* as a point of reference and guide for the recommended minimum setbacks (Appendix B) from the center of a tree's trunk to development works and the distances may be increased or decreased by the author in accordance with AS4970 as a result of other factors providing mitigating circumstances or constraints as indicated by but not restricted to the following:
1. Condition of individual trees,
  2. Tolerance of individual species to disturbance,
  3. Geology e.g. physical barriers in soil, rock floaters, bedrock to surface
  4. Topography e.g. slope, drainage,
  5. Soil e.g. depth, drainage, fertility, structure,
  6. Microclimate e.g. due to landform, exposure to dominant wind,
  7. Engineering e.g. techniques to ameliorate impact on trees such as structural soil, gap graded fill, lateral boring,
  8. Construction e.g. techniques to ameliorate impact on trees such as pier and beam, bridge footings, suspended slabs,
  9. Root mapping,
  10. Physical limitations - existing modifications to the environment and any impact to tree/s by development e.g. property boundaries, built structures, houses, swimming pools, road reserves, utility services easements, previous impact by excavation, or construction in other directions, soil level changes by cutting or filling, existing landscaping works within close proximity, modified drainage patterns,
  11. Extraneous factors e.g. potential future impacts from development on adjoining land when the tree is located on or near to a property boundary.

- 2.5 **Stands of Trees** - Trees in groups may be referred to as stands and a stand may exclusively contain specimens to be either retained or removed or a combination of both. A stand may be used to discuss all the trees on a given site to expedite their assessment, or refer to trees growing proximate to one another or within a defined space. Stands may be comprised by mass boundary or screen plantings, to form a group of the same or a mixture of taxa. Each stand is considered as a single unit with each component tree assessed and expressed in tabular form, or indicated by a given percentage as a population sample of each stand. Where it is appropriate for a stand of trees to be retained in full or part, the location and setback of Tree Protection Zone fences or works, are prescribed to provide for the preservation of the stand or selected component trees, in a condition not less than that at the time of initial inspection for its incorporation into the existing landscape of the site, or in a reduced but sustainable condition due to the impact of the development but ameliorated through tree protection measures.
- 2.6 **Tree Significance** - The trees/s have been allocated a significance rating as determined by using the Tree Significance - Assessment Criteria of the IACA Significance of a Tree, Assessment Rating System (STARS)© (IACA, 2010), Appendix A.
- 2.7 The meanings for terminology used herein are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009. An extract from the IACA Dictionary forms a glossary of terms included as Appendix E.

### **3.0 PRUNING STANDARDS**

- 3.1 Any pruning recommended in this report is to be to the Australian Standard® AS4373 *Pruning of amenity trees*, and conducted in accordance with the *Guide to Managing Risks of Tree Trimming and Removal Work*, July 2016, Safe Work Australia.
- 3.2 All pruning or removal works are to be in accordance with the appropriate Tree Management Policy where applicable, or Tree Management Order (TMO), or Tree Preservation Order (TPO).
- 3.3 Tree maintenance work is specialised and in order to be undertaken safely to ensure the works carried out are not detrimental to the survival of a tree being retained, and to assist in the safe removal of any tree, should be undertaken by a qualified Arboriculturist with appropriate competencies recognised within the Australian Qualification Framework, with a minimum of 5 years of continual experience within the industry of operational amenity arboriculture, and covered by appropriate and current types of insurance to undertake such works.

## 4.0 RECOMMENDATIONS

- 4.1 Tree 1 (1 tree) is proposed to be retained and protected as part of the project the subject of this report as shown in Appendix G - Tree Location Plan and Appendix H – Tree Protection Plan.
- 4.2 Where Tree Protection Zone works are to be modified this must be undertaken in consultation with the Project Arborist to ensure that tree protection is maintained.
- 4.3 Tree 1 (1 tree) may require crown pruning to remove deadwood and to reduce crown projection for building clearance and safe working access as detailed in Appendix H – Tree Protection Plan and should be conducted in accordance with 3.0 Pruning Standards.
- 4.4 Tree 1 (1 tree) may require root pruning for excavation works subject to tree sensitive hand excavation. Where required it is to be undertaken as detailed in Appendix H – Tree Protection Plan and should be conducted in accordance with 3.0 Pruning Standards.



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Hort. Cert.  
TRAQ (IAS) Tree Risk Assessment

## REFERENCES

1. Central Darling Shire Council, Plan of Management (PoM) – Lots 2, 3 and 4 DP 1201089, and Lot 111 DP 1201028, Bonney Street Wilcannia, Issue A, February 2020, Central Darling Shire Council, viewed 5/03/2021, <https://www.centraldarwin.nsw.gov.au/f.ashx/21Councilmeetings/21February/11-9.6a-PLAN-of-Management-Report-Bonney-St-10-2-2021.pdf>
2. Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia
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## DISCLAIMER

The author and Urban Tree Management take no responsibility for actions taken and their consequences, contrary to those expert and professional instructions given as recommendations pertaining to safety by way of exercising our responsibility to our client and the public as our duty of care commitment, to mitigate or prevent hazards from arising or risks from being eliminated or mitigated or managed to reduce harm or damage, from a failure moment in full or part, from a structurally deficient or unsound tree or a tree likely to be rendered thus by its retention and subsequent deterioration from modification/s to its growing environment either existing or proposed, either above or below ground, either existing or proposed, either above or below ground, contrary to our advice.

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# Appendix A

## IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010)©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

### Tree Significance - Assessment Criteria



#### 1. High Significance in landscape

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa *in situ* - tree is appropriate to the site conditions.

#### 2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

#### 3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

#### Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.


#### Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

**The tree is to have a minimum of three (3) criteria in a category to be classified in that group.**

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

**Table 1.0 Tree Retention Value - Priority Matrix.**

		Significance				
		1. High	2. Medium	3. Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1. Long >40 years					
	2. Medium 15-40 Years					
	3. Short <1-15 Years					
	Dead					
<p><u>Legend for Matrix Assessment</u></p> <div style="text-align: right;">  </div>						
	<p><b>Priority for Retention (High)</b> - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 <i>Protection of trees on development sites</i>. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.</p>					
	<p><b>Consider for Retention (Medium)</b> - These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.</p>					
	<p><b>Consider for Removal (Low)</b> - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.</p>					
	<p><b>Priority for Removal</b> - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.</p>					

**REFERENCES**

Australia ICOMOS Inc. 1999, *The Burra Charter – The Australian ICOMOS Charter for Places of Cultural Significance*, International Council of Monuments and Sites, [www.icomos.org/australia](http://www.icomos.org/australia)

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# Appendix B

## Extract from Australian Standard AS4970 2009 Protection of trees on development sites

### Section 3, Determining the tree protection zones of the selected trees

#### 3.1 Tree protection zone (TPZ)

*“The tree protection zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.*

*The TPZ incorporates the structural root zone (SRZ) (refer to Clause 3.3.5).”*

#### 3.2 Determining the TPZ

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12.

$$\text{TPZ} = \text{DBH} \times 12$$

where

DBH = trunk diameter measured at 1.4 m above ground

Radius is measured from the centre of the stem at ground level.

# Appendix C

## Extract from Australian Standard AS4970 2009 Protection of trees on development sites

### Section 3, Determining the protection zones of the selected trees

#### 3.3.5 Structural root zone (SRZ)

“The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree. The SRZ only needs to be calculated when a major encroachment into a TPZ is proposed. Root investigation may provide more information on the extent of these roots.”

#### Determining the SRZ

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12.

SRZ radius expressed by the curve is calculated by the following formula,

$$R_{SRZ} = (D \times 50)^{0.42} \times 0.64$$

where

*D* = trunk diameter, in metres measured immediately above the root buttress.

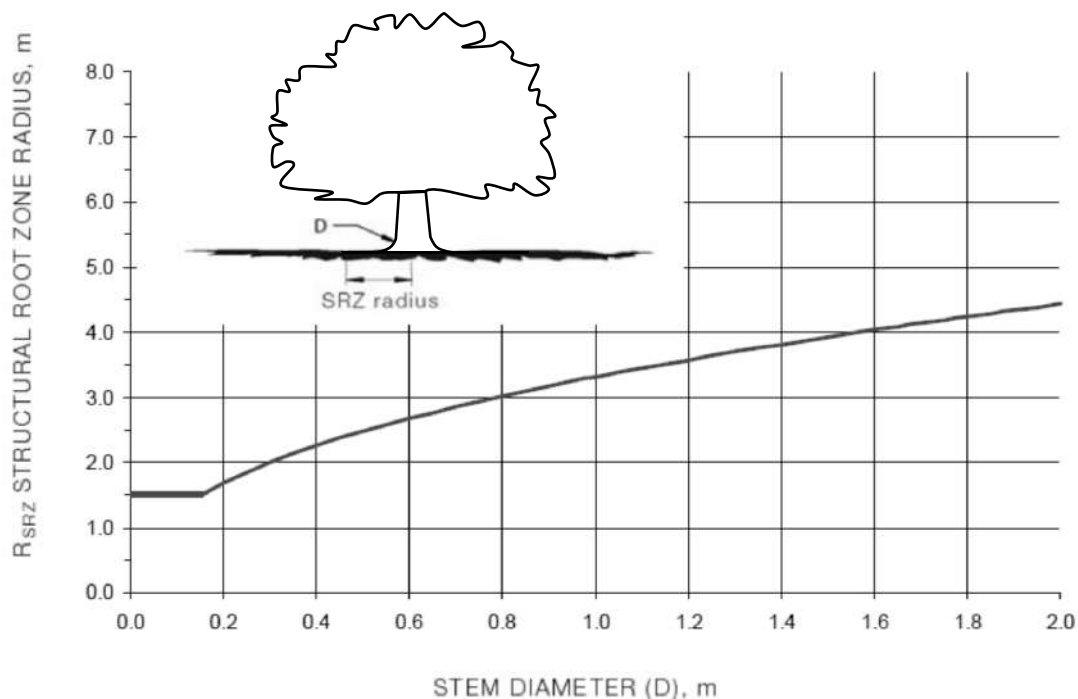


FIGURE 1 STRUCTURAL ROOT ZONE CALCULATION  
(AS 4970 – 2009, Amendment No. 1 March 2010)

#### NOTES:

- 1 R<sub>SRZ</sub> is the calculated structural root zone radius (SRZ radius).
- 2 D is the stem diameter measured immediately above root buttress.
- 3 The R<sub>SRZ</sub> for trees less than 0.15 m diameter is 1.5 m.
- 4 The R<sub>SRZ</sub> formula and graph do not apply to palms, other monocots, cycads and tree ferns.
- 5 This does not apply to trees with an asymmetrical root plate.



# Appendix D

## Matrix - Sustainable Retention Index Value (SRIV) ©

Version 4, 2010

Developed by IACA – Institute of Australian Consulting Arboriculturists [www.iaca.org.au](http://www.iaca.org.au)

The matrix is to be used with the value classes defined in the Glossary for Age / Vigour / Condition.

An index value is given to each category where ten (10) is the highest value.

Age Class	Vigour Class and Condition Class					
	Good Vigour & Good Condition (GVG)	Good Vigour & Fair Condition (GVF)	Good Vigour & Poor Condition (GVP)	Low Vigour & Good Condition (LVG)	Low Vigour & Fair Condition (LVF)	Low Vigour & Poor Condition (LVP)
	Able to be retained if sufficient space available above and below ground for future growth. No remedial work or improvement to growing environment required. May be subject to high vigour. Retention potential - Medium – Long Term.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work may be required or improvement to growing environment may assist. Retention potential - Medium Term. Potential for longer with remediation or favourable environmental conditions.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work unlikely to assist condition, improvement to growing environment may assist. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. No remedial work required, but improvement to growing environment may assist vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment may assist condition and vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	Unlikely to be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment unlikely to assist condition or vigour. Retention potential - Likely to be removed immediately or retained for Short Term. Potential for longer with remediation or favourable environmental conditions.
Young (Y)	<b>YGVG - 9</b> Index Value 9 Retention potential - Long Term. Likely to provide minimal contribution to local amenity if height <5 m. High potential for future growth and adaptability. Retain, move or replace.	<b>YGVF - 8</b> Index Value 8 Retention potential - Short – Medium Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Medium-high potential for future growth and adaptability. Retain, move or replace.	<b>YGVP - 5</b> Index Value 5 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Low-medium potential for future growth and adaptability. Retain, move or replace.	<b>YLVG - 4</b> Index Value 4 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Medium potential for future growth and adaptability. Retain, move or replace.	<b>YLVF - 3</b> Index Value 3 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Low-medium potential for future growth and adaptability. Retain, move or replace.	<b>YLVP - 1</b> Index Value 1 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Low potential for future growth and adaptability.
Mature (M)	<b>MGVG - 10</b> Index Value 10 Retention potential - Medium - Long Term.	<b>MGVF - 9</b> Index Value 9 Retention potential - Medium Term. Potential for longer with improved growing conditions.	<b>MGVP - 6</b> Index Value 6 Retention potential - Short Term. Potential for longer with improved growing conditions.	<b>MLVG - 5</b> Index Value 5 Retention potential - Short Term. Potential for longer with improved growing conditions.	<b>MLVF - 4</b> Index Value 4 Retention potential - Short Term. Potential for longer with improved growing conditions.	<b>MLVP - 2</b> Index Value 2 Retention potential - Likely to be removed immediately or retained for Short Term.
Over-mature (O)	<b>OGVG - 6</b> Index Value 6 Retention potential - Medium - Long Term.	<b>OGVF - 5</b> Index Value 5 Retention potential - Medium Term.	<b>OGVP - 4</b> Index Value 4 Retention potential - Short Term.	<b>OLVG - 3</b> Index Value 3 Retention potential - Short Term. Potential for longer with improved growing conditions.	<b>OLVF - 2</b> Index Value 2 Retention potential - Short Term.	<b>OLVP - 0</b> Index Value 0 Retention potential - Likely to be removed immediately or retained for Short Term.



# Appendix E

## Glossary

From

*Dictionary for Managing Trees in Urban Environments*

Institute of Australian Consulting Arboriculturists (IACA) 2009.

### Vigour

**Vigour** Ability of a tree to sustain its life processes. This is independent of the *condition* of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g. *dormant*, deciduous or semi-deciduous trees. Vigour can be categorized as *Normal Vigour*, *High Vigour*, *Low Vigour* and *Dormant Tree Vigour*.

**Normal Vigour** Ability of a tree to maintain and sustain its life processes. This may be evident by the *typical* growth of leaves, *crown cover* and *crown density*, branches, roots and trunk and *resistance to predation*. This is independent of the *condition* of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

**High Vigour** *Accelerated growth* of a tree due to incidental or deliberate artificial changes to its growing *environment* that are seemingly beneficial, but may result in *premature aging* or failure if the favourable conditions cease, or promote *prolonged senescence* if the favourable conditions remain, e.g. water from a leaking pipe; water and nutrients from a leaking or disrupted sewer pipe; nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard; a tree subject to a stringent watering and fertilising program; or some trees may achieve an extended lifespan from continuous *pollarding* practices over the life of the tree.

**Low Vigour** Reduced ability of a tree to sustain its life processes. This may be evident by the *atypical* growth of leaves, reduced *crown cover* and reduced *crown density*, branches, roots and trunk, and a deterioration of their functions with reduced *resistance to predation*. This is independent of the *condition* of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

**Dormant Tree Vigour** Determined by existing turgidity in lowest order branches in the outer extremity of the crown, with good bud set and formation, and where the last *extension growth* is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.

### Age of Trees

**Age** Most trees have a stable biomass for the major proportion of their life. The estimation of the age of a tree is based on the knowledge of the expected lifespan of the taxa *in situ* divided into three distinct stages of measurable biomass, when the exact age of the tree from its date of cultivation or planting is unknown and can be categorized as *Young*, *Mature* and *Over-mature* (British Standards 1991, p. 13, Harris *et al*, 2004, p. 262).

**Young** Tree aged less than <20% of life expectancy, *in situ*.

**Mature** Tree aged 20-80% of life expectancy, *in situ*.

**Over-mature** Tree aged greater than >80% of life expectancy, *in situ*, or *senescent* with or without reduced *vigour*, and declining gradually or rapidly but irreversibly to death.

### Periods of Time

**Periods of Time** The life span of a tree in the urban environment may often be reduced by the influences of encroachment and the dynamics of the environment and can be categorized as *Immediate*, *Short Term*, *Medium Term* and *Long Term*.

**Immediate** An *episode* or occurrence, likely to happen within a twenty-four (24) hour period, e.g. tree failure or collapse in full or part posing an imminent danger.

**Short Term** A period of time less than <1 – 15 years.

**Medium Term** A period of time 15 – 40 years.

**Long Term** A period of time greater than >40 years.

### Trunk

**Trunk** A single stem extending from the *root crown* to support or elevate the *crown*, terminating where it divides into separate *stems* forming *first order branches*. A trunk may be evident at or near ground or be absent in *acaulescent* trees of *deliquescent* habit, or may be continuous in trees of *excurrent* habit. The trunk of any *caulescent* tree can be divided vertically into three (3) sections and can be categorized as *Lower Trunk*, *Mid Trunk* and *Upper Trunk*. For a *leaning* tree these may be divided evenly into sections of one third along the trunk.

**Acaulescent** A *trunkless* tree or tree growth forming a very short *trunk*. See also *Caulescent*.

**Caulescent** Tree grows to form a *trunk*. See also *Acaulescent*.

## **Condition of Trees**

**Condition** A tree's *crown form* and growth habit, as modified by its *environment* (aspect, suppression by other trees, soils), the *stability* and *viability* of the *root plate*, trunk and structural branches (first (1<sup>st</sup>) and possibly second (2<sup>nd</sup>) order branches), including structural defects such as wounds, cavities or hollows, *crooked* trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with *vigour* and it is possible for a tree to be of *normal vigour* but in *poor condition*. Condition can be categorized as *Good Condition*, *Fair Condition*, *Poor Condition* and *Dead*.

**Good Condition** Tree is of good habit, with *crown form* not severely restricted for space and light, physically free from the adverse effects of *predation* by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

**Fair Condition** Tree is of good habit or *misshapen*, a form not severely restricted for space and light, has some physical indication of *decline* due to the early effects of *predation* by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the *environment* essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.

**Poor Condition** Tree is of good habit or *misshapen*, a form that may be severely restricted for space and light, exhibits symptoms of advanced and *irreversible decline* such as fungal, or bacterial infestation, major die-back in the branch and *foliage crown*, *structural deterioration* from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local *environment* that would normally be sufficient to provide for its basic survival if in *good* to *fair* condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and *predation* by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour..

**Dead** Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms;

### *Processes*

Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves);

Osmosis (the ability of the root system to take up water);

Turgidity (the ability of the plant to sustain moisture pressure in its cells);

Epicormic shoots or *epicormic strands* in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a *lignotuber*);

### *Symptoms*

Permanent leaf loss;

Permanent wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots);

Abscission of the *epidermis* (bark desiccates and peels off to the beginning of the sapwood).

**Removed** No longer present, or tree not able to be located or having been cut down and retained on a site, or having been taken away from a site prior to site inspection.

## **Leaning Trees**

**Leaning** A tree where the *trunk* grows or moves away from upright. A lean may occur anywhere along the *trunk* influenced by a number of contributing factors e.g. genetically predetermined characteristics, competition for space or light, prevailing winds, aspect, slope, or other factors. A *leaning* tree may maintain a *static lean* or display an increasingly *progressive lean* over time and may be hazardous and prone to *failure* and *collapse*. The degrees of leaning can be categorized as *Slightly Leaning*, *Moderately Leaning*, *Severely Leaning* and *Critically Leaning*.

**Slightly Leaning** A leaning tree where the trunk is growing at an angle within 0°-15° from upright.

**Moderately Leaning** A leaning tree where the trunk is growing at an angle within 15°-30° from upright.

**Severely Leaning** A leaning tree where the trunk is growing at an angle within 30°-45° from upright.

**Critically Leaning** A leaning tree where the trunk is growing at an angle greater than >45° from upright.

**Progressively Leaning** A tree where the degree of *leaning* appears to be increasing over time.

**Static Leaning** A leaning tree whose lean appears to have stabilized over time.

## **Form of Trees**

**Crown Form** The shape of the crown of a tree as influenced by the availability or restriction of space and light, or other contributing factors within its growing environment. Crown Form may be determined for tree shape and habit generally as *Dominant, Codominant, Intermediate, Emergent, Forest* and *Suppressed*. The habit and shape of a *crown* may also be considered qualitatively and can be categorized as *Good Form* or *Poor Form*.

**Good Form** Tree of *typical* crown shape and habit with proportions representative of the taxa considering constraints such as origin e.g. indigenous or exotic, but does not appear to have been adversely influenced in its development by environmental factors in situ such as *soil water* availability, prevailing wind, or cultural practices such as lopping and competition for space and light.

**Poor Form** Tree of *atypical* crown shape and habit with proportions not representative of the species considering constraints and appears to have been adversely influenced in its development by environmental factors in situ such as *soil water* availability, prevailing wind, cultural practices such as lopping and competition for space and light; causing it to be *misshapen* or disfigured by disease or vandalism.

**Crown Form Codominant** Crowns of trees restricted for space and light on one or more sides and receiving light primarily from above e.g. constrained by another tree/s or a building.

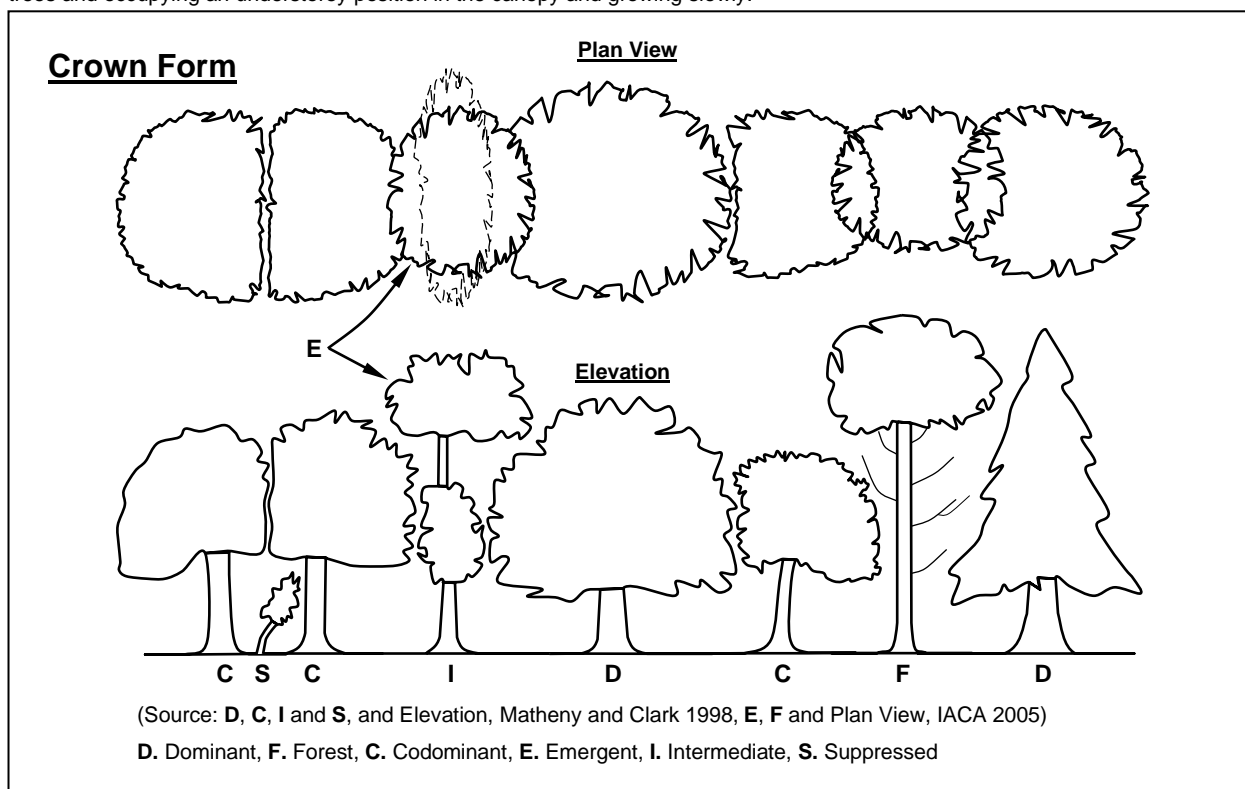
**Crown Form Dominant** Crowns of trees generally not restricted for space and light receiving light from above and all sides.

**Crown Form Emergent** Crowns of trees restricted for space on most sides receiving most light from above until the *upper crown* grows to protrude above the canopy in a stand or forest environment. Such trees may be *crown form dominant* or transitional from *crown form intermediate* to *crown form forest* asserting both *apical dominance* and *axillary dominance* once free of constraints for space and light.

**Crown Form Forest** Crowns of trees restricted for space and light except from above forming tall trees with narrow spreading crowns with foliage restricted generally to the top of the tree. The trunk is usually erect, straight and continuous, tapering gradually, crown often excurrent, with first order branches becoming structural, supporting the live crown concentrated towards the top of the tree, and below this point other first order branches arising radially with each *inferior* and usually temporary, divergent and ranging from horizontal to ascending, often with internodes exaggerated due to competition for space and light in the *lower crown*.

**Crown Form Intermediate** Crowns of trees restricted for space on most sides with light primarily from above and on some sides only.

**Crown Form Suppressed** Crowns of trees generally not restricted for space but restricted for light by being *overtopped* by other trees and occupying an understorey position in the canopy and growing slowly.



## **Symmetry**

**Symmetry** Balance within a *crown*, or *root plate*, above or below the *axis* of the trunk of branch and foliage, and root distribution respectively and can be categorized as *Asymmetrical* and *Symmetrical*.

**Asymmetrical** Imbalance within a crown, where there is an uneven distribution of branches and the foliage *crown* or *root plate* around the vertical *axis* of the trunk. This may be due to *Crown Form Codominant* or *Crown Form Suppressed* as a result of natural restrictions e.g. from buildings, or from competition for space and light with other trees, or from exposure to wind, or artificially caused by pruning for clearance of roads, buildings or power lines. An example of an expression of this may be, crown asymmetrical, bias to west.

**Symmetrical** Balance within a crown, where there is an even distribution of branches and the *foliage crown* around the vertical *axis* of the trunk. This usually applies to trees of *Crown Form Dominant* or *Crown Form Forest*. An example of an expression of this may be crown symmetrical.

**Crown Spread Orientation** Direction of the *axis* of *crown spread* which can be categorized as *Orientation Radial* and *Orientation Non-radial*.

**Crown Spread Orientation Non-radial** Where the crown extent is longer than it is wide, e.g. east/west or E/W. Further examples, north/south or N/S, and may be *Crown Form Codominant*, e.g. **A** or **B**, *Crown Form Intermediate* e.g. **A**, or *Crown Form Suppressed* e.g. **B**, and crown symmetry is *symmetrical* e.g. **A**, or *asymmetrical* e.g. **B**.

**Crown Spread Orientation Radial** Where the *crown spread* is generally an even distance in all directions from the trunk and often where a tree has *Crown Form Dominant* and is *symmetrical*.

**Significant** Important, weighty or more than ordinary.

**Significant Tree** A tree considered important, weighty or more than ordinary. Example: due to prominence of location, or *in situ*, or contribution as a component of the overall landscape for *amenity* or aesthetic qualities, or *curtilage* to structures, or importance due to uniqueness of taxa for species, subspecies, variety, *crown form*, or as an historical or cultural planting, or for age, or substantial dimensions, or habit, or as *remnant vegetation*, or habitat potential, or a rare or threatened species, or uncommon in cultivation, or of aboriginal cultural importance, or is a commemorative planting.

**Substantial** A tree with large dimensions or proportions in relation to its place in the landscape.

**Sustainable Retention Index Value (SRIV)** A visual tree assessment method to determine a qualitative and numerical rating for the viability of urban trees for development sites and management purposes, based on general tree and landscape assessment criteria using classes of *age*, *condition* and *vigour*. SRIV is for the professional manager of urban trees to consider the tree *in situ* with an assumed knowledge of the *taxon* and its growing environment. It is based on the physical attributes of the tree and its response to its environment considering its position in a matrix for age class, vigour class, condition class and its sustainable retention with regard to the safety of people or damage to property. This also factors the ability to retain the tree with remedial work or beneficial modifications to its growing environment or removal and replacement. SRIV is supplementary to the decision made by a tree management professional as to whether a tree is retained or removed (IACA - Institute of Australian Consulting Arboriculturists 2005).

**Diameter at Breast Height (DBH)** Measurement of trunk width calculated at a given distance above ground from the base of the tree often measured at 1.4 m. The trunk of a tree is usually not a circle when viewed in cross section, due to the presence of *reaction wood* or *adaptive wood*, therefore an average diameter is determined with a *diameter tape* or by recording the trunk along its narrowest and widest axes, adding the two dimensions together and dividing them by 2 to record an average and allowing the orientation of the longest axis of the trunk to also be recorded. Where a tree is growing on a lean the distance along the top of the trunk is measured to 1.4m and the diameter then recorded from that point perpendicular to the edge of the trunk. Where a *leaning* trunk is *crooked* a vertical distance of 1.4m is measured from the ground. Where a tree branches from a trunk that is less than 1.4m above ground, the trunk diameter is recorded perpendicular to the length of the *trunk* from the point immediately below the base of the flange of the *branch collar* extending the furthest down the trunk, and the distance of this point above ground recorded as *trunk* length. Where a tree is located on sloping ground the DBH should be measured at half way along the side of the tree to average out the angle of slope. Where a tree is *acaulescent* or *trunkless* branching at or near ground an average diameter is determined by recording the radial extent of the trunk at or near ground and noting where the measurement was recorded e.g. at ground.

**Crown Projection (CP)** Area within the *dripline* or beneath the lateral extent of the *crown* (Geiger 2004, p. 2). See also *Crown spread* and *Dripline*.

**Dripline** A line formed around the edge of a tree by the lateral extent of the *crown*. Such a line may be evident on the ground with some trees when exposed soil is displaced by rain shed from the crown. See also *Crown Projection*.

**Tree Protection Zone (TPZ)** Area around a tree set aside to protect the trunk, roots and crown during development works. This is to protect the tree physically and a sufficient proportion of its growing environment above and below ground to assist *stability* and prolong viability. The TPZ is often delineated by an enclosed fence and established prior to demolition or construction and maintained until the completion of works. The fenced-off area around the tree is usually located at a specific distance from the trunk determined as multiples of the trunk diameter, usually *Diameter at breast height* (DBH). Special protection or construction works may provide a TPZ without a fence having been erected, e.g. a barrier formed by site sheds located on piers. Such a protection area may form an exclusion zone for all works including the temporary or permanent location of utility services. Note: Any *encroachment* into the area would require additional tree protection specifications or works in consultation with the *Project arborist*.

**Encroachment** 1. The growth of branches, trunk or roots onto another property. 2. Any work within a *Tree Protection Zone* other than for the maintenance of the *Tree Protection Zone*.

## Deadwood

**Deadwood** Dead branches within a tree's crown and considered quantitatively as separate to *crown cover* and can be categorised as *Small Deadwood* and *Large Deadwood* according to diameter, length and subsequent *risk* potential. The amount of dead branches on a tree can be categorized as *Low Volume Deadwood*, *Medium Volume Deadwood* and *High Volume Deadwood*. See also *Dieback*.

**Deadwooding** Removing of dead branches by *pruning*. Such pruning may assist in the prevention of the spread of *decay* from *dieback* or for reasons of safety near an identifiable target.

**Small Deadwood** A dead branch up to 10mm diameter and usually <2 metres long, generally considered of low *risk* potential.

**Large Deadwood** A dead branch >10mm diameter and usually >2 metres long, generally considered of high *risk* potential.

**Low Volume Deadwood** Where <5 dead branches occur that may require *removal*.

**Medium Volume Deadwood** Where 5-10 dead branches occur that may require *removal*.

**High Volume Deadwood** Where >10 dead branches occur that may require *removal*.

## Dieback

**Dieback** The death of some areas of the *crown*. Symptoms are leaf drop, bare twigs, dead branches and tree death, respectively. This can be caused by root damage, root disease, bacterial or fungal canker, severe bark damage, intensive grazing by insects, *abrupt changes* in growth conditions, drought, water-logging or over-maturity. Dieback often implies reduced *resistance*, *stress* or *decline* which may be temporary. Dieback can be categorized as *Low Volume Dieback*, *Medium Volume Dieback* and *High Volume Dieback*.

**Low Volume Dieback** Where <10% of the *crown cover* has died. See also *Dieback*, *High Volume Dieback* and *Medium Volume Dieback*.

**Medium Volume Dieback** Where 10-50% of the *crown cover* has died.

**High Volume Dieback** Where >50% of the *crown cover* has died.

## Epicormic shoots

**Epicormic Shoots** Juvenile shoots produced at branches or trunk from *epicormic strands* in some Eucalypts (Burrows 2002, pp. 111-131) or sprouts produced from dormant or latent buds concealed beneath the bark in some trees. Production can be triggered by fire, pruning, wounding, or root damage but may also be as a result of *stress* or *decline*. Epicormic shoots can be categorized as *Low Volume Epicormic Shoots*, *Medium Volume Epicormic Shoots* and *High Volume Epicormic Shoots*.

**Low Volume Epicormic Shoots** Where <10% of the *crown cover* is comprised of live *epicormic shoots*.

**Medium Volume Epicormic Shoots** Where 10-50% of the *crown cover* is comprised of live *epicormic shoots*.

**High Volume Epicormic Shoots** Where >50% of the *crown cover* is comprised of live *epicormic shoots*.

## Roots

**First Order Roots (FOR)** Initial woody roots arising from the *root crown* at the base of the *trunk*, or as an *adventitious root mass* for structural support and *stability*. Woody roots may be buttressed and divided as a marked gradation, gradually tapering and continuous or tapering rapidly at a short distance from the root crown. Depending on soil type these roots may descend initially and not be evident at the root crown, or become buried by changes in soil levels. Trees may develop 4-11 (Perry 1982, pp. 197-221), or more first order roots which may radiate from the trunk with a relatively even distribution, or be prominent on a particular aspect, dependent upon physical characteristics e.g. leaning trunk, *asymmetrical* crown; and constraints within the growing *environment* from topography e.g. slope, soil depth, rocky outcrops, exposure to predominant wind, soil moisture, depth of *water table* etc.

**Orders of Roots** The marked divisions between woody roots, commencing at the initial division from the base of the trunk, at the *root crown* where successive branching is generally characterised by a gradual reduction in root diameters and each gradation from the trunk and can be categorized numerically, e.g. *first order roots*, second order roots, third order roots etc. Roots may not always be evident at the *root crown* and this may be dependent on species, age class and the growing environment. Palms at maturity may form an adventitious root mass.

**Root Plate** The entire root system of a tree generally occupying the top 300-600mm of soil including roots at or above ground and may extend laterally for distances exceeding twice the height of the tree (Perry 1982, pp. 197-221). Development and extent is dependent on water availability, soil type, *soil depth* and the physical characteristics of the surrounding landscape.

**Root Crown** Roots arising at the base of a trunk.

**Zone of Rapid Taper** The area in the *root plate* where the diameter of *structural roots* reduces substantially over a short distance from the *trunk*. Considered to be the minimum radial distance to provide structural support and *root plate* stability. See also *Structural Root Zone (SRZ)*.

**Structural Roots** Roots supporting the infrastructure of the *root plate* providing strength and *stability* to the tree. Such roots may taper rapidly at short distances from the *root crown* or become large and woody as with gymnosperms and dicotyledonous angiosperms and are usually 1<sup>st</sup> and 2<sup>nd</sup> order roots, or form an *adventitious root mass* in monocotyledonous angiosperms (palms). Such roots may be crossed and grafted and are usually contained within the area of *crown projection* or extend just beyond the *dripline*.

# APPENDIX F – Tree Assessment

Tree ID number	Botanical Name	Age Y: Young M: Mature OM: Overmature (senescent)	Height (m)	Spread (m)	DBH (mm)	DARB (mm)	TPZ (m. rad) AS 4970 (2009)	SRZ (m. rad) AS 4970 (2009)	SRIV Age, Vigour, Condition / Index Rating (see Appendix D) www.iaca.org.au / Estimated Life Expectancy 1 = Long 2 = Medium 3 = Short	STARS Significance scale (see Appendix A) www.iaca.org.au 1 = High 2 = Medium 3 = Low Retention Value 1 = High 2 = Medium 3 = Low 4 = Remove	Retain / Remove / Transplant  pr = prune cr = crown rt = roots	Comments and Recommendations
Tree ID number	Botanical Name, common name	Age	Height	Spread	DBH	DARB	TPZ	SRZ	SRIV	STARS	Action	Comments and Recommendations
1	<i>Eucalyptus largiflorens</i> – Black Box	M	13	North 7.7 m West 8.8 m South 10.3 m East 10.5 m	1200 x 900 DBH 1050 mm average	1050	12.0	3.4	MGVF - 9 / 1	1 / 1	Retain	Trunk straight to 3 m. Crown cover 80% approx. and Crown density 85% approx. High volume deadwood in mid- lower crown. Second order structural branches descending on lower crown and one in contact with ground to southwest. Burl growths on trunk from west and east at 1600 mm. Tree previously pruned with branch stubs up to 300 mm diameter evident in mid crown.  Galvanised steel cable (12 mm diameter) in tree on first order structural branch (FOSB) to southwest in lower crown at 3 m. The cable is to be removed as it is constricting the stem. A flat head steel nail 2.5 mm diameter was observed protruding 60 mm from trunk adjacent the Left wound margin at 200 mm above ground and 250 mm from wound margin.
												<ul style="list-style-type: none"> <li>- First order root (FOR) to NE 400 mm diameter at buttress at 300 mm above ground. Root extending at surface for 900 mm and descending.</li> <li>- FOR to north 300 mm diameter at buttress at edge of trunk, with a lesion at 250 mm from edge of trunk resulting in root bifurcation, extending to N and NW both 150 mm diameter and descending.</li> <li>- FOR to W, 300 mm diameter at root buttress, descending at 150 mm from edge of trunk.</li> </ul>
												<b>Trunk Wound Assessment</b>
												<p>Trunk wound, basal, to southwest extending from ground to 1500 mm and potentially to 3 m but disrupted by horizontal burl bulges causing bark to be extruded and to diverge on the upper and lower sides. Base 220 mm wide at ground. Wound occluded from 450 mm. Depth of margins, right 390 mm and left 480 mm at ground. Wound face to dead heartwood entire proximally from ground.</p> <p>From the extent of the wound estimated from the depth of wound margins, wound length and advanced almost occluded wound margins and the low rainfall in the area approx. 100 mm per annum and corresponding slow growth rate of the tree, slowed further after wounding, the tree is estimated 250-300 years old. The wounding event is estimated to have occurred approx. 120-150 years ago and causation is highly likely to be of Aboriginal cultural origin, particularly in the trees location close to the Darling River.</p>

# APPENDIX – G, Tree Location Plan, 1 of 3 (tree/s numbered per Appendix F - Tree Assessment)

Lots 2, 3 & 4 DP1201089 & Lot 111 DP 1201028, Bonney Street, Wilcannia NSW, Ref: 23037, 5/03/2021.

Prepared by Urban Tree Management Australia P/L, 65 Excelsior Street, Merrylands NSW 2160, tel. 02 9760 1389.

From Detail Survey at Bonney Street, Wilcannia for Proposed Medical Clinic, Scale 1:400 @ A2, Reference T19-8D, date 13/02/2020 prepared by Graham F. Howe  
 Registered surveyor, 515 Wyman Lane, Broken Hill NSW 2880, t. 08 8087 3660.

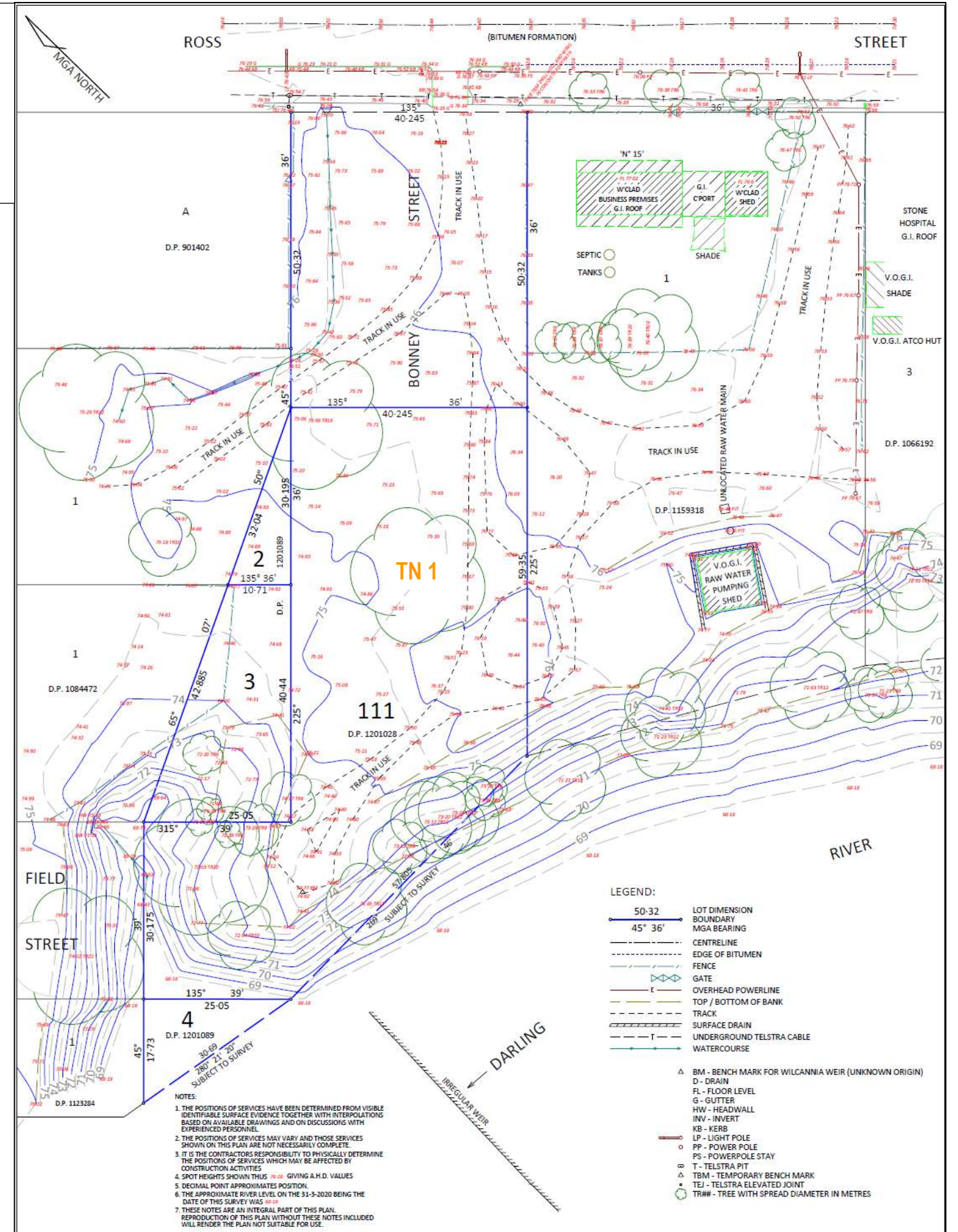
### Legend

**TN 10.** Tree/s or stands of trees numbered in **orange and bold** or surrounded by an unbroken line are recommended for **retention**.

**TN 11.** Tree/s or stands of trees numbered in **blue and not bold** or surrounded by a broken line are recommended for **removal**.



Note: trees indicated, unnumbered are either shrubs, or trees of species, or dimensions, or condition class not protected by the Tree Preservation Order or trees not affected by the proposed works or were already removed.





## Appendix G – Tree Location Plan, Land Zoning Map, 2 of 3

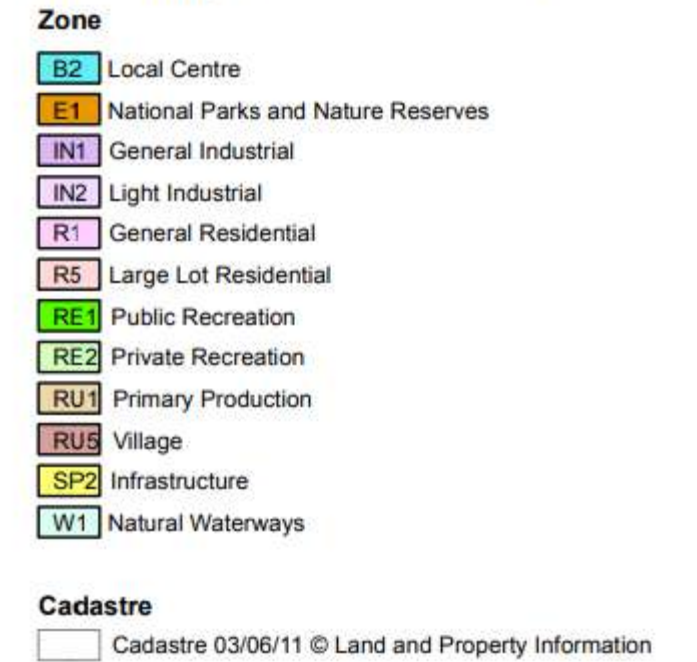
**Lots 2, 3 & 4 DP1201089 & Lot 111 DP 1201028, Bonney Street, Wilcannia NSW, Ref: 23037, 5/03/2021.**

Prepared by Urban Tree Management Australia P/L, 65 Excelsior Street, Merrylands NSW 2160, tel. 02 9760 1389.

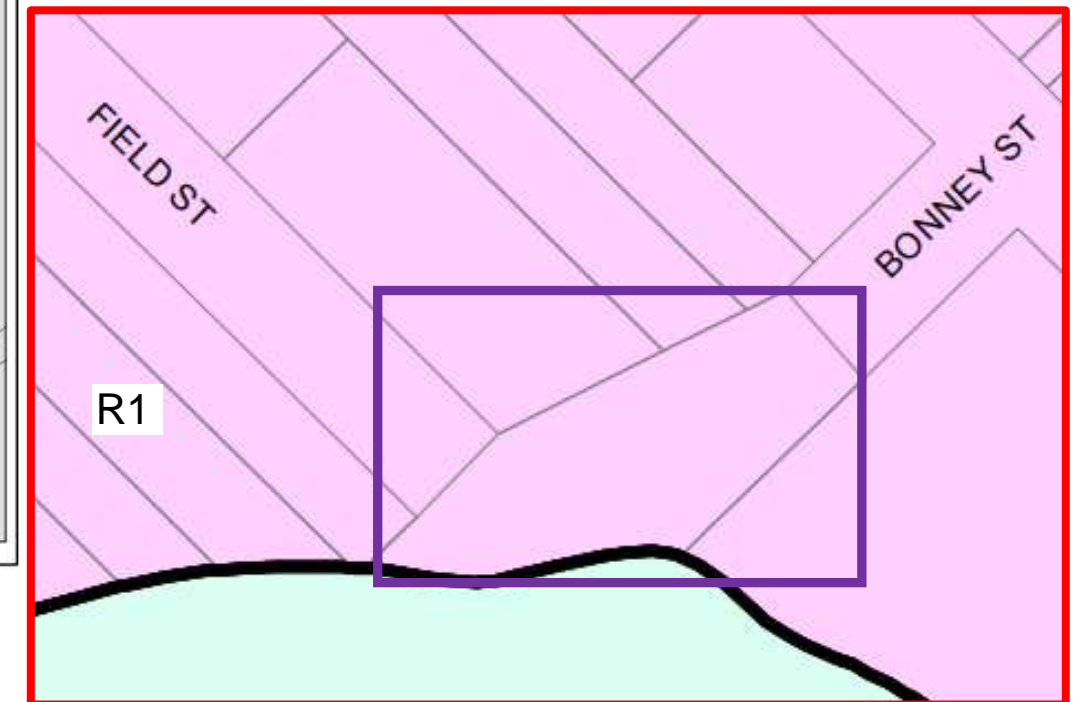
From NSW Legislation, Central Darling Local Environmental Plan 2012 (2013 EPI 33), Land Zoning Map – Sheet LZN\_006A.



Land Zoning Map - Sheet LZN\_006A



Land Zoning Map – Highlighted red section showing location of subject tree/s in R1 area (see Inset Plan)



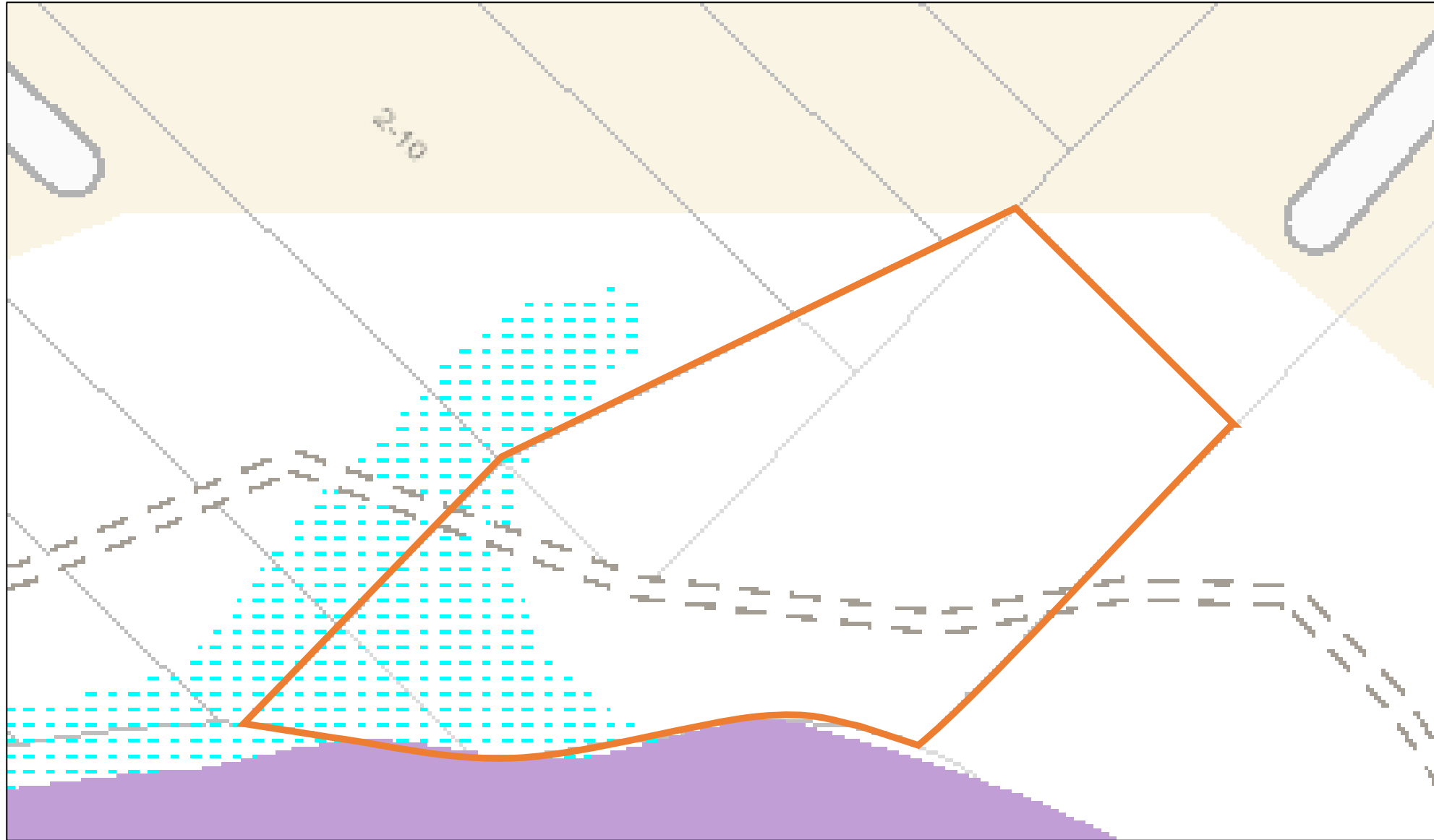
Inset Land Zoning Map – purple outlined area showing location of subject tree/s



## Appendix G – Tree Location Plan, Biodiversity Values Map, 3 of 3

Lots 2, 3 & 4 DP1201089 & Lot 111 DP 1201028, Bonney Street, Wilcannia NSW, Ref: 23037, 5/03/2021.

Prepared by Urban Tree Management Australia P/L, 65 Excelsior Street, Merrylands NSW 2160, tel. 02 9760 1389.

From NSW Government, DPIE, Biodiversity Values Map and Threshold Tool.



<input checked="" type="checkbox"/>	Biodiversity Values
<input checked="" type="checkbox"/>	 Biodiversity Values
<input checked="" type="checkbox"/>	 Biodiversity Values (added in the last 90 days)

Biodiversity Values Map – orange outlined area showing location of subject tree/s

## APPENDIX H – TREE PROTECTION PLAN 1 of 4 - Tree Protection Zones - Standard Procedure



The Protective fencing where required may delineate the **TPZ** and should be located as determined by the project arborist in accordance with AS4970 *Protection of trees on development sites*, Section 4, 4.3. "Fencing should be erected before any machinery or materials are brought onto the site and before the commencement of works including demolition. Once erected, protective fencing must not be removed or altered without approval by the project arborist. The TPZ must be secured to restrict access. AS4687 *Temporary fencing and hoardings* specifies applicable fencing requirements. Shade cloth or similar should be attached to reduce the transport of dust, other particulate matter and liquids into the protected area. Fence posts and supports should have a diameter greater than 20 mm and be located clear of roots. Existing perimeter fencing and other structures may be suitable as part of the protective fencing."

AS4970 Section 4, Tree protection measures, Figure 3 Protective fencing shows examples of such fencing.

**Legend:**

- 1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
- 2 Alternative plywood or wooden paling fence panels. The fencing material also prevents building materials or soil entering the TPZ.
- 3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
- 4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots. "

AS4970 Section 4, Tree protection measures, 4.2 Activities restricted within the TPZ

"Activities generally excluded from the TPZ included but are not limited to-

- (a) Machine excavation including trenching;
- (b) Excavation for silt fencing;
- (c) cultivation;
- (d) storage;
- (e) preparation of chemicals, including preparation of cement products;
- (f) parking of vehicles and plant;
- (g) refuelling;
- (h) dumping of waste;
- (i) wash down and cleaning of equipment;
- (j) placement of fill;
- (k) lighting of fires;
- (l) soil level changes;
- (m) temporary or permanent installation of utilities and signs, and
- (n) physical damage to the tree."

**Tree Protection signage** is to be attached to each **Tree Protection Zone** and displayed from within the development site in accordance with AS4970 2009 *Protection of trees on development sites*, Section 4.4 and example Figure C1 (as shown) and lettering to comply with AS1319.

Where a tree is to be retained and a **Tree Protection Zone** cannot be adequately established due to restricted access e.g. tree located along side an access way, the trunk and branches in the lower crown will be protected by wrapping 2 layers of hessian or carpet underfelt around the trunk and branches for a minimum of 2 m or as lower branches permit, then wire or rope secures 75x50x2000 mm hardwood battens together around the trunk (do not nail or screw to the trunk or branches). The number of battens to be used is as required to encircle the trunk and the battens are to extend to the base of the tree (AS4970 2009 *Protection of trees on development sites*, Figure 4 Examples of Trunk, Branch and ground protection).

**Trunk/Branch and root protection** If a tree is growing down slope from an excavation, a silt fence located along the contours of the site in the area immediately above the **Tree Protection Zone** fencing may need to be installed and regularly maintained to prevent burial and asphyxiation of the roots of the tree. To allow for the maintenance of both fences, the silt fence must be constructed separately to the tree protection fence and the 2 fences must be constructed independently of each other and standalone. To reduce competition with the tree the area within the **Tree Protection Zone** is to be kept free of weeds. These are best removed by the application of foliar herbicide with Glyphosate as the active constituent. This is the preferred method rather than removal by cultivation of the soil within the dripline, to minimise root disturbance to the tree. The removal of woody weeds such as Privet should use the cut and paint method of herbicide application. Weeds to be controlled within the **Tree Protection Zone**, for the duration of the project.

The area of the Tree Protection Zone to be mulched to a depth of 100 mm with organic material being 75% leaf litter and 25% wood, and this being composted material preferably from the same genus and species of tree as that to where the mulch is to be applied, i.e. species specific mulch. The depth of mulch and type as indicated, to be maintained for the duration of the project. Where deep excavation will expose the soil profile to drying out the root plate is to be protected by pegging jute matting across the ground surface 2 m back from the edge of the profile and 2 m down the face of the profile and is to be in one continuous sheet or layers up to 5 mm thick and overlapped 300 mm and pegged. Pegs are to be a minimum length of 200 mm and spaced at 500 mm increments in a grid pattern. Once installed mulch is to be placed on top of the jute matting previously described.

No services either temporary or permanent are to be located within the **Tree Protection Zone**. If services are to be located within the **Tree Protection Zone**, special details will need to be provided by the Project Arborist for the protection of the tree regarding the location of the service/s.

A tree will not be fertilised during its protection within the **Tree Protection Zone**, as this may hasten its decline if it were to decline. If a tree is to be fertilised this should be in consultation with the Project Arborist as per AS4970 (2009).

In the event of prolonged dry periods, or where a tree has been transplanted, or where excavation nearby, especially up slope, leads to drying out of a soil profile, or modification to ground water flow, or flows across an existing ground surface to the tree and its growing environment; deep root watering thoroughly at least twice a week is to be undertaken to irrigate the tree. The need for such watering is determined readily by observing the dryness of the soil surface within the dripline of the tree by scraping back some mulch. Mulch is to be reinstated afterwards. In the event of disrupted ground or surface water flows to the tree due to excavation, filling or construction, a reticulated irrigation system may be required to be installed within the **Tree Protection Zone**. If an irrigation system is to be installed, consideration must be given to volume, frequency, and drainage of water delivered, and this should be in consultation with the Project Arborist as per AS4970 (2009).

**Scaffolding** "Where scaffolding is required it should be erected outside the TPZ. Where it is essential for scaffolding to be erected within the TPZ, branch removal should be minimized. This can be achieved by designing scaffolding to avoid branches or tying back branches. Where pruning is unavoidable it must be specified by the project arborist in accordance with AS4373. Ground below the scaffolding should be protected by boarding (e.g. scaffolding board or plywood sheeting) as shown in Figure 5. Where access is required, a board walk or other surface material should be installed to minimise soil compaction. Boarding should be placed over a layer of mulch and impervious sheeting to prevent soil contamination. The boarding should be left in place until the scaffolding is removed." (Standards Australia 2009, p. 18).

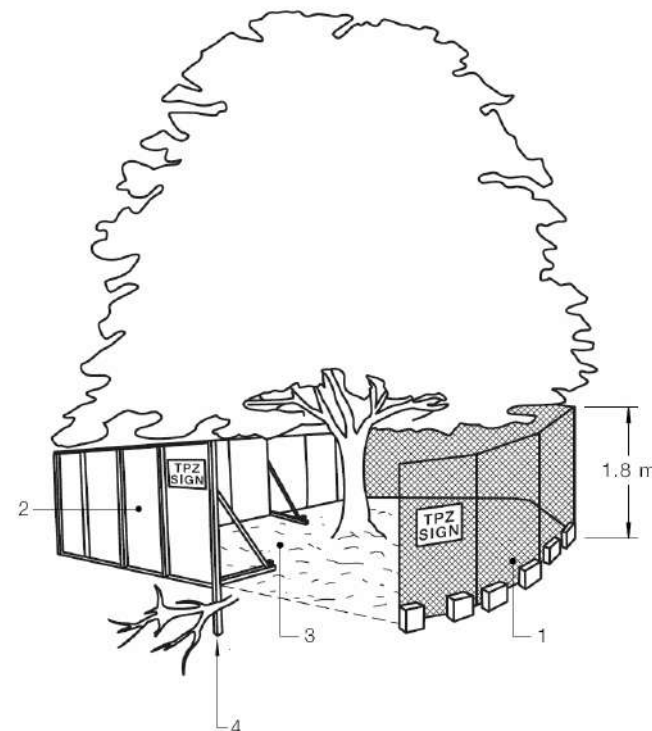


FIGURE 3 PROTECTIVE FENCING



FIGURE C1 TREE PROTECTION ZONE SIGN

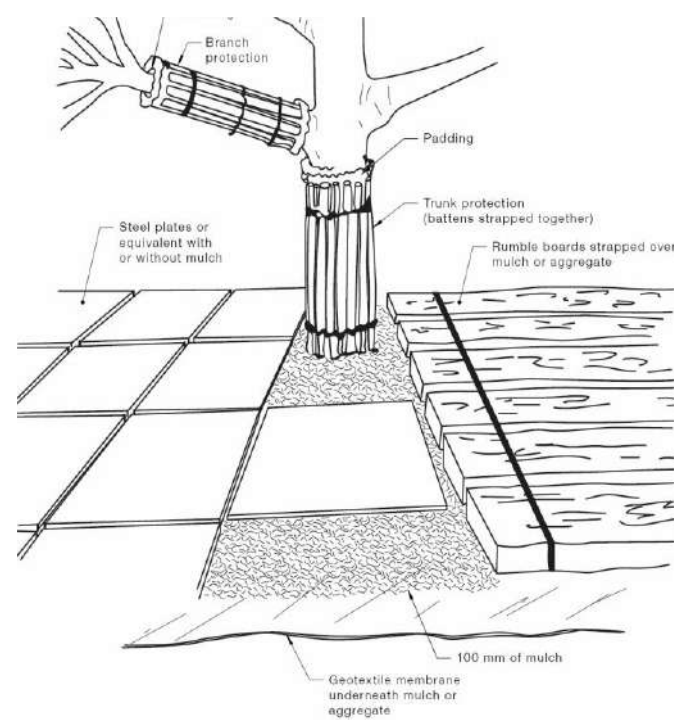
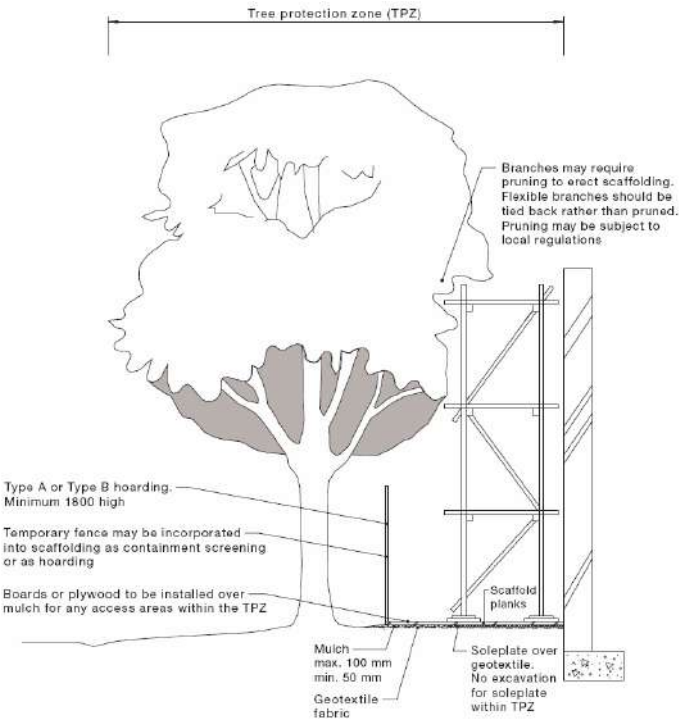


FIGURE 4 EXAMPLES OF TRUNK, BRANCH AND GROUND PROTECTION



NOTE: Excavation required for the insertion of support posts for tree protection fencing should not involve the severance of any roots greater than 20 mm in diameter, without the prior approval of the project arborist.

FIGURE 5 INDICATIVE SCAFFOLDING WITHIN A TPZ

## APPENDIX H – Tree Protection Plan, 2 of 4

(trees numbered per Appendix F - Tree Assessment)  
**Lots 2, 3 & 4 DP1201089 & Lot 111 DP 1201028, Bonney Street, Wilcannia NSW, Ref: 23037, 5/03/2021.**

Prepared by Urban Tree Management Australia P/L, 65  
Excelsior Street, Merrylands NSW 2160, tel. 02 9760 1389.



### **Tree Protection Works - General**

**All retained tree/s** Existing levels are to be preserved and no excavation except by hand to protect structural roots is to be undertaken within the Tree Protection Zone/s. No cutting or filling is to be undertaken within any TPZ unless specified by the Project Arborist.

**Induction for Tree Protection** All workers entering the site involved in construction must be advised of the tree protection measures and specifications outlined within this report during the site induction. This is to be verbally acknowledged and signed off before commencement of work.

### **Tree Protection Works - Specific**

#### **Prior to Demolition**

**Pruning – Tree 1** Pruning is required for clearance for safe working access and to remove some deadwood and is to be to be conducted per AS4973(2007) with the pruning categories detailed under *Crown Maintenance* and *Crown Modification*. Crown projection was measured 7.7 m to North, 8.8 m to West, 10.3 m to South and 10.5 m to East. Pruning to provide 7 m clearance from centre of trunk to the *Nerve Centre* and *Keeping Well* buildings while maintaining the shape and integrity of the tree.

Galvanised steel cable (12 mm diameter) in tree on first order structural branch (FOSB) to southwest in lower crown at 3 m. Cable to be removed as is constricting stem.

**Crown Maintenance** - AS4373(2007) Sec. 7, 7.2.2 and 7.2.4

**Deadwooding** – “Deadwooding is the removal of dead branches. The minimum diameter and location of branches to be removed shall be specified.”

Dead branches up to 300 mm diameter are to be removed from over paths and buildings for reasons of safety. However hollow branches that may provide fauna habitat are to be retained or shortened to prevent collapse while retaining their habitat potential.

**Selective Pruning** - “Selective pruning may be used to remove identified branches that are causing a specific problem. These branches will be specified at the time of assessment.”

Pruning may include branches up to 400 mm diameter and may remove 10% approximately of the live crown. Branches are to be pruned from descending and restricting access to paths and for clearance from over buildings. However hollow branches that may provide fauna habitat are to be retained or shortened to prevent collapse while retaining their habitat potential.

**Crown Modification** - AS4373(2007) Sec. 7, 7.3

**Reduction pruning** – “For reduction pruning the ends of branches are removed to internal branches or stems. The extent of crown cover or limb reduction shall be specified at the time of assessment.”

Pruning may include branches up to 400 mm diameter and may remove 15 – 20% approximately of the live crown. Branches are to be pruned from descending and restricting access to paths and for clearance from over buildings. However hollow branches that may provide fauna habitat are to be retained or shortened to prevent collapse while retaining their habitat potential.

**Note:** All branches to be pruned are to be checked on site before works begin. As works progress some additional branches may require pruning due to them having been obscured by foliage and other branches at the time of assessment, or pruning, breakages or movement since. Conversely, as works progress some branches may not require pruning or may require less pruning due to the recoil of pruned or crossed branches providing movement and desired clearances.

**TPZ Fencing or works Tree/s 1** Post tree pruning this tree is to be enclosed within a Tree Protection Zone and maintained and retained until the completion of all building works. This is to be installed as shown in Appendix H – Tree Protection Plan - Tree Protection Zone - Standard Procedure, Plan 1 of 4. Tree Protection zone signage is to be applied to the fence per Plan 1 of 4 Figure C1.

**Trunk and Branch protection** As per AS4970 (2009) Protection of trees on development sites, Section 4 Tree protection measures, 4.5.2 Trunk and branch protection, the trunk, column root to the north of the trunk and branches to 4 m are to be protected from possible damage from collision with trucks or plant equipment and are to be wrapped with 4 layers of hessian or a single layer of carpet underfelt around the subject stems for a minimum of 4 m and extending to first order branches, then wire or rope is to be used to secure 75x50x2000 mm hardwood battens to the trunk (do not nail or screw to the trunk). The number of battens to be used is as required to encircle the trunk and the battens are to extend to the base of the tree as per AS4970 (2009) Figure 4, (see Appendix G, Plan 1 of 4).

**Scaffolding within the Tree Protection Zone or any protected tree** Not required as retained tree protected at sufficient distances to not be impacted by scaffolding.

**Mulching** Mulch with aged leaf litter is required within the TPZ of this tree to a minimum depth of 50-100 mm and is to be maintained and kept weed free for the duration of works on the site.

Any plant equipment is to work from outside of the TPZ reaching into the TPZ to minimise damage to overhanging branches and to protect roots.

All exiting soil levels within the TPZ fenced area are to be retained unaltered to protect tree roots.

### **During Demolition and Earth Works**

**Crown Protection – Tree 1** Plant equipment is to be kept away from the crown of this tree and work is to be conducted from outside of the TPZ reaching into the TPZ to minimise soil disturbance and compaction and branch and trunk damage.

**Root Protection – Tree 1** No work is to be undertaken within the TPZ. Where access is required within the TPZ, roots are to be protected from soil compaction by the application of ground protection as per AS4970 (2009) section 4, 4.5.3 Ground Protection, where a permeable membrane such as geotextile fabric is to be located at existing ground level beneath a layer of mulch or crushed rock with no fines 100 mm deep and covered with rumble boards or steel plates as per AS4970 (2009) Figure 4, (see Appendix G, Plan 1 of 4). Plant equipment is to work from outside of the TPZ reaching into the TPZ to minimise soil disturbance and compaction, this to include building footings, piers and pavement.

**TPZ Fencing or works Tree 1** Tree Protection Zone fences and works are to remain in place during this part of the project.

## APPENDIX H – Tree Protection Plan, 3 of 4

(trees numbered per Appendix F - Tree Assessment)  
**Lots 2, 3 & 4 DP1201089 & Lot 111 DP 1201028, Bonney Street, Wilcannia NSW, Ref: 23037, 5/03/2021.**

Prepared by Urban Tree Management Australia P/L, 65 Excelsior Street, Merrylands NSW 2160, tel. 02 9760 1389.



### During Construction

**Crown Protection – Tree 1** Plant equipment is to be kept away from the crown of this tree and work is to be conducted from outside of the TPZ reaching into the TPZ to minimise soil disturbance and compaction and branch and trunk damage.

**Root Protection – Tree 1** No work is to be undertaken within the TPZ. Where access is required within the TPZ, roots are to be protected from soil compaction by the application of ground protection as per AS4970 (2009) section 4, 4.5.3 Ground Protection, where a permeable membrane such as geotextile fabric is to be located at existing ground level beneath a layer of mulch or crushed rock with no fines 100 mm deep and covered with rumble boards or steel plates as per AS4970 (2009) Figure 4, (see Appendix G, Plan 1 of 4). Plant equipment is to work from outside of the TPZ reaching into the TPZ to minimise soil disturbance and compaction this to include building footings, piers and pavement.

**Pier footings with the TPZ** - Piers for buildings and walkway ramps are to be located in hand excavated holes to 600 mm deep to determine the presence of structural roots (root greater than >40 mm diameter). The design is to have sufficient flexibility to allow a pier to be relocated 100 mm from the edge of a structural root. After excavation to 600 mm and where no structural root is encountered a pier can be excavated mechanically to the required

depth with the plant equipment reaching into the TPZ to continue excavation with the auger. Waste soil is to be removed away from the TPZ.

**TPZ Fencing or works Tree 1** Tree Protection Zone fences and works are to remain in place during this part of the project.

**Root Protection from Soil Profile Desiccation - utility trenches – all protected Trees** Where an excavation profile is to be open for 1 day or more the exposed structural roots (roots >400 mm diameter) and those within the soil profile are to be protected drying out. The exposed structural roots are to be wrapped with a triple layer of hessian which is to be fastened to itself with hessian to prevent unraveling. The soil profile to 2 m deep (or to the base of the excavation if less than 2 m) is to be achieved by applying a double layer of hessian fabric to cover the exposed soil profile from grade within the Tree Protection Zone of these trees and fixed into place by metal pegs at the bottom, and the fabric is to overlap the ground at surface by 300 mm and be pegged into place with metal pegs. The soil profile protection is to remain in place and be maintained until backfilling is completed.

**Location of underground utilities within a Tree Protection Zone – All retained tree/s** All underground utilities and any stormwater are to be located away from the TPZ. Utility services should not be located within the Tree Protection Zone. Any utility services to be located underground within the TPZ are to be undertaken utilising excavation techniques that prevent or minimise damage to structural roots (roots greater than >40 mm diameter). Such works should be conducted with non-motorised hand tools or with an air knife or water knife and vacuum truck or with directional drilling with minimum depth to top of bore of 600 mm, to prevent soil compaction and root damage and works are to be monitored and certified by the Project Arborist.

**Precautions in respect to temporary work – All retained tree/s** If pedestrian or vehicular access is required within a Tree Protection Zone the roots of the tree are to be protected from soil compaction by the application of ground protection as per AS4970 (2009) Figure 4, (see Appendix H, Plan 1 of 4), where a permeable membrane such as geotextile fabric is to be located at existing ground level beneath a layer of mulch or crushed rock with no fines 100 mm deep and covered with rumble boards or steel plates. Such works are to be monitored and certified by the Project Arborist. Any plant equipment is to work from outside of the TPZ reaching into the TPZ to minimise soil disturbance and compaction. The ground protection works are to remain in place until building works are completed. Maintain tree protection, waste material is to be kept clear of the TPZ.

**Backfilling within a Tree Protection Zone** Not to be undertaken within the Tree Protection Zone.

**Excavation and construction of paths** A path section within the Tree Protection Zone is to be hand excavated to the depth of the path footing along the line of path closest to the tree to determine the presence of any structural roots. Roots requiring pruning are to be pruned per Root Pruning below. Any plant equipment is to work from outside of the TPZ reaching into the TPZ to minimise damage to overhanging branches and to protect roots from soil compaction of crushing of woody roots near the surface.

**Root Pruning** Were required, root pruning is to be conducted in accordance with (AS4373, 2007, p. 18) sec. 9 *Root Pruning*, Cuts are to be made with clean sharp tools with final cuts made to undamaged tissue. Final cuts should be made perpendicular to the length of the root with a final cut to undamaged tissue to remove injured or crushed tissues allowing the tree to develop strong internal boundaries and generate new roots (Shigo 1989, p. 199).

### Post Construction and Landscaping

Remove Tree Protection Zone works.

Remedial pruning to crown of tree as required to be conducted per AS4373 (2007).

**Excavated Garden Beds – Tree 1** No excavated garden beds are to be constructed within the TPZ.

**Excavation for landscape plantings within the Tree Protection Zones** This should be undertaken manually, to prevent damage to structural roots or loss of fine roots. Existing soil grades should be maintained with plant container size restricted to a maximum size of 5 litres. No more than 2 plants per square metre for 5 litre and 5 plants per square metre for 150 mm pot size.

Maintain crown protection.

Waste material is to be kept clear of the TPZ

# APPENDIX H – Tree Protection Plan, 4 of 4

(trees numbered per Appendix F - Tree Assessment)

**Lots 2, 3 & 4 DP1201089 & Lot 111 DP 1201028, Bonney Street, Wilcannia NSW, Ref: 23037, 5/03/2021.**

Prepared by Urban Tree Management Australia P/L, 65 Excelsior Street, Merrylands NSW 2160, tel. 02 9760 1389.

From Roof Plan (further reduced), Job No.: 480, Scale 1:200 @ A3, Dwg No.: 02, prepared by Troppo Architects 28 East Terrace, Adelaide, South Australia 5000, t. +61 8 8232 9696.



### Legend

**TN 9** Trees numbered in blue and not bold are recommended for retention.

**TN 10** Trees numbered in orange and bold are recommended for retention.

Tree Protection Zone (TPZ), setbacks as indicated, or other protection measures or works as indicated.

Tree Protection Zone Fence.

Tree Protection Zone (TPZ).

Structural Root Zone (SRZ).

### Tree Protection Zone setbacks

1. UTM Tree No. / UTM Stand No.	2. Tree Protection Zone (TPZ) = 12 x DBH (m) From center of trunk (COT) in metres AS4970 (2009) Section 3 (see Appendix B)	3. Structural Root Zone <b>SRZ</b> From center of trunk (COT), trunk diameter above root buttress (DARB) AS4970 (2009) Section 3, 3.3.5 (see Appendix C) where applicable (m)	4. Distance of fence with TPZ setback <b>reduced by 10%</b> of area on one side of tree only, in metres equating to approx. 0.3 radius as per AS4970 (2009) Section 3, 3.3 (mm)	5. Proposed distance of works on the side closest to excavation / building construction in metres From center of trunk (COT), (m)
1	12.0	3.5	8.82	8.0



- 1. Treatment Room
  - 2. Consult Room
  - 3. Meeting Room
  - 4. Backup Generator
  - 5. Cleaner/ Store
  - 6. Mental Health Room
  - 7. Disabled Access Toilet
  - 8. Airlock
  - 9. Reception
  - 10. Nursing Managers Office
  - 11. Staff Open Plan Office
  - 12. Staff Lockers
  - 13. Healthy Start Waiting/ Deck
  - 14. Keeping Well Waiting Room/ Deck
  - 15. Server Room
  - 16. Pram/ Gopher Park
  - 17. Staff Toilets
  - 18. Staff Room/ Deck
  - 19. Meeting Room
  - 20. BBQ
  - 21. Plant
  - 22. Bench
  - 23. Sculpture Garden
- HEALTHY START 3 SLABS: 171 m<sup>2</sup>  
 NERVE CENTRE 4 SLABS: 241 m<sup>2</sup>  
 KEEPING WELL 3 SLABS: 171 m<sup>2</sup>  
 EXTERNAL DECKS 165 m<sup>2</sup>



Photograph 1.0 taken 23/02/2021 by D Draper, Tree 1 view to west



Photograph 2.0 taken 23/02/2021 by D Draper, Tree 1 view to north showing trunk burls.



Photograph 3.0 taken 23/02/2021 by D Draper, Tree 1 view to north showing base of almost occluded trunk wound.



Photograph 4.0 taken 23/02/2021 by D Draper, Tree 1 view to northeast showing old pruning stubs in mid crown.

## Appendix E - Bush Fire Assessment



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# Bush Fire Assessment Report

Maari Ma Wilcannia Clinic  
Bonney Street  
Wilcannia

(Our Reference: 32342-BR01\_A)  
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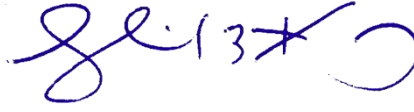




## Disclaimer

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<b>Report Title:</b>	Bush Fire Assessment Report
<b>Project Name:</b>	Maari Ma Wilcannia Clinic
<b>Client:</b>	Troppo Architects
<b>Project No.</b>	32342
<b>Report Reference</b>	32342-BR01_A
<b>Date:</b>	6/4/21
<b>Revision:</b>	Final

<b>Prepared by:</b>	<b>Reviewed by:</b>
	
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# 1 INTRODUCTION

## 1.1 Background

This Bush Fire Assessment Report (BFAR) has been prepared to accompany a Development Application (DA) for the Maari Ma Wilcannia Clinic on Lot 111 DP 1201028 and Lots 2-4 DP 1201089, Bonney Street, Wilcannia. The purpose of this report is to provide a bushfire assessment for the proposed development in accordance *Planning for Bushfire Protection 2019* (PBP).

## 1.2 Proposed Development

The development site is located in the township of Wilcannia within the Central Darling Shire Local Government Area. The proposed complex includes a new primary health care facility consisting of the following; car parking, ambulance and drop of areas, 'keeping well' section, never centre, 'healthy start' section, entry deck and elders deck, community/gathering areas and landscaping throughout.

Refer to the Development Plans in **Appendix A** of this report.

## 1.3 Legislative Requirements

### 1.3.1 Environmental Planning and Assessment Act 1979

#### 1.3.1.1 Integrated Development

The proposed development is integrated development by virtue of Section 4.46 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as it requires both development consent and authorisation under Section 100B (Bushfire Safety Authority) of the *Rural Fires Act 1997* in order for it to be carried out.

#### 1.3.1.2 Bush Fire Prone Land

The subject site is designated as bush fire prone land, pursuant to Section 10.3 of the EP&A Act. The site is identified as containing Category 3 Vegetation and Vegetation Buffer on the Bush Fire Prone Land Map as shown in **Figure 1** below.



Source: (NSW Planning & Environment, 2021)

**Figure 1 – Bush Fire Prone Land Map**

### 1.3.1.1 Rural Fires Act 1997

Section 100B of the *Rural Fires Act 1997* (RF Act) requires a Bush Fire Safety Authority to be obtained before developing bushfire prone land for certain purposes. These purposes include development of bush fire prone land for a Special Fire Protection Purpose, which encompasses the proposed development.

Clause 44 of the *Rural Fires Regulation 2013* outlines the requirements for inclusion in any application for a Bush Fire Safety Authority. This report has been prepared to provide the information required by Clause 44. A checklist for the Clause 44 matters is provided in **Appendix B**.

### 1.3.1.2 Planning for Bush Fire Protection

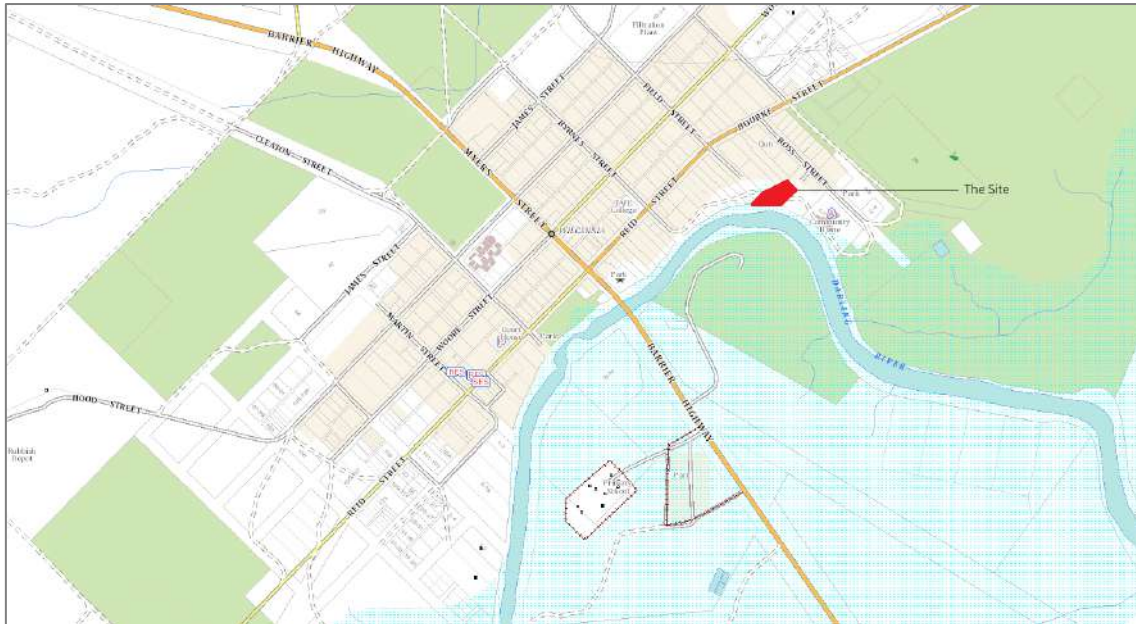
The New South Wales' Rural Fire Service's (RFS) *Planning for Bush Fire Protection 2019* (PBP) applies to all DAs in bush fire prone land.

This report has been prepared to address the requirements of PBP, specifically as a Special Fire Protection Purpose (SFPP). Considering the nature of the development proposal, a merit's based assessment of PBP has also been undertaken.

## 2 THE SITE & ITS SURROUNDS

### 2.1 Site Location

The site is located on a vacant site in the township of Wilcannia, as shown in **Figure 2** below. The site is located in the Dubbo Regional Local Government Area.



Source: (NSW Government Spatial Services, 2021)

**Figure 2 – Site Location**

### 2.2 Site Details

The site is comprised of Lot 111 DP 1201028 and Lots 2-4 DP 1201089 and has a combined property area of approximately 4945m<sup>2</sup>. Refer to the Detail Survey provided in **Appendix B** of this report.

The site has direct frontage to Bonney Street, which is an unformed road that connects to Ross Street. There are trees scattered throughout the site and within proximity, as shown in **Figure 3** below.



Source: (NearMaps, 2021)

Figure 3 – Site Aerial



Source: (NSW Planning & Environment, 2020)

Figure 4 – Zoning Map

The site is zoned R1 General Residential pursuant to the provisions under the *Central Darling Local Environmental Plan 2012* as shown in **Figure 4** above. The wider locality is generally zoned R1 Primary Production RU1 lands located to the east, and W1 Natural Waterways and RE2 Private Recreation.



## **2.3 Environmental Considerations**

### **2.3.1 Environmentally Significant Features**

No matters of environmental significance have been identified for the site and there is no known areas of high biodiversity on the site or within proximity.

### **2.3.2 Threatened Species, Populations and Ecological Communities**

No ecological assessments are known to have been undertaken for the site. The site is however heavily disturbed as a result of the previous and current land uses.

### **2.3.3 Indigenous Heritage**

An Aboriginal Heritage Information Management System (AHIMS) Search was undertaken for the site which revealed that no items of indigenous heritage have been recorded as being identified on the site.

### 3 BUSH FIRE ASSESSMENT

#### 3.1 Methodology

The methodology utilised for the bush fire assessment is outlined in A1.1 of the PBP. The following provides the required information in accordance with the methodology.



#### 3.2 Bush Fire Fuels



Pursuant to Appendix 1 of PBP, all vegetation within 140m of the site (assessment area) has been classified in accordance with *Ocean Shores to Desert Dunes* (Keith, 2004) and Figure 2.3 of AS3959. Photographs of the vegetation from the site inspection carried out on 12 March 2021 are provided in the following plates for each assessment plot.



Figure 5 – Vegetation Classification

Plot 1	
Existing Classification:	Managed vegetation
Post Development Classification:	Managed vegetation
Description:	Managed vegetation within the existing urban area of Wilcannia. Some Eucalypts.

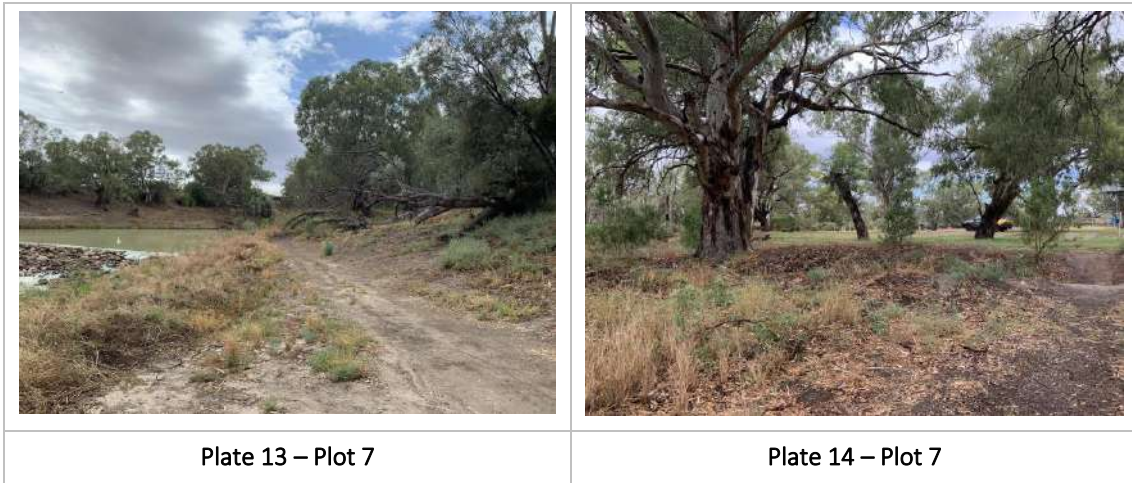
	
<p align="center"><b>Plate 1 – Plot 1</b></p>	<p align="center"><b>Plate 2 – Plot 1</b></p>

<p><b>Plot 2</b></p>	
<p><b>Existing Classification:</b></p>	<p>Managed vegetation</p>
<p><b>Post Development Classification:</b></p>	<p>Managed vegetation</p>
<p><b>Description:</b></p>	<p>Managed vegetation within the existing urban area of Wilcannia.</p>
	
<p align="center"><b>Plate 3 – Plot 2</b></p>	<p align="center"><b>Plate 4 – Plot 2</b></p>

<p><b>Plot 3</b></p>	
<p><b>Existing Classification:</b></p>	<p>Managed vegetation</p>
<p><b>Post Development Classification:</b></p>	<p>Managed vegetation</p>
<p><b>Description:</b></p>	<p>Managed vegetation within the existing urban area of Wilcannia.</p>

	
<b>Plate 5 – Plot 3</b>	<b>Plate 6 – Plot 3</b>
<b>Plot 4</b>	
Existing Classification:	Managed vegetation
Post Development Classification:	Managed vegetation
Description:	Managed vegetation within the existing urban area of Wilcannia.
	
<b>Plate 7 – Plot 4</b>	<b>Plate 8 – Plot 4</b>
<b>Plot 5</b>	
Existing Classification:	Managed vegetation
Post Development Classification:	Managed vegetation
Description:	Managed vegetation within the existing urban area of Wilcannia.

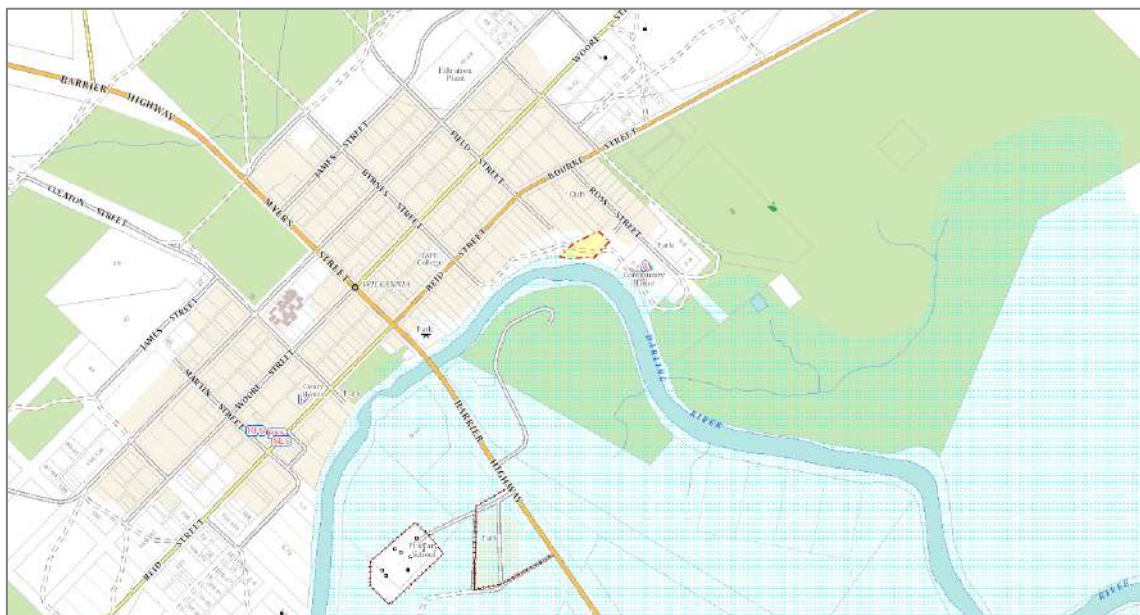
	
<b>Plate 9 – Plot 5</b>	<b>Plate 10 – Plot 5</b>
<b>Plot 6</b>	
Existing Classification:	Forested wetlands
Post Development Classification:	Forested wetlands
Description:	Riparian vegetation consisting of small trees, bushes and grasses.
	
<b>Plate 11 – Plot 6</b>	<b>Plate 12 – Plot 6</b>
<b>Plot 7</b>	
Existing Classification:	Woodland
Post Development Classification:	Woodland
Description:	Woodlands consisting of Eucalypts and other native species.



### 3.3 Topography

Pursuant to Appendix 1.4 of PBP, contour data has been sourced from the NSW Spatial Information Exchange Mapping system. The contour data was verified by ground truthing during the site inspection. A Detail Survey of the site has also been prepared and is provided in **Appendix B** of this report.

The land is relatively flat throughout, with the wider locally falling towards the Darling River, which is to the south west of the subject site.



Source: (NSW Government Spatial Services, 2021)

**Figure 6 – Topography**

### 3.4 Fire Weather Area

The subject site is located within the Central Darling Shire LGA. Pursuant to Table A1.6 of the PBP, the relevant Forest Fire Danger Index (FFDI) for the site is 80.

### 3.5 Asset Protection Zone Determination

The relevant Asset Protection Zones (APZ) are to be determined based on Table A1.12.3 of PBP. Accordingly, an assessment is provided in **Table 1** below.

Table 1 – Asset Protection Zone Determination			
Plot	Vegetation Class	Effective Slope	APZ
1	Managed vegetation	Upslope/flat	N/A
2	Managed vegetation	Upslope/flat	N/A
3	Managed vegetation	Upslope/flat	N/A
4	Managed vegetation	Upslope/flat	N/A
5	Managed vegetation	Upslope/flat	N/A
6	Forested wetlands	>5-10 <sup>0</sup>	16m
7	Woodland	>0-5 <sup>0</sup>	13m

Plots 1-5 are considered urban environments and are managed, therefore an APZ is generally not required for these plots. For Plots 6 and 7 however, the worst case APZ required for the proposed structures is 16m. Considering the scale of the development, it is recommended that a minimum 20m APZ is applied for Plots 6 and 7.

### 3.6 Bushfire Attack Level Assessment

The Bushfire Attack Level (BAL) assessment has been determined as per Table A1.12.6 of PBP. The inputs used in the calculation of the BAL are outlined in **Table 2** below. The relevant BAL is applicable to the proposed buildings on the site.

Table 2 – BAL Inputs	
Requirement	Input Used
Relevant FDI (table 2.1 of AS3959)	80
Classified vegetation	As per <b>Section 3.2</b> of this report, Keith (2004) and Figure 2.3 of AS3959.
Separation Distance	As provided below.
Effective Slope	As per Table 1.

Using the inputs outlined above, the BAL has been calculated for each of the Plots identified in **Section 3.2**.

Table 3 – Bushfire Attack Levels				
Plot	Vegetation Class	Separation Distance (adopted 20m APZ)	Effective Slope	BAL
1	Managed vegetation	N/A	Upslope/flat	N/A
2	Managed vegetation	N/A	Upslope/flat	N/A
3	Managed vegetation	N/A	Upslope/flat	N/A
4	Managed vegetation	N/A	Upslope/flat	N/A
5	Managed vegetation	N/A	Upslope/flat	N/A
6	Forested wetlands	20m	>5-10 <sup>0</sup>	BAL-19
7	Woodland	20m	>0-5 <sup>0</sup>	BAL-19
<b>Worst Case BAL</b>				<b>BAL-19</b>

The worst case and therefore the applicable BAL for the proposed development is **BAL-19**. The relevant construction standards for BAL-19 are outlined in Sections 3 and 6 of AS3959.

The BAL does not apply to any class 10a storage sheds/structures.



## 4 BUSH FIRE PROTECTION MEASURES

### 4.1 Introduction

The proposed development, being a Special Fire Protection Purpose (SFPP), is required to comply with the Bush Fire Protection Measures (BFPM) outlined in Section 6.8 of PBP. This section of the report assesses the relevant BFPMs. There are eight key BFPMs outlined by PBP for SFPP development:

- Asset Protection Zones;
- Landscaping;
- Construction Standards;
- Access;
- Water Supply;
- Electrical Services;
- Gas Services; and
- Emergency management.

The relevant BFPMs are addressed throughout **Section 4** of this report.

### 4.2 Aims and Objectives of PBP

The aim of PBP is:

*to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.*

The specific objectives of PBP are to:

- *afford buildings and their occupants protection from exposure to a bush fire;*
- *provide for a defensible space to be located around buildings;*
- *provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;*
- *ensure that appropriate operational access and egress for emergency service personnel and occupants is available;*
- *provide for ongoing management and maintenance of BFPMs;*
- *and ensure that utility services are adequate to meet the needs of firefighters.*

The proposal has considered radiant heat levels of less than 29kW/m<sup>2</sup> to avoid flame contact, that would provide for appropriate separation to the hazards. The development in conjunction with the bush fire protection measures will provide for safe operational access and egress for emergency services personnel and patrons as well as sufficient water supply. Therefore, the proposed development is considered to be consistent with the objectives of PBP.

### 4.3 Objectives for SFPP Developments

Section 6.2 of PBP contains the specific objectives for special fire protection purposes:

- *Minimise levels of radiant heat, localised smoke and ember attack through increased APZ, building design and siting;*
- *Provide an appropriate operational environment for emergency service personnel during firefighting and emergency management;*
- *Ensure the capacity of existing infrastructure (such as roads and utilities) can accommodate the increase in demand during emergencies as a result of the development; and*
- *Ensure emergency evacuation procedures and management which provides for the special characteristics and needs of occupants.*

In being consistent with the BFPs, the proposed development complies with objectives for SFPP developments, as outlined above.

### 4.4 Asset Protection Zones

The following table outlines the Performance Criteria and associated Acceptable Solutions for the APZ BFP in accordance with Table 6.8a of PBP.

Table 4 Asset Protection Zones		
Performance Criteria	Acceptable Solution/Comment	Compliance
Radiant heat levels of greater than 10kW/m <sup>2</sup> (calculated at 1200k) will not be experienced on any part of the building.	An Asset Protection Zone of 20m is applied to Plots 6 and 7 and shall be established in accordance with Table A1.12.1 Appendix 1 of PBP. Plots 1-5 are considered urban environments and therefore act as an existing APZ.	✓
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	There are no lands within the proposed APZ with a slope exceeding 18 degrees.	✓
APZs are maintained to prevent the spread of fire to the building. The APZ is provided in perpetuity.	The APZ shall be managed in accordance with Appendix 4 of PBP and it within the boundaries of the site. Any other structures are to be located further than 6m from the building.	✓

## 4.5 Landscaping

The following table outlines the Performance Criteria and associated Acceptable Solutions for Landscaping in accordance with Table 6.8a of PBP.

Table 5 Landscaping		
Performance Criteria	Acceptable Solution/Comment	Compliance
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	<p>The applied APZs shall be established and maintained in accordance with Appendix 4 and the applicable <i>Asset Protection Zone Standards</i>.</p> <p>There shall be no branches overhanging the roof and new plantings shall be established to ensure that there are no continuous tree canopies.</p> <p>Any proposed fencing shall be constructed in accordance with Section 7.6 of PBP.</p>	✓

## 4.6 Construction Standards

The following table outlines the Performance Criteria and associated Acceptable Solutions for Construction Standards in accordance with Table 6.8a of PBP.

Table 6 Construction Standards		
Performance Criteria	Acceptable Solution/Comment	Compliance
The proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.	As detailed in Section 3.6, the worst case and therefore the applicable BAL for the proposed development is <b>BAL-19</b> .	✓

## 4.7 Access Standards

The following table outlines the Performance Criteria and associated Acceptable Solutions for Access in accordance with Table 6.8b of PBP.

Table 7 Access		
Performance Criteria	Acceptable Solution/Comment	Compliance
Firefighting vehicles are provided with safe, all-weather access to structures	<p>Access throughout the site shall be designed, constructed as follows:</p> <ul style="list-style-type: none"> <li>Two wheel drive, all weather access roads and internal driveways;</li> </ul>	✓

and hazard vegetation.	<ul style="list-style-type: none"> <li>Any traffic management devices shall not prohibit access for emergency service vehicles;</li> <li>Turning areas shall be established in accordance with Appendix 3 of PBP;</li> <li>All access roads and driveways are to be a minimum 4m width.</li> </ul>	
The capacity of access roads is adequate for firefighting vehicles.	The capacity of the proposed driveways will be sufficient to carry fully loaded firefighting vehicles up to 23 tonnes. No bridges or causeways are required.	✓
There is appropriate access to water supply.	Reticulated water is available to the development.	✓
Perimeter Road	Given the urban locality of the proposed development, it is considered that a perimeter road is not required in this instance. The proposed access point and onsite manoeuvrability shall provide for safe access for fire fighting vehicles and evacuation for residents and staff.	N/A

#### 4.8 Water Supplies

The following table outlines the Performance Criteria and associated Acceptable Solutions for Water supply in accordance with Table 6.8c of PBP.

Table 8 Water Supply		
Performance Criteria	Acceptable Solution/Comment	Compliance
An adequate water supply is provided for firefighting purposes.	Reticulated water supply shall be provided with access points and fire hydrants located on the site.	✓
water supplies are located at regular intervals; and the water supply is accessible and reliable for firefighting operations.	The water supply shall be easily accessible for fire fighting vehicles.	✓
Flows and pressure are appropriate.	Fire hydrants will be located, spaced, sized and pressured to comply with AS2419.1.	✓

The integrity of the water supply is maintained.	All above-ground water service pipes including taps etc shall be constructed of metal material.	✓
Water supplies are adequate in areas where reticulated water is not available.	N/A reticulated area.	N/A

#### 4.9 Electricity and Gas Services

The following table outlines the Performance Criteria and associated Acceptable Solutions for the Electricity and Gas Services in accordance with Table 6.8c of PBP.

Table 9 Electricity and Gas Services		
Performance Criteria	Acceptable Solution/Comment	Compliance
Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	It is recommended that any new powerlines are to be constructed underground. Vegetation around existing/new transmission lines are to be maintained in accordance with the specifications in <i>ISSC3 Guideline for Managing Vegetation Near Powerlines</i> .	✓
Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	The structures are to be connected to bottled gas (if required). The following recommendations are provided: <ul style="list-style-type: none"> <li>• Installed and maintained in accordance with AS/NZS 1596:2004 with metal piping used;</li> <li>• All fixed cylinders are to be kept clear of flammable materials to a distance of 10m;</li> <li>• All connections to be metal construction;</li> <li>• Safety valves are to be directed away from the building and at least 2m away from any combustible material;</li> <li>• Polymer-sheathed flexible gas supply lines are to be used;</li> <li>• Aboveground gas service pipes external to the building are to be metal.</li> </ul>	✓

#### 4.10 Emergency Management

The following table outlines the Performance Criteria and associated Acceptable Solutions for Construction Standards in accordance with Table 6.8d of PBP.

Table 10 Construction Standards		
Performance Criteria	Acceptable Solution/Comment	Compliance
A Bush Fire Emergency Management and Evacuation is prepared.	A Bush Fire Emergency Management and Evacuation Plan is to be prepared in accordance with RFS requirements, AS3745:2010 and AS4083:2010. The plan should include planning for the early relocation of occupants.	✓
Appropriate and adequate management arrangements are established for consultation and implementation of the Bush Fire Emergency Management and Evacuation Plan.	An Emergency Planning Committee is required to be established for the facility who will consultant with residents and staff in developing and implements an Emergency Procedures Manual. Details of all emergency assembly areas including on site and off-site arrangement shall bee established, and an annually emergency evacuation is to be conducted.	✓

## 5 RECOMMENDATIONS

The assessment of the proposed development carried out in this report has assumed the development will be carried out in accordance with a number of bush fire protection measures (BFPMs). The following provides a summary of the BFPMs that must be incorporated into the development to ensure it best protects the development from the effects of bushfire in accordance with the requirements of PBP and other best practice guidelines.

- Asset Projection Zone/Defendable Space:
  - The proposed structure to be located on the site shall be afforded with an Asset Protection Zone of 20m for Plots 6 and 7 only;
  - It is recommended that the entire site be managed as an Asset Protection Zone;
  - The APZ's are to be managed in accordance with Appendix 4 of PBP.
- Landscaping:
  - The applied Asset Protection Zones shall be established and maintained in accordance with Appendix 4 of PBP and the applicable *Asset Protection Zone Standards*;
  - There shall be no branches overhanging the roof of any proposed structures and new plantings shall be established to ensure that there are no continuous tree canopies.
- Construction Standards:
  - The proposed development is to be constructed to a BAL 19 standard and in accordance with PBP/AS 3959:2009. The BAL does not apply to class 10a storage structures.
- Access
  - Access to water tanks shall be kept clear at all times;
  - Any traffic management devices shall not prohibit access for emergency vehicles;
  - Turning areas as shall be established in accordance with Appendix 3 of PBP;
  - The access roads shall be constructed to be capable of carrying a fully loaded firefighting vehicle up to 23 tonnes;
  - All internal roads are to be at least 4m in width and no bridges or causeways are to be constructed, however if required, shall be constructed and maintained in accordance with PBP provisions.
  - No tree plantings or obstructions shall occur on either side of the access roads that would prohibit access to and from the site in the event of fire.
- Services
  - Water:

- Reticulated water supply shall be provided with access points and fire hydrants located on the site. The water supply shall be easily accessible for fire fighting vehicles;
- Hardened driveways are to be provided to the access points;
- Fire hydrants are to be located, spaced, sized and pressured to comply with AS2419.1;
- All aboveground water service pipes including taps etc shall be constructed of metal material.
- Electricity and Gas:
  - Vegetation around existing/new transmission lines are to be maintained in accordance with the specifications in *ISSC3 Guideline for Managing Vegetation Near Powerlines*;
  - Any proposed gas bottles shall be installed and maintained in accordance with AS/NZS 1596:2004 with metal piping used;
  - All fixed cylinders are to be kept clear of flammable materials to a distance of 10m (or appropriately shielded);
  - All connections are to be of metal construction.
- Bushfire Danger Period:
  - Before the commencement of the Bushfire Danger Period, a review of the vegetation on the site and applied BFPs is recommended to be undertaken. Fuel reduction measures are recommended throughout the site.
- Emergency Evacuation Plans:
  - Preparation of a Bush Fire Emergency Management and Evacuation Plan, in accordance with RFS requirements;
  - An Emergency Planning Committee is required to be established for the facility in accordance with PBP requirements;
  - A Fire Management Plan (FMP) should be prepared for the property that is reviewed and updated annually.



## 6 CONCLUSION

The proposed development, on completion, will ensure that the proposed development is located in an area that has a low to moderate bushfire hazard level. With the implementation of the recommendations, as outlined in **Section 6**, it is considered that the proposed development is appropriately protected from bushfire and complies with the requirements of PBP. The proposed development is not expected to increase the bushfire risk.

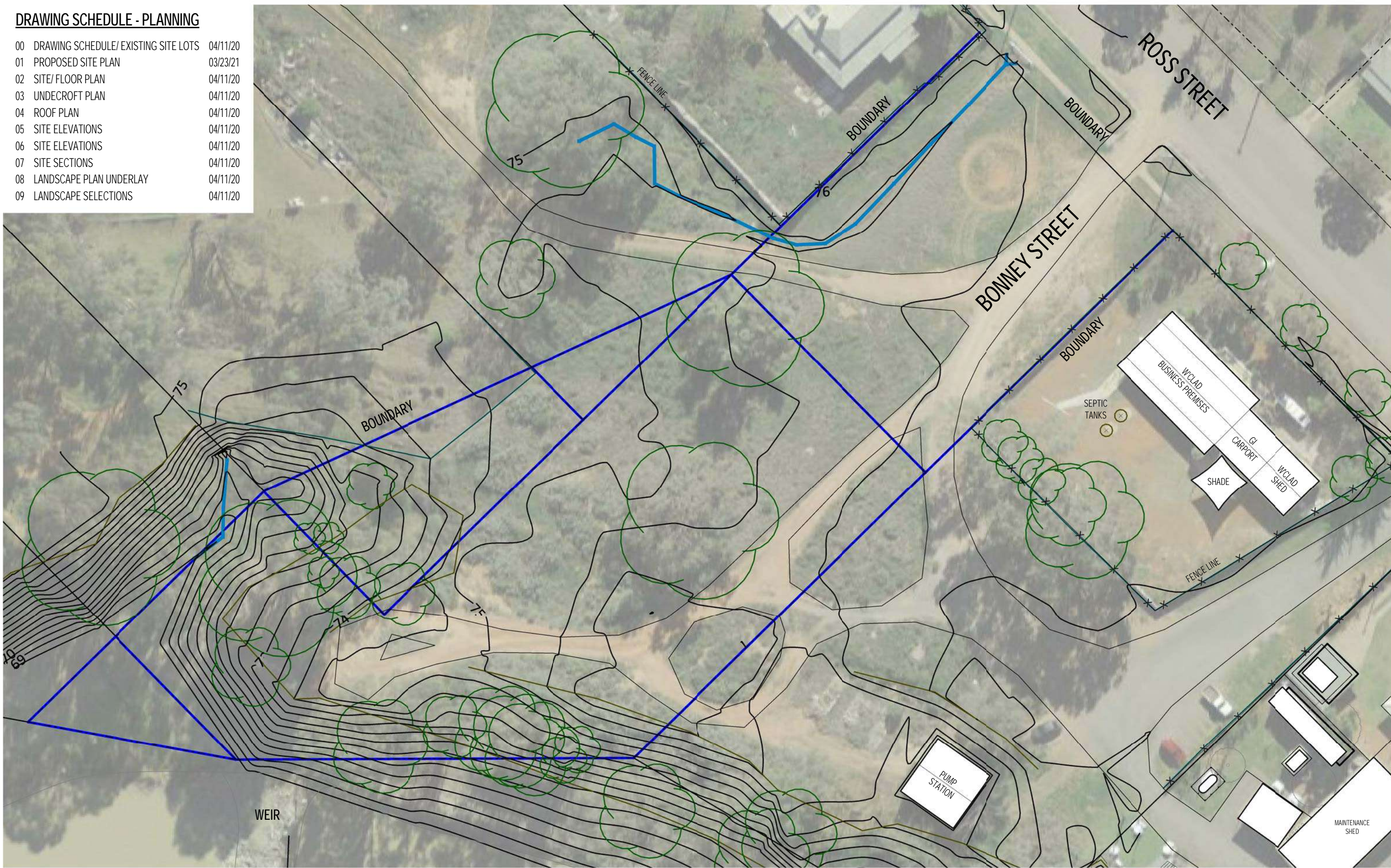
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## Appendix A - Development Plans

**DRAWING SCHEDULE - PLANNING**

00	DRAWING SCHEDULE/ EXISTING SITE LOTS	04/11/20
01	PROPOSED SITE PLAN	03/23/21
02	SITE/ FLOOR PLAN	04/11/20
03	UNDECROFT PLAN	04/11/20
04	ROOF PLAN	04/11/20
05	SITE ELEVATIONS	04/11/20
06	SITE ELEVATIONS	04/11/20
07	SITE SECTIONS	04/11/20
08	LANDSCAPE PLAN UNDERLAY	04/11/20
09	LANDSCAPE SELECTIONS	04/11/20



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SETTING OUT OF WORK IS THE RESPONSIBILITY OF THE CONTRACTOR. VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF WORKS. WORK TO FIGURED DIMENSIONS AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE SUPERINTENDANT BEFORE PROCEEDING. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATION.



**MAARI MA WILCANNIA CLINIC**  
 MAARI MA

**DRAWING SCHEDULE/ EXISTING SITE LOTS**

ISSUE	DATE	AMENDMENT

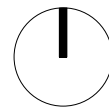
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Issue Date:		Drawn:	ML
		Checked:	AOL



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**MAARI MA WILCANNIA CLINIC**  
 MAARI MA

**PROPOSED SITE PLAN**

ISSUE	DATE	AMENDMENT

Job No:	480	Issue:	
Scale:	1 : 500 @ A3	Dwg No:	01
Issue Date:		Drawn:	Author
		Checked:	Checker

- 1. Treatment Room
- 2. Consult Room
- 3. Wet/ Dry Store
- 4. Backup Generator
- 5. Cleaner/ Store
- 6. Mental Health Room
- 7. Disabled Access Toilet
- 8. Airlock
- 9. Reception
- 10. Nursing Managers Office
- 11. Staff Open Plan Office
- 12. Staff Lockers
- 13. Healthy Start Waiting/ Play Room/ Deck
- 14. Keeping Well Waiting Room/ Deck
- 15. Server Room
- 16. Pram/ Gopher Park
- 17. Staff Toilets
- 18. Staff Room/ Deck
- 19. Elders Room
- 20. Meeting Room
- 21. BBQ
- 22. Kitchen/ Pantry
- 23. Plant
- 24. Bench
- 25. Sculpture Garden



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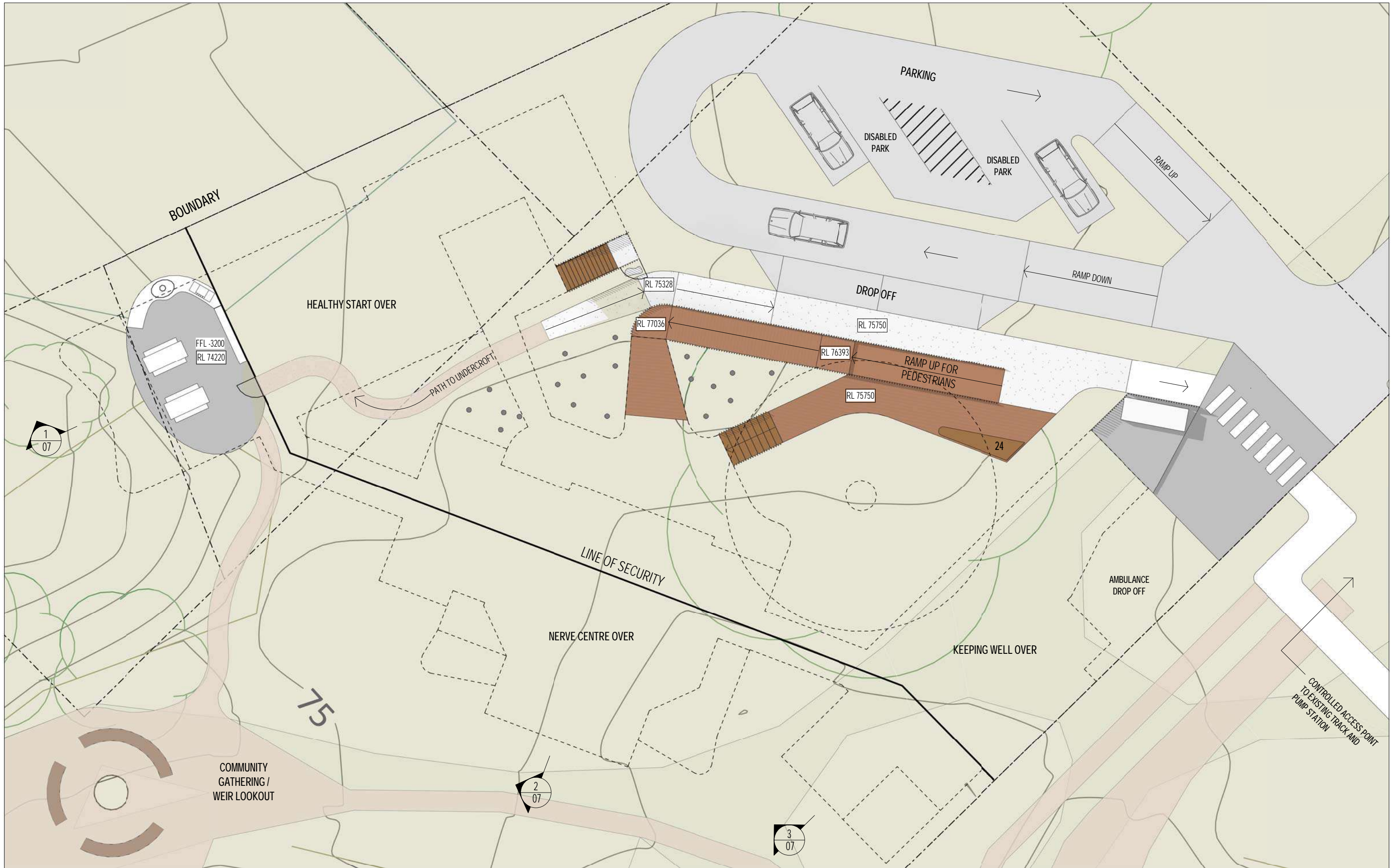
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**MAARI MA WILCANNIA CLINIC**  
 MAARI MA

**SITE/ FLOOR PLAN**

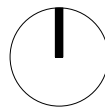
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		Checked:	AOL
ISSUE	DATE	AMENDMENT	



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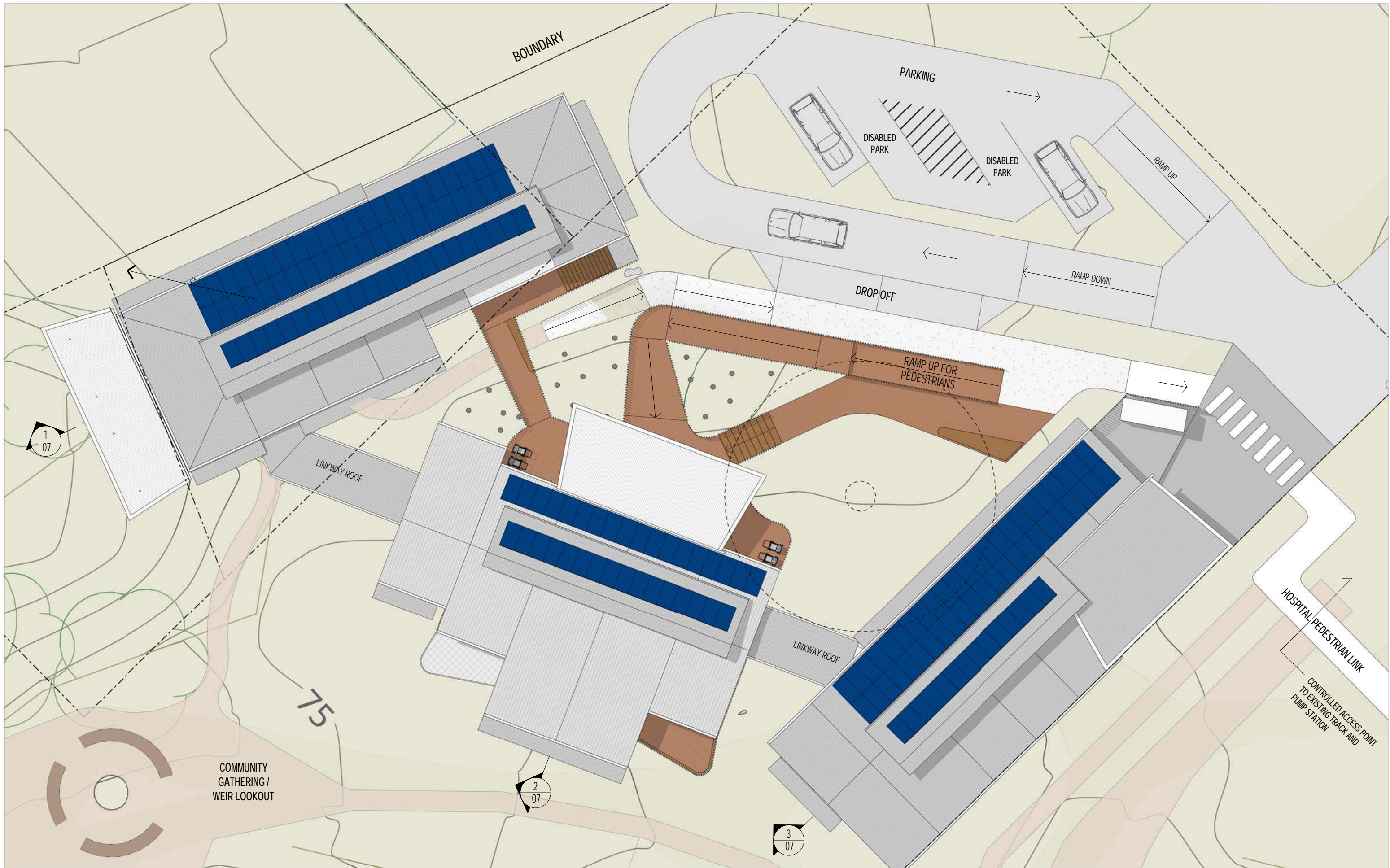


**MAARI MA WILCANNIA CLINIC**  
 MAARI MA

**UNDERCROFT PLAN**

ISSUE	DATE	AMENDMENT

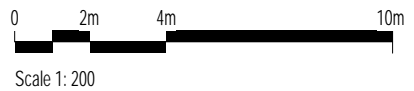
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Issue Date:		Drawn:	Author
		Checked:	Checker



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**MAARI MA WILCANNIA CLINIC**  
 MAARI MA

**ROOF PLAN**

ISSUE	DATE	AMENDMENT

Job No:	480	Issue:	
Scale:	1 : 200 @ A3	Dwg No:	04
Issue Date:		Drawn:	ML
		Checked:	AOL





**NORTH ELEVATION**



**SOUTH ELEVATION**

PRELIMINARY ISSUE

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**MAARI MA WILCANNIA CLINIC**  
 MAARI MA

**SITE ELEVATIONS**

ISSUE	DATE	AMENDMENT

Job No:	480	Issue:	
Scale:	1 : 200	@ A3	
Issue Date:		Dwg No:	05
Drawn:	ML	Checked:	AOL



**EAST ELEVATION**



**WEST ELEVATION**

PROPOSED BRIDGE AND  
GATHERING CIRCLE

PRELIMINARY ISSUE

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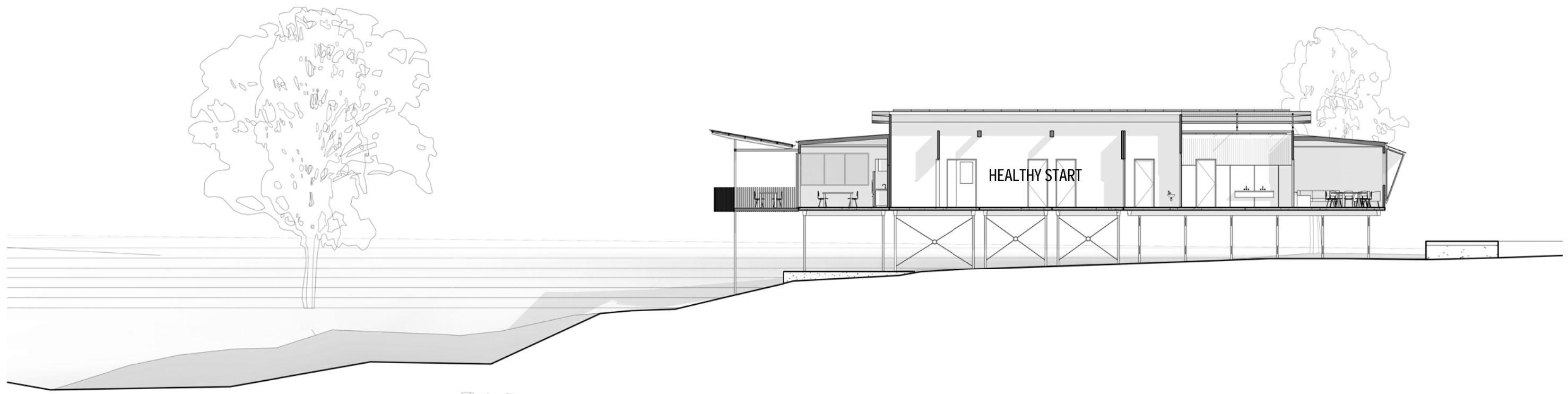
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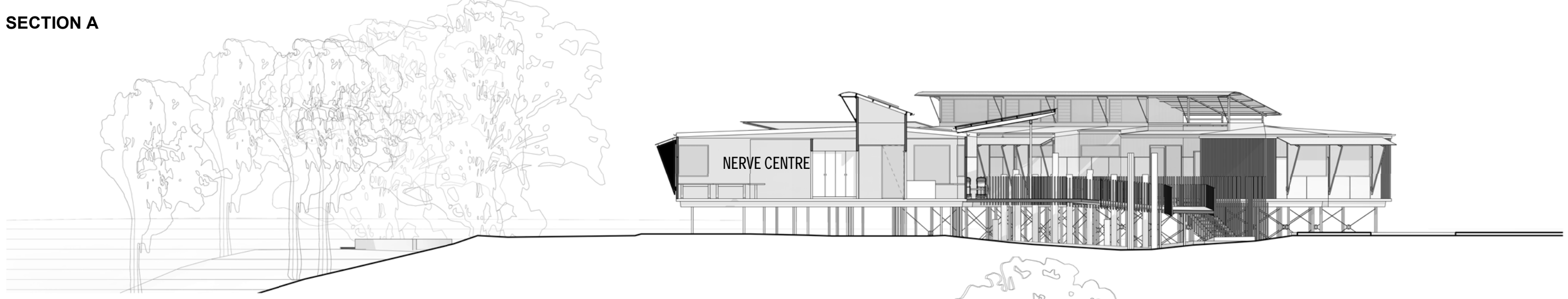
**MAARI MA WILCANNIA CLINIC**  
MAARI MA

**SITE ELEVATIONS**

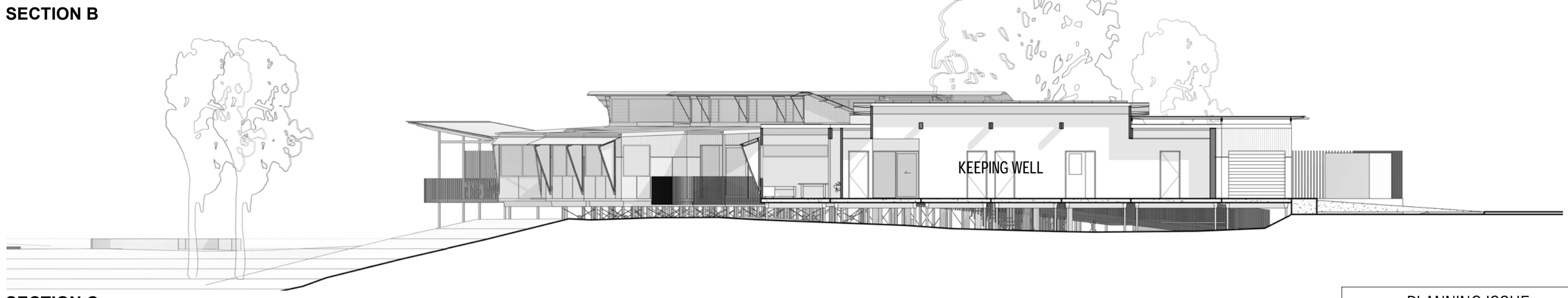
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			Issue Date:	Dwg No:
			Drawn: ML	Checked: AOL
ISSUE	DATE	AMENDMENT		<b>06</b>



SECTION A



SECTION B



SECTION C

PLANNING ISSUE

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MAARI MA WILCANNIA CLINIC  
 MAARI MA

SITE SECTIONS

ISSUE	DATE	AMENDMENT

Job No:	480	Issue:	
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Issue Date:		Dwg No:	07
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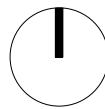
- 1. Treatment Room
- 2. Consult Room
- 3. Wet/ Dry Store
- 4. Backup Generator
- 5. Cleaner/ Store
- 6. Mental Health Room
- 7. Disabled Access Toilet
- 8. Airlock
- 9. Reception
- 10. Nursing Managers Office
- 11. Staff Open Plan Office
- 12. Staff Lockers
- 13. Healthy Start Waiting/ Play Room/ Deck
- 14. Keeping Well Waiting Room/ Deck
- 15. Server Room
- 16. Pram/ Gopher Park
- 17. Staff Toilets
- 18. Staff Room/ Deck
- 19. Elders Room
- 20. Meeting Room
- 21. BBQ
- 22. Kitchen/ Pantry
- 23. Plant
- 24. Bench
- 25. Sculpture Garden



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**MAARI MA WILCANNIA CLINIC**  
 MAARI MA

**LANDSCAPE PLAN UNDERLAY**

Job No:	480	Issue:	
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Issue Date:		Drawn:	ML
		Checked:	CD
ISSUE	DATE	AMENDMENT	

# Maari Ma Wellbeing Centre - Wilcannia

## TREES



**Acacia pendula**  
Weeping Myall, Boree, Nilyah, Balaar  
H: 5-12m



**Acacia stenophylla**  
Shoestring Acacia  
H:4-10m



**Acacia victoriae**  
Gundablue



**Angophera melanoxylon**  
Coolabah Apple  
H: 15m



**Eucalyptus camaldulensis**  
River Red Gum  
H: 20-30m W: 10-15m



**Atalaya hemiglauca**  
White wood



**Santalum acuminatum**  
Sweet Quandong

## SHRUBS



**Atriplex nummelaria**  
Old Man Saltbush  
H: 3m W: 2-4m



**Dodonaea viscosa subsp. Angustissima**  
Narrow Leaf Hopbush



**Eremophila longifolia**  
Emu Bush



**Rhagodia spinescens**  
Spiny Saltbush  
H: 1-2m W: 1-2m



**Westringia rigida**  
Stiff Westringia  
H: 0.3-0.5m W: 0.8-1m



**Prostanthera striatiflora**  
Native Thyme



**Enchylaena tomentosa**  
Ruby Saltbush

## GRASSES



**Maireana brevifolia**  
Small Leaf Bluebush  
H: 0.5-1m W: 0.5-1.5m



**Lepidium africanum**  
Pepper Cress



**Centipeda cunninghamii**  
Old Man Weed



**Cymbopogon ambiguus**  
Native Lemongrass



**Cyperus gymnocaulos**  
Spiny Flat Sedge

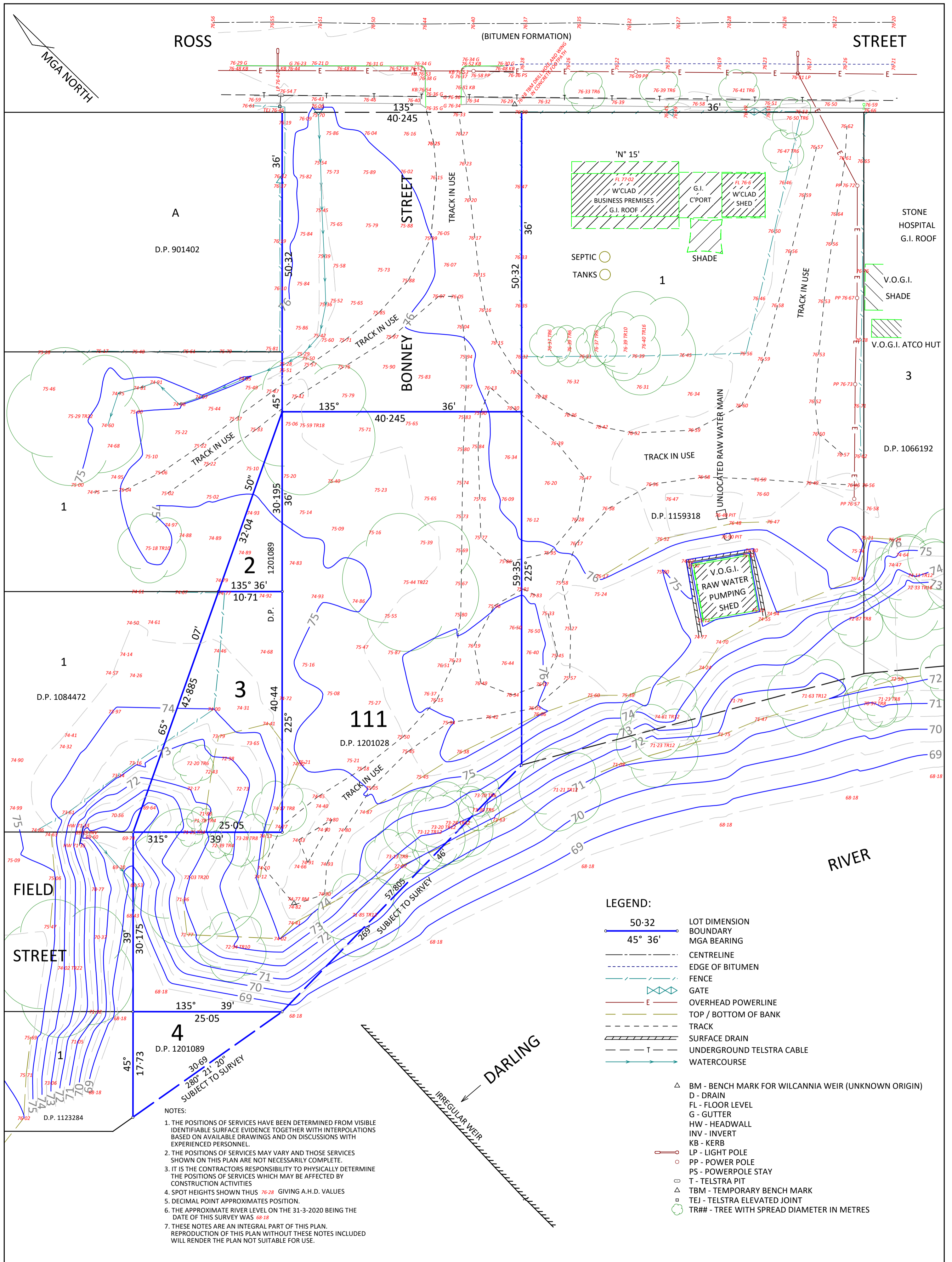


**Lomandra densiflora**  
Pointed Mat-rush  
H: 0.2-0.6m W: 0.8-1m



**Enneapogon Avenaceus**  
Bottle Washers

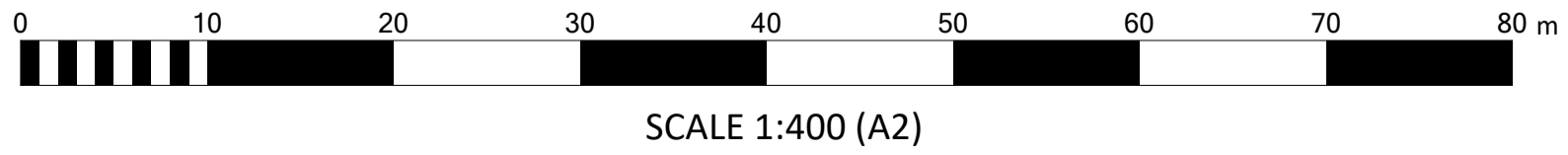
## Appendix B - Detail Survey



NOTES:

1. THE POSITIONS OF SERVICES HAVE BEEN DETERMINED FROM VISIBLE IDENTIFIABLE SURFACE EVIDENCE TOGETHER WITH INTERPOLATIONS BASED ON AVAILABLE DRAWINGS AND ON DISCUSSIONS WITH EXPERIENCED PERSONNEL.
2. THE POSITIONS OF SERVICES MAY VARY AND THOSE SERVICES SHOWN ON THIS PLAN ARE NOT NECESSARILY COMPLETE.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO PHYSICALLY DETERMINE THE POSITIONS OF SERVICES WHICH MAY BE AFFECTED BY CONSTRUCTION ACTIVITIES
4. SPOT HEIGHTS SHOWN THUS 76.28 GIVING A.H.D. VALUES
5. DECIMAL POINT APPROXIMATES POSITION.
6. THE APPROXIMATE RIVER LEVEL ON THE 31-3-2020 BEING THE DATE OF THIS SURVEY WAS 68.18
7. THESE NOTES ARE AN INTEGRAL PART OF THIS PLAN. REPRODUCTION OF THIS PLAN WITHOUT THESE NOTES INCLUDED WILL RENDER THE PLAN NOT SUITABLE FOR USE.

- LEGEND:**
- 50.32 LOT DIMENSION
  - 45° 36' BOUNDARY
  - MGA BEARING
  - CENTRELINE
  - EDGE OF BITUMEN
  - FENCE
  - GATE
  - OVERHEAD POWERLINE
  - TOP / BOTTOM OF BANK
  - TRACK
  - SURFACE DRAIN
  - UNDERGROUND TELSTRA CABLE
  - WATERCOURSE
- △ BM - BENCH MARK FOR WILCANNIA WEIR (UNKNOWN ORIGIN)
  - D - DRAIN
  - FL - FLOOR LEVEL
  - G - GUTTER
  - HW - HEADWALL
  - INV - INVERT
  - KB - KERB
  - LP - LIGHT POLE
  - PP - POWER POLE
  - PS - POWERPOLE STAY
  - T - TELSTRA PIT
  - TBM - TEMPORARY BENCH MARK
  - TEJ - TELSTRA ELEVATED JOINT
  - TR## - TREE WITH SPREAD DIAMETER IN METRES



**DETAIL SURVEY AT BONNEY STREET, WILCANNIA FOR PROPOSED MEDICAL CLINIC**

LENGTHS ARE IN METRES	<b>GRAHAM F. HOWE</b> REGISTERED SURVEYOR PH/FAX 08 8087 3660 515 WYMAN LANE, BROKEN HILL P.O. BOX 317 N.S.W. 2880	SIGNED:	
SCALE 1:400 (A2)		31-3-2020	T19-8D

## Appendix F - Flood Planning Letter



13/05/2021  
Central Darling Shire Council  
PO Box 165

To Whom It May Concern,

## Re: Flood Levels, Wilcannia Health Clinic

The proposed Health Clinic at Ross St in Wilcannia will be situated on the north bank of the Darling River. The Health Centre's finished floor level is proposed to be 77.42 AHD. This floor level corresponds to Wilcannia Hospital in the neighbouring allotment. Contemporary anecdotal evidence from local sources suggests that the hospital, built in 1879, has not been subject to flooding from the river in the past 50 years. No account of historical flooding has been determined from a desktop study. Without knowledge of the specific 1% Annual Exceedance Probability (AEP) level at this point on the Darling River, it seems appropriate to adopt this level for the floor level of the proposed development.

As per "National Arrangements for Flood Forecasting and Warning" by the *Bureau of Meteorology*, the "minor flood" event occurs at a river height of 9.0m at Gauging Station 425008 (BOM ref 546010), located adjacent to the proposed site. The "major flood" event occurs at 10.4m. As of the date of this letter, the current river height is 9.244m, according to the Bureau of Meteorology website. This exceeds the "minor flood" level. A Central Darling Shire Council representative reported that the river level is perceived appreciably lower than the Hospital's floor level on this date. This indicates the "major flood" level is below the proposed floor level. The corresponding AHD level of the "major flood" and its correlation to the 1% AEP are unknown at this time.

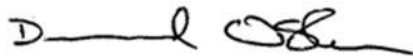
In the past 50 years, the "major flood" level has been exceeded in April 2012, March 2011, September-November 1998, June-July 1990, July-September 1983, March-May 1976, and February-March 1974. In that period, the highest water level (11.583m) was recorded on the 5<sup>th</sup> of April 1976. Anecdotal evidence suggests that this was below the Hospital's floor level. Flood data has been sourced from the Murray-Darling Basin Authority website.

The proposed Health Centre will be located on the northern bank. The floodplain at this location is located on the south bank and it is expected that the majority of flooding will occur on this side of the river. Minor flood depths and flow velocities are expected at the proposed facility during a significant flood event.

It should also be stated that the proposed development is a Health Clinic intended to provide non-emergency out-patient care that is routine or preventative. In-patient care will continue to be at the Wilcannia Hospital. As such, consideration of long-term continuous care of patients in critical condition at the facility is not applicable.

Yours faithfully,

BARNSON PTY LTD



Diarmaid J O'Shea

*B.Eng MIEAust CPEng*

Civil Engineer

## Appendix G - Aboriginal Due Diligence Report



# Maari Ma Wellbeing Centre, Wilcannia - Aboriginal Due Diligence Assessment

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**Barnson Pty Ltd**

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**DOCUMENT TRACKING**

<b>Project Name</b>	Maari Ma Wellbeing Centre, Wilcannia - Aboriginal Due Diligence Assessment
<b>Project Number</b>	20MUD-17477
<b>Project Manager</b>	Rebecca Croake
<b>Prepared by</b>	Charlotte Bradshaw, Tyler Beebe
<b>Reviewed by</b>	Tyler Beebe
<b>Approved by</b>	Rebecca Croake
<b>Status</b>	Final
<b>Version Number</b>	v2
<b>Last saved on</b>	21 April 2021

This report should be cited as ‘Eco Logical Australia, 2021 *Maari Ma Wellbeing Centre, Wilcannia - Aboriginal Due Diligence Assessment*. Prepared for Barnson Pty Ltd.’

**ACKNOWLEDGEMENTS**

This document has been prepared by Eco Logical Australia Pty Ltd with support from Jim Sarantzouklis from Barnson.

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# 1. Introduction

## 1.1 Project background

Barnson Pty Ltd (Barnson) engaged Eco Logical Australia Pty Ltd (ELA) to undertake an Aboriginal Due Diligence assessment (ADD) for the proposed Maari Ma Wellbeing Centre located to the south west of Bonney Street (Lot 2, 3 and 4 DP 1201089 and Lot 111 DP 1201028), Wilcannia, NSW (hereafter referred to as 'the study area'; Figure 1). ELA understands that the scope of works involves the construction of buildings, roads and associated landscaping.

A plan of the proposed works has been provided by Maari Ma Health Aboriginal Corporation (Figure 2).

This assessment outlines the findings of the Aboriginal Due Diligence Assessment of the study area, in accordance with the *Due Diligence Code of Practice for the protection of Aboriginal Objects in New South Wales* (DECCW 2010a).

## 1.2 Assessment process

The methodology of this Aboriginal due diligence assessment includes:

- Undertake an extensive search of the Aboriginal Heritage Information Management System (AHIMS) database maintained by Heritage NSW, Department of Premier and Cabinet (Heritage NSW) to establish if there are any previously recorded Aboriginal objects or places within the study area;
- Undertake a search of the Central Darling Local Environment Plan (LEP) 2012 Schedule 5 (Environmental Heritage), the NSW State Heritage Inventory and the Australian Heritage Database in order to determine if there are any sites of Aboriginal significance or sensitivity located within the study area;
- Undertake a desktop review of relevant previous Aboriginal heritage assessments to understand the local archaeological context and assist in predicting the likely occurrence of unrecorded Aboriginal sites or objects, and
- Undertake a site inspection to identify any Aboriginal sites and / or areas of sensitive landforms.

The aim of this report is to establish whether Aboriginal objects are present within the study area, if it is likely that unknown Aboriginal objects are located in the study area and determine whether further assessment and/or an Aboriginal Heritage Impact Permit (AHIP) is required.

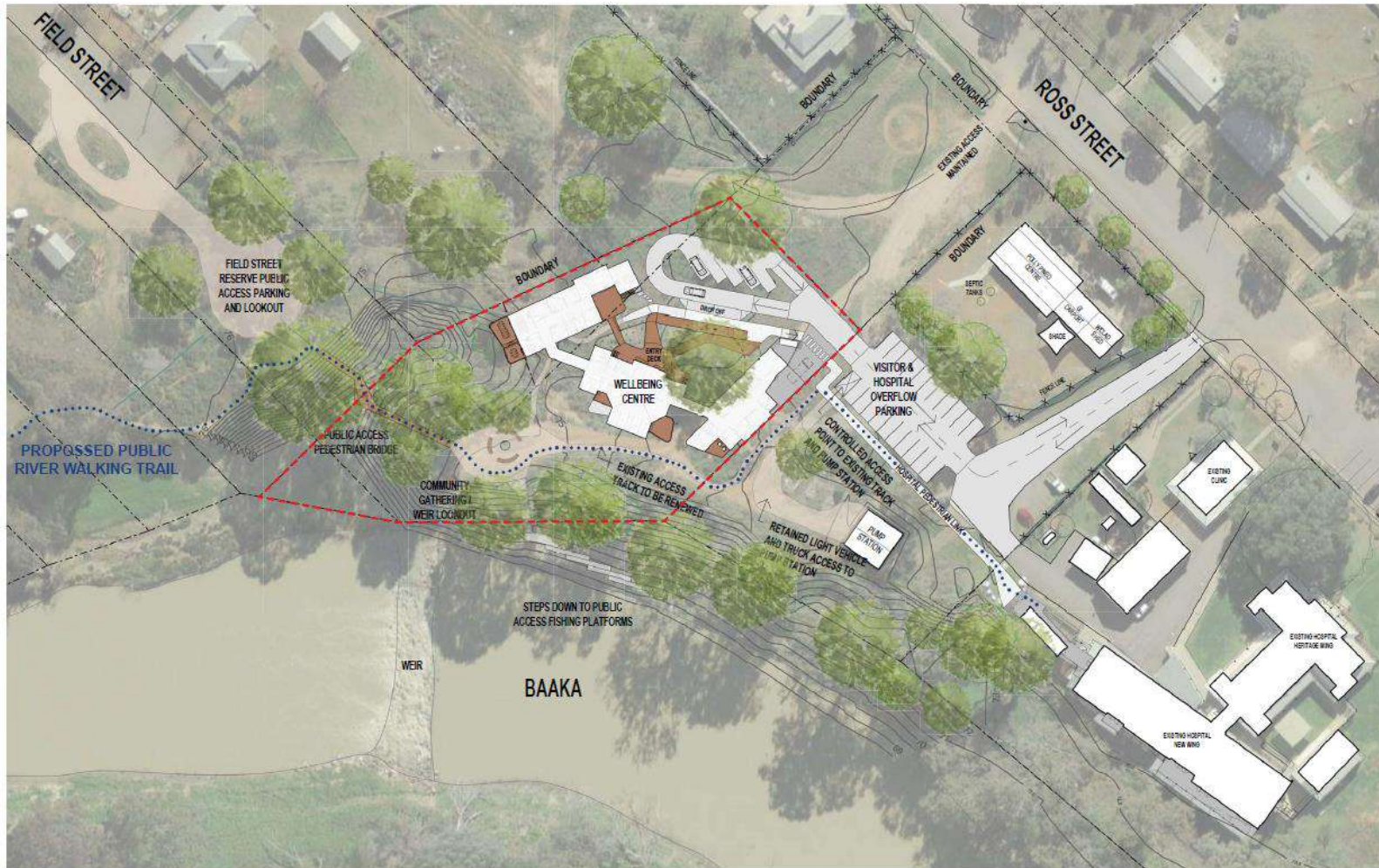
The due diligence process involves *"taking reasonable and practical measures to determine whether your actions will harm an Aboriginal object and, if so, what measures can be taken to avoid that harm"* (DECCW 2010a:4).

If harm cannot be avoided, further technical studies and approvals will be required (see section 4).





Figure 1: The study area



MAARI MA WELLBEING CENTRE - WILCANNIA  
LOCALITY PLAN  
28.07.2020



Maari Ma Health Aboriginal Corporation



Figure 2: Plan of proposed wellbeing centre (source: Maari Ma Health Aboriginal Corporation 2020)

## 2. Basis for cultural heritage management

*Places of cultural significance enrich people's lives, often providing a deep and inspirational sense of connection to community and landscape, to the past, and to lived experiences ... they are irreplaceable and precious (Australia ICOMOS Burra Charter 2013:1).*

Traditionally, heritage and archaeological assessments have focused on the significance of the tangible elements of cultural heritage (Brown 2008). Items such as structures and archaeological artefacts have been considered predominantly in terms of their scientific/research potential and representativeness (New South Wales Heritage Office 2015:20-24). By focusing on the scientific qualities of heritage, many of the intangible qualities of heritage were not considered. This is especially crucial when participating in the management and protection of Aboriginal cultural heritage. By nature, Aboriginal cultural heritage is multi-faceted: it consists not only of tangible structures and objects of value for scientific investigations, but also of a deeply complex array of intangible expressions, such as stories, memories, and traditions. Many of the rights and interests of Aboriginal communities in their own heritage is formed on the basis of this intangibility. It stems from their spirituality, customary law, original ownership, and continuing custodianship (Australian Heritage Commission 2002:5). These intangible expressions often share a strong link with the landscape. Byrne *et al.* (2003:3) describe this connection in the form of a map, where individuals:

*Carry around in [their] heads a map of the landscape which has all these places and their meanings detailed on it. When we walk through our landscapes the sight of a place will often trigger the memories and the feelings [that] go with them ... it is the landscape talking to us.*

Crucially, those who are not connected to the landscape in question will not be able to discern these intangible meanings embedded in the landscape; they can only come to recognise the significance by consulting with local knowledge holders (Byrne *et al.* 2003:3). And, even so, they may vary between individuals, reflecting unique experiences.

By recognising the rights and interests of Aboriginal knowledge holders and community members in their cultural heritage, all parties involved in the identification, conservation, and management of this cultural heritage must acknowledge that Aboriginal people (Australian Heritage Commission 2002:6):

- Are the primary source of information on the value of their heritage and how this is best conserved;
- Must have an active role in any heritage planning processes;
- Must have input into primary decision-making in relation to their heritage so that they can continue to fulfil their obligations towards this heritage; and
- Must control the intellectual property and other information relating specifically to their heritage, as this may be an integral aspect of its heritage value.

As such, cultural heritage sites and objects are fundamental elements of Aboriginal peoples' identities, connections, and belonging to their communities. The careful protection and management of this heritage is essential for the preservation of connection between past, present, and future.

## 3. Assessment process

### 3.1 Identify if the proposed activity will disturb the ground surface

The proposed works and associated infrastructure will disturb the ground surface.

### 3.2 Database searches and known information sources

#### 3.2.1 AHIMS search

The AHIMS database maintained by Heritage NSW and regulated under Section 90Q of the *National Parks and Wildlife Act 1974*. The AHIMS database holds information and records regarding the registered Aboriginal sites (Aboriginal objects, as defined under the Act) and declared Aboriginal places that exist in NSW.

A search of the AHIMS database was conducted on 17 March 2021 (search ID 576880) to identify if any registered Aboriginal sites were present within, or adjacent to, the study area (**Appendix A**). The search parameters include a 5 km radius surrounding the study area. The AHIMS database search was conducted within the following lot/coordinates:

**Table 1: Search Parameters for the AHIMS database search**

Search Parameters	
GDA Zone	54
Eastings	721231 - 731231
Northings	6501215 - 6511215

The AHIMS search result:

**Table 2: Search results for the AHIMS database search**

Search Results	
Aboriginal sites recorded	113
Aboriginal places declared	1

The AHIMS search identified 113 Aboriginal sites and one Aboriginal place within the search parameters. No Aboriginal sites have previously been recorded within the study area. AHIMS ID 24-5-0167 ('Wilcannia Weir Fishtrap') is located in close proximity to the study area. The site card associated with this site is not digitised. AHIMS was contacted on 17 March 2021 requesting further information regarding AHIMS ID 24-5-0167, though no further information is available.

The Aboriginal place identified in the search is **Steamers Point** (NPW Gazette No. 59) and is listed as a Ceremonial Site. This Aboriginal place is located approximately 1 km east from the study area. The Statement of Significance is as follows:

**Why is it an Aboriginal Place?**

*The value for which the Aboriginal Place is of special significance to Aboriginal culture includes, but is not limited to, the area having special significance to the Baakantji and other local Aboriginal peoples.*

*The values associated with this special significance to Aboriginal culture include, but are not limited to, the area being an important Baakantji camping area adjacent to the Darling River, a source of food and water as well as a travelling route through country. The place contains significant archaeological evidence including stone arrangements, artefact scatters, middens, and scarred trees.*

**Why is it important to Aboriginal People?**

*Local Aboriginal people have a strong spiritual and emotional attachment to the area. It is a place where Aboriginal families lived and where traditional knowledge and cultural life was sustained. The significance of Steamers Point has accumulated over time and embraces the richness and diversity of Aboriginal life including the strong pastoral history of the region. For many, Steamers Point is a key to understanding the past.*

(SHR, 2015)

The distribution of recorded Aboriginal sites adjacent to the study area is shown in Figure 3. A regional overview of AHIMS sites surrounding the study area is shown in Figure 4. The frequencies of site types recorded within the AHIMS database search area are listed below.

**Table 3: Frequencies of site types**

Site Contexts	Site Features	Number	%
Open	Aboriginal Resource and Gathering	1	0.9
	Aboriginal Resource and Gathering; Aboriginal Ceremony and Dreaming; Ochre Quarry; Water Hole	1	0.9
	Aboriginal Resource and Gathering; Aboriginal Ceremony and Dreaming; Water Hole	1	0.9
	Aboriginal Resource and Gathering; Water Hole	1	0.9
	Artefact	36	31.9
	Artefact; Burial	1	0.9
	Artefact; Earth Mound; Shell	1	0.9
	Artefact; Habitation Structure; Hearth; Potential Archaeological Deposit (PAD); Shell	1	0.9
	Artefact; Hearth	5	4.4
	Artefact; Hearth; Shell	2	1.8
	Artefact; Shell	1	0.9
	Burial	3	2.7

Site Contexts	Site Features	Number	%
	Burial; Modified Tree (Carved or Scarred)	1	0.9
	Conflict	1	0.9
	Earth Mound; Shell; Artefact	1	0.9
	Fish Trap	3	2.7
	Habitation Structure	2	1.8
	Habitation Structure; Modified Tree (Carved or Scarred)	1	0.9
	Habitation Structure; Stone Quarry; Shell; Artefact; Earth Mound	1	0.9
	Hearth	1	0.9
	Modified Tree (Carved or Scarred)	46	40.7
	Stone Arrangement; Stone Quarry	1	0.9
	Water Hole	1	0.9
	<b>Total</b>	<b>113</b>	<b>100</b>

The most common site features to occur in the area are culturally modified trees (40.7%) followed by artefacts (31.9%). All sites are located in open contexts.

### 3.2.2 Local, state and national heritage registers

Searches of the Australian Heritage Database, the State Heritage Inventory (SHI) and Central Darling Local Environment Plan (2012) utilising the term “Wilcannia” were conducted on 17 March 2021 in order to determine if any places of Aboriginal significance are located within the study area.

There are two heritage items located within the close vicinity of the study area. The Wilcannia District Hospital (LEP I19) is located directly adjacent to the study area. The LEP item is listed in the hospital category and is a “rare surviving late nineteenth-century hospital in the region” (SHI). The Wilcannia Golf Club (LEP I18) is located approx. 70 m north-west of the study area. The LEP item is listed in the brewery category as “it incorporates the remnants of the first (1875) brewery constructed and operated by Emil Resch in Australia” (SHI).

The proposed scope of works will not impact on the significance of these heritage items or encroach on the heritage curtilage.

No Aboriginal sites or heritage items with associated Aboriginal significance were recorded on these databases within the study area.

The Wilcannia Mission Camps and Cultural Places (NPW Gazette No. 297) is located approximately 500 m south-west. The Statement of Significance is as follows:

*The Aboriginal Place demonstrates aspects of traditional ways of life such as the making of canoes and coolamons, wooden artefact making, use of aquatic resources such as fish, yabbies and mussels, and understanding of the hydrology and ecology of the river and linked aquifers and springs through the traditional knowledge of the sacred Ngatji or Rainbow Serpent.*

*This traditional knowledge was seamlessly transferred into the historic camping period, and into the present. Canoe trees show the transition from very old trees cut out around 200 years ago, to a canoe cut out by Barkandji matriarch Granny Moysey and her family around 1922, to a series of canoes cut out by known people in the 1940's to 1950's. Interest has been rekindled in making canoes again with elders who witnessed canoes being cut out. Stories also document practices such as fishing, yabbying and collecting mussels, as well as hunting and collecting emu eggs.*

*The historic camps show the deliberate placement of huts in similar ways to the traditional period, taking into account location near shade trees, fresh water, aquatic foods, and spacing and orientation of huts to keep family close and give privacy from others, and clustering of huts according to kinship relationships. The historic camps are marked by domestic and work-related historic artefacts and remnant garden plants, and hut materials indicating the construction methods of huts using traditional building methods (use of round timber and cane grass and gum leaf thatching), and new methods adopted from employment as fencers on pastoral stations.*

*The oral history collected from elders' documents who lived in the camps so young people can learn about their family history. The stories describe what was hard about those times (such as carting water, no electricity, primitive toilets etc,) and how they dealt with these problems, and what was better about those times than today (plenty of fish and yabbies, bush medicines, fresh water, no bills). They describe the close family ties and extended kinship groups, about how everyone helped each other, the sounds of adults and children laughing, chatting and singing every evening in the firelight, and how every child was looked after by their large kinship network. They emphasize a sense of freedom and pride, and the self-reliance and resilience of the people.*

*The camps demonstrate significant aspects of the history of NSW. They grew in the 1930's and 1940's in response to families escaping the Aborigines Welfare Board enforced authoritarian regime and Tuberculosis epidemic of the Menindee Aboriginal Station or "Mission". The camps provided a pool of skilled but often underpaid labour for the pastoral stations, local government, and town businesses, separate from the town but important to the economy, with limited opportunities for health, education, training, welfare and economic assistance. Located on the flood prone side of the river, the major floods in 1950, 1956, and 1974 were the catalyst for social change as the camp people had to be re-located on higher ground on the edge of the town, where many stayed and eventually built permanent housing through their own housing project. The relationship between the occupants of the camps and adjacent fourteen "Mission" houses built by the Aborigines Welfare Board in 1953 documents the many ways the Aboriginal people evaded, ignored, used and worked around the assimilationist policy of the 1950's to 1970's. The camps are associated with Aboriginal people who during their lifetime had a significant influence on the history of NSW, for example:*

- *Elsie Jones who began teaching Barkandji in the Wilcannia schools nearly fifty years ago and was instrumental in the introduction of Aboriginal language courses in schools/TAFE in NSW.*
- *William Bates who was influential in setting up the Aboriginal Legal Service, led the buying of pastoral stations for Aboriginal people through the Western Regional*

*Aboriginal Land Council in the 1980's, led the Mutawintji National Park blockade in 1983, and led changes to the NPWS Act that enabled National Parks to be handed back to the Traditional owners and the return of Mutawintji, the first national park to be returned to the traditional owners.*

- *Alfie Bates and others who organized Barkandji Housing Corp in the 1970's and 1980's, that enabled Aboriginal people to manufacture concrete bricks and build their own houses*
- *William Riley who amongst many significant achievements campaigned to save the Baaka or Darling River from over-allocation of water and founded Northern Basin Aboriginal Nations.*
- *Numerous Barkandji, Ngiyampaa and Malyangapa traditional knowledge holders and language speakers (including George Dutton, Alf Barlow, Jack Johnson, Dougal McFarlane, Fred Biggs, Elsie Jones, Kate Bugmy, Gertie Johnson, Granny Quayle, and Granny Moysey), recorded by researchers Dr Jeremy Beckett, Dr Luise Hercus and Prof. Wurm during the 1950's and 1960's enabling important language and cultural knowledge to be handed down the generations.*

*The Wilcannia community aspire to have all the camp sites and other features protected, signposted and used as an educational resource for younger generations to learn about their history and culture.*

(SHI, 2020)

Under the proposed scope of works, the significance of Wilcannia Mission and Cultural Places (NPW Gazette No. 297) Aboriginal place is not anticipated to be impacted or harmed.





Figure 3: AHIMS registered sites in/within the vicinity of the study area

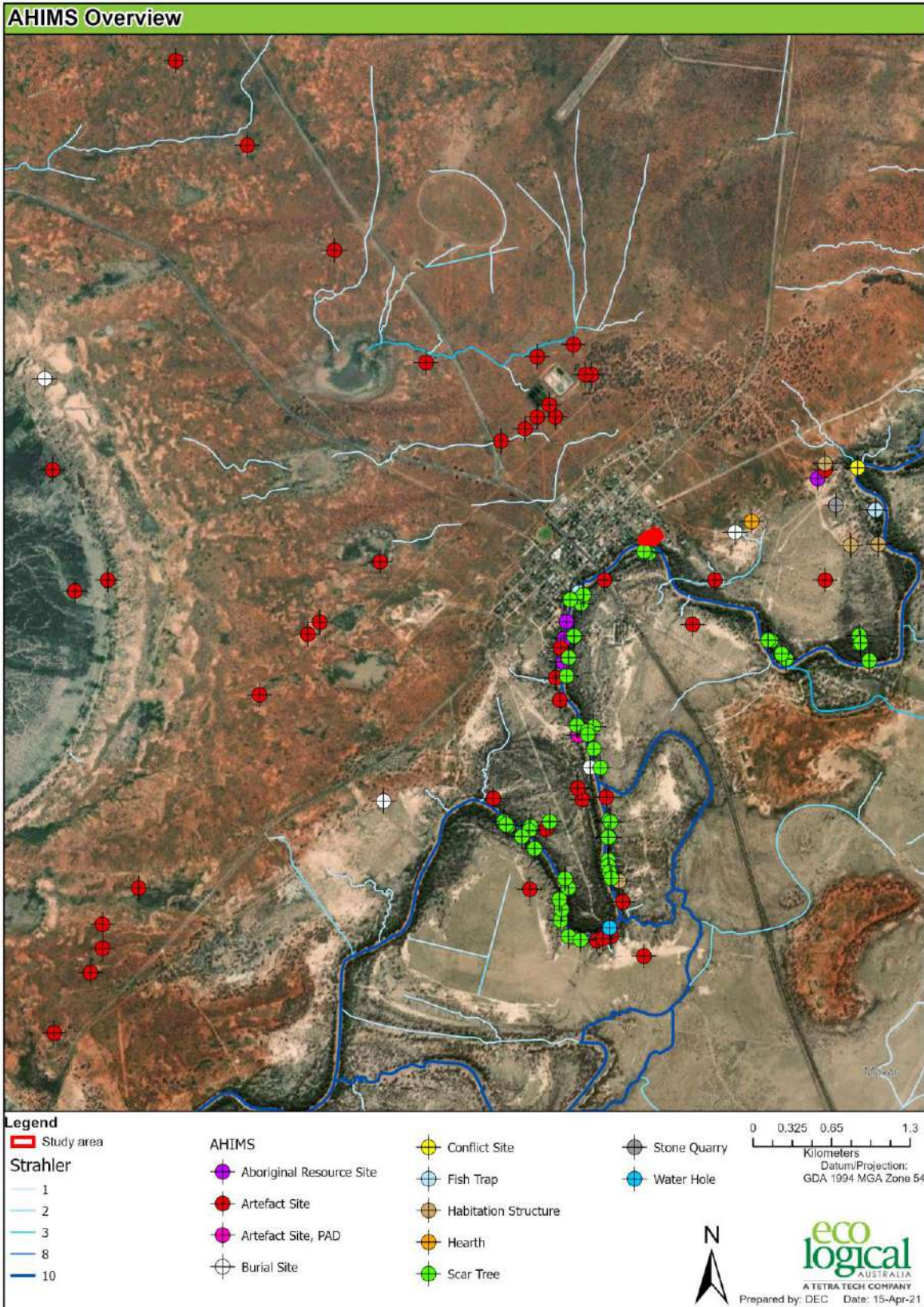


Figure 4: Regional overview of AHIMS sites in the area



Figure 5: Heritage items within the vicinity of the study area

### 3.2.3 Previous archaeological investigation

Only a minor number of surveys and archaeological investigations have occurred in Wilcannia and the Central Darling region over the past forty years, primarily in association with the expansion of infrastructure and water management initiatives. The following reports are most applicable to the current project.

GHD, 2020. *Wilcannia Weir Replacement EIS Scoping Report*. Prepared for Water NSW.

GHD was engaged by Water NSW to undertake an Environmental Impact Statement (EIS) scoping report for the proposed replacement and relocation of the Wilcannia weir. The project includes the deconstruction of the existing weir, located directly south of the current study area within the Darling River, and the construction of the new weir, approximately 5 km downstream of the existing weir. The EIS scoping report included a preliminary assessment of Aboriginal and non-Aboriginal heritage constraints.

In assessing the existing environment, GHD determined the banks of the river to possess high archaeological sensitivity as well as high cultural significance due to both history of Aboriginal occupation along the Darling River and the flora and fauna resources within it. The AHIMS search identified AHIMS ID 24-5-0160 (Union Bend Canoe Tree 3) within close proximity to the proposed new weir site. As the project is a State Significant Development (SSD) and due to the sensitive nature of the project areas, an Aboriginal Cultural Heritage Assessment (ACHA) was recommended for further investigation.

Martin, Sarah, 1987. *Archaeological Survey of a Proposed Route for a 33KV Power Line Between Menindee and Wilcannia*. Prepared for Broken Hill City Council.

Consultant archaeologist Sarah Martin was engaged by Broken Hill City Council to undertake an archaeological survey for the 33kv power line between Menindee and Wilcannia. The purpose of the survey was to locate and record Aboriginal archaeological sites within the proposed power line route, make recommendations for future management of any identified sites and consult with the Wilcannia and Menindee Local Aboriginal Land Councils (LALC) and the Western Regional Aboriginal Land Council. The survey area was divided into eight landform units – Darling River Floodplain, Woytchugga Creek, Sandplain, Sandplain with Linear Dunes, Bonley Creek, Allambie Hills and Dissected Slopes, Paleochannel on Haythorpe Station and Depression near Menindee Lake. The current study area is located within the Darling River Floodplain.

Martin's predictive model found campsites occurring within all landforms in the region, though with much higher concentration within the Darling River floodplains, burials likely to occur in linear dunes adjacent to the floodplain and shell middens within lake lunettes and also along the higher sections of the river bank or within linear dunes and sandplains adjacent to the floodplain. The field survey was partially on foot and partially in a vehicle. The survey identified 74 Aboriginal sites, including 25 camp sites within the sandplain/linear dune landforms (62.5 km surveyed), 15 campsites and one campsite with shell within the floodplain landforms (14.8 km surveyed) and 11 campsites and one quarry site within the Allambie hills and slopes landforms (9.2 km surveyed). The most scientifically significant site recorded during the survey is located on the northern bank of Woytchugga Creek located south of Wilcannia township, which was previously recorded by National Parks and Wildlife. Areas of erosions within the creek bed has revealed lithic artefacts including hand axes and microliths, as well as

fragmented human remains, hearths and mussel shells. This site is likely to contain *in situ* archaeological deposits.

The most common lithic material identified was silcrete, with a silcrete quarry site near Woytchugga Creek. The results of the survey gave evidence that all eight surveyed landforms were utilised at varying degrees by Aboriginal people. The identification of grinding stones is indicative of seed foods as a dietary staple and the identification of heat oven stones suggests kangaroo, emu and fibrous roots were slow cooked over fire in in-ground ovens. Due to the scientific and cultural significance of the sites associated with Woytchugga Creek, the Wilcannia LALC requested one of the power poles be placed 30 m further south to mitigate any damage, and further recommendations were made to restrict access to the during the construction and maintenance process.

Department of Premier and Cabinet, 2020. *Wilcannia Mission Camps and Cultural Places: Aboriginal Place Assessment Report*. Prepared for NSW Department of Premier and Cabinet.

The Department of Premier and Cabinet undertook an Aboriginal Place Assessment Report for the nomination of Wilcannia Mission Camps and Cultural Places as an Aboriginal Place at the request of Wilcannia LALC. The proposed Aboriginal Place is located on the eastern side of the Darling River across from the Wilcannia township to the western side of the river south to Union Bend. The basis of the nomination of Wilcannia Mission Camps and Cultural Places is the demonstration of traditional ways of life including the construction of canoes and coolamons, wooden artefact making, use of aquatic resources such as fish, yabbies and mussels and understanding of the hydrology and ecology of the river, and the traditional knowledge that was directly transferred to the 'historic camping period'.

The placement of historic camps reflects the location of pre-contact campsites, as they were in close proximity to water, amongst the trees and grouped in clusters according to kinship relationships. The relics of the historic camps include domestic and labour-related artefacts, remnant garden plants and hut materials from both modern and traditional materials and methods. The camps also demonstrate early 20<sup>th</sup> century history of NSW and the tenacity of the Aboriginal populations in western NSW. In response to the Tuberculosis epidemic at the Menindee Aboriginal Mission controlled by the Aborigines Welfare Board, Aboriginal families escaped these conditions and sought labour in Wilcannia. Wilcannia Mission Camps and Cultural Places was nominated by the Wilcannia LALC on the rationale that the tangible and intangible evidence of the way of life in the fringe camp was in danger of being lost and that inter-generational teaching needs to be continued into the current and future generations, as well as for the protection and preservation of sites such as canoe trees, coolamon trees, a mound site, middens, lithic artefacts, ovens and historic material remains.

### 3.3 Landscape assessment

A sensitive landscape is an area that has the potential for archaeological material to be present within it. According to the *Due Diligence Code of Practice* (DECCW 2010a), archaeologically sensitive landscapes can include areas:

- Within 200m of waters; or
- Located within a sand dune system; or
- Located on a ridge top, ridge line, headland; or
- Located within 200m below or above a cliff face; or
- Within 20m of or in a cave, rock shelter, or a cave mouth; and is on land that is not disturbed land

The Due Diligence Code of Practice (DECCW 2010a:18) defines disturbed land as areas that have any land that:

*“Has been the subject of a human activity that has changed the land’s surface, being changes that remain clear and observable. Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure) and construction of earthworks.”*

#### 3.3.1 Bioregion

The study area is situated within the Wilcannia Plains subregion of the Darling Riverine Plains bioregion of NSW (Morgan 2001). A summary of the geology, landforms, soils and vegetation typical within this subregion is provided in Table 4 below:

**Table 4: Wilcannia Plains subregion summary (source: NSW Department of Planning, Industry and Environment)**

Wilcannia Plains Subregion	
Geology	Alluvial plains of the mid-Darling valley, confined between the Cobar peneplain and Mulga lands bioregions. Shallow Quaternary alluvial sediments over bedrock.
Characteristic Landforms	Channel and floodplain features. Anabranched streams present feeding valley margin lakes. Limited areas of dunes and sandplains.
Typical Soils	Grey clays from channels to backplains and on lake beds. Red soils and patchy sands probably representing alluvial terraces.
Vegetation	Coolabah, river red gum, river cooba and black box along the channels. Canegrass and lignum in depressions, with saltbush, bluebush and grasses on backplains. Poplar box, belah, rosewood, black bluebush and black box on red soils and valley margins.

#### 3.3.2 Soil Landscapes

Detailed soil landscape assessments have not been undertaken within the study area, however more general regional studies can inform the soil profile and characteristics. The study area is located within the Denian land system (*LSDe*) which is characterised by slightly undulating Quaternary alluvial plains, outwash plains and dunes' transitional between active floodplain and sandplain. Grey cracking clay

occur within floodplains and red and yellow texture contrast soils, calcareous red earths and solonized brown soils within plains. Cracking clay soils tend to heave and settle during periods of wet or dry climates. This cycle of heaving and settling often disturbs any underlying archaeological deposit.

The *Soil Landscapes of Wilcannia 1:250,000 Geological series* (Frenda, 1965) identifies that the study area soil landscape consists of quaternary residual soils (Qrs), characteristic of floodplains, outwash areas and drainage flats of black and red clayey silt and sand. Without approximate soil depths, acidity and erodibility, it is difficult to accurately assess the likelihood of *in situ* archaeological deposits or the survivability of organic matter (Figure 6).

### 3.3.3 Hydrology

The study area is located on the northern bank of the Darling River (*Barka*) (Figure 6). A permanent source of fresh water and a major landscape feature in the region. It would have been a focal point of past Aboriginal occupation.



Figure 6: Soils and hydrology of the study area



### 3.4 Predictive model

An accurate reconstruction of past lifeways, technologies and land-use patterns of pre-colonial Aboriginal people can be flawed as it is often dependant on historical documents written by Europeans who held an ethnocentric bias concerning cultures that they did not fully understand. When possible, Aboriginal oral history is an invaluable resource in understanding the past. Archaeological investigations, in conjunction with both Aboriginal oral history and European documentation, can inform these gaps in our understanding, and in many cases challenge the biased notions proliferated by early colonial accounts.

Dates of the earliest occupation of the continent by Aboriginal people are subject to continued revision as more research is undertaken. The earliest undisputed radiocarbon date from NSW comes from a rock shelter site north of Penrith on the Nepean, known as Shaw's Creek K2, which has been dated to 14,700 +/- 250 BP (Beta 12423) (Attenbrow 2010). The earliest dates in the Western Plains region come from Lake Mungo, which include the oldest human remains ever recorded in Australia and some of the oldest found in the world. The Lower Mungo deposit contains a rich archaeological assemblage including hearths, burnt bones, middens, mollusc shells, human skeletons and stone artefacts. Combined radiocarbon, Uranium-series and Thermoluminescence dating provide evidence of human occupation at Lake Mungo as early as 50-46 000 years ago (Bowler et al. 2003; Hiscock 2008). Within the site, 130 skeletons have been identified, including WLH1 (Willandra Lakes Hominid 1) which is the earliest known human cremation in the world, and WLH3 (Willandra Lakes Hominid 3), also known as "Mungo Man", which is the earliest known burial in Australia. The skeletal remains of Mungo Man were scattered with red ochre, a resource not local to the area suggesting long distance trade (Hiscock 2008).

The study area is located on the traditional lands of the Barkandji people. The *Barka* or *Baaka* (the Darling River) is central to Barkandji cultural identity, lifeways and spirituality as provider of resources and the home of the sacred *Ngatji* (or Rainbow Serpent). The waterways of the Darling River provided the Barkandji with yabbies, fish and mussels. However, the Darling River was a less constant water source than the Murray River and the elaborate and innovative fish traps, fishing equipment and stone dams constructed by Aboriginal groups along the Darling River reflect this resource scarcity (Heritage Office and Department of Urban Affairs and Planning 1996). Along the banks of the Darling River, the flora resources all possessed distinct purposes. The bark of the *Kurkuru* (black box [*Eucalyptus largiflorens*]) was used to construct coolamons and wooden implements and the leaves were burnt for traditional smoking ceremonies. The bark of the *Pamara* or *Kamuru* (river red gum [*Eucalyptus camaldulensis*]) was used to build canoes, the leaves were smoked to create a mosquito repellent and the bark and gum have medicinal uses. *Pulya Pulya* (common reed [*Phragmites australis*]) was melted down to create a resin for mouth seals on didgerdoos, as well as weaving nets and necklaces (Local Land Services Western Region 2016).

Barkandji traditions and practices were irrevocably interrupted with European contact in the 19th century. From 1853, the riverboat trade began along the Murray and Darling Rivers and Wilcannia was an important hub along the trade route. Unlike the more populous settlements further east, the European industries of far west NSW were more dependent on the labour of Aboriginal people as timber getters, timber cutters, shearers, cattlemen and domestic helpers. Typical remuneration was in the form of clothing, food and tobacco (Beckett 1978; Heritage Office and Department of Urban Affairs and

Planning 1996). Historical accounts recall the lawlessness of the Western plains during this time and the harsh realities for the swiftly dwindling Aboriginal population.

*It did not matter who was shot. Every blackfellow that was killed was considered a pest. He would get you as soon as he possibly could... The law at this time could hang a man for killing a blackfellow. But there was nobody to enforce the law if the squatters did not take it into their own hands (Beckett 1978).*

A major consequence of European settlement was the material and cultural dispossession of the Barkandji, however strong oral histories and Aboriginal Knowledge has retained some of these traditions into present day.

Based on the material evidence and range of archaeological sites across the region, it is clear that Aboriginal people have been utilising the land and resources within the Western Plains region for tens of thousands of years. The predictive model outlined in Table 5 below has been developed for the study area based on the AHIMS search results, landscape assessment and regional and local Aboriginal archaeological context outlined above.

**Table 5: Predictive model**

Site Type	Description	Likelihood to occur
Open camp sites/stone artefact scatters/isolated finds	Open camp sites represent past Aboriginal subsistence and stone knapping activities and include archaeological remains such as stone artefacts and hearths. This site type usually appears as surface scatters of stone artefacts in areas where vegetation is limited and ground surface visibility increases.  Isolated finds may represent a single item discard event or be the result of limited stone knapping activity. The presence of such isolated artefacts may indicate the presence of a more extensive, in situ buried archaeological deposit, or a larger deposit obscured by low ground visibility.	Moderate. The AHIMS search and previous investigations suggest open camp sites/stone artefacts scatters to be common site features. The proximity to Darling River and the lack of past land use indicates a moderate likelihood for this site type to occur.
Potential Archaeological Deposit	Potential Archaeological Deposits (or PADs) are areas where there is no surface expression of stone artefacts, but due to a landscape feature there is a strong likelihood that the area will contain buried deposits of stone artefacts.	Low to moderate. Sensitive landforms in areas of low disturbance possess moderate potential for in situ archaeological deposits, however the soil profile may be shallow and the bank eroded.
Scarred or carved trees	Tree bark was utilised by Aboriginal people for various purposes, including the construction of shelters (huts), canoes, paddles, shields, baskets and bowls, fishing lines, cloaks, torches and bedding, as well as being beaten into fibre for string bags or ornaments (sources cited in Attenbrow 2002: 113). Trees may also have been scarred in order to gain access to food resources (e.g. cutting toe-holds so as to climb the tree and catch possums or birds), or to mark locations such as tribal territories. Such scars, when they occur, are typically described as scarred trees.	High. The AHIMS search identified that culturally modified trees are the most common site feature in the vicinity of the study area as tree scarring was practiced by Aboriginal people in Wilcannia well into the 20th century.

Site Type	Description	Likelihood to occur
Axe grinding grooves	Grinding grooves are the physical evidence of tool making or food processing activities undertaken by Aboriginal people. The manual rubbing of stones against other stones creates grooves in the rock; these are usually found on flat areas of abrasive rock such as sandstone.	Low. There are no known grinding grooves in the vicinity. The landform does not possess the characteristics for this site feature.
Bora/ceremonial	Aboriginal ceremonial sites are locations that have spiritual or ceremonial values to Aboriginal people. Aboriginal ceremonial sites may comprise natural landforms and, in some cases, will also have archaeological material. Bora grounds are a ceremonial site type, usually consisting of a cleared area around one or more raised earth circles, and often comprised of two circles of different sizes, connected by a pathway, and accompanied by ground drawings or mouldings of people, animals or deities, and geometrically carved designs on the surrounding trees.	Moderate. Previous assessments have not identified this site type in the area. Bora/ceremonial sites are often informed only by oral history and cultural knowledge.
Burial	Mortuary practices often took place in proximity to camp sites, as most people tended to die in or close to camp and it is difficult to move a body over a long distance. Soft, sandy soils on or close to rivers and creeks allowed for easier removal of earth for burial. Similarly, rock shelters or middens also provided accessible burial places. Burial sites may be marked by stone cairns, modified trees, or a natural landmark. They may also be identified through historic records or oral histories.	Moderate to high. The study area is within the bank of the Darling River within a deep, alluvial soil landscape. The AHIMS search indicates burials to be a common site feature. The study area is located on the opposite river bank of a known Aboriginal camp site/mission.
Contact/historical sites	Artefacts located at such sites may involve the use of introduced materials such as glass or ceramics by Aboriginal people or be sites of Aboriginal occupation in the historical period.	Moderate. Historical artefacts are moderately likely to be found within the study area, namely in association with the historic camps/mission or the riverboat trade.

### 3.5 Visual inspection

A visual inspection of the study area was undertaken by ELA Archaeologist Tyler Beebe 7 April 2021. Visual inspection aimed to identify Aboriginal objects if present and assess the archaeological potential of the study area.

Initial visual inspection identified a significantly disturbed landscape. Disturbances to the study area were a result of the construction, maintenance, and ongoing use of unsealed dirt vehicle tracks, the cutting/scraping and mounding of soils, and the widespread soil erosion caused by those activities.

Despite these disturbances previously unidentified Aboriginal objects were observed across the study area, in addition an Aboriginal scarred tree was found along the shoreline of the Darling River but it has been determined that it is outside the study area and will not be impacted by the proposed works. The artefacts were observed eroding out of the sides and surface of the vehicle tracks, and within the disturbed land adjacent to the track. As a result, these two areas recorded and registered on the AHIMS database as AHIMS #'s 24-5-0220 and 24-5-0221.



Figure 7: disturbed vehicle track



Figure 8: Disturbed vehicle track



Figure 9: soil dumping/mounding on site



Figure 10: Representative selection of Aboriginal artefacts observed within study area (AHIMS site 24-5-0221)



Figure 11: AHIMS site 24-5-0220



Figure 12: Location of site 24-5-0220 along Darling River

### 3.6 Impact avoidance assessment

The proposed wellbeing centre and associated infrastructure will impact the ground surface and Aboriginal sites. In addition to the identified Aboriginal sites (AHIMS ID 24-5-0221 and AHIMS ID 24-5-0220), the landform is sensitive for the presence of further unidentified Aboriginal objects. Previous investigations within the region give evidence for archaeological deposits of high scientific significance within similar landforms. Avoiding impact to the sensitive landforms is not possible under the proposed scope of works.

Although the study area was found to be significantly disturbed by past land use, in accordance with the National Parks and Wildlife NPW) Act 1974 all Aboriginal objects are protected regardless of context, as such further assessment is required in the form of an Aboriginal Cultural Heritage Assessment (ACHA) in order to support an Aboriginal Heritage Impact Permit (AHIP) application prior to any further proposed works.

## 4. Statutory requirements

Aboriginal objects and places in New South Wales are afforded protection under the *National Parks and Wildlife Act 1974* (NPW Act) irrespective of whether they are registered on AHIMS. Strict penalties apply for engaging in activities that inflict harm to an Aboriginal cultural heritage site or object without consent for activities under the NPW Act. Under Part 6 of the NPW Act, consent or authorisation for harmful activities may be given under an AHIP. Should harm be inflicted upon an Aboriginal site or object, there are five defences:

- The harm was authorised under an AHIP;
- The proponent exercised due diligence prior to causing the harm and is able to demonstrate this;
- The harm was caused during activities that complied with a code of practice as described in Part 5 of the *National Parks and Wildlife Regulation 2019* (New South Wales). For example, undertaking archaeological test excavations in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b);
- The harm was caused as part of a low-impact activity or omission under the regulation, and the proponent was not aware of the presence of Aboriginal cultural material; or
- The harm caused during activities that are exempted under Section 87A of the NPW Act. For example, emergency fire-fighting or bushfire hazard reduction work, as defined by the *Rural Fires Act 1997* (New South Wales).

To assess the requirement of an AHIP, Heritage NSW necessitates that an ACHA is prepared in accordance with the *Guide to Investigating, Assessing, and Reporting on Aboriginal Cultural Heritage in New South Wales* (OEH 2011) and the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010a).

These two guides establish a set of guidelines to aid land users in being aware of how their activities could damage Aboriginal cultural heritage sites and advise Archaeologists of the requirements that must be followed during the investigation of Aboriginal cultural heritage sites. If an AHIP is required, Heritage NSW necessitates that it is further supported by a copy of the approval for the development or infrastructure issued under Part 4 or Part 5 of the *Environmental Planning and Assessment Act 1979* in the form of a Development Application or a Review of Environmental Factors.

## 5. Conclusions and Recommendations

### CONCLUSION

The purpose of the Aboriginal heritage due diligence assessment is to identify if there are Aboriginal sites and/or sensitive landforms which may indicate the presence of Aboriginal sites and may therefore require further assessment and approval under Part 6 of the *National Parks and Wildlife Act 1974*. The steps and results of the due diligence assessment are included below.

#### **Step 1: Determine if the activity will disturb the ground surface.**

The proposed wellbeing clinic and associated infrastructure will disturb the ground surface.

#### **Step 2a: Search the AHIMS database and use any other sources of information of which you are already aware.**

ELA has undertaken an extensive search of the AHIMS database maintained by Heritage NSW, the relevant heritage databases (Australian Heritage database, State Heritage Inventory) and reviewed available background reports including

- GHD, 2020. *Wilcannia Weir Replacement EIS Scoping Report*. Prepared for Water NSW.
- Martin, Sarah, 1987. *Archaeological Survey of a Proposed Route for a 33KV Power Line Between Menindee and Wilcannia*. Prepared for Broken Hill City Council.
- Department of Premier and Cabinet, 2020. *Wilcannia Mission Camps and Cultural Places: Aboriginal Place Assessment Report*. Prepared for NSW Department of Premier and Cabinet.

The AHIMS search identified 113 Aboriginal sites and 1 Aboriginal Places being recorded within the 5 km search area surrounding the study area. No AHIMS sites were located within the current study area.

The relevant heritage databases (Australian Heritage database, State Heritage Inventory) did not identify listed historical heritage sites or any items of Aboriginal significance within or adjacent to the study area.

#### **Step 2b: Determine if the activity is in area where landscape features indicate the presence of Aboriginal objects**

The study area is in close proximity to water. While the land has undergone moderate to high ground disturbance, Aboriginal objects were identified.

#### **Step 3: Can you avoid harm to the object or disturbance of the landscape feature?**

Under the current scope of works, harm cannot be avoided to the sensitive landscape features or Aboriginal sites.

#### **Step 4: Desktop assessment and visual inspection**

A desktop assessment did not identify Aboriginal sites or places within the study. The visual inspection was undertaken on 7 April 2021 by Archaeologist Tyler Beebe which identified moderate to high ground disturbance and Aboriginal sites within the study area.

## Step 5: Further investigation and impact assessment

Due to the above assessment, Aboriginal objects have been identified within the study area and the proposed works have potential to impact Aboriginal sites. As such, further assessment will be required.

### RECOMMENDATIONS

Based on the findings of this due diligence and the requirement of the NPW Act the following is recommended.

#### ***Recommendation 1 – ACHA, Aboriginal community consultation and test excavation***

Based on the sensitive nature of the study area and presence of Aboriginal sites, an ACHA should be prepared which would include an impact assessment of the proposed development. The ACHA would entail Aboriginal community consultation following the ‘*Aboriginal cultural heritage consultation requirements for proponents 2010*’ (DECCW 2010) to identify Aboriginal cultural heritage values through consultation with Aboriginal stakeholders.

Further archaeological assessment including detailed field survey with Aboriginal stakeholders should be undertaken to inform archaeological values across the developable area. The ACHA can be prepared in advance of any DA and inform areas of opportunity and constraint for development.

#### ***Recommendation 2 – AHIP application***

The ACHA can be used to support a future AHIP application to Heritage NSW if Aboriginal sites cannot be avoided by future development. Heritage NSW require that AHIP applications are supported by an approval under Part 4 or Part 5 of the *Environmental Planning and Assessment Act 1979* (such as a DA) as a supporting document.

#### ***Recommendation 3 – General measures***

Aboriginal objects are protected under the NPW Act regardless if they are registered on AHIMS or not. If suspected Aboriginal objects, such as stone artefacts are located during future works, works must cease in the affected area and an archaeologist called in to assess the finds. If the finds are found to be Aboriginal objects, Heritage NSW must be notified under section 89A of the NPW Act. Appropriate management and avoidance or approval under a section 90 AHIP should then be sought if Aboriginal objects are to be moved or harmed.

In the extremely unlikely event that human remains are found, works should immediately cease, and the NSW Police should be contacted. If the remains are suspected to be Aboriginal, Heritage NSW may also be contacted at this time to assist in determining appropriate management.



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<https://apps.environment.nsw.gov.au/dpcheritageapp/ViewHeritageItemDetails.aspx?ID=1330085>

State Heritage Inventory, *Wilcannia District Hospital*, accessed 31 March 2021

<https://apps.environment.nsw.gov.au/dpcheritageapp/ViewHeritageItemDetails.aspx?ID=1330074>

## Appendix A AHIMS Search Results

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
24-5-0164	Boblo's Hole Fishing Place	GDA	54	725538	6505150	Open site	Valid	Aboriginal Resource and Gathering : -, Water Hole : -		104416
	<a href="#">Contact</a>							<a href="#">Permits</a>		
24-5-0005	George Dutton's Grave, Wilcannia Cemetery	AGD	54	723929	6503821	Open site	Valid	Burial : -	Burial/s	
	<a href="#">Contact</a>							<a href="#">Permits</a>		
24-5-0006	Wilcannia 01	AGD	54	725757	6505649	Open site	Valid	Artefact : -	Open Camp Site	
	<a href="#">Contact</a>							<a href="#">Permits</a>		
24-5-0007	Wilcannia 02	AGD	54	726671	6505649	Open site	Valid	Artefact : -	Open Camp Site	
	<a href="#">Contact</a>							<a href="#">Permits</a>		
24-5-0008	Wilcannia 03	AGD	54	727585	6505649	Open site	Valid	Artefact : -	Open Camp Site	
	<a href="#">Contact</a>							<a href="#">Permits</a>		
24-5-0009	Wilcannia 04	AGD	54	727585	6506563	Open site	Valid	Artefact : -	Open Camp Site	
	<a href="#">Contact</a>							<a href="#">Permits</a>		
24-5-0014	Wilcannia 06	AGD	54	721370	6505558	Open site	Valid	Artefact : -	Open Camp Site	421
	<a href="#">Contact</a>							<a href="#">Permits</a>		
24-5-0015	Wilcannia 07	AGD	54	721644	6505649	Open site	Valid	Artefact : -	Open Camp Site	421
	<a href="#">Contact</a>							<a href="#">Permits</a>		
24-5-0016	Wilcannia 08	AGD	54	721187	6506563	Open site	Valid	Artefact : -	Open Camp Site	421
	<a href="#">Contact</a>							<a href="#">Permits</a>		
24-5-0118	Wilcannia Common 11;WC11;	AGD	54	723400	6505300	Open site	Valid	Artefact : -	Open Camp Site	1517
	<a href="#">Contact</a>							<a href="#">Permits</a>		
24-5-0119	Wilcannia Common 12;WC12;	AGD	54	723900	6505800	Open site	Valid	Artefact : -	Open Camp Site	1517
	<a href="#">Contact</a>							<a href="#">Permits</a>		
24-5-0082	WP-2;	AGD	54	721400	6510900	Open site	Valid	Artefact : -	Open Camp Site	2020,2021
	<a href="#">Contact</a>							<a href="#">Permits</a>	244	
24-5-0083	WP-3;	AGD	54	721930	6510350	Open site	Valid	Artefact : -	Open Camp Site	2020,2021
	<a href="#">Contact</a>							<a href="#">Permits</a>	244	
24-5-0084	WP-4;	AGD	54	722206	6509950	Open site	Valid	Artefact : -	Open Camp Site	2020,2021
	<a href="#">Contact</a>							<a href="#">Permits</a>	244	
24-5-0085	WP-5;	AGD	54	722800	6509250	Open site	Valid	Artefact : -	Open Camp Site	2020,2021
	<a href="#">Contact</a>							<a href="#">Permits</a>	244	
24-5-0086	WP-6;	AGD	54	723520	6508380	Open site	Valid	Artefact : -	Open Camp Site	2020,2021
	<a href="#">Contact</a>							<a href="#">Permits</a>	244	
24-5-0087	WP-7;Samples 28 - 35;	AGD	54	724280	6507450	Open site	Valid	Artefact : -	Open Camp Site	2020,2021

Report generated by AHIMS Web Service on 17/03/2021 for Charlotte Bradshaw for the following area at Datum :GDA, Zone : 54, Eastings : 721231 - 731231, Northings : 6501215 - 6511215 with a Buffer of 0 meters. Additional Info : ADD. Number of Aboriginal sites and Aboriginal objects found is 113

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## AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 17477 Wilcannia

Client Service ID : 576880

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	<a href="#">Contact</a>	<a href="#">Recorders</a>				E Hunter,Harvey Johnston,Ms.Vanessa Edmonds		<a href="#">Permits</a>	244	
24-5-0088	WS-OS-1 Wilcannia Sewrage Oxidation Ponds	AGD	54	724900	6506800	Open site	Valid	Artefact :-	Open Camp Site	2967
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Central West Archaeological and Heritage Services Pty Ltd		<a href="#">Permits</a>		
24-5-0089	WS-OS-2;Wilcannia Sewrage Oxidation Ponds;	AGD	54	725200	6507000	Open site	Valid	Artefact :-	Open Camp Site	2967
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Central West Archaeological and Heritage Services Pty Ltd		<a href="#">Permits</a>		
24-5-0090	WS-OS-3 Wilcannia Sewrage Oxidation Ponds	AGD	54	725350	6507000	Open site	Valid	Artefact :-	Open Camp Site	2967
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Central West Archaeological and Heritage Services Pty Ltd		<a href="#">Permits</a>		
24-5-0091	WS-OS-4;Wilcannia Sewrage Oxidation Ponds;	AGD	54	725500	6507600	Open site	Valid	Artefact :-	Open Camp Site	2967
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Central West Archaeological and Heritage Services Pty Ltd		<a href="#">Permits</a>		
24-5-0092	WS-M-1 - Wilcannia Sewrage Oxidation Ponds	AGD	54	725100	6506900	Open site	Valid	Earth Mound :-, Shell :-, Artefact :-	Midden	2967
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Central West Archaeological and Heritage Services Pty Ltd		<a href="#">Permits</a>		
24-5-0093	WS-IF-4;Wilcannia Sewrage Oxidation Ponds;	AGD	54	725300	6507100	Open site	Valid	Artefact :-	Isolated Find	2967
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Central West Archaeological and Heritage Services Pty Ltd		<a href="#">Permits</a>		
24-5-0094	WS-IF-1;Wilcannia Sewrage Oxidation Ponds;	AGD	54	725650	6507350	Open site	Valid	Artefact :-	Isolated Find	2967
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Central West Archaeological and Heritage Services Pty Ltd		<a href="#">Permits</a>		
24-5-0095	WS-IF-2;Wilcannia Sewrage Oxidation Ponds;	AGD	54	725600	6507350	Open site	Valid	Artefact :-	Isolated Find	2967
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Central West Archaeological and Heritage Services Pty Ltd		<a href="#">Permits</a>		
24-5-0096	WS-IF-3;Wilcannia Sewrage Oxidation Ponds;	AGD	54	725200	6507500	Open site	Valid	Artefact :-	Isolated Find	2967
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Central West Archaeological and Heritage Services Pty Ltd		<a href="#">Permits</a>		
24-5-0160	Union Bend canoe 3	GDA	54	725268	6503789	Open site	Valid	Modified Tree (Carved or Scarred) :-		104416
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Doctor.Sarah Martin		<a href="#">Permits</a>		
24-5-0146	Steamer Point Island Fishtrap	GDA	54	728123	6506407	Open site	Valid	Fish Trap : 1		
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Doctor.Sarah Martin		<a href="#">Permits</a>		
24-5-0147	Steamer Point, Granny Moysey Camp 1	GDA	54	727917	6506115	Open site	Valid	Habitation Structure : 1, Stone Quarry : 1, Shell : 1, Artefact : 1, Earth Mound : 1		
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Doctor.Sarah Martin		<a href="#">Permits</a>		
24-5-0148	Steamer Point, Granny Moysey Camp 2	GDA	54	727706	6506792	Open site	Valid	Habitation Structure : 1		
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Doctor.Sarah Martin		<a href="#">Permits</a>		
24-5-0149	Steamer Point, Karl Leppard's Camp	GDA	54	728148	6506124	Open site	Valid	Habitation Structure : 1		
	<a href="#">Contact</a>	<a href="#">Recorders</a>				Doctor.Sarah Martin		<a href="#">Permits</a>		

Report generated by AHIMS Web Service on 17/03/2021 for Charlotte Bradshaw for the following area at Datum :GDA, Zone : 54, Eastings : 721231 - 731231, Northings : 6501215 - 6511215 with a Buffer of 0 meters. Additional Info : ADD. Number of Aboriginal sites and Aboriginal objects found is 113

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## AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 17477 Wilcannia

Client Service ID : 576880

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
24-5-0150	Steamer Point Mukirili Tree	GDA	54	727645	6506669	Open site	Valid	Aboriginal Resource and Gathering : 1		
	<u>Contact</u>							<u>Recorders</u> Doctor.Sarah Martin		<u>Permits</u>
24-5-0144	Steamer Point 1	GDA	54	727795	6506448	Open site	Valid	Stone Arrangement : 1, Stone Quarry : 2		
	<u>Contact</u>							<u>Recorders</u> Doctor.Sarah Martin		<u>Permits</u>
24-5-0145	Steamer Point - Where the Ngatyj sunk the Steamer.	GDA	54	727974	6506757	Open site	Valid	Conflict : 1		
	<u>Contact</u>							<u>Recorders</u> Doctor.Sarah Martin		<u>Permits</u>
24-5-0165	Johnny Bates canoe tree 2	GDA	54	725790	6504431	Open site	Valid	Modified Tree (Carved or Scarred) :		104416
	<u>Contact</u>							<u>Recorders</u> Doctor.Sarah Martin		<u>Permits</u>
24-5-0166	Lynette's Camp and root anvils	GDA	54	725999	6503338	Open site	Valid	Habitation Structure : -, Modified Tree (Carved or Scarred) :		104416
	<u>Contact</u>							<u>Recorders</u> Doctor.Sarah Martin		<u>Permits</u>
24-5-0167	Wilcannia Weir Fishtrap	GDA	54	726228	6506123	Open site	Valid	Fish Trap : 1		
	<u>Contact</u>							<u>Recorders</u> Ms.Jodielyn Edge		<u>Permits</u>
24-5-0136	Union Bend 1;	AGD	54	725640	6504100	Open site	Valid	Burial : -, Modified Tree (Carved or Scarred) :-	Burial/s,Scarred Tree	104416
	<u>Contact</u>							<u>Recorders</u> Badger Bates,Mark Sutton		<u>Permits</u>
24-5-0156	Johnny Bates canoe tree 1	GDA	54	725921	6503697	Open site	Valid	Modified Tree (Carved or Scarred) :		104416
	<u>Contact</u>							<u>Recorders</u> Doctor.Sarah Martin		<u>Permits</u>
24-5-0157	Dunny Canoe Tree	GDA	54	725582	6505185	Open site	Valid	Modified Tree (Carved or Scarred) :		104416
	<u>Contact</u>							<u>Recorders</u> Doctor.Sarah Martin		<u>Permits</u>
24-5-0158	Granny Moysey Canoe Tree	GDA	54	725580	6503280	Open site	Valid	Modified Tree (Carved or Scarred) :		104416
	<u>Contact</u>							<u>Recorders</u> Doctor.Sarah Martin		<u>Permits</u>
24-5-0159	Union Bend Ngatji Waterhole	GDA	54	725921	6502949	Open site	Valid	Water Hole : -		104416
	<u>Contact</u>							<u>Recorders</u> Doctor.Sarah Martin		<u>Permits</u>

Report generated by AHIMS Web Service on 17/03/2021 for Charlotte Bradshaw for the following area at Datum :GDA, Zone : 54, Eastings : 721231 - 731231, Northings : 6501215 - 6511215 with a Buffer of 0 meters. Additional Info : ADD, Number of Aboriginal sites and Aboriginal objects found is 113

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## AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 17477 Wilcannia

Client Service ID : 576880

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
24-5-0151	Mission river camp canoe tree	GDA	54	725627	6505364	Open site	Valid	Modified Tree (Carved or Scarred) :		104416
	<u>Contact</u>									
	<u>Recorders</u>	Doctor.Sarah Martin							<u>Permits</u>	
24-5-0152	Karntja Kate coolamon tree	GDA	54	725786	6504616	Open site	Valid	Modified Tree (Carved or Scarred) :		104416
	<u>Contact</u>									
	<u>Recorders</u>	Doctor.Sarah Martin							<u>Permits</u>	
24-5-0153	Wilcannia Cemetery bend mound	GDA	54	724960	6504020	Open site	Valid	Artefact :- , Earth Mound :- , Shell :-		104416
	<u>Contact</u>									
	<u>Recorders</u>	Doctor.Sarah Martin							<u>Permits</u>	
24-5-0155	River Camp canoe tree 2	GDA	54	725685	6505634	Open site	Valid	Modified Tree (Carved or Scarred) :		104416
	<u>Contact</u>									
	<u>Recorders</u>	Doctor.Sarah Martin							<u>Permits</u>	
24-5-0185	Old Wilcannia Weir Canoe Tree 3	GDA	54	726245	6506050	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<u>Contact</u>									
	<u>Recorders</u>	Mr.Douglas Williams,Access Archaeology & Heritage							<u>Permits</u>	
24-5-0186	Old Wilcannia Weir Canoe Tree 2	GDA	54	726220	6506060	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<u>Contact</u>									
	<u>Recorders</u>	Mr.Douglas Williams,Access Archaeology & Heritage							<u>Permits</u>	
24-5-0187	Old Wilcannia Weir Canoe Tree 1	GDA	54	726205	6506065	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<u>Contact</u>									
	<u>Recorders</u>	Mr.Douglas Williams,Access Archaeology & Heritage							<u>Permits</u>	
24-5-0188	Wilcannia Coolemon Tree 1	GDA	54	725705	6505705	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<u>Contact</u>									
	<u>Recorders</u>	Mr.Douglas Williams,Access Archaeology & Heritage							<u>Permits</u>	
24-5-0189	Wilcannia Canoe Tree 1	GDA	54	725595	6505665	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<u>Contact</u>									
	<u>Recorders</u>	Mr.Douglas Williams,Access Archaeology & Heritage							<u>Permits</u>	
24-5-0190	Union Bend Coolamon Tree 15	GDA	54	725650	6504625	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<u>Contact</u>									
	<u>Recorders</u>	Mr.Douglas Williams,Access Archaeology & Heritage							<u>Permits</u>	

Report generated by AHIMS Web Service on 17/03/2021 for Charlotte Bradshaw for the following area at Datum :GDA, Zone : 54, Eastings : 721231 - 731231, Northings : 6501215 - 6511215 with a Buffer of 0 meters. Additional Info : ADD. Number of Aboriginal sites and Aboriginal objects found is 113

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**AHIMS Web Services (AWS)**  
Extensive search - Site list report

Your Ref/PO Number : 17477 Wilcannia

Client Service ID : 576880

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
24-5-0191	Union Bend Coolamon Tree 14	GDA	54	725740	6504580	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									<a href="#">Recorders</a> Mr.Douglas Williams,Access Archaeology & Heritage
24-5-0192	Union Bend Coolamon Tree 13	GDA	54	725740	6504550	Open site	Valid	Modified Tree (Carved or Scarred) :		<a href="#">Permits</a>
	<a href="#">Contact</a>									<a href="#">Recorders</a> Mr.Douglas Williams,Access Archaeology & Heritage
24-5-0193	Union Bend Toehold Tree 1	GDA	54	725845	6504275	Open site	Valid	Modified Tree (Carved or Scarred) :		<a href="#">Permits</a>
	<a href="#">Contact</a>									<a href="#">Recorders</a> Mr.Douglas Williams,Access Archaeology & Heritage
24-5-0194	Union Bend Canoe Tree 10	GDA	54	725915	6503840	Open site	Valid	Modified Tree (Carved or Scarred) :		<a href="#">Permits</a>
	<a href="#">Contact</a>									<a href="#">Recorders</a> Mr.Douglas Williams,Access Archaeology & Heritage
24-5-0195	Union Bend Coolamon Tree 12	GDA	54	725930	6503825	Open site	Valid	Modified Tree (Carved or Scarred) :		<a href="#">Permits</a>
	<a href="#">Contact</a>									<a href="#">Recorders</a> Mr.Douglas Williams,Access Archaeology & Heritage
24-5-0196	Union Bend Coolamon Tree 11	GDA	54	725910	6503700	Open site	Valid	Modified Tree (Carved or Scarred) :		<a href="#">Permits</a>
	<a href="#">Contact</a>									<a href="#">Recorders</a> Mr.Douglas Williams,Access Archaeology & Heritage
24-5-0197	Union Bend Coolamon Tree 10	GDA	54	725910	6503510	Open site	Valid	Modified Tree (Carved or Scarred) :		<a href="#">Permits</a>
	<a href="#">Contact</a>									<a href="#">Recorders</a> Mr.Douglas Williams,Access Archaeology & Heritage
24-5-0198	Union Bend Coolamon Tree 9	GDA	54	725910	6503465	Open site	Valid	Modified Tree (Carved or Scarred) :		<a href="#">Permits</a>
	<a href="#">Contact</a>									<a href="#">Recorders</a> Mr.Douglas Williams,Access Archaeology & Heritage
24-5-0199	Union Bend Canoe Tree 9	GDA	54	725920	6503410	Open site	Valid	Modified Tree (Carved or Scarred) :		<a href="#">Permits</a>
	<a href="#">Contact</a>									<a href="#">Recorders</a> Mr.Douglas Williams,Access Archaeology & Heritage
24-5-0200	Union Bend Canoe Tree 8	GDA	54	725935	6503360	Open site	Valid	Modified Tree (Carved or Scarred) :		<a href="#">Permits</a>
	<a href="#">Contact</a>									<a href="#">Recorders</a> Mr.Douglas Williams,Access Archaeology & Heritage

Report generated by AHIMS Web Service on 17/03/2021 for Charlotte Bradshaw for the following area at Datum :GDA, Zone : 54, Eastings : 721231 - 731231, Northings : 6501215 - 6511215 with a Buffer of 0 meters. Additional Info : ADD. Number of Aboriginal sites and Aboriginal objects found is 113  
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## AHIMS Web Services (AWS)

### Extensive search - Site list report

Your Ref/PO Number : 17477 Wilcannia

Client Service ID : 576880

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
24-5-0201	Union Bend Coolamon Tree 5	GDA	54	725515	6503015	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0202	Union Bend Coolamon Tree 6	GDA	54	725515	6503010	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0203	Union Bend Coolamon Tree 7	GDA	54	725580	6502880	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0217	Wowser bend canoe 6	GDA	54	727256	6505325	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0218	Wowser Bend Canoe 7	GDA	54	727988	6505367	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0219	Wilcannia golf course 1	GDA	54	727098	6506312	Open site	Valid	Hearth : -		
	<a href="#">Contact</a>									
24-5-0204	Union Bend Coolamon Tree 8	GDA	54	725680	6502850	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0205	Union Bend Coolamon Tree 4	GDA	54	725525	6503100	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0206	Union Bend Coolamon Tree 3	GDA	54	725505	6503185	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0207	Union Bend Coolamon tree 2	GDA	54	725425	6503830	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									

Report generated by AHIMS Web Service on 17/03/2021 for Charlotte Bradshaw for the following area at Datum :GDA, Zone : 54, Eastings : 721231 - 731231, Northings : 6501215 - 6511215 with a Buffer of 0 meters. Additional Info : ADD. Number of Aboriginal sites and Aboriginal objects found is 113

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**AHIMS Web Services (AWS)**  
Extensive search - Site list report

Your Ref/PO Number : 17477 Wilcannia

Client Service ID : 576880

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
24-5-0208	Union Bend Canoe Tree 7	GDA	54	725255	6503755	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0209	Union Bend Canoe Tree 6	GDA	54	725300	6503605	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0210	Union Bend Coolamon Tree 1	GDA	54	725195	6503705	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0211	Union Bend Canoe Tree 5	GDA	54	725080	6503795	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0212	Union Bend Canoe Tree 4	GDA	54	725045	6503830	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0213	South Wilcannia 2	GDA	54	725515	6505265	Open site	Valid	Artefact :-		
	<a href="#">Contact</a>									
24-5-0215	Union Bend Canoe Tree 11	GDA	54	725065	6503805	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0216	Union Bend Coolamon Tree 16	GDA	54	725565	6505035	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<a href="#">Contact</a>									
24-5-0214	Wilcannia Mission AP 6d	GDA	54	725895	6504030	Open site	Valid	Artefact :- , Hearth :-		
	<a href="#">Contact</a>									
24-5-0183	South Wilcannia 1	GDA	54	725475	6505020	Open site	Valid	Artefact :-		
	<a href="#">Contact</a>									
24-5-0184	Union Bend Brick Clamp	GDA	54	725510	6504835	Open site	Valid	Artefact :-		
	<a href="#">Contact</a>									
24-5-0111	Wilcannia Common 2;WC2;	AGD	54	721200	6501900	Open site	Valid	Artefact :-	Open Camp Site	1517
	<a href="#">Contact</a>									

Report generated by AHIMS Web Service on 17/03/2021 for Charlotte Bradshaw for the following area at Datum :GDA, Zone : 54, Eastings : 721231 - 731231, Northings : 6501215 - 6511215 with a Buffer of 0 meters. Additional Info : ADD. Number of Aboriginal sites and Aboriginal objects found is 113  
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## AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 17477 Wilcannia

Client Service ID : 576880

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
24-5-0112	Wilcannia Common 4;WC4; <a href="#">Contact</a>	AGD	54	721500	6502400	Open site	Valid	Artefact : -	Open Camp Site	1517
24-5-0113	Wilcannia Common 5;WC5; <a href="#">Contact</a>	AGD	54	721600	6502600	Open site	Valid	Artefact : -	Open Camp Site	1517
24-5-0114	Wilcannia Common 6;WC6; <a href="#">Contact</a>	AGD	54	721600	6502800	Open site	Valid	Artefact : -	Open Camp Site	1517
24-5-0115	Wilcannia Common 8;WC8; <a href="#">Contact</a>	AGD	54	721900	6503100	Open site	Valid	Artefact : -	Open Camp Site	1517
24-5-0116	Wilcannia Common 9;WC9; <a href="#">Contact</a>	AGD	54	722900	6504700	Open site	Valid	Artefact : -	Open Camp Site	1517
24-5-0117	Wilcannia Common 10;WC10; <a href="#">Contact</a>	AGD	54	723300	6505200	Open site	Valid	Artefact : -	Open Camp Site	1517
24-5-0022	White Sandy Hill Wilcannia <a href="#">Contact</a>	AGD	54	726488	6505283	Open site	Valid	Artefact : -, Burial : -	Burial/s,Open Camp Site	
24-5-0023	Union Bend Wilcannia <a href="#">Contact</a>	GDA	54	725552	6503356	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	104416
24-5-0029	Wowser's Bend, Steamers Point, Wilcannia <a href="#">Contact</a>	GDA	54	727234	6505330	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
24-5-0161	Rocky crossing/fish trap <a href="#">Contact</a>	GDA	54	725666	6505725	Open site	Valid	Fish Trap : -		104416
24-5-0162	Springs and ochre site <a href="#">Contact</a>	GDA	54	725564	6505482	Open site	Valid	Aboriginal Resource and Gathering : -, Aboriginal Ceremony and Dreaming : -, Ochre Quarry : -, Water Hole : -		104416
24-5-0163	Springs and stony bank <a href="#">Contact</a>	GDA	54	725548	6505341	Open site	Valid	Aboriginal Resource and Gathering : -, Aboriginal Ceremony and Dreaming : -, Water Hole : -		104416

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Your Ref/PO Number : 17477 Wilcannia

Client Service ID : 576880

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
24-5-0138	wilcannia golf course burial site <b>Contact</b> Mr.Gerald Quayl	AGD	54	726838	6506045	Open site	Valid	Burial : 20 <b>Permits</b>		
24-5-0140	woytchugga lake exposed burial site 2 <b>Contact</b> Badger Bates	AGD	54	721121	6507316	Open site	Valid	Burial : 15 <b>Permits</b>		
24-5-0141	steamers point scared tree (3) <b>Contact</b> Gerry Saals	AGD	54	727950	6504982	Open site	Valid	Modified Tree (Carved or Scarred) : 3 <b>Permits</b>		
24-5-0179	Wilcannia Mission AP 5 <b>Contact</b>	GDA	54	726030	6503165	Open site	Valid	Artefact : -, Hearth : - <b>Permits</b>		
24-5-0180	Wilcannia Mission AP 4 <b>Contact</b>	GDA	54	726205	6502715	Open site	Valid	Artefact : - <b>Permits</b>		
24-5-0181	Wilcannia Mission AP 3 <b>Contact</b>	GDA	54	725935	6502880	Open site	Valid	Artefact : - <b>Permits</b>		
24-5-0182	Wilcannia Mission AP 2 <b>Contact</b>	GDA	54	725865	6502860	Open site	Valid	Artefact : -, Shell : - <b>Permits</b>		
24-5-0175	Wilcannia Mission AP IF 1 <b>Contact</b>	GDA	54	725815	6502845	Open site	Valid	Artefact : - <b>Permits</b>		
24-5-0176	Wilcannia New Weir 1 <b>Contact</b>	GDA	54	725260	6503270	Open site	Valid	Artefact : -, Hearth : - <b>Permits</b>		
24-5-0177	Wilcannia New Weir 2 <b>Contact</b>	GDA	54	725395	6503765	Open site	Valid	Artefact : -, Hearth : - <b>Permits</b>		
24-5-0178	Wilcannia Mission AP 1 <b>Contact</b>	GDA	54	725515	6503150	Open site	Valid	Artefact : -, Hearth : -, Shell : - <b>Permits</b>		
24-5-0172	Wowser Bend Canoe 4 <b>Contact</b>	GDA	54	727999	6505306	Open site	Valid	Modified Tree (Carved or Scarred) : - <b>Permits</b>		
24-5-0173	Wowser Bend/Iron Pole 3 <b>Contact</b>	GDA	54	727382	6505177	Open site	Valid	Modified Tree (Carved or Scarred) : - <b>Permits</b>		
24-5-0174	Wowser Bend/Iron Pole 2 <b>Contact</b>	GDA	54	727344	6505217	Open site	Valid	Modified Tree (Carved or Scarred) : - <b>Permits</b>		

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**AHIMS Web Services (AWS)**  
 Extensive search - Site list report

Your Ref/PO Number : 17477 Wilcannia

Client Service ID : 576880

<u>SiteID</u>	<u>SiteName</u>	<u>Datum</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>	<u>Context</u>	<u>Site Status</u>	<u>SiteFeatures</u>	<u>SiteTypes</u>	<u>Reports</u>
24-5-0168	Union Bend Midden & Brown Family hut	GDA	54	725662	6504544	Open site	Valid	Artefact : -, Habitation Structure : -, Hearth : -, Potential Archaeological Deposit (PAD) : -, Shell : -		
	<u>Contact</u>	<u>Recorders</u>	Doctor.Sarah Martin,Mr.Douglas Williams,Access Archaeology & Heritage					<u>Permits</u>		
24-5-0169	Union Bend Traditional camp 183	GDA	54	725657	6504107	Open site	Valid	Artefact : -, Hearth : -, Shell : -		
	<u>Contact</u>	<u>Recorders</u>	Doctor.Sarah Martin					<u>Permits</u>		
24-5-0170	Union Bend Traditional Camps 184	GDA	54	725694	6504012	Open site	Valid	Artefact : -, Hearth : -		
	<u>Contact</u>	<u>Recorders</u>	Doctor.Sarah Martin					<u>Permits</u>		

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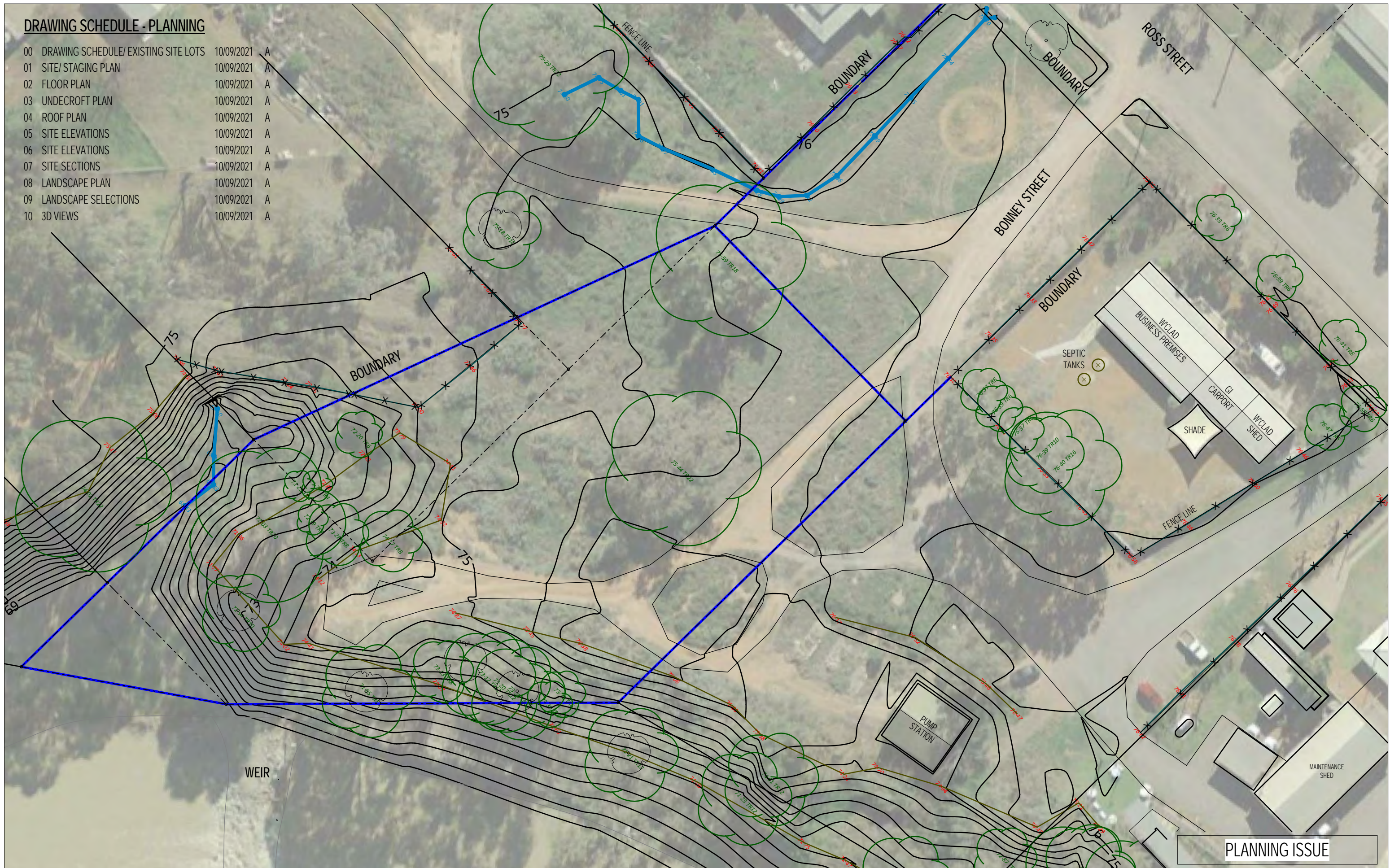
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## Appendix H - Development Plans

**DRAWING SCHEDULE - PLANNING**

00	DRAWING SCHEDULE/ EXISTING SITE LOTS	10/09/2021	A
01	SITE/ STAGING PLAN	10/09/2021	A
02	FLOOR PLAN	10/09/2021	A
03	UNDECROFT PLAN	10/09/2021	A
04	ROOF PLAN	10/09/2021	A
05	SITE ELEVATIONS	10/09/2021	A
06	SITE ELEVATIONS	10/09/2021	A
07	SITE SECTIONS	10/09/2021	A
08	LANDSCAPE PLAN	10/09/2021	A
09	LANDSCAPE SELECTIONS	10/09/2021	A
10	3D VIEWS	10/09/2021	A



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**MAARI MA WILCANNIA  
 WELLBEING CENTRE**  
 BONNEY STREET WILCANNIA  
 FOR MAARI MA ABORIGINAL HEALTH

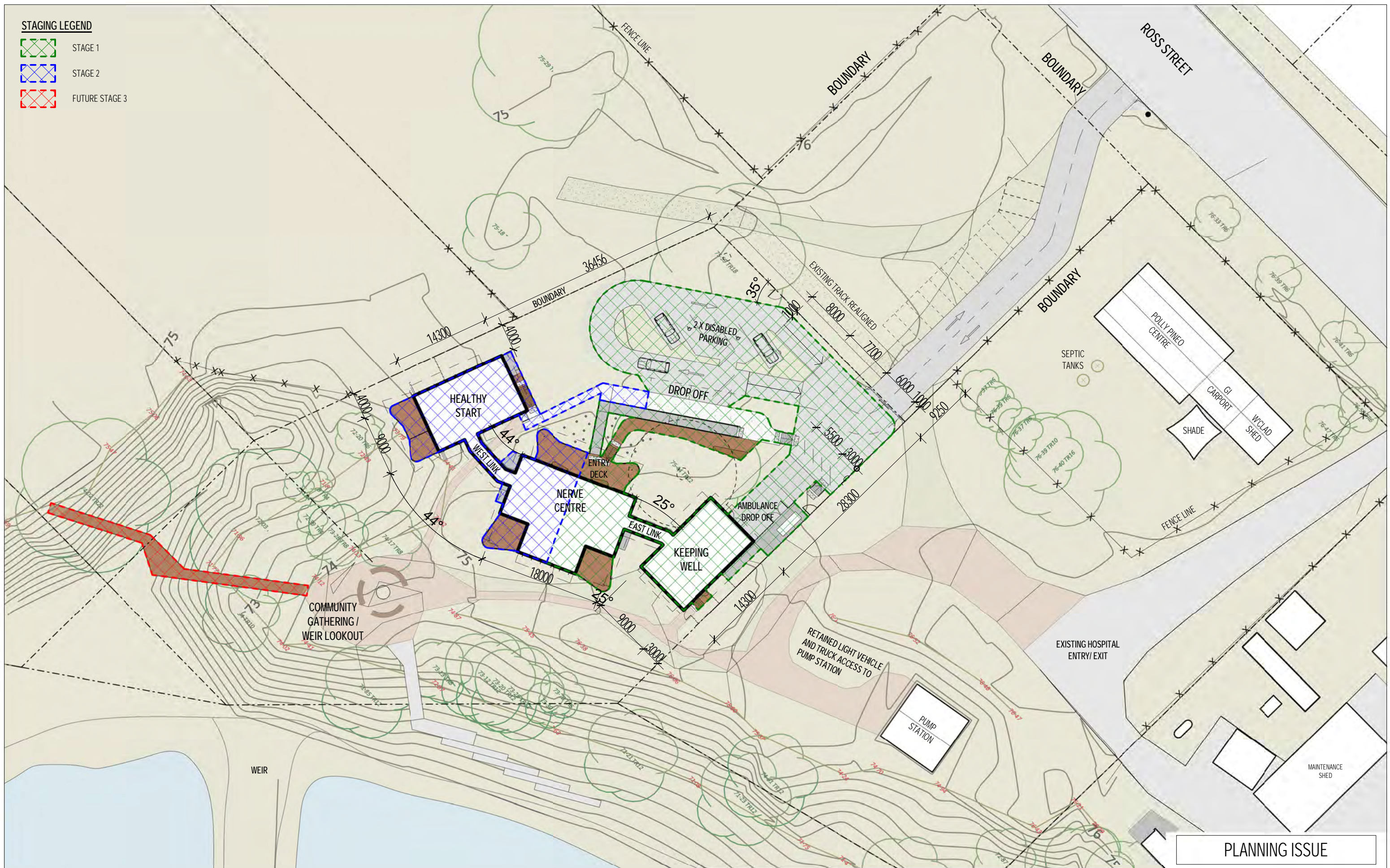
**DRAWING SCHEDULE/ EXISTING  
 SITE LOTS**

ISSUE	DATE	AMENDMENT
A	05.10.2021	PLANNING ISSUE

Job No:	480	Issue:	A
Scale:	1 : 500 @ A3	Dwg No:	00
Issue Date:	05.10.2021	Drawn:	ML
Checked:	AOL		

**STAGING LEGEND**

- STAGE 1
- STAGE 2
- FUTURE STAGE 3

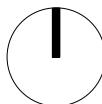


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



**SITE/ STAGING PLAN**

ISSUE	DATE	AMENDMENT
A	05.10.2021	PLANNING ISSUE

Job No:	480	Issue:	A
Scale:	As indicated @ A3	Dwg No:	01
Issue Date:	05.10.2021	Drawn:	ML
		Checked:	AOL



**LEGEND**

-  PEDESTRIAN ZONE/ CROSSING LINEMARKING TO MEET ASS RELEVANT STANDARDS
-  TACTILE INDICATORS AS SPEC. TO COMPLY WITH AS 1428
-  1800 CYCLONE FENCING
-  RWT RAINWATER TANKS LOCATED UNDER BUILDINGS. REFER TO CIVIL ENGINEERS DOCS FOR SIZES

**ROOM LEGEND**

1. TREATMENT ROOM
2. CONSULT ROOM
3. MEETING ROOM
4. BACKUP GENERATOR
5. CLEANER/ STORE
6. MENTAL HEALTH ROOM
7. PATIENT/ DISABLED TOILET
8. AIRLOCK
9. RECEPTION
10. NURSING MANAGERS OFFICE
11. STAFF OPEN PLAN OFFICE
12. STAFF LOCKERS
13. HEALTHY START WAITING DECK
14. KEEPING WELL WAITING DECK
15. SERVER CABINET
16. PRAM/ GOPHER PARK
17. STAFF TOILETS
18. STAFF ROOM/ DECK
19. MEETING ROOM
20. PLANT PLATFORM
21. BENCH
22. SCULPTURE GARDEN
23. RIVER VIEW DECK

**NERVE CENTRE (4 MODULES)**  
 ENCLOSED: 200.57 m<sup>2</sup>  
 WAITING DECKS: 56.58 m<sup>2</sup>  
 COMBINED: 257.15m<sup>2</sup>

**KEEPING WELL (2 MODULES)**  
 ENCLOSED: 130.71 m<sup>2</sup>

**HEALTHY START (2 MODULES)**  
 ENCLOSED: 130.71 m<sup>2</sup>  
 RIVER FRONT DECK: 32.90 m<sup>2</sup>  
 COMBINED: 163.61m<sup>2</sup>

**WEST LINK**  
 ENCLOSED: 19.46m<sup>2</sup>

**EAST LINK**  
 ENCLOSED 14.25m<sup>2</sup>

**TOTAL ENCLOSED AREA: 495.70m<sup>2</sup>**

- ENTRY DECK: 59.91 m<sup>2</sup>
- ENTRY RAMP/ STAIR: 48.65 m<sup>2</sup>
- GARDEN DECK: 54.82 m<sup>2</sup>
- AMBULANCE RAMP/ PLANT 95 m<sup>2</sup>
- AMBULANCE TURNING APRON: 185 m<sup>2</sup>
- PARKING LOOP/ DROP OFF: 383 m<sup>2</sup>
- BONNEY STREET ENTRY EXIT: 370 m<sup>2</sup>

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



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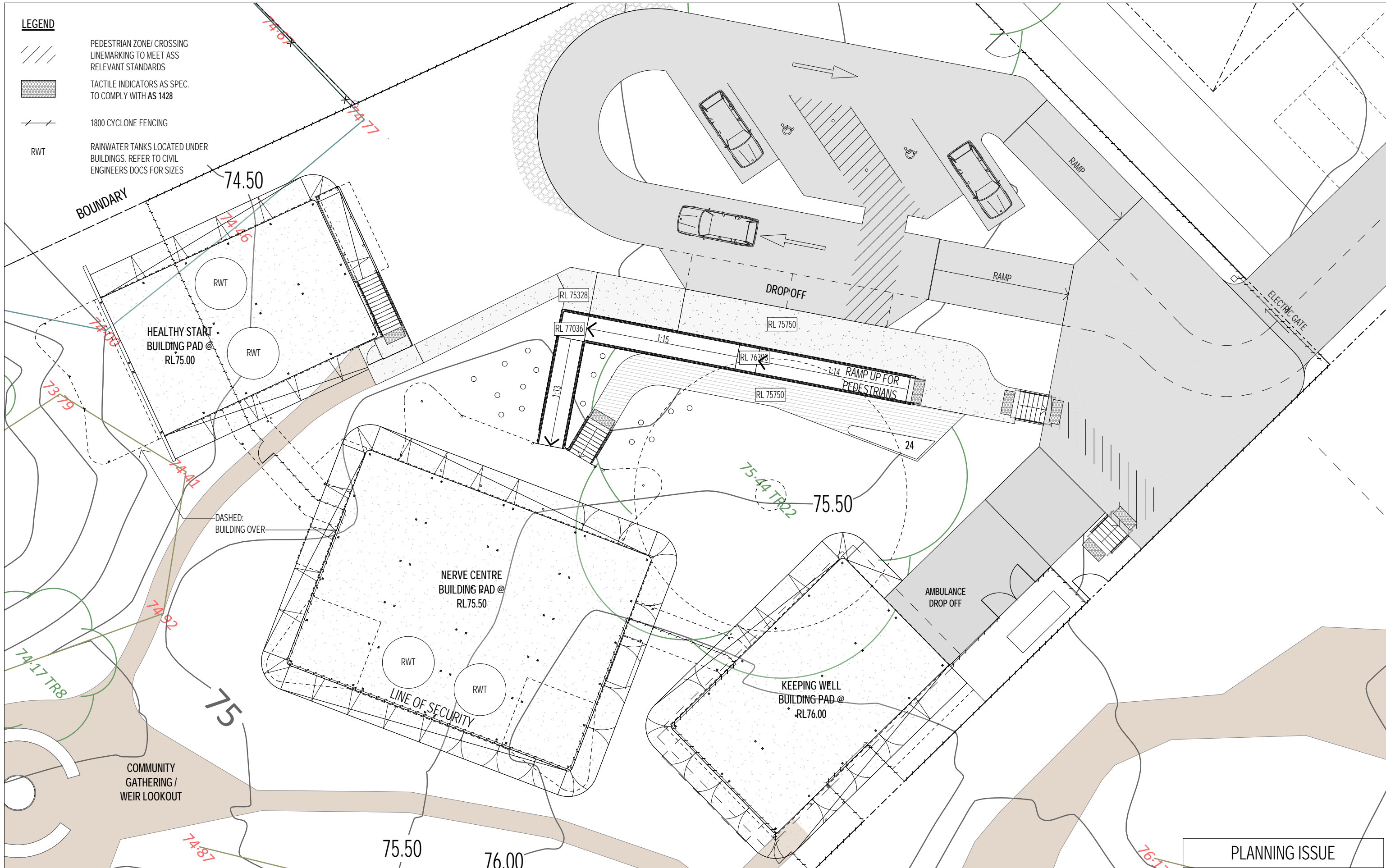
**FLOOR PLAN**

ISSUE	DATE	AMENDMENT
A	05.10.2021	PLANNING ISSUE

Job No:	480	Issue:	A
Scale:	As indicated @ A3	Dwg No:	02
Issue Date:	05.10.2021	Drawn:	ML
		Checked:	AOL

**LEGEND**

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-  1800 CYCLONE FENCING
-  RWT RAINWATER TANKS LOCATED UNDER BUILDINGS. REFER TO CIVIL ENGINEERS DOCS FOR SIZES

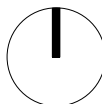


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**UNDECROFT PLAN**

ISSUE	DATE	AMENDMENT
A	05.10.2021	PLANNING ISSUE

Job No:	480	Issue:	A
Scale:	As indicated @ A3	Dwg No:	03
Issue Date:	05.10.2021	Drawn:	ML
		Checked:	AOL

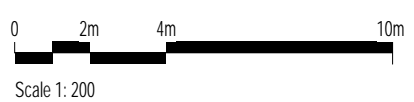


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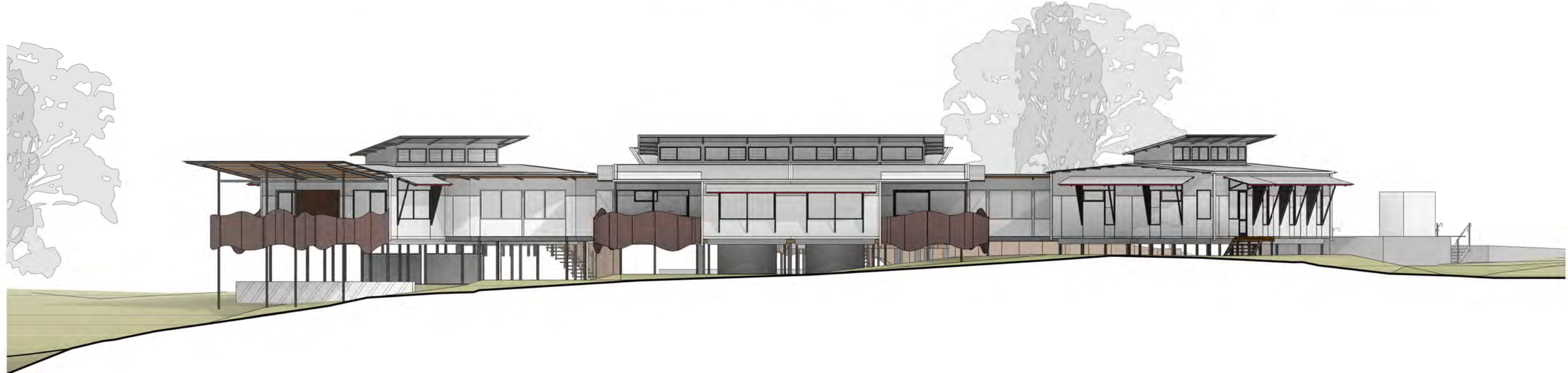
**ROOF PLAN**

ISSUE	DATE	AMENDMENT
A	05.10.2021	PLANNING ISSUE

Job No:	480	Issue:	A
Scale:	1 : 200 @ A3	Dwg No:	04
Issue Date:	05.10.2021	Drawn:	ML
		Checked:	AOL



**NORTH SITE ELEVATION**



**SOUTH SITE ELEVATION**

ROOF/ WALL SHEETING:  
'DUNE' CUSTOM ORB  
TRIMS IN 'DUNE'

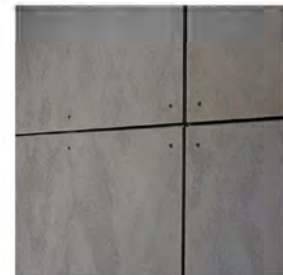
WALL SHEETING:  
FIBRE CEMENT SHEETING

SHADING SCREENS/ BALUSTRADES:  
LASER CUT CORTEN SHEETS

DECKING:  
CYPRESS PINE

DECKING:  
FRP MESH

ROOF EQUIPMENT:  
SOLAR PANELS



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BONNEY STREET WILCANNIA

FOR MAARI MA ABORIGINAL HEALTH

**SITE ELEVATIONS**

			Job No: 480	Issue: A
			Scale: 1 : 200 @ A3	
			Issue Date: 05.10.2021	Dwg No: 05
A	05.10.2021	PLANNING ISSUE	Drawn: ML	Checked: AOL
ISSUE	DATE	AMENDMENT		



**EASTSITE ELEVATION**



**WEST SITE ELEVATION**

ROOF/ WALL SHEETING:  
'DUNE' CUSTOM ORB  
TRIMS IN 'DUNE'

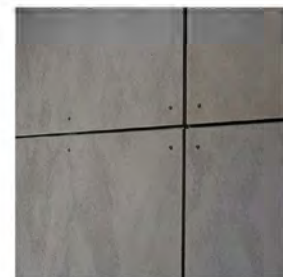
WALL SHEETING:  
FIBRE CEMENT SHEETING

SHADING SCREENS/ BALUSTRADES:  
LASER CUT CORTEN SHEETS

DECKING:  
CYPRESS PINE

DECKING:  
FRP MESH

ROOF EQUIPMENT:  
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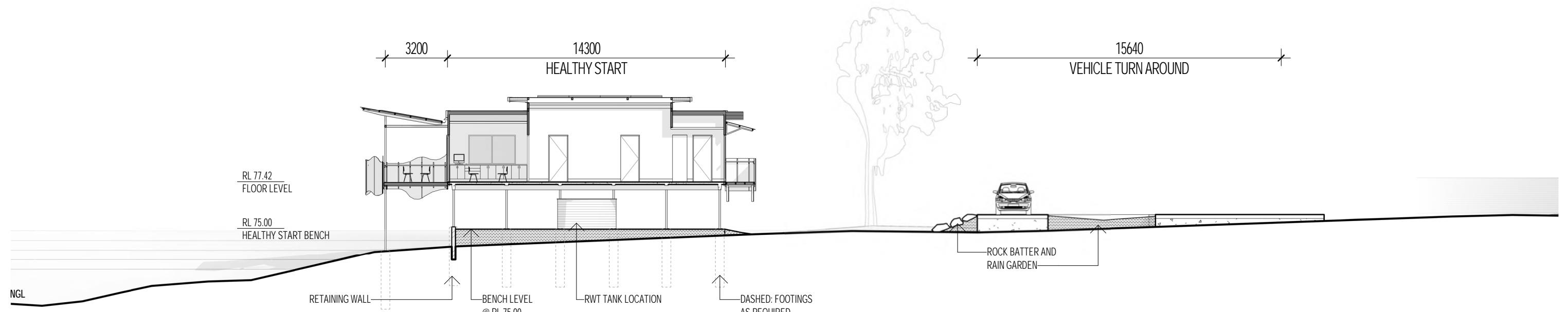
**MAARI MA WILCANNIA  
WELLBEING CENTRE**

BONNEY STREET WILCANNIA

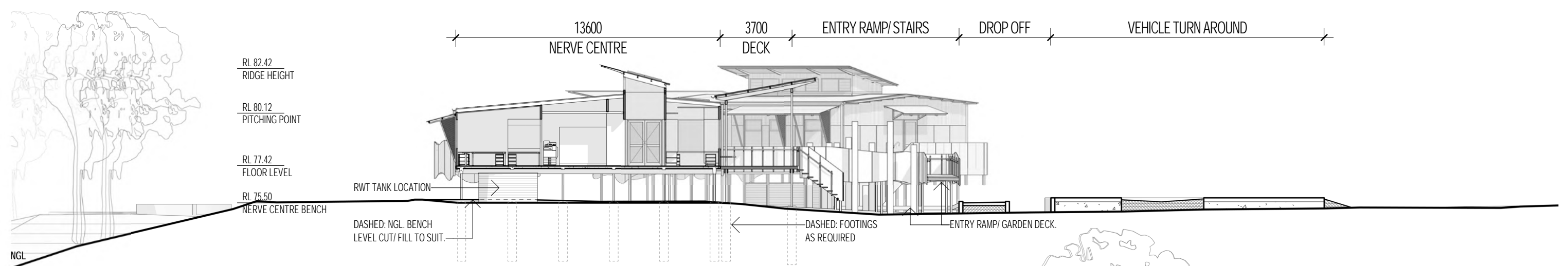
FOR MAARI MA ABORIGINAL HEALTH

**SITE ELEVATIONS**

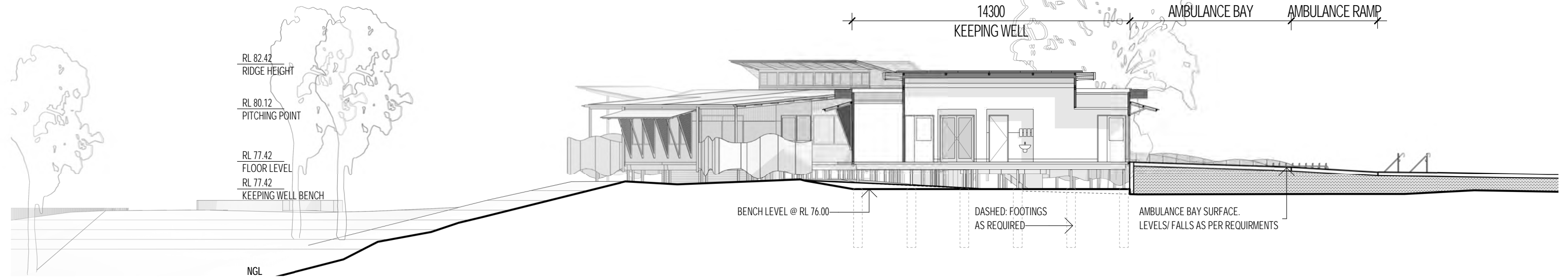
			Job No: 480	Issue: A
			Scale: 1 : 200 @ A3	
			Issue Date: 05.10.2021	Dwg No: 06
A	05.10.2021	PLANNING ISSUE	Drawn: ML	Checked: AOL
ISSUE	DATE	AMENDMENT		



**PLANNING - SITE SECTION A**



**PLANNING - SITE SECTION B**



**PLANNING - SITE SECTION C**

**PLANNING ISSUE**

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 E: adelaide@tropo.com.au

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0 2m 4m 10m  
 Scale 1: 200

**MAARI MA WILCANNIA  
 WELLBEING CENTRE**  
 BONNEY STREET WILCANNIA  
 FOR MAARI MA ABORIGINAL HEALTH

**SITE SECTIONS**

A	05.10.2021	PLANNING ISSUE
ISSUE	DATE	AMENDMENT

Job No:	480	Issue:	A
Scale:	1 : 200 @ A3	Dwg No:	07
Issue Date:	05.10.2021	Drawn:	ML
		Checked:	AOL

# Maari Ma Wellbeing Centre - Wilcannia

## Landscape Theming

- Local Wilcannia traditional Artwork has inspired the ground plane patterning of the site.
- Inspiration has also been drawn from the flood-plane landscape typology.
- Dry creek beds, referencing existing overland flow paths, starting from the island within the car park, branch out on either side of the main deck and flow around the site reconnecting in a rock pool inspired by traditional rock fish traps.
- Rippling off from the creek beds are lines of vegetation, merging in some areas to create feature pockets.
- As the built form is raised above the ground plane the patterning will be appreciated from elevated positions.
- When on the ground plane, the landscape will be an immersive experience for participants.
- The design will showcase specific edible and medicinal plant species in feature areas.
- The design will incorporate incidental natural play elements to provide opportunities for interaction, engagement and learning with the landscape.

## Community Space

- The design is open to the riverfront, providing valuable community gathering spaces independent to the built form.
- The design proposes a variety of seating areas including large gathering spaces, contemplation areas for private reflection, a rock pool space and a lawned area.
- Utilising the under croft of the building is a resting area with some protection from the elements
- Incorporate decorative screening to distinguish the community space from the wellbeing centre, providing an opportunity to collaborate with local artists.

## Landscaped Entry

- Accessible entry with drop off zone
- Landscaped car park with amenity planting and shade trees
- Patterning of planting extends into the hard surface to form continuous lines through the landscape
- Existing tree to be a focal point of the entry space, with access provided around and under as tree allows.
- Natural local rock retaining to car park edge.



# Maari Ma Wellbeing Centre - Wilcannia

## TREES



**Acacia pendula**  
Weeping Myall, Boree, Nilyah, Balaar  
H: 5-12m



**Acacia stenophylla**  
Shoestring Acacia  
H:4-10m



**Acacia victoriae**  
Gundablue



**Angophera melanoxylon**  
Coolabah Apple  
H: 15m



**Eucalyptus camaldulensis**  
River Red Gum  
H: 20-30m W: 10-15m



**Atalaya hemiglauca**  
White wood



**Santalum acuminatum**  
Sweet Quandong

## SHRUBS



**Atriplex nummelaria**  
Old Man Saltbush  
H: 3m W: 2-4m



**Dodonaea viscosa subsp. Angustissima**  
Narrow Leaf Hopbush



**Eremophila longifolia**  
Emu Bush



**Rhagodia spinescens**  
Spiny Saltbush  
H: 1-2m W: 1-2m



**Westringia rigida**  
Stiff Westringia  
H: 0.3-0.5m W: 0.8-1m



**Prostanthera striatiflora**  
Native Thyme



**Enchylaena tomentosa**  
Ruby Saltbush

## GRASSES



**Maireana brevifolia**  
Small Leaf Bluebush  
H: 0.5-1m W: 0.5-1.5m



**Lepidium africanum**  
Pepper Cress



**Centipeda cunninghamii**  
Old Man Weed



**Cymbopogon ambiguus**  
Native Lemongrass



**Cyperus gymnocaulos**  
Spiny Flat Sedge



**Lomandra densiflora**  
Pointed Mat-rush  
H: 0.2-0.6m W: 0.8-1m



**Enneapogon Avenaceus**  
Bottle Washers





PLANNING ISSUE

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**MAARI MA WILCANNIA  
 WELLBEING CENTRE**  
 BONNEY STREET WILCANNIA

FOR MAARI MA ABORIGINAL HEALTH

3D VIEWS

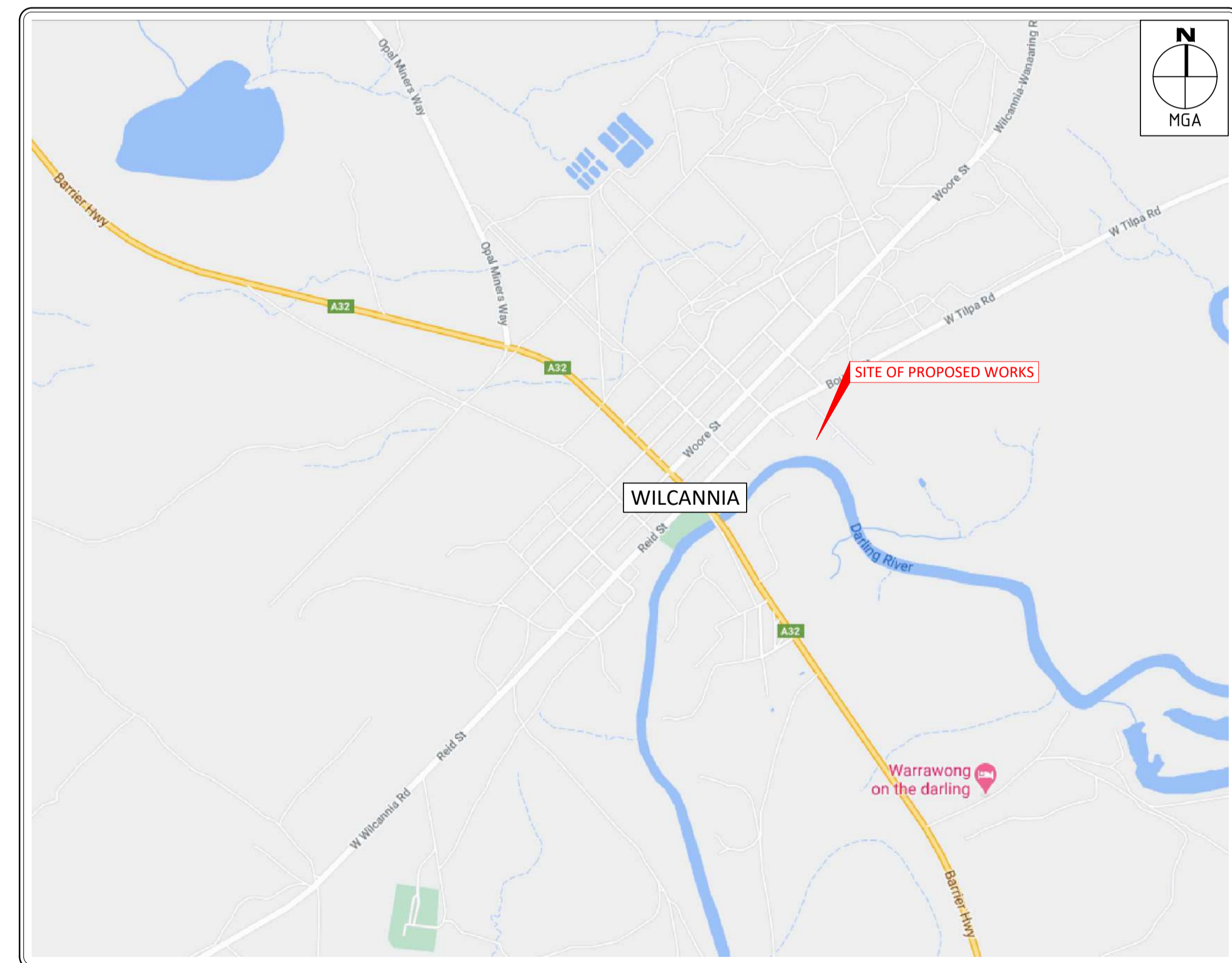
			Job No: 480	Issue: A
			Scale: @ A3	
			Issue Date: 05.10.2021	Dwg No: 10
A	05.10.2021	PLANNING ISSUE	Drawn: ML	Checked: AOL
ISSUE	DATE	AMENDMENT		

## Appendix I - Preliminary Civil Drawings

# Civil Design and Documentation for "Maari Ma" Health Aboriginal Corporation Wilcannia Well Being Centre, Wilcannia, NSW 2836

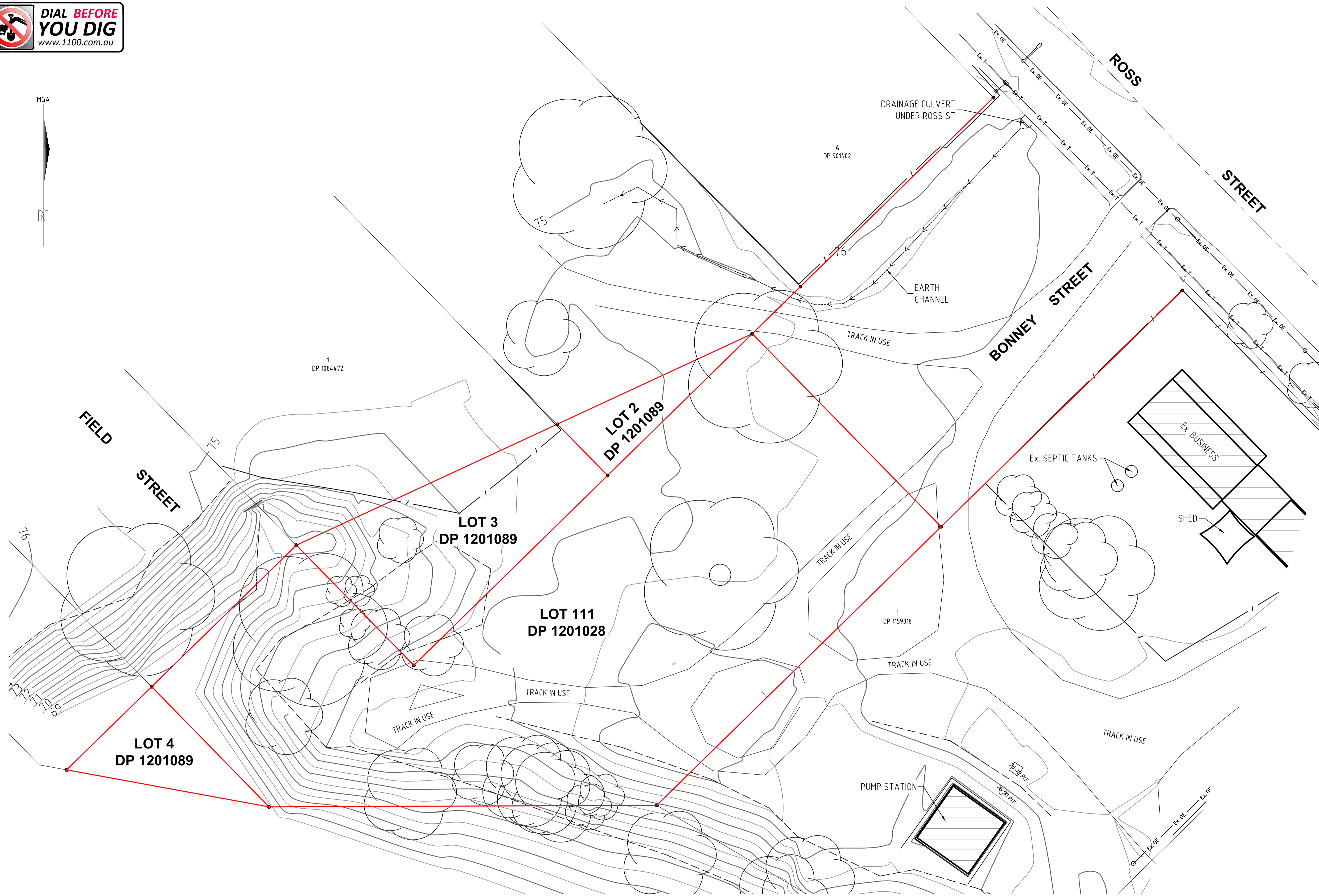
## SCHEDULE OF DRAWINGS

SHEET No.	DESCRIPTION
32342-C00	COVER SHEET AND DRAWING SCHEDULE
32342-C01	EXISTING SITE PLAN
32342-C02	CONCEPT EARTH BATTER & BUILDING PADS DESIGN PLAN
32342-C03	PROPOSED STORMWATER MANAGEMENT PLAN
32342-C04	PROPOSED ROOF DRAINAGE PLAN
32342-C05	PROPOSED CARPARK DESIGN PLAN WITH LEVELS
32342-C06	STORMWATER - STANDARD NOTES AND DETAILS
32342-C07	RETAINING WALL - STANDARD NOTES AND DETAILS
32342-C10	BEARING PIER FOOTING DESIGN PLAN, DETAILS & NOTES



LOCALITY PLAN  
NOT TO REDUCTION RATIO

SUBMISSION FOR DA



**LEGEND**

- EXISTING SUBJECT CADASTRAL BOUNDARIES
- EXISTING ADJOINING CADASTRAL BOUNDARIES
- TOP/BOTTOM OF BANK
- EXISTING FENCE
- EXISTING OVERHEAD ELECTRICAL LINE
- EXISTING UNDERGROUND COMMUNICATIONS LINE
- EXISTING TREE - SIZE DENOTES APPROX. SPREAD
- EXISTING DRAINAGE CHANNEL
- EXISTING GRAVEL TRACK AREA
- EXISTING ROOFED AREA

**NOTES:**

- CONTOUR INTERVAL = 0.50m
- CONTOURS AND LEVELS SHOWN ARE FROM EXTERNALLY SUPPLIED CAD DATA. BARNSON TAKES NO RESPONSIBILITY FOR THE ACCURACY OF THIS DATA.
- NO CADASTRAL BOUNDARIES, EASEMENTS, RESTRICTIONS OR ENCUMBRANCES HAVE BEEN INVESTIGATED BY BARNSON.
- SERVICE LOCATIONS AND DEPTHS SHOWN HEREON ARE FROM EXTERNALLY SUPPLIED CAD DATA. BARNSON TAKES NO RESPONSIBILITY FOR THE ACCURACY OF THIS DATA. THE LOCATION OF AND DEPTHS OF ALL SERVICES SHOULD BE OBTAINED FROM SERVICE PROVIDERS, LOCATED AND VERIFIED ON SITE PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION.
- UNDERGROUND SERVICES MAY EXIST WHICH HAVE NOT BEEN SHOWN ON THIS PLAN.

SCALE 1:300(A1)  
 0 5 10 15 20 25  
 0 5 10 15 20 25

SCALE 1:600(A3)

**EXISTING SITE PLAN**  
 REDUCTION RATIO 1:300 @ A1  
 1:600 @ A3

SUBMISSION FOR DA



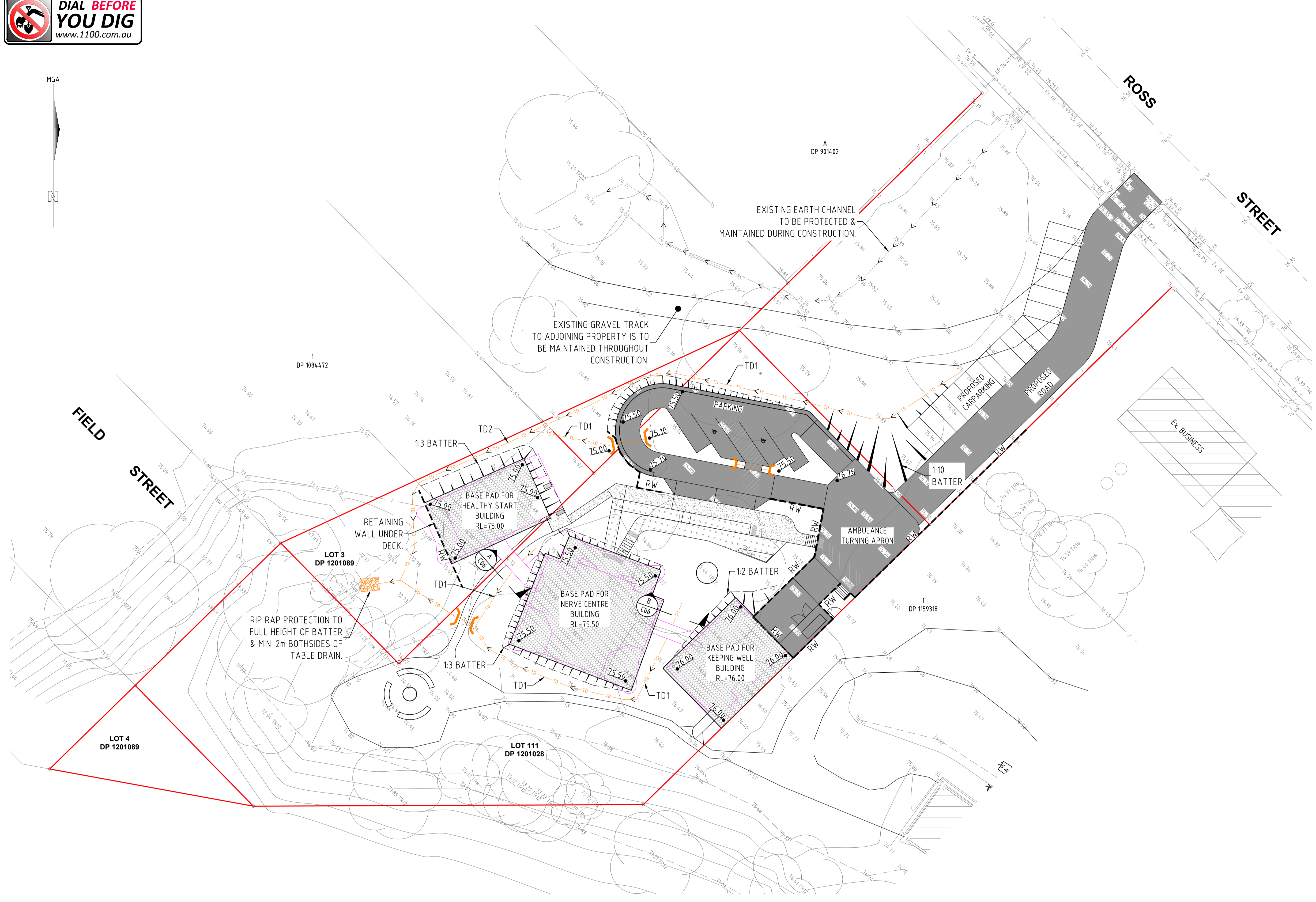
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 Project: "MAARI MA" WILCANNIA WELL BEING CENTRE  
 ROSS & BONNEY STREETS, WILCANNIA NSW 2836  
 Drawing Title: EXISTING SITE PLAN

Rev	Date	Amendment
A	16-04-2021	ISSUED FOR PRELIMINARY
B	23-04-2021	ISSUED FOR DA

Design	DOS	Certification	
Drawn	LT		
Check	LM	Drawing Number	Revision
Original Sheet Size = A1		32342 - C01	B



LEGEND	
	EXISTING SUBJECT CADASTRAL BOUNDARIES
	EXISTING ADJOINING CADASTRAL BOUNDARIES
	TOP/BOTTOM OF BANK
	EXISTING FENCE
	EXISTING OVERHEAD ELECTRICAL LINE
	EXISTING UNDERGROUND COMMUNICATIONS LINE
	EXISTING TREE - SIZE DENOTES APPROX. SPREAD
	EXISTING GRAVEL TRACK AREA
	EXISTING ROOFED AREA

LEGEND (proposed)	
	PROPOSED TABLE DRAIN 1 (1200WIDEx150DEEP)
	PROPOSED TABLE DRAIN 2 (2400WIDEx300DEEP)
	PROPOSED STORMWATER DRAINAGE PIPE
	PROPOSED RETAINING WALL (14.00 MAX.)
	PROPOSED CULVERT & HEAD WALLS
	EXISTING SURFACE LEVEL
	PROPOSED SURFACE LEVEL
	PROPOSED 1:3 BATTER UNLESS OTHERWISE STATED
	PROPOSED BUILDING PAD AREA
	PROPOSED BITUMEN ROAD AREA
	PROPOSED PATH TRACK AREA
	PROPOSED TIMBER DECK & RAMP AREA
	PROPOSED PAVING AREA

SCALE 1:300(A1)  
 0 5 10 15 20 25  
 0 5 10 15 20 25  
 SCALE 1:600(A3)

**CONCEPT EARTH BATTER & BUILDING PADS**  
**DESIGN PLAN**  
 REDUCTION RATIO 1:300 @ A1  
 1:600 @ A3

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 Project: "MAARI MA" WILCANNIA WELL BEING CENTRE  
 ROSS & BONNEY STREETS, WILCANNIA NSW 2836  
 Drawing Title: CONCEPT EARTH BATTER & BUILDING PADS  
 DESIGN PLAN

Rev	Date	Amendment
A	16-04-2021	ISSUED FOR PRELIMINARY
B	23-04-2021	ISSUED FOR DA

Design	DOS	Certification	
Drawn	LT		
Check	LM	Drawing Number	Revision
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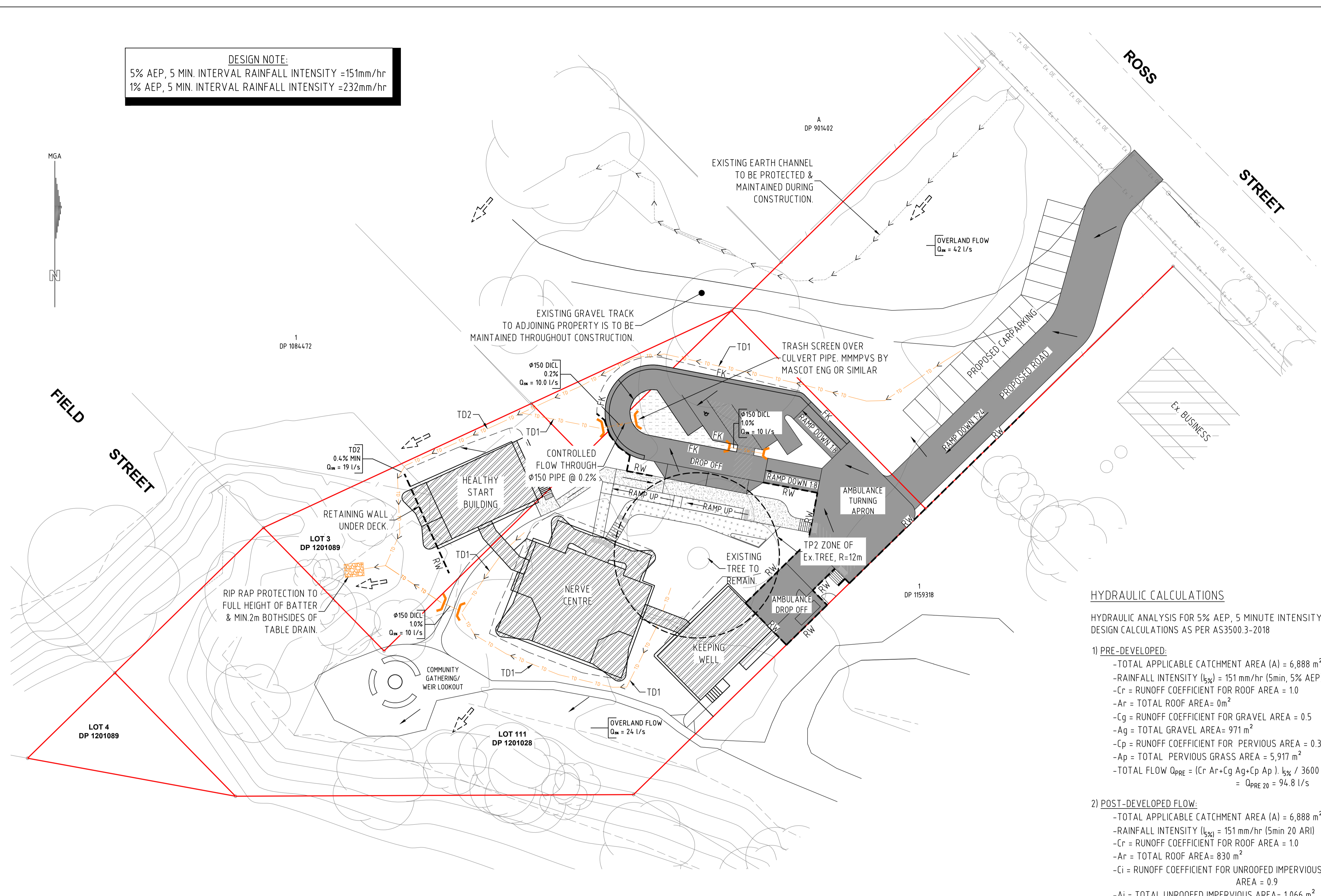
**LEGEND**

- EXISTING SUBJECT CADASTRAL BOUNDARIES
- EXISTING ADJOINING CADASTRAL BOUNDARIES
- TOP/BOTTOM OF BANK
- EXISTING FENCE
- EXISTING OVERHEAD ELECTRICAL LINE
- EXISTING UNDERGROUND COMMUNICATIONS LINE
- EXISTING TREE - SIZE DENOTES APPROX. SPREAD
- EXISTING GRAVEL TRACK AREA
- EXISTING ROOFED AREA

**LEGEND (proposed)**

- EXTENT OF PROPOSED ROOF
- PROPOSED TABLE DRAIN 1 (1200WIDEx150DEEP)
- PROPOSED TABLE DRAIN 2 (2400WIDEx300DEEP)
- PROPOSED STORMWATER DRAINAGE PIPE
- PROPOSED RETAINING WALL (1400 MAX.)
- PROPOSED CULVERT & HEADWALL
- PROPOSED OVERLAND FLOW PATH DIRECTION
- PROPOSED SURFACE FALL DIRECTION
- PROPOSED CONCRETE FLUSH KERB
- PROPOSED PIPE SIZE & MATERIAL  
GRADIENT 5% AEP FLOW
- PROPOSED BITUMEN ROAD AREA
- PROPOSED PATH TRACK AREA
- PROPOSED TIMBER DECK & RAMP AREA
- PROPOSED PAVING AREA
- PROPOSED ON-GROUND OSD BASIN(4.5m2xAVG 110mm)

**DESIGN NOTE:**  
 5% AEP, 5 MIN. INTERVAL RAINFALL INTENSITY =151mm/hr  
 1% AEP, 5 MIN. INTERVAL RAINFALL INTENSITY =232mm/hr



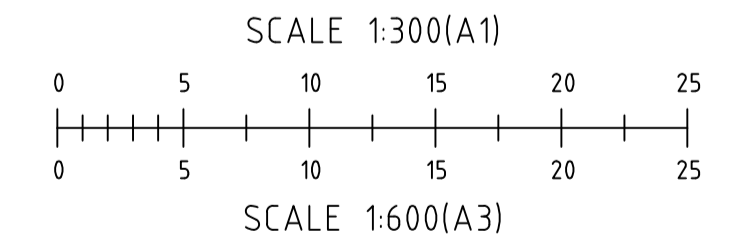
**HYDRAULIC CALCULATIONS**

HYDRAULIC ANALYSIS FOR 5% AEP, 5 MINUTE INTENSITY. DESIGN CALCULATIONS AS PER AS3500.3-2018

- 1) PRE-DEVELOPED:
  - TOTAL APPLICABLE CATCHMENT AREA (A) = 6,888 m<sup>2</sup>
  - RAINFALL INTENSITY (I<sub>5%</sub>) = 151 mm/hr (5min, 5% AEP)
  - Cr = RUNOFF COEFFICIENT FOR ROOF AREA = 1.0
  - Ar = TOTAL ROOF AREA= 0m<sup>2</sup>
  - Cg = RUNOFF COEFFICIENT FOR GRAVEL AREA = 0.5
  - Ag = TOTAL GRAVEL AREA= 971 m<sup>2</sup>
  - Cp = RUNOFF COEFFICIENT FOR PERVIOUS AREA = 0.3
  - Ap = TOTAL PERVIOUS GRASS AREA = 5,917 m<sup>2</sup>
  - TOTAL FLOW Q<sub>PRE</sub> = (Cr Ar + Cg Ag + Cp Ap) . I<sub>5%</sub> / 3600 = Q<sub>PRE 20</sub> = 94.8 l/s
- 2) POST-DEVELOPED FLOW:
  - TOTAL APPLICABLE CATCHMENT AREA (A) = 6,888 m<sup>2</sup>
  - RAINFALL INTENSITY (I<sub>5%</sub>) = 151 mm/hr (5min 20 ARI)
  - Cr = RUNOFF COEFFICIENT FOR ROOF AREA = 1.0
  - Ar = TOTAL ROOF AREA= 830 m<sup>2</sup>
  - Ci = RUNOFF COEFFICIENT FOR UNROOFED IMPERVIOUS AREA = 0.9
  - Ai = TOTAL UNROOFED IMPERVIOUS AREA= 1,066 m<sup>2</sup>
  - Cg = RUNOFF COEFFICIENT FOR GRAVEL AREA = 0.5
  - Ag = TOTAL GRAVEL AREA= 691 m<sup>2</sup>
  - Cp = RUNOFF COEFFICIENT FOR PERVIOUS AREA = 0.3
  - Ap = TOTAL PERVIOUS GRASS AREA = 4,301 m<sup>2</sup>
  - TOTAL FLOW Q<sub>POST</sub> = Cr Ar + Ci Ai + Cp Ap . I<sub>5%</sub> / 3600 = Q<sub>POST 1</sub> = 14.3.7 l/s
- 3) RWT OSD VOLUME CALCULATION
  - TOTAL FLOW TO RWT = Cr Ar . I<sub>5%</sub> / 3600 = 33.3 l/s
  - REQUIRED STORAGE VOLUME = FLOW TO RWT × 5 × 60 = 33.3 × 5 × 60 = 10.0 m<sup>3</sup>

**HYDRAULIC CALCULATIONS CONT'D**

- 4) ON GROUND OSD VOLUME CALCULATION
  - PRE DEVELOPED FLOW = Q<sub>PRE</sub> = 94.8 l/s
  - TOTAL FLOW TO OSD BASIN = FLOW FROM IMPERVIOUS AREA = 660 × 0.9 × 151 / 3600 = 24.9 l/s
  - ALLOWABLE OUTFLOW = 9.3 l/s
  - REQUIRED RETENTION VOLUME = TOTAL FLOW - Q<sub>PRE</sub> = (24.9 - 9.3) × 5 × 60 = 4.7 m<sup>3</sup>
  - VOLUME OF PROPOSED DETENTION BASIN = 4.5m<sup>2</sup> × 0.33/3 m = 5.0m<sup>3</sup>
  - MAX FLOW Ø150 STEEL PIPE CULVERT @ 0.2% = 10 l/s
  - PROVIDE TRASH SCREEN OVER PIPE CULVERT, MMMPVs BY MASCOT ENGINEERING OR SIMILAR.



**PROPOSED STORMWATER MANAGEMENT PLAN**

REDUCTION RATIO  
 1:300 @ A1  
 1:600 @ A3

**SUBMISSION FOR DA**



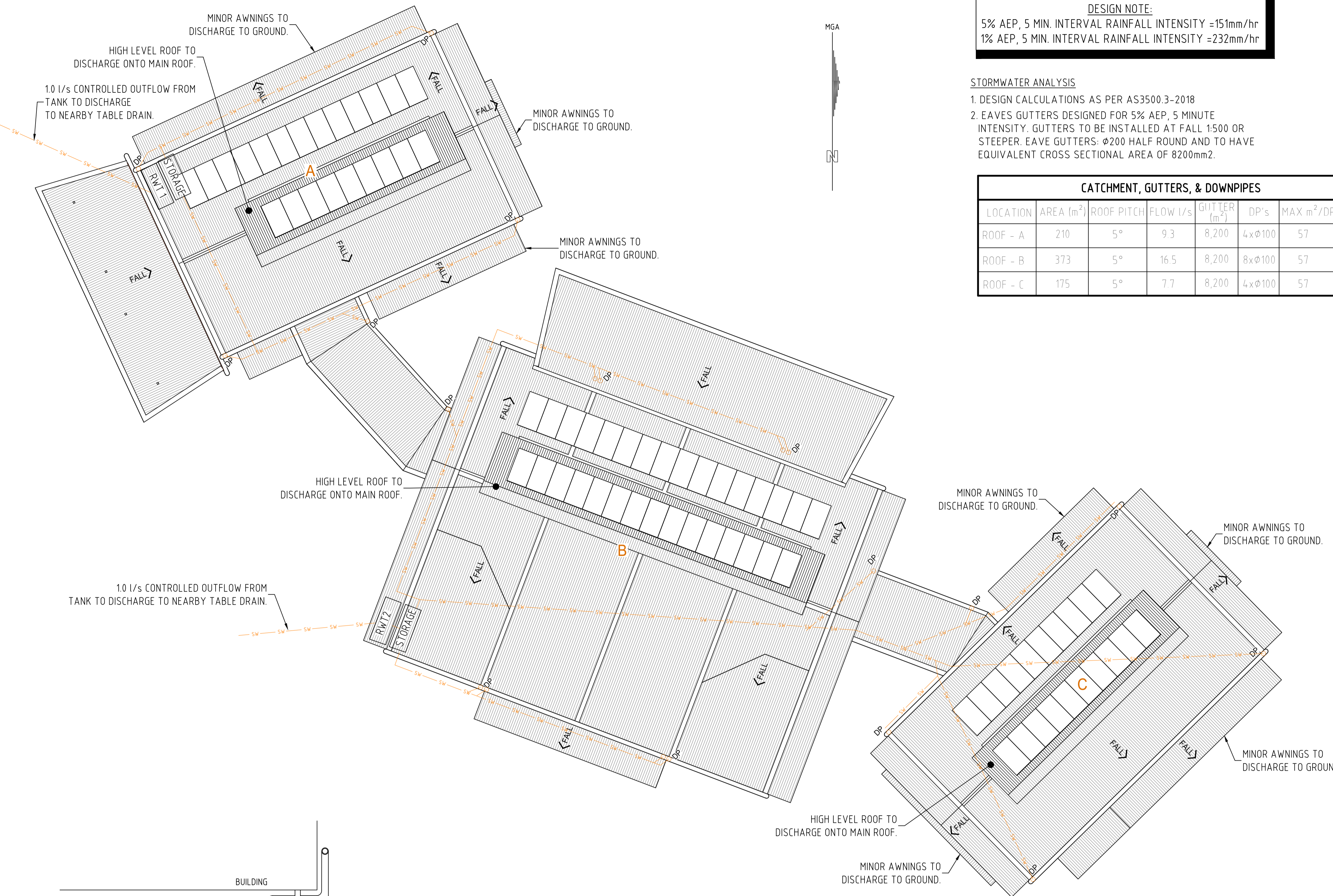
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 Drawing Title: PROPOSED STORMWATER MANAGEMENT PLAN

Rev	Date	Amendment
A	16-04-2021	ISSUED FOR PRELIMINARY
B	23-04-2021	ISSUED FOR DA

Design	DOS	Certification
Drawn	LT	
Check	LM	Drawing Number
Original Sheet Size = A1		32342 - C03
		Revision
		B



**DESIGN NOTE:**  
 5% AEP, 5 MIN. INTERVAL RAINFALL INTENSITY = 151mm/hr  
 1% AEP, 5 MIN. INTERVAL RAINFALL INTENSITY = 232mm/hr

**STORMWATER ANALYSIS**  
 1. DESIGN CALCULATIONS AS PER AS3500.3-2018  
 2. EAVES GUTTERS DESIGNED FOR 5% AEP, 5 MINUTE INTENSITY. GUTTERS TO BE INSTALLED AT FALL 1:500 OR STEEPER. EAVE GUTTERS: Ø200 HALF ROUND AND TO HAVE EQUIVALENT CROSS SECTIONAL AREA OF 8200mm<sup>2</sup>.

LOCATION	AREA (m <sup>2</sup> )	ROOF PITCH	FLOW l/s	GUTTER (m <sup>2</sup> )	DP's	MAX m <sup>2</sup> /DP
ROOF - A	210	5°	9.3	8,200	4xØ100	57
ROOF - B	373	5°	16.5	8,200	8xØ100	57
ROOF - C	175	5°	7.7	8,200	4xØ100	57

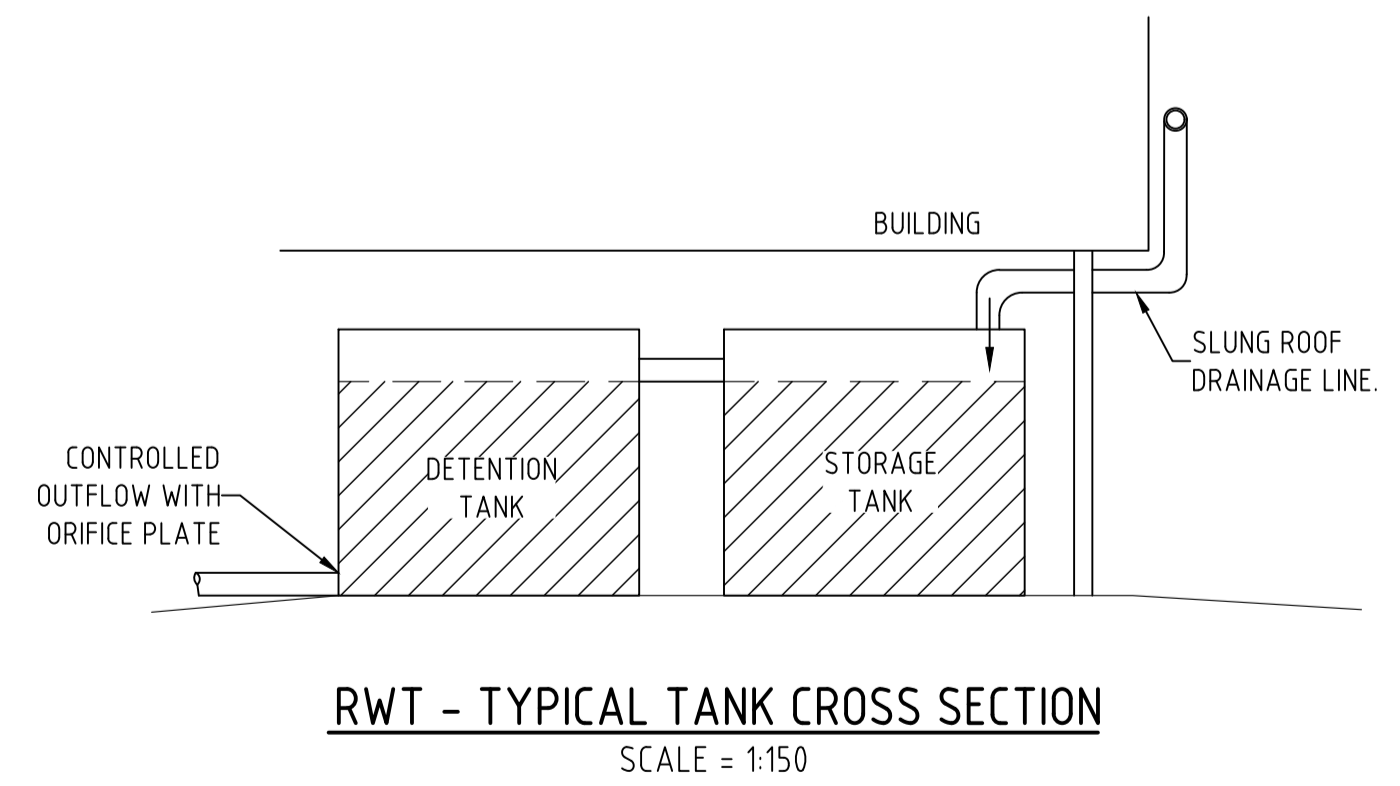
**LEGEND (proposed)**

- [Hatched Area] EXTENT OF PROPOSED ROOF
- [Orange Line] PROPOSED STORMWATER PIPE SLUNG UNDER BUILDING FLOOR
- [Circle with X] PROPOSED DOWN PIPE
- [Arrow] FALL - DIRECTION OF FALL
- [Box with #] PROPOSED RAINWATER TANK AS SPECIFIED OR SIMILAR.
- [C] ROOF - CATCHMENT IDENTIFIER

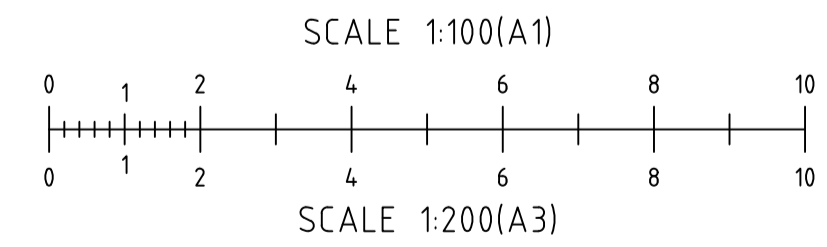
**HYDRAULIC CALCULATIONS CONT'D**

**RWT 1 - 3000L DETENTION TANK**  
 3000L SLIMLINE TANK BY KINGSPAN (2500Lx700Wx1860H)  
**RWT 1 OSD VOLUME CALCULATION**  
 TOTAL FLOW TO RWT 1 = 9.3 l/s (ROOF A)  
 REQUIRED STORAGE VOLUME = (9.3-1.0) x 5 x 60 = 9.7 x 5 x 60 = 2.47 m<sup>3</sup>  
 OSD VOLUME PROPOSED = 3.0m<sup>3</sup>  
**ORIFICE CONTROL FLOW CALCULATIONS - RWT 1**  
 - AVAILABLE HEAD ABOVE PIPE CENTER LINE = 1.79m  
 - EXIT VELOCITY =  $\sqrt{2gh}$  = 5.92 m/s  
 - ORIFICE COEFFICIENT = 0.8  
 - FLOW THROUGH Ø16.4 ORIFICE = (0.8 x 5.92) x 0.0164<sup>2</sup> / 4 x π = 0.001 m<sup>3</sup>/s  
 - CONTROL OUTFLOW THROUGH Ø16.4 ORIFICE PLATE = 1.0 l/s

**RWT 2 - 7000L DETENTION TANK**  
 7000L SLIMLINE TANK BY KINGSPAN (3300Lx1150Wx2020H)  
**RWT 2 OSD VOLUME CALCULATION**  
 TOTAL FLOW TO RWT 2 = 24.2 l/s (ROOF B + C)  
 REQUIRED STORAGE VOLUME = (24.2-1.0) x 5 x 60 = 6.96 m<sup>3</sup>  
 OSD VOLUME PROPOSED = 7.00m<sup>3</sup>  
**ORIFICE CONTROL FLOW CALCULATIONS - RWT 2**  
 - AVAILABLE HEAD ABOVE PIPE CENTER LINE = 1.95m  
 - EXIT VELOCITY =  $\sqrt{2gh}$  = 6.177 m/s  
 - ORIFICE COEFFICIENT = 0.8  
 - FLOW THROUGH Ø16.1 PIPE = (0.8 x 6.177) x 0.0161<sup>2</sup> / 4 x π = 0.001 m<sup>3</sup>/s  
 - CONTROL OUTFLOW THROUGH Ø16.1 ORIFICE PLATE = 1.0 l/s



**PROPOSED ROOF DRAINAGE PLAN**  
 REDUCTION RATIO 1:100 @ A1  
 1:200 @ A3



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 Project: "MAARI MA" WILCANNIA WELL BEING CENTRE  
 ROSS & BONNEY STREETS, WILCANNIA NSW 2836  
 Drawing Title: PROPOSED ROOF DRAINAGE PLAN

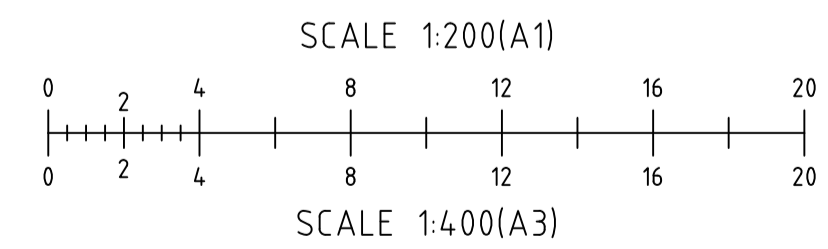
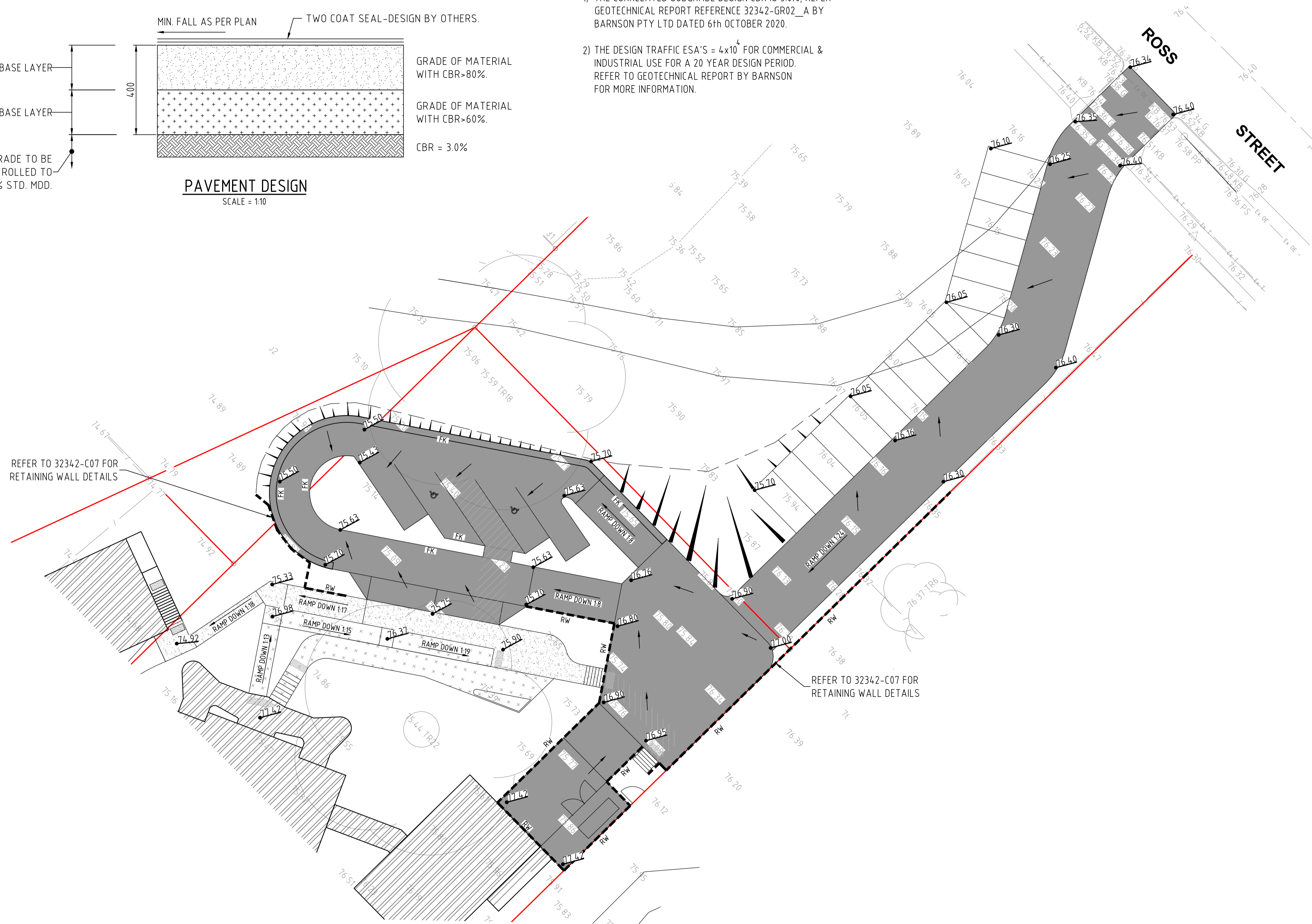
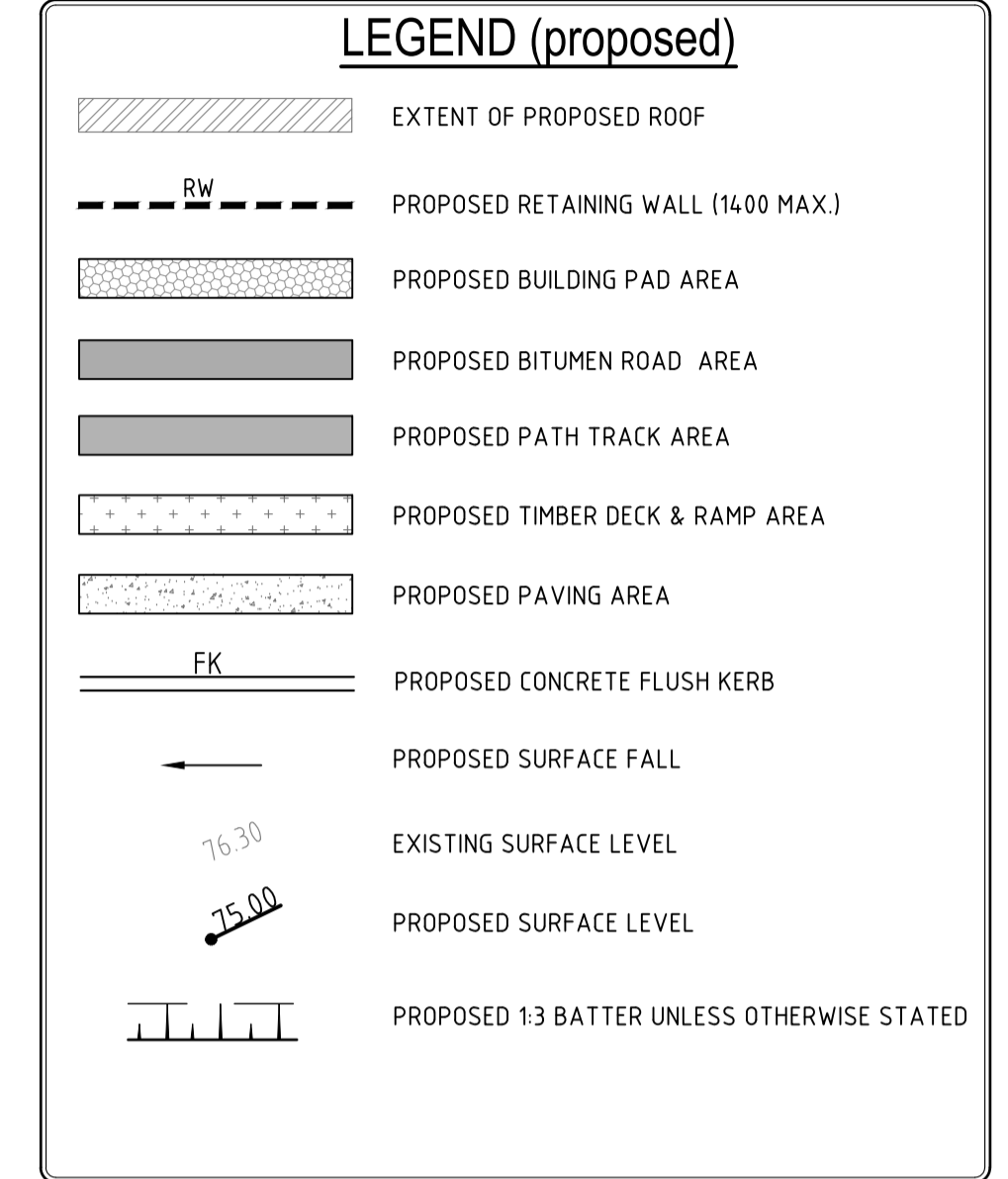
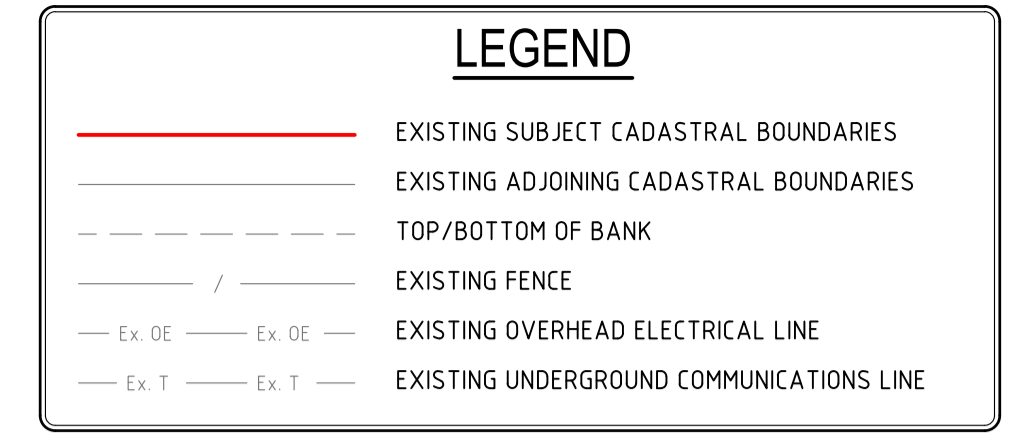
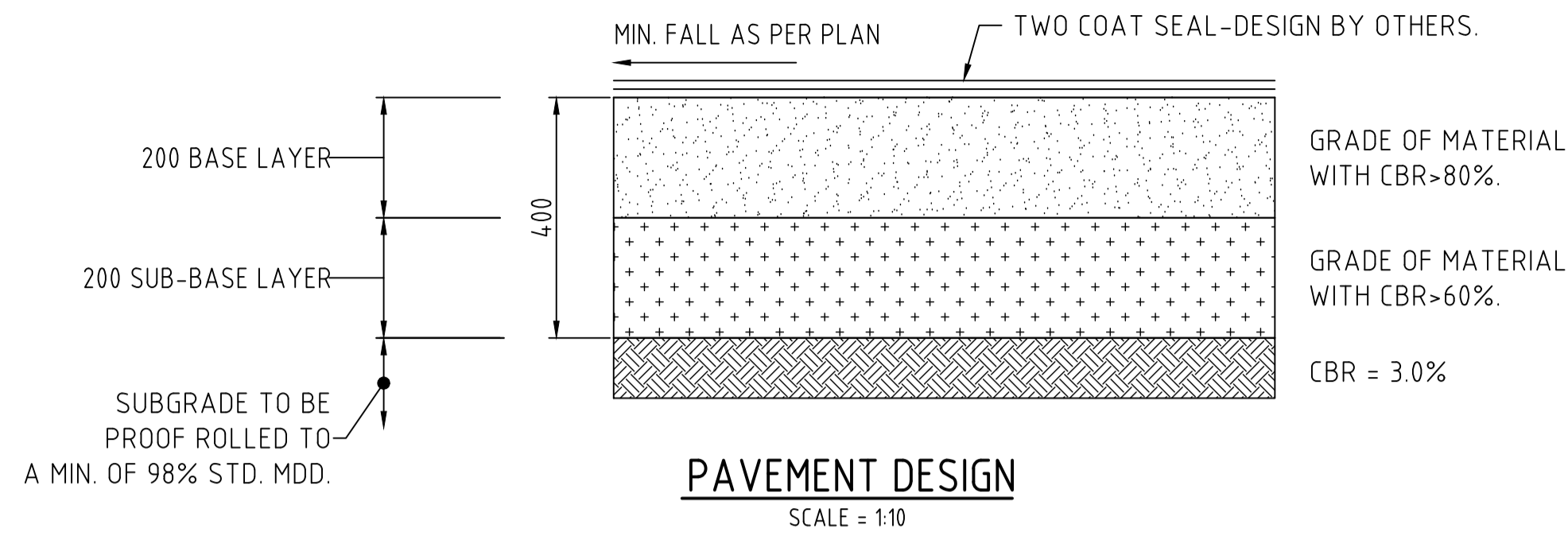
Rev	Date	Amendment
A	16-04-2021	ISSUED FOR PRELIMINARY
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Design	DOS	Certification
Drawn	LT	
Check	LM	Drawing Number
Original Sheet Size = A1		32342 - C04
		Revision
		B

NOTE: REFER TO GEOTECHNICAL REPORT 32342-GR02\_A DATED 6th OCTOBER 2020 BY BARNSON PTY LTD FOR MORE INFORMATION.

**DESIGN NOTES**

- 1) THE CORRELATED SUBGRADE DESIGN CBR IS 3.0%, REFER GEOTECHNICAL REPORT REFERENCE 32342-GR02\_A BY BARNSON PTY LTD DATED 6th OCTOBER 2020.
- 2) THE DESIGN TRAFFIC ESA'S = 4x10<sup>4</sup> FOR COMMERCIAL & INDUSTRIAL USE FOR A 20 YEAR DESIGN PERIOD. REFER TO GEOTECHNICAL REPORT BY BARNSON FOR MORE INFORMATION.



**PROPOSED CARPARK DESIGN PLAN**  
REDUCTION RATIO 1:200 @ A1, 1:400 @ A3

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 Project: "MAARI MA" WILCANNIA WELL BEING CENTRE  
 ROSS & BONNEY STREETS, WILCANNIA NSW 2836  
 Drawing Title: PROPOSED CARPARK DESIGN PLAN WITH LEVELS

Rev	Date	Amendment
A	16-04-2021	ISSUED FOR PRELIMINARY
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		Revision
		B



**STORMWATER NOTES**

1. ALL DOWNPIPE LINES SHALL BE SEWER GRADE uPVC WITH SOLVENT WELD JOINTS (U.N.O)
2. EQUIVALENT STRENGTH VCP OR FCP PIPES MAY BE USED.
3. MINIMUM GRADE TO STORMWATER LINES TO BE 0.5% MINIMUM (U.N.O)
4. CONTRACTORS TO SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTORS TO ENSURE PROPER CONNECTION BETWEEN DISSIMILAR PIPEWORK.
5. ALL CONNECTIONS TO EXISTING DRAINAGE PITS SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND THE INTERNAL WALL OF THE PIT AT THE POINT OF ENTRY SHALL BE CEMENT RENDERED TO ENSURE A SMOOTH FINISH.
6. APPROVED PRECAST PITS MAY BE USED.
7. WHERE TRENCHES ARE IN ROCK, THE PIPE SHALL BE BEDDED ON A MIN. 50mm CONCRETE BED (75mm THICK BED OF 12mm BLUE METAL) UNDER THE BARREL OF THE PIPE. THE PIPE COLLAR AT NO POINT SHALL BEAR THE ROCK. IN OTHER THAN ROCK, PIPES SHALL BE LAID ON A 75mm THICK SAND BED. IN ALL CASES, BACKFILL THE TRENCH WITH THE SAND TO 200mm ABOVE THE PIPE. WHERE THE PIPE IS UNDER PAVEMENTS, BACKFILL REMAINDER OF TRENCH WITH SAND OR APPROVED GRANULAR BACKFILL COMPACTED IN 150mm LAYERS TO 98% MAX. DRY DENSITY.
8. WHERE STORMWATER LINES PASS UNDER FLOOR SLABS, SEWER GRADE RUBBER RING JOINTS ARE TO BE USED.
9. ALL PIPES IN THE ROADWAY AND FOOTPATH AREAS, WHERE THE DEPTH OF PIPE IS LESS THAN 500mm FROM THE FINISHED SURFACE LEVEL ARE TO BE CONCRETE ENCASED.

**PIPE TRENCH - FILL NOTES:**

**1. BEDDING SAND**

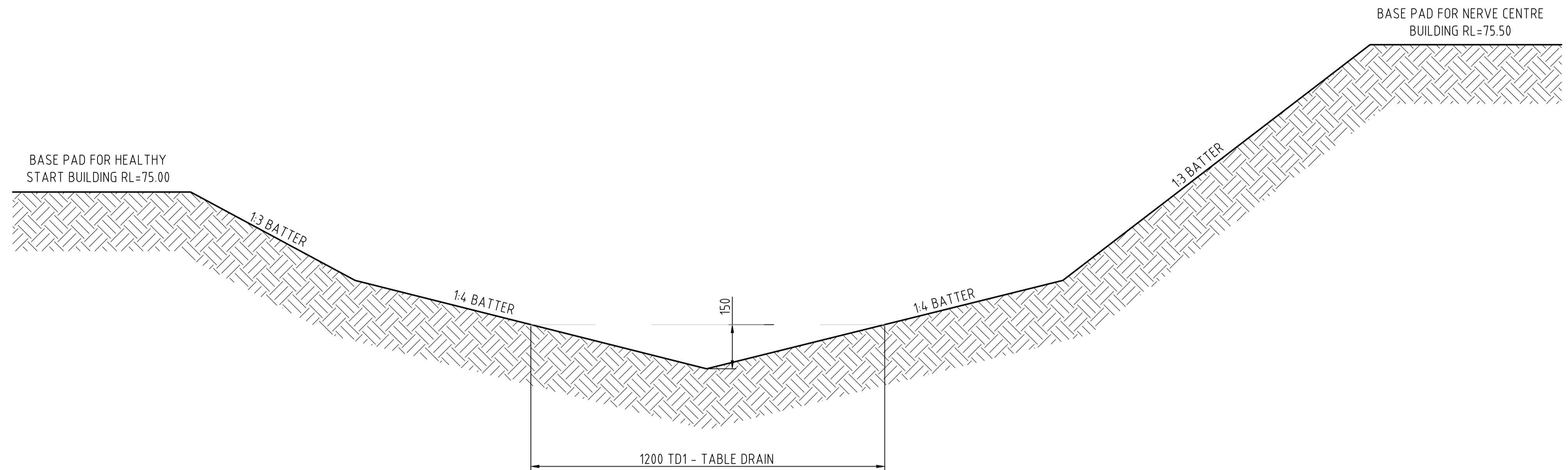
BEDDING SAND SHALL BE GRANULAR MATERIAL HAVING A LOW PERMEABILITY AND HIGH STABILITY WHEN SATURATED, CONFORMING TO THE GRADING LIMITS FOR BEDDING SAND AS INDICATED IN THE CONTRACT DOCUMENTS. BEDDING SAND SHALL BE COMPACTED TO A DENSITY INDEX OF 95% AS DETERMINED IN ACCORDANCE WITH AS1289.

**2. APPROVED IMPORTED GRANULAR FILL**

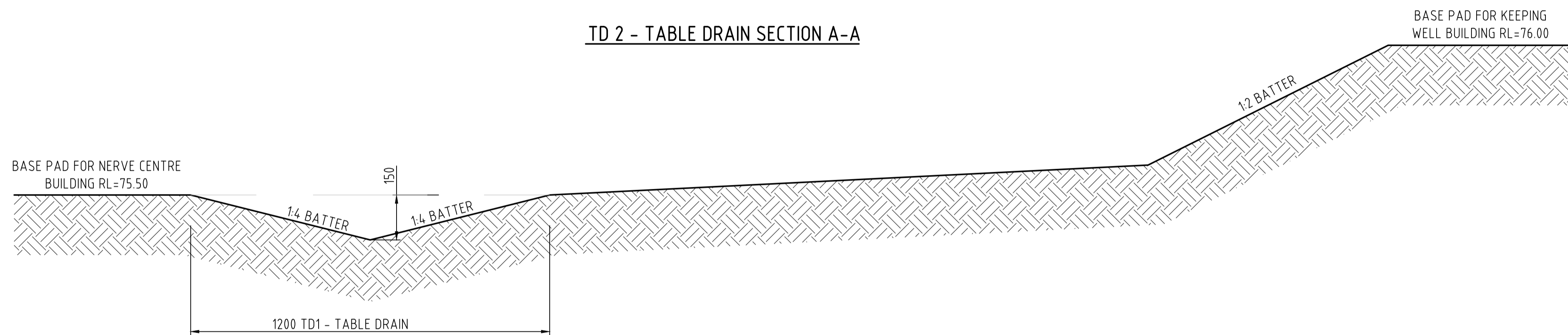
ONLY IMPORTED GRANULAR FILL MATERIAL APPROVED BY THE SUPERINTENDENT SHALL BE USED. THIS FILL MATERIAL SHALL BE COMPACTED IN LAYERS NOT EXCEEDING 300mm THICK TO A DRY DENSITY OF 100% OF THE STANDARD MAXIMUM DRY DENSITY OF THE MATERIAL AND WITH A MOISTURE CONTENT NO MORE THAN 1% ABOVE OPTIMUM MOISTURE CONTENT AS DETERMINED IN ACCORDANCE WITH AS1289.

**3. ORDINARY EXCAVATED FILL MATERIAL**

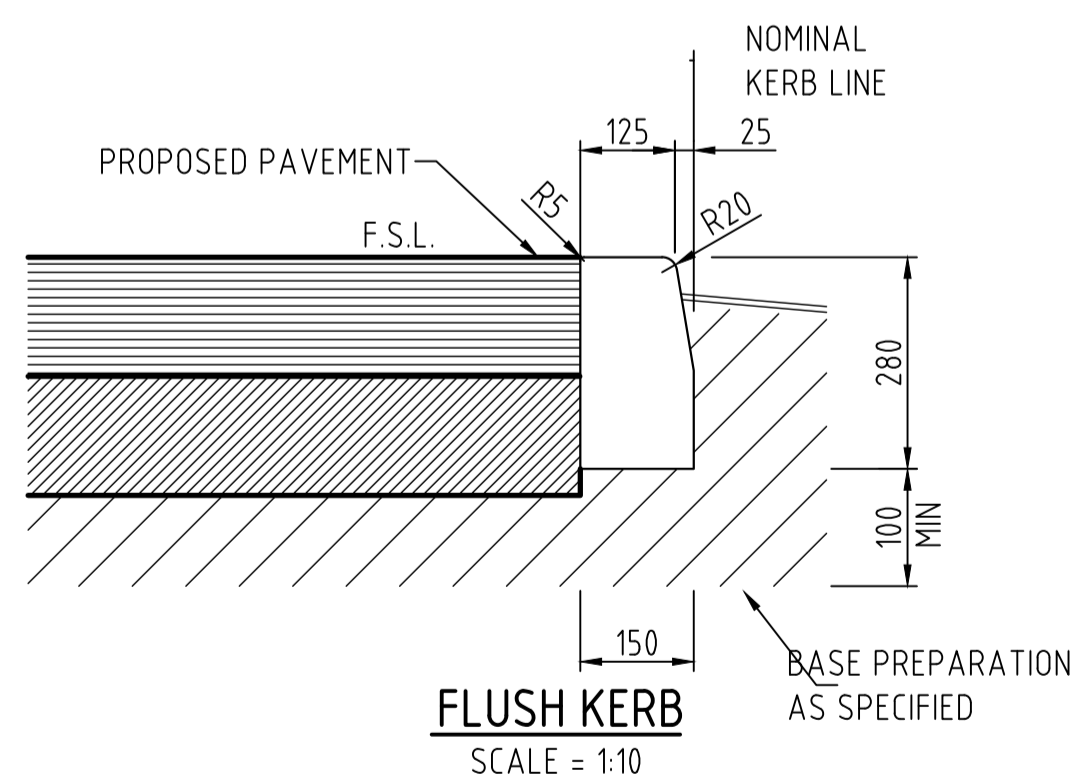
ORDINARY EXCAVATED FILL MATERIAL IS EXCAVATED TRENCH MATERIAL THAT IS FREE OF VEGETABLE MATTER, HUMUS, LARGE CLAY LUMPS AND ROCK BOULDERS. THIS FILL MATERIAL SHALL BE COMPACTED IN LAYERS NOT EXCEEDING 300mm THICK, TO A DENSITY OF 95% OF THE STANDARD MAXIMUM DRY DENSITY OF THE MATERIAL WITH A MOISTURE CONTENT OF NOT MORE THAN 1% ABOVE THE OPTIMUM MOISTURE CONTENT AS DETERMINED IN ACCORDANCE WITH AS1289.



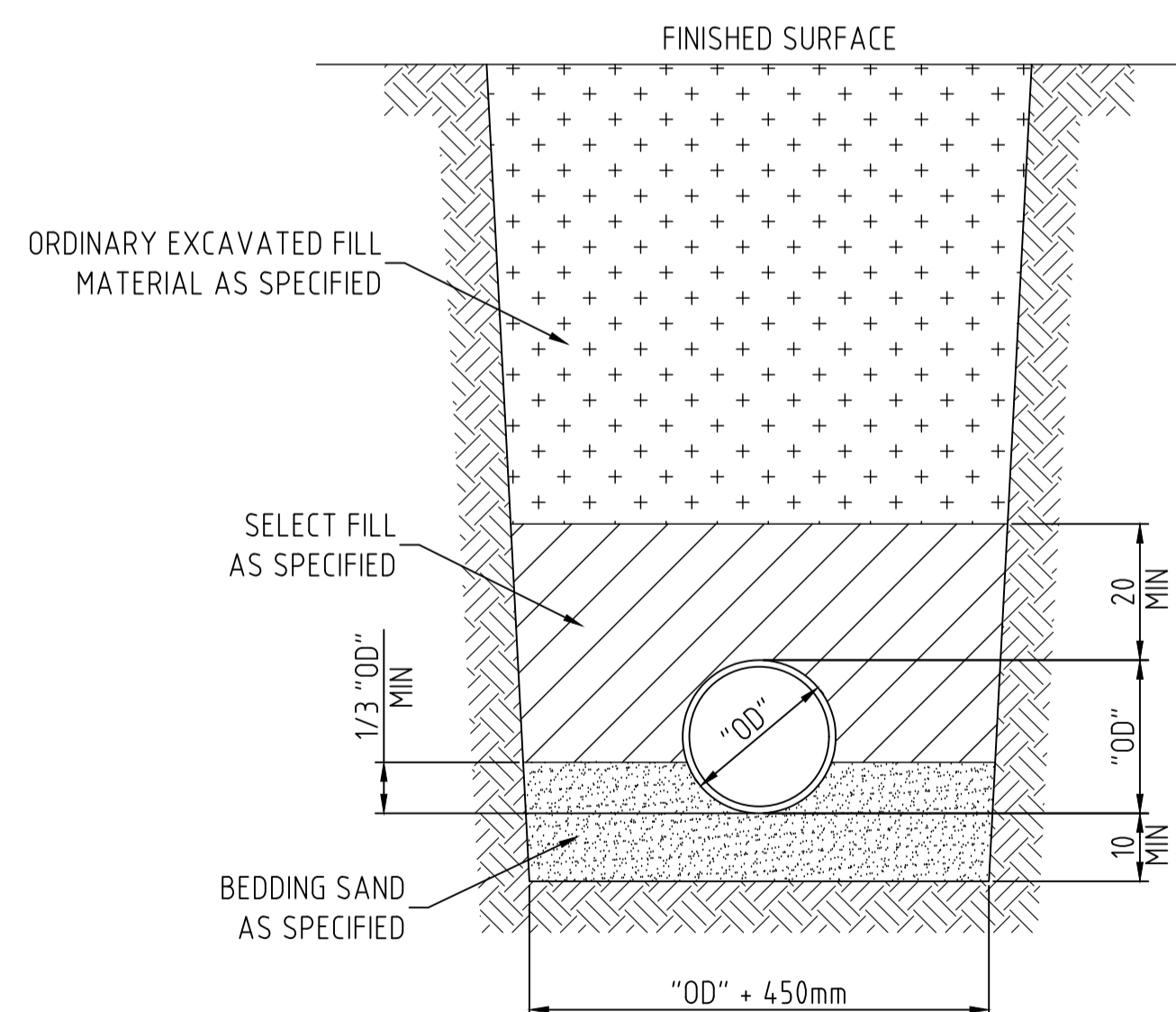
**TD 2 - TABLE DRAIN SECTION A-A**



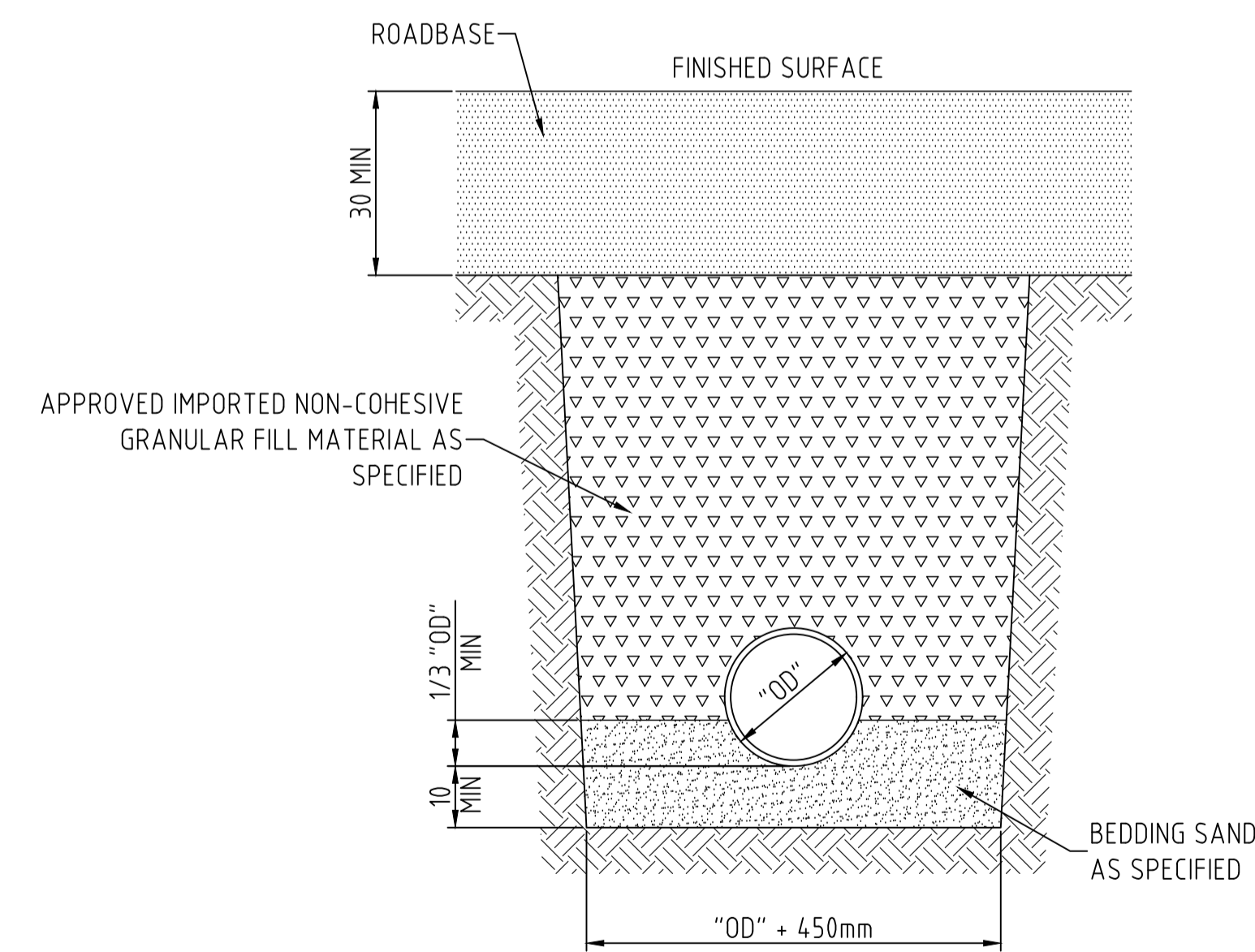
**TD 1 - TABLE DRAIN SECTION B-B**



**FLUSH KERB**  
SCALE = 1:10



**PIPE TRENCH - EARTH FOUNDATION**  
SCALE = 1:10



**PIPE TRENCH - ROADWAY**  
SCALE = 1:10

NOTE: PIPE COLLAR IS NOT TO REST ON ORIGINAL MATERIAL

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**RETAINING WALL LOADING NOTES**

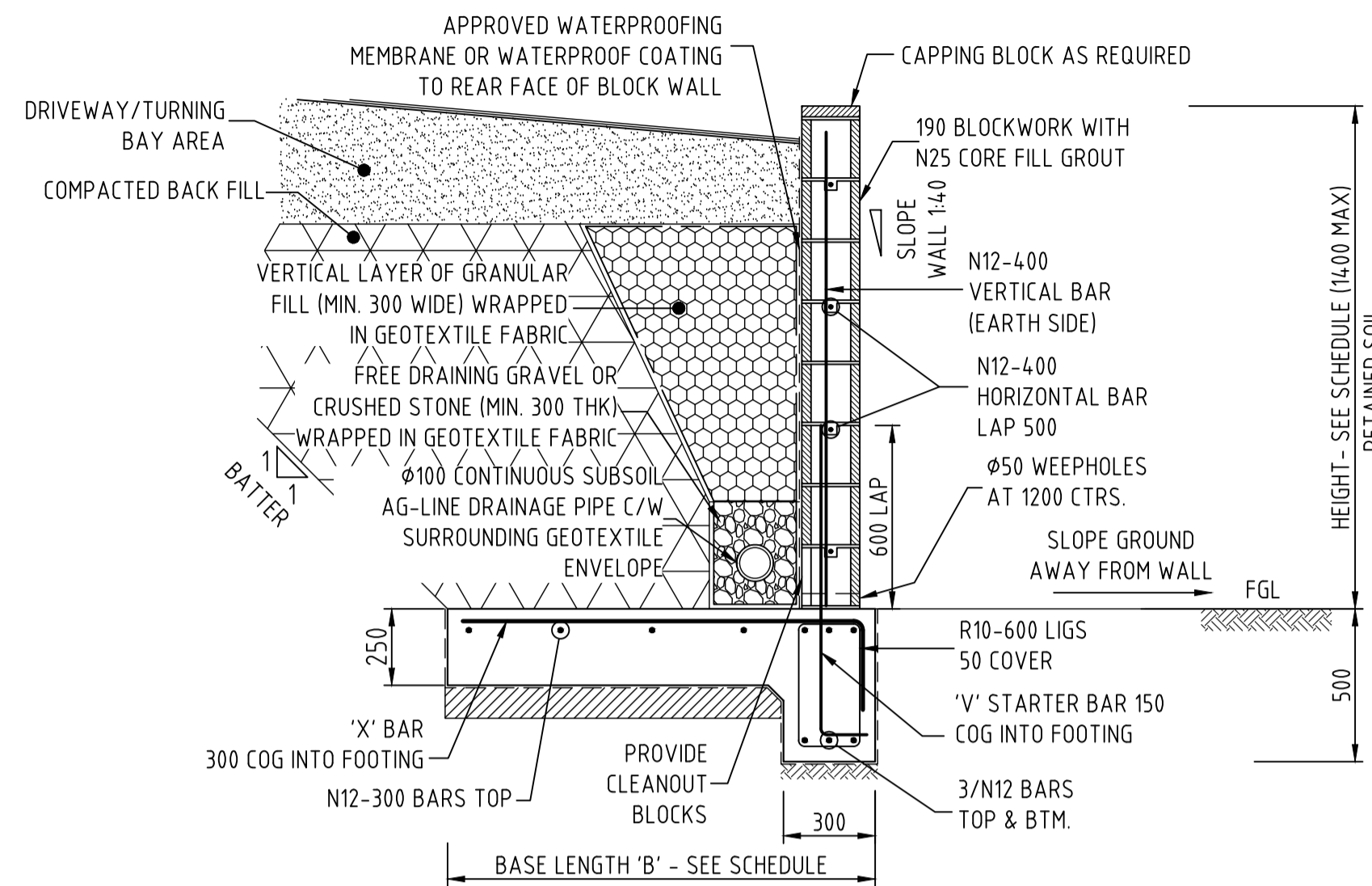
1. ALL LOADS HAVE BEEN DETERMINED ACCORDING TO AS1170-2002
2. DEAD LOADS:
  - A) SELF WEIGHT OF RETAINING WALL.
3. LIVE LOADS:
  - A) RETAINING WALL SURCHARGE LIVE LOAD = 5 kPa FOR MEDIUM VEHICLE LOADING TO AS1170-2002.
4. EARTH LOADS
  - A) RETAINED MATERIAL UNIT WIGHT,  $\gamma = 20 \text{ kN/m}^3$
  - B) LATERAL EARTH PRESSURE,  $K_a = 0.35$
  - C) NO HYDROSTATIC PRESSURES DESIGNED FOR.

**RETAINING WALL NOTES**

- A) RETAINING WALL
  1. CONCRETE EXPOSURE CLASSIFICATION = A2 TO AS3600-2009
  2. SLAB, BEAM & REINFORCEMENT AS PER DETAILS WITH 50 COVER
  3. CONCRETE IS TO BE GRADE N25 (25 MPa STRENGTH AT 28 DAYS)
  4. BASE PREPARATION: MIN. 100mm HARD-CORE BASE (DGB20 OR SIMILAR APPROVED) COMPACTED IN 150mm LAYERS TO 98% STANDARD COMPACTION.
  5. A WATERPROOF MEMBRANE CONSISTING OF A 0.2mm NOMINAL THICKNESS POLYETHYLENE FILM, SHALL BE PLACED UNDER ALL SLABS & BEAMS U.N.O. IT SHALL BE HIGH IMPACT RESISTANT IN ACCORD WITH CLAUSES 5.3.3.2 AND 5.3.3.3 OF AS2870-2011.
  6. SERVICES TO BE PLACED IN A 300mm WIDE x 450mm DEEP TRENCH A MINIMUM OF 600mm FROM FOOTING TO AVOID UNDERMINING OF FOOTINGS.

**MASONRY NOTES**

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3700-2018.
2. THE DESIGN STRENGTH OF MASONRY SHALL BE IN ACCORDANCE WITH THE MASONRY SCHEDULE BELOW. MORTAR ADMIXTURES SHALL NOT BE USED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.
3. MORTAR JOINTS SHALL BE 10mm THICK AND HAVE A MAXIMUM TOOLED DEPTH OF 3mm UNLESS NOTED OTHERWISE.
4. CLEANOUT HOLES SHALL BE PROVIDED AT THE BASE OF ALL CORES OR CAVITIES WHICH ARE TO BE GROUTED OR FILLED.
5. REINFORCING STEEL SHALL BE FIXED SECURELY IN POSITION PRIOR TO GROUTING.
6. ALL MORTAR OBSTRUCTIONS IN CORES OR CAVITIES SHALL BE REMOVED PRIOR TO GROUTING & FILLING. THIS MAY BE DONE USING A ROD FROM THE TOP OF THE WALL. ALL MORTAR THUS REMOVED SHALL BE CLEANED FROM THE BOTTOM OF THE WALL PRIOR TO CLEAN OUT HOLES BEING CLOSED FOR GROUTING.
7. GROUT FOR BOND BEAMS, LINTELS, CORE FILLING OR CAVITY FILLING SHALL COMPRISE OF A MIX OF CEMENT : LIME : 10mm AGGREGATE = 1:0.25:3 UNLESS OTHERWISE NOTED. MAXIMUM SLUMP TO BE 230mm.
8. CORES AND CAVITIES SHALL BE FILLED IN 1000mm MAXIMUM LIFTS WHERE REQUIRED.
9. GROUT SHALL BE THOROUGHLY COMPACTED USING A PLAIN BAR.
10. NO CHASES SHALL BE CUT INTO LOAD BEARING MASONRY WALLS WITHOUT THE APPROVAL OF THE ENGINEER.
11. VERTICAL CONTROL JOINTS SHALL BE POSITIONED IN ALL MASONRY WALLS AT 6000mm MAXIMUM CENTERS, AND AT SPECIFIC LOCATIONS LISTED BELOW:
  - A) AT MAJOR CHANGES IN WALL HEIGHT.
  - B) AT CHANGES IN WALL THICKNESS OTHER THAN FOR PIERS & BUTTRESSES.
  - C) AT CONTROL JOINTS IN FOOTINGS, FLOOR SLABS AND ROOF SLABS.
  - D) AT CHASES AND RECESSES FOR PIPES, COLUMNS, FIXTURES ETC.
  - E) AT ONE OR BOTH SIDES OF A WALL OPENING.
  - F) NEAR WALL INTERSECTIONS.
  - G) NEAR RETURN ANGLES IN "L", "T" & "U" SHAPED STRUCTURES.
12. THE BUILDER SHALL SUBMIT TO THE ENGINEER DRAWINGS FOR REVIEW OF PROPOSED LOCATIONS FOR CONTROL JOINTS, PRIOR TO LAYING ANY BLOCKS OR BRICKS.
13. OBSERVATION FOR THE CONSTRUCTION OF NON-LOADBEARING MASONRY WALLS, PARTITIONS AND OTHER NON-LOADBEARING ELEMENTS IS NOT INCLUDED IN THE STRUCTURAL ENGINEERS SCOPE OF WORK.
14. WHERE MASONRY WALLS ARE NON-LOADBEARING AT EITHER HORIZONTAL OR VERTICAL FACES, THEY SHALL BE SEPARATED FROM THE CONCRETE BY 12mm THICK "CANEITE" OR EXPANDED POLYSTYRENE UNLESS NOTED OTHERWISE.
15. NON-LOADBEARING MASONRY WALLS ARE TO BE KEPT A MINIMUM OF 15mm CLEAR FROM THE SOFFIT OF BEAMS AND SLABS OVER. IF THE WALL SERVES AS A FIRE SEPARATING WALL, THEN THE GAP SHALL BE FILLED WITH AN APPROVED FIRE RATED FLEXIBLE SEALANT.
16. ALL MASONRY IS TO BE FIXED TO ADJOINING CONCRETE AND OR STEEL SUPPORTING MEMBERS BY MFA 3/3 MASONRY ANCHORS OR EQUIVALENT AT 600 MAXIMUM CENTERS VERTICALLY, AND MFA 4/M MASONRY ANCHORS OR EQUIVALENT AT 1000 MAXIMUM CENTERS HORIZONTALLY UNLESS NOTED OTHERWISE.
17. WALL TIES SHALL BE PROVIDED AT 600mm MAXIMUM CENTERS HORIZONTALLY & VERTICALLY AND CONSIST OF 3.1mm DIA GALVANISED WIRE UNLESS NOTED OTHERWISE.
18. ALL MASONRY ANCHORS ARE TO BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS.
15. MASONRY IS NOT TO BE ERECTED OFF SUSPENDED WORK UNTIL ALL FORMWORK & FALSEWORK SYSTEMS PROVIDING SUPPORT HAVE BEEN REMOVED.
19. A 300mm WIDE STRIP OF COARSE GRAINED MATERIAL IS TO BE PLACED BEHIND ALL RETAINING WALLS.

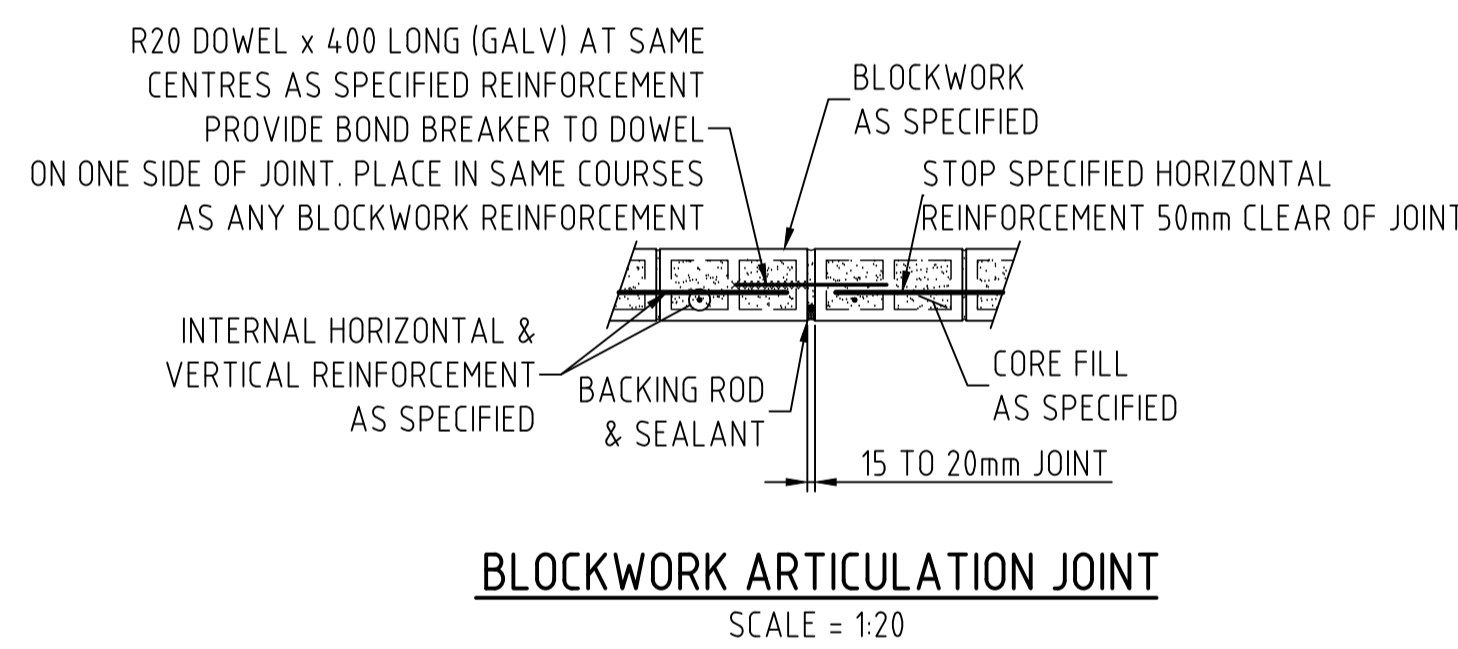


**RETAINING WALL (MAX. 1400 HIGH)**

RETAINING WALL SCHEDULE			
MAXIMUM HEIGHT (mm)	'V' STARTER BAR/ 'X' BAR (SIZE AND LAP)	BASE LENGTH 'B' LEVEL BACK FILL (mm)	BASE LENGTH 'B' MAX. 1:4 SLOPE (mm)
1400	N12 AT 400mm CTRS. 'V' BAR LAP 600 WITH VERT. BAR	1300	1700
1200	N12 AT 400mm CTRS. 'V' BAR LAP 600 WITH VERT. BAR	1100	1500
1000	N12 AT 400mm CTRS. 'V' BAR LAP 600 WITH VERT. BAR	1000	1200
800	N12 AT 400mm CTRS. 'V' BAR LAP 600 WITH VERT. BAR	800	1000
600	N12 AT 400mm CTRS. 'V' BAR LAP 600 WITH VERT. BAR	600	800

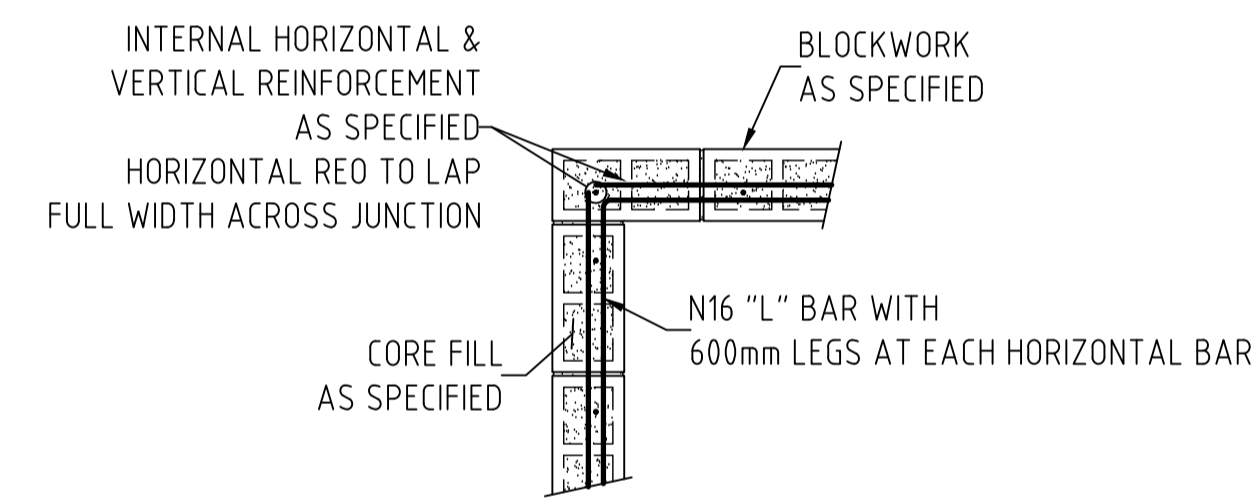
NOTE: REFER TO TYPICAL RETAINING WALL DETAIL

**BLOCKWORK ARTICULATION JOINT NOTE:**  
ARTICULATION JOINT TO BE POSITIONED AT 6m MAX. CTRS. REFER SPECIFIC DETAIL.



**BLOCKWORK ARTICULATION JOINT**

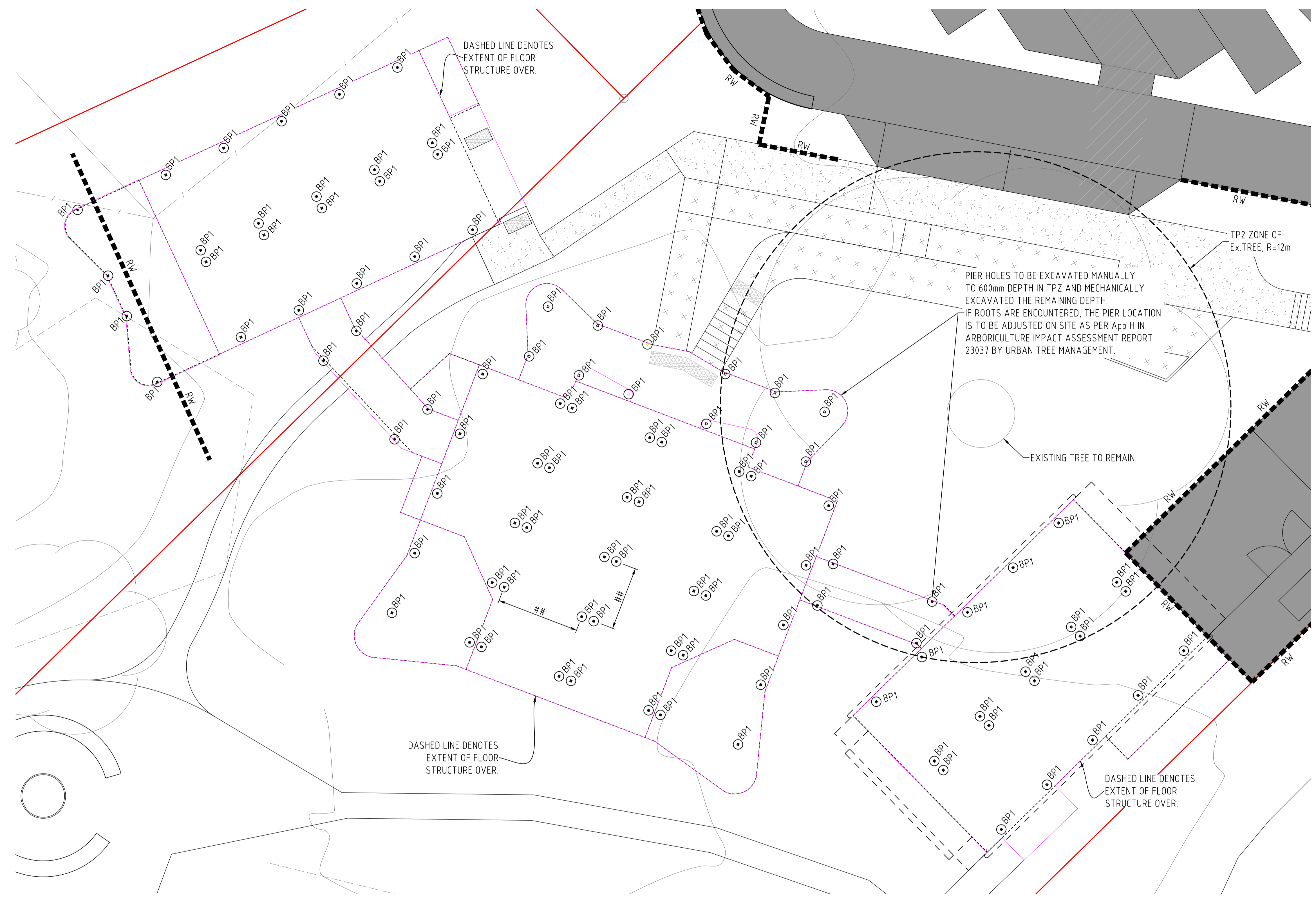
SCALE = 1:20



**BLOCK WALL "L" INTERSECTION DETAIL**

SCALE = 1:20

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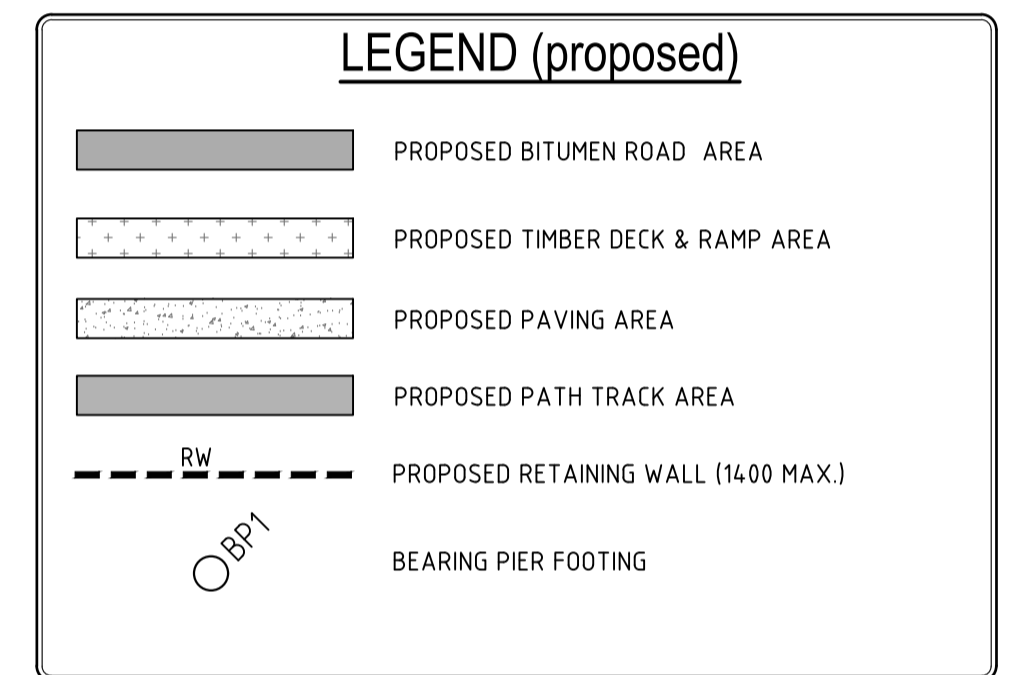


- GEOTECHNICAL NOTES**
- THESE SLAB & FOOTING HAS BEEN DESIGNED FOR A CLASS "H2-D" SITE AS DEFINED BY AS2870-2011, BASED UPON GEOTECHNICAL REPORT BY BARNSON PTY LTD, REFERENCE 32342-GR02\_A DATED 06th OCTOBER 2020.
  - FACTORED ALLOWABLE BEARING CAPACITIES  $Q_a$ : TO BE CONFIRMED ON SITE:
    - A) PIER BASE = 450 kPa
  - SKIN FRICTION  $f_s$ : TO BE CONFIRMED ON SITE
    - A) PIER SHAFTS = 35 kPa

- PAD & STRIP FOOTING NOTES**
- CONCRETE EXPOSURE CLASSIFICATION = A1 TO AS3600-2009
  - CONCRETE IS TO BE GRADE N25 (25 MPa STRENGTH AT 28 DAYS AGE)
  - FOOTING DEPTH & WIDTH AS PER RELATIVE DETAILS
  - FOOTING REINFORCEMENT AS SPECIFIED IN RELEVANT DETAILS WITH 50mm COVER
  - SERVICES TO BE PLACED IN A 300mm WIDE x 450mm DEEP TRENCH A MINIMUM OF 600mm FROM EDGE OF BUILDING TO AVOID UNDERMINING OF FOOTINGS.

**GENERIC DRAWINGS REFERENCE**  
 THIS PLAN SHALL BE READ IN CONJUNCTION WITH THE FOLLOWING REFERENCE DRAWINGS WHICH FORM PART OF THE PROJECT SPECIFICATION: G1000, G1001, G1002, G1003, G1004, G1005, G1006, G1007 & 32342-S02.

**LEGEND**  
 ## PIER FOOTING SPACING TO SUIT FLOORING SYSTEM DESIGN BY OTHERS

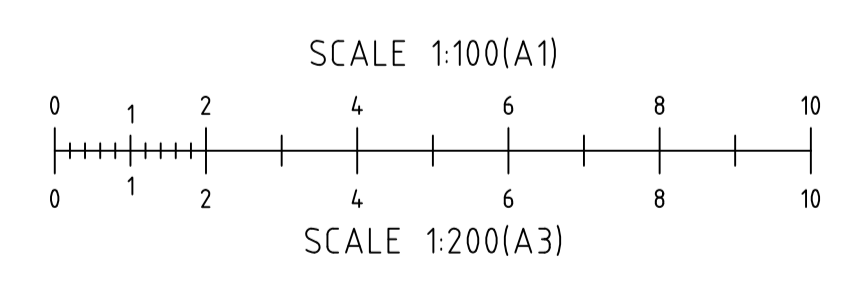


PIER HOLES TO BE EXCAVATED MANUALLY TO 600mm DEPTH IN TPZ AND MECHANICALLY EXCAVATED THE REMAINING DEPTH. IF ROOTS ARE ENCOUNTERED, THE PIER LOCATION IS TO BE ADJUSTED ON SITE AS PER App H IN ARBORICULTURE IMPACT ASSESSMENT REPORT 23037 BY URBAN TREE MANAGEMENT.

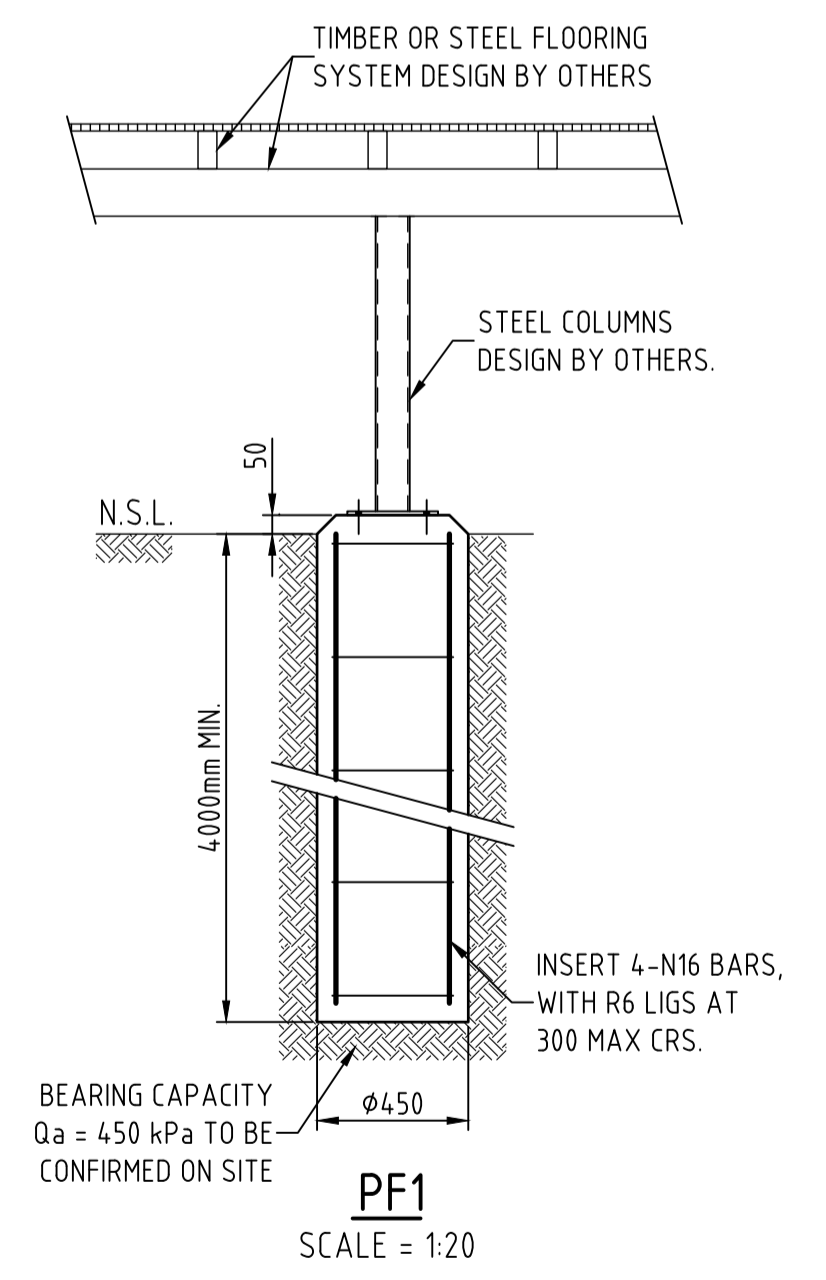
EXISTING TREE TO REMAIN.

DASHED LINE DENOTES EXTENT OF FLOOR STRUCTURE OVER.

DASHED LINE DENOTES EXTENT OF FLOOR STRUCTURE OVER.



**BEARING PIER FOOTING DESIGN PLAN**  
 REDUCTION RATIO 1:100 @ A1, 1:200 @ A3



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Client: TROPPO ARCHITECTS  
 Project: "MAARI MA" WILCANNIA WELL BEING CENTRE  
 ROSS & BONNEY STREETS, WILCANNIA NSW 2836  
 Drawing Title: BEARING PIER FOOTING DESIGN PLAN, DETAILS & NOTES

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A	23-04-2021	ISSUED FOR DA

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Check	LM	Drawing Number
Original Sheet Size = A1		32342 - C10
		Revision
		A

## **Appendix J - Preliminary Site Contamination Investigation**



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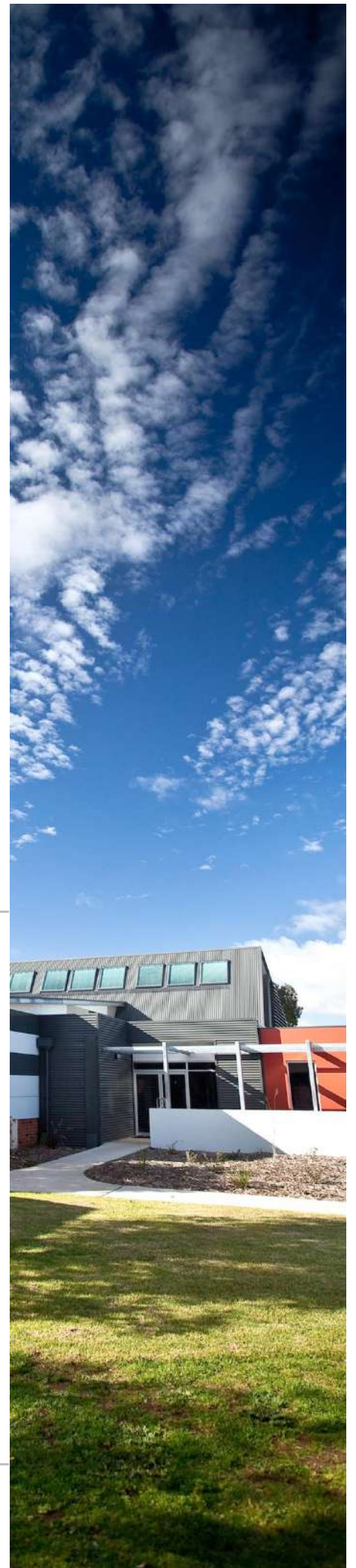
# Preliminary Site Contamination Assessment

Maari Ma Health Clinic  
Wilcannia  
NSW

(Our Reference:32342 ER01)

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## Disclaimer

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<b>Project Name:</b>	Preliminary Site Contamination Assessment Maari Ma Health Clinic, Wilcannia, NSW 2836
<b>Client:</b>	Troppo Architects
<b>Project No.</b>	32342
<b>Report Reference</b>	32342 ER01
<b>Date:</b>	28/07/2021
<b>Revision:</b>	Final

<b>Prepared by:</b>	<b>Reviewed by:</b>
	
Nardus Potgieter MSc(Chem) Environmental Scientist	Jim Sarantzouklis MAIBS MEHA RPIA Director

## EXECUTIVE SUMMARY

Barnson was engaged by Troppo Architects to undertake a preliminary contaminated site investigation in support of the development of a Maari Ma Health Clinic at Bonney Street, Wilcannia NSW, known as Lot 2, 3 and 4 DP 1201089 and Lot 111 DP 1201028 (referred to as the Subject Site).

The investigation has as its objectives to identify contamination issues that may affect the suitability of the Subject Site for the future commercial use of the site for the Maari Ma Health Clinic and assess the need for possible further investigations, and remediation or management of any contamination issues identified.

The investigation was based on a desktop review of information available for the Subject Site, as well as the findings of a site inspection and confirmatory sampling and analysis of surface soils collected at the site.

A review of the available historical information has deliberated that the Subject Site has not been used for activities/ uses that could be flagged as obvious contamination issues.

The potential for *significant* environmental contamination to be present across the Site has been deduced as being low, however, activities associated with the historical use of the Subject Site have been identified as having a potential to contaminate surface soil. The following potential sources and areas of contamination were identified:

- Historical structures
- Vehicles accessing the Site
- Unclassified fill

A site inspection, supplemented with confirmatory sampling and analysis, was conducted to determine the presence and significance of potential contamination associated with the identified sources.

Based on the findings of the desktop review and site investigation it can be stated with a reasonable level of confidence that the Subject Site is unlikely to be contaminated. This finding is supported with analytical results of soil samples collected at the Subject Site, in which no contaminants were detected above health-risk based screening criteria. The Subject Site is therefore considered suitable for the proposed future commercial use as Health Clinic.

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## APPENDICES

Appendix A – Chain of Custody and Laboratory Report

## 1.0 INTRODUCTION

### 1.1 Background

Barnson was engaged by Troppo Architects (the Client) to undertake a preliminary contaminated site investigation in support of a Maari Ma Health Clinic on Lot 2,3 and 4 DP 1201089 and Lot 111 DP 1201028, known as Bonney Street, Wilcannia, NSW (hereafter referred to as the Subject Site).

The Client has submitted a request for a Preliminary Site Investigation (PSI) in support of the construction of the Maari Ma Health Clinic with associated car parking, ambulance and drop off areas, "Keeping Well" section, nerve centre, 'healthy start' section, entry deck and Elders' deck, community/ gathering areas and landscaping associated with the proposed development.

In accordance with the State Environmental Planning Policy 55 (Remediation of Land) the consent authority must determine if land is contaminated and, if so, whether it is suitable for the intended purpose or require remediation.

### 1.2 Objectives

The objectives of the investigation are:

- Identify contamination that may affect the site's suitability for residential development, and;
- Assess the need for possible further investigations, remediation or management of any contamination identified.

### 1.3 Scope of Work

To meet the objectives, Barnson completed the following scope of work:

- Site identification including a review of site history, site condition, surrounding environment, geology and, where available, hydrogeology.
- Desktop review of site history and assessment of potential sources of contamination.
- Development of a Conceptual Site Model (CSM) with information gathered from the data review and site inspection.
- Site inspection to assess site conditions.
- Collection of confirmatory soil samples and analysis to determine nature of possible contamination.
- Provide conclusions as to the suitability of the site for the intended future land use.
- Preparation of a report.

### 1.4 Purpose of this report

The purpose of this report is to document, with cognisance of the Guidelines of Consultants Reporting on Contaminated sites (NSW EPA, 2020), works undertaken, in accordance with the scope of works as described in Section 1.3, results of the desktop review and site inspection, and recommendations for further actions required to determine fitness of the site for the use.

## 1.5 Assumptions and Limitations

The following assumptions have been made in preparing this report:

- The future use of the site will be for a health services facility in the form of the Maari Ma Health Clinic, which is pursuant the *Central Darling Local Environmental Plan 2012*. This assumption forms the basis for the conceptual site model (Section 4).
- All information pertaining to the contamination status of the site has been obtained through public record searches, a preliminary site inspection and analysis of confirmatory samples collected at the Subject Site. All documents and information in relation to the Subject Site, which were obtained from public records, are accepted to be correct and has not been independently verified or checked.

It should be recognised that even the most comprehensive site assessments may fail to detect all contamination on a site. This is because contaminants may be present in areas that were not previously surveyed or sampled or may migrate to areas that showed no signs of contamination when sampled. Investigative works undertaken at the Subject Site by Barnson identified actual conditions only at those locations in which sampling and analysis were performed. Opinions regarding the conditions of the site have been expressed based on historical information and analytical data obtained and interpreted from previous assessments of the site. Barnson does not take responsibility for any consequences as a result of variations in site conditions.

## 2.0 SITE DESCRIPTION

### 2.1 Site Identification

Table 2.1 presents a summary of the available information pertaining to the identification of the Subject Site. The Subject Site is zoned as General Residential (R1). The information regarding the Subject Site is in Table 2.1 below.

Figure 2.1 presents a map indicating the location of the Subject Site.

**Table 2.1: Summary of Subject Site identification details.**

Information	Details
Site address	Bonney Street, Wilcannia, NSW, 2836
Lot/Section and Deposited Plan No.	Lot 2, 3 and 4 DP 1201089 and Lot 111 DP 1201028
Zoning	R1 – General Residential
County	Young
Parish	Wilcannia
Local Government Area	Central Darling Shire Council



**Figure 2.1:** Location of the Subject Site.

## 2.2 Layout and Features

Figure 2.1 shows the Subject Site has a direct frontage to Bonney Street which is connected to Ross Street. Bonney Street is to become the entrance to the proposed development. The southern boundary of the site is bounded by the Darling River, the east is adjacent the Wilcannia Hospital and to the west are residential developments. The Subject Site is located approximately 800m from the main business district of the Wilcannia township.

The Subject Site has previously been used for water supply with evidence of a pump shed adjacent the Subject Site and other unknown uses as remnants of an old building were also found on site. An unsealed road (Bonney Street) is the entrance to the Subject Site. The site is abundant in vegetation, as shown in Figure 2.1, and is covered in a variety of flora including trees, shrubs, and grasses.

Figure 2.2 presents a plan of the Subject Site that is supplemented with photographs showing the different elements of the Site (Figure 2.3 to Figure 2.7). Figure 2.2 includes markers indicating the vantage point and direction of the photographs.



Figure 2.2: Existing Subject Site layout.



Figure 2.3: Photo A –Photo of existing driveway heading west of the Subject Site



Figure 2.4: Photo B – View of the Subject Site.



Figure 2.5: Photo C – View of pump shed on adjacent Lot



Figure 2.6: Photo D – Remnants of old building adjacent pump shed.



Figure 2.7: Photo E – Photo of fill and brick remnants on site

### 2.3 Proposed Development

Tropo Architects approached Barnson to provide support in the preparation of a Development Application (DA) for the proposed Maari Ma Health Clinic within the township of Wilcannia on Lot 2, 3 and 4 DP 1201089 and Lot 111 DP 1201028. The development will include associated car parking, ambulance and drop off areas, “Keeping Well” section, nerve centre, “Healthy Start” Section, entry deck and elders’ deck, community and gathering areas and related landscaping throughout. The proposed development can be deemed a health services facility.

Figure 2.8 shows a detailed layout of the proposed health clinic and its associated developments. It is accepted that the proposed development will not require to significantly disturb the surface soil of the Subject Site.





MAARI MA WELLBEING CENTRE - WILCANNIA  
 SITE PLAN - KITCHEN IN HEALTHY START  
 23.07.2020

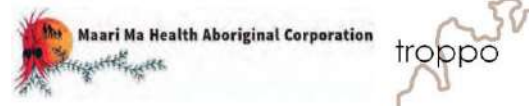


Figure 2.8: Proposed development layout

## 3.0 SITE SETTING

### 3.1 Geology

A review of the 1:250000 Geology map of Wilcannia (refer to Figure 3.1) shows that geologically, the Subject Site is underlain by Mesozoic age units of sandstone, siltstone and claystone; with flat to gently undulating plains of red and brown clayey sand, loam and lateritic soils.

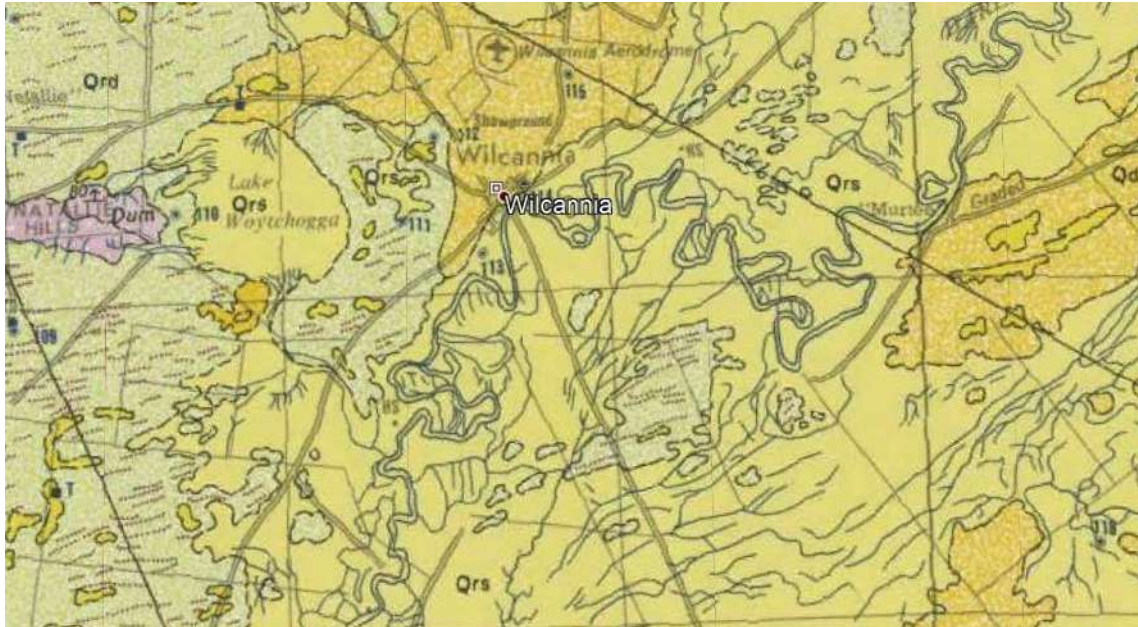


Figure 3.1: Wilcannia 1:250000 geology map showing the location of the Subject Site

An examination of the Geological Survey of NSW maps of Naturally Occurring Asbestos (accessed on 27<sup>th</sup> of July 2021), shows that the geological units underlying the Subject Site has no asbestos potential.

### 3.2 Soils

The dominant soil type at the Subject Site is described as moderately deep sands and red earths with loamy sand to sandy loam topsoils. The is amenable to water sheet erosion under low vegetation cover.

The Atlas of Australian Acid Sulfate Soil has the subject site in an area of 'very low' probability of occurrence (a 0-5% chance of occurrence).

### 3.3 Topography and Drainage

Figure 3.2 presents topographical information overlain on the map of the Subject Site. The presented data shows that the Subject Site is relatively flat throughout. there is a gradual fall from the north-eastern end of the Subject Site to the south-western.

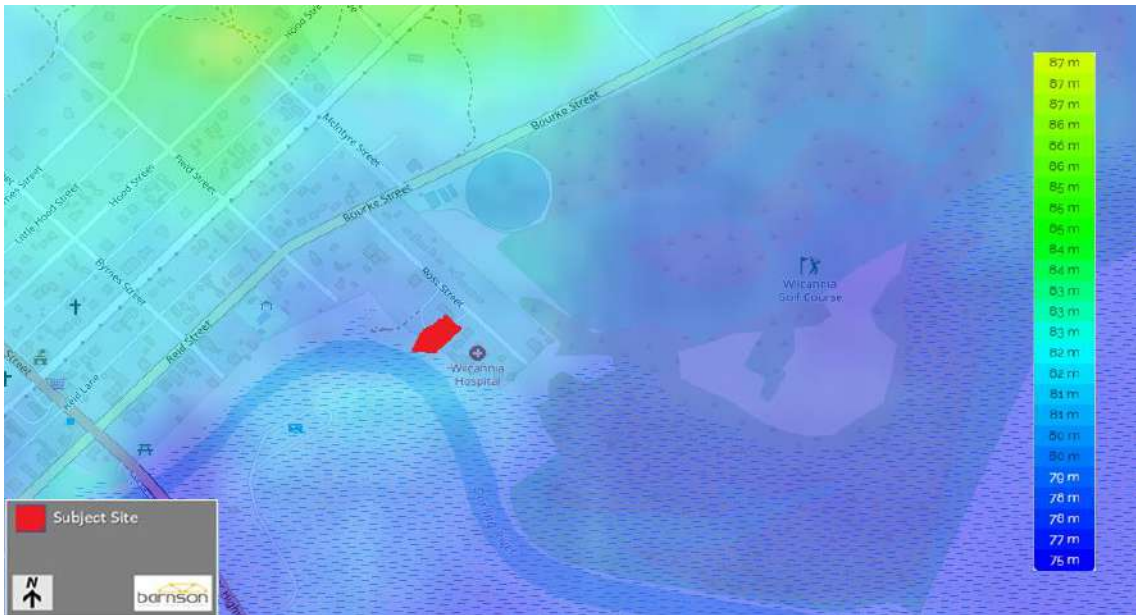


Figure 3.2: Subject Site topography.

The nearest natural water body to the Subject Site is the Darling River, which at its closest is located at a distance of less than 10m to the south-west.

### 3.4 Groundwater Resources

A review of existing groundwater bore records (WaterNSW, 2021) indicate no registered groundwater bores inside the boundary of the Subject Site, and only one within 500m of the Subject Site. The only groundwater bore within 500m of the Subject Site is identified in Figure 3.3, it is located to the north-west of the site.



Figure 3.3: Groundwater bores near the Subject Site.

The information recorded in the database for the closest off-site bore indicate the depth of the bore is 35.10m with a Standing Water Level (SWL) of 12.20m. The shallowest water bearing zone for GW019002 was recorded at 33.50m. According to the database, the bore is for domestic/general use purposes.

The *Central Darling Local Environmental Plan 2012* does not offer information regarding the locality's groundwater vulnerability.

## 4.0 SITE HISTORY

### 4.1 Historical Land Use

Historical aerial images show the Subject Site has defined vehicular access in the form of an unsealed vehicle path which leads both to the river and a water pump shed. There is evidence of a demolished building near the pump shed, however when the building was demolished is unknown. The rest of the Subject Site is abundant with vegetation, with one tree being identified as a scar tree, having heritage significance.

### 4.2 Historical Record of Site Contamination

Datasets maintained by the Office of Environment and Heritage (OEH) including notices under CLM Act, POEO Environment Protection License Register and environmental incidents were reviewed.

- **List of NSW contaminated sites notified to EPA** – The sites appearing on the OEH "List of NSW contaminated sites notified to the EPA" indicate that the notifiers consider that the sites are contaminated and warrant reporting to EPA. However, the contamination may or may not be significant enough to warrant regulation by the EPA. The EPA needs to review information before it can make a determination as to whether the site warrants regulation. A search of the listing returned no record for the Subject Site.
- **Contaminated Land Record of Notices** – A site will be on the Contaminated Land Record of Notices only if the EPA has issued a regulatory notice in relation to the site under the *Contaminated Land Management Act 1997*. A search of the register in July 2021 returned no record for the Subject Site and indicated no listings for any site within a radius of 1,000m.

There is further no record of the Subject Site or within a radius of 1,000m from these areas, in any of the following databases:

- Former Gasworks database
- EPA PFAS Investigation Program
- Defence PFAS Investigation & Management Program
- Air services Australia National PFAS Management Program
- Defence 3 Year Regional Contamination Investigation Program

### 4.3 Previous Site Investigations

No information relating to any previous assessment of contamination at the Subject Site was available for review.

## 5.0 CONCEPTUAL SITE MODEL

### 5.1 General

The conceptual site model (CSM) is intended to provide an understanding of the potential for contamination and exposure to contaminants within the investigation areas. The CSM draws together the available historical information for the site, with site specific geological, and hydrogeological information to identify potential contaminants, contamination sources, migration and exposure pathways and sensitive receptors.

### 5.2 Sources

The identification of sources presented here is based on the review of available historical information and photographs, as well as an understanding of current conditions at the Subject Site. The following is a summary of the potentially contaminated areas and sources of contamination identified:

- Historical structures

The Subject Site include remnants (demolition waste) of former structures. The former structures could potentially have included hazardous materials such as asbestos and lead based paint. Deterioration and demolition of the former structures can result in the localised dispersion of hazardous materials over the surface of the Subject Site.

- Vehicles accessing the Site

The well-defined informal vehicle path crossing the Subject Site is evidence of motorised vehicles entering and driving across the surface of the site. These vehicles can potentially contribute to localised hydrocarbon contamination of the surface soils in this area.

- Unclassified fill

There is evidence of fill material being stockpiled at the Subject Site. Unclassified fill material could potentially originate from other contaminated sites or could contain demolition wastes contaminated with hazardous materials such as asbestos or lead based paints.

- Uncontrolled disposal of waste.

Although the Subject Site is not fenced and is clearly accessible by vehicles there is no evidence to suggest that significant quantities of domestic or demolition waste has been disposed of at the Subject Site. Uncontrolled disposal of waste is therefore not considered a potential source of contamination.

### 5.3 Contaminants of Potential Concern

Considering the potential sources relevant to the Subject Site, a wide variety of contaminants may be present. With the demolition waste and unclassified fill material, as well as the movement of vehicles across the site considered the primary potential sources of contamination, hazardous materials (i.e. asbestos and lead based paint) and hydrocarbons are accepted as the most likely contaminants.

Based on this understanding of the site history and activities, the contaminants of potential concern identified for the investigation include:

- heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn);
- hydrocarbons (mainly fuel and lubricants); and
- asbestos.

### 5.4 Pathways

The primary pathways by which receptors could be exposed to the contaminants outlined above include:

- Inhalation of dust or vapours.
- Dermal contact with contaminated soils.
- Incidental ingestion of contaminated soils.
- Surface runoff, sediment transport and discharge to surface waters.
- Vertical and horizontal migration of contamination through the soils into the underlying groundwater.

Of the listed potential pathways, the contamination of water resources through infiltration is considered the most unlikely. The Subject Site is not indicated as a groundwater vulnerable zone and the depth to groundwater in the general area is reported as >30m. This depth to groundwater would limit vertical migration of any contaminants which may be entering the surface soil from above.

### 5.5 Receptors

Potential receptors may include:

#### *Human receptor populations*

- Visitors to the site (e.g. members of the public making use of the facility, workers conducting maintenance, contractors,);
- Workers at the Clinic; and
- Workers involved in the construction of the Clinic facility.

#### *Environmental Receptors*

- Local drainage channels and receiving surface water bodies; and
- Groundwater resources beneath the site (negligible likelihood of contamination expected).

## 5.6 Potential for Contamination

The Subject Site is not listed in any of the contaminated land databases. Based on the results of the desktop assessment, the overall likelihood for *significant* chemical contamination to be present within the site is low.

Although former land use and activities at the site is reasoned to have a potential for contaminating surface soils, the type and quantity of contaminants introduced through this land use is not expected to have led to significant contamination.

## 6.0 SITE INSPECTION

### 6.1 General

The objective of the investigation is to determine whether there are any environmental risks associated with the Subject Site that could affect the proposed future development and would require further investigation or action to render the site suitable for its intended use.

The desktop evaluation of the site history and current use of the site did not identify any significant risks in this regard but did identify both historical and current land use activities that could contribute to contamination of the surface soils of the Subject Site.

Barnson conducted an inspection of the Subject Site on 11 March 2021. The purpose of the site inspection was to verify the findings of the desktop assessment, as well as to collect confirmatory samples of soil from areas of the Subject Site where development is proposed or contamination is suspected. Based on the findings of the CSM the inspection and sampling were focussed on the surface soils (50-300mm). The site inspection included all areas of the Subject Site.

During the site inspection the following observations were made:

- The Subject Site is in general good order without visible signs of disturbance to the soils or vegetation at the Site.
- All visible open ground and prominent features at the Subject Site were inspected. No visible discoloration or staining of open ground or soil, and no obvious discoloration or irregularities in the occurrence of vegetation was observed during the inspection.
- Concrete and bricks remaining from the demolition of the historical structures at the site were observed at two locations (see Figure 6.1).



**Figure 6.1: Historical demolition waste.**

- The areas with demolition waste were carefully inspected for hazardous materials. No evidence of any fibre cement sheeting, paint or staining associated with hydrocarbons were observed.
- No evidence of any waste disposal was noted at the Subject Site and no general waste was observed in any other part of the Subject Site during the site inspection.
- A stockpile of fill material was observed near the informal vehicle pathway.
- There is a drainage channel across the western portion of the Site, draining stormwater runoff across the site to the Darling River.

## **6.2 Confirmatory Sampling**

The purpose of collecting confirmatory samples as part of the site inspection is to determine if any of the potential contaminants identified from the CSM are present. The samples are not intended for statistically valid characterisation or quantification of contamination levels. The collection of surface soil samples at the site was therefore focussed on areas where contamination of the surface soil could most likely have occurred or accumulated.

Samples of soil were collected from the stockpile of fill material as well as the drainage channel. Reasoning is that any surface soil contamination present at the Subject Site could have washed down and accumulated in the sediments of the drainage channel. It has to be noted that the drainage channel in the most part crosses through other lots not included in the Subject Site. Any contamination potentially present at any of these off-site lots may also accumulate in the drainage channel.

Table 6.1 is a summary description of the collected samples.



**Table 6.1: Summary of sample details.**

Sample Reference Number	Description
BLF-01	Soil sample collected from fill stockpile.
BLF-02	Soil sample collected from fill stockpile.
BLF-03	Soil sample collected from fill stockpile.
BLF-04	Sediment (0-100mm) sample collected from drainage channel.

The pattern followed for the soil sampling can be described as Judgement Sampling, where points are selected on the basis of the investigator’s knowledge of the proposed land use and likely distribution of contaminants at a site. It is an efficient sampling method for confirmatory sampling that utilises knowledge of the site history and field observations to direct sample collection (NSW EPA, 1995).

All samples were submitted to the Envirolab Services laboratory in Sydney, for determination of the following parameters:

- metallic element (cadmium, chromium, copper, lead, nickel and zinc) concentrations, including arsenic and mercury in soil;
- extraction with organic solvent and analysis of Total Recoverable Hydrocarbons (TRH) fractions C6 to C40, benzene, toluene, ethylbenzene and total xylene (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs), polychlorinated biphenyls (PCBs); and
- the presence of asbestos fibres.

Although pesticides and herbicides are not considered potential contaminants for the Subject Site, the analytical package included extraction with organic solvent and analysis of Organochlorine (OCP) and Organophosphorus (OPP) pesticide compounds. The laboratory is NATA accredited for all the analysis indicated above.

### 6.3 Analytical Results

The Envirolab Services laboratory report for the samples is attached as Appendix A. The laboratory report indicates that heavy metals, mixtures of straight chain organic compounds ranging from C10 to C40 and trace quantities of polycyclic organic compounds were detected in the soil. The concentrations of petroleum hydrocarbons, asbestos (total recoverable) as well as persistent pesticide and herbicide compounds are indicated as below the limits of detection in the surface soil samples.

The metals detected include chromium (Cr), copper (Cu), lead (Pb), nickel (Ni), and zinc (Zn). Concentrations of arsenic, cadmium and mercury are reported to be below the limit of detection in all samples.

Table 6.2 presents a summary of the compounds and elements detected above the limit of detection. The laboratory performed a duplicate and triplicate (metals only) analysis of sample BLF-01 for quality control purposes. The results of this duplicate and triplicate analysis are also listed in Table 6.2.

**Table 6.2: Summary of metal, hydrocarbon and pesticide concentrations detected in surface soil samples from the Subject Site.**

Analyte	BLF-01	BLF -01 Duplicate	BLF -01 Triplicate	BLF -02	BLF -03	BLF -04
	mg.kg <sup>-1</sup>					
<i>Metals (mg.kg<sup>-1</sup>)</i>						
Arsenic (As)	<4	<4	<4	<4	<4	<4
Cadmium (Cd)	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium (Cr)	14	13	14	12	13	21
Copper (Cu)	29	24	24	16	11	16
Lead (Pb)	42	35	36	54	51	11
Mercury (Hg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel (Ni)	8	8	8	7	7	16
Zinc (Zn)	370	240	210	85	120	38
<i>Hydrocarbons (mg.kg<sup>-1</sup>)</i>						
TRH C10 - C14	<50	<50	-	<50	<50	74
TRH C15 - C28	140	150	-	<100	<100	420
TRH C29 - C36	110	120	-	<100	<100	440
TRH >C10-C16	<50	<50	-	<50	<50	130
TRH >C10 - C16 less Naphthalene (F2)	<50	<50	-	<50	<50	130
TRH >C16-C34 (F3)	220	240	-	<100	<100	680
TRH >C34-C40 (F4)	<100	<100	-	<100	<100	360
Total positive PAHs	<0.05	<0.05	-	<0.05	0.82	<0.05
<i>Pesticide (mg.kg<sup>-1</sup>)</i>						
Dieldrin	0.2	0.2	-	<0.1	<0.1	<0.1

The laboratory results further indicate that no asbestos fibres were present in any of the soil samples analysed.

## 6.4 Analytical Data Quality

Samples were collected in new, clean containers using cleaned equipment and were placed in glass jars provided by the laboratory that were refrigerated after filling and transported in an insulated container to the laboratory. Chain of custody was recorded for all samples. A copy of the signed sheet is attached as Appendix A.

The analyses were undertaken at a NATA accredited laboratory. The laboratory quality control procedures in the form of duplicates as well as analyte and surrogate spikes were applied to all contaminant classes analysed. The results reported for the duplicate is within the Relative Percent Difference range of the acceptance criteria for a duplicate sample. The analyte spike recoveries reported for the different sets of organic analytes are indicated as within the acceptance criteria (see Appendix A).

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 contaminated site investigation.

## 7.0 ASSESSMENT

### 7.1 Assessment Criteria - Human Health and Environmental Risk

Screening for human health and ecological risk, utilises published human health investigation levels (HILs) and ecological screening and investigation levels (ESLs & EILs) from the National Environment Protection (Assessment of Site Contamination) Measure (NEPC, 1999) to identify contaminant concentrations in soil that may pose a risk to future residents, people visiting the site, or to ecological receptors.

HILs are scientifically based, generic assessment criteria designed to be used in the screening of potential risks to human health from chronic exposure to contaminants. HIL's are conservatively derived and are designed to be protective of human health under the majority of circumstances, soil types and human susceptibilities and thus represent a reasonable 'worst-case' scenario for specific land-use settings. The HILs selected for evaluation of the Subject Site, and its intended use as clinic facility, are those derived for commercial/industrial land use (HIL-D) and assumes a commercial land use such as shops, offices or factories with associated levels of access to potentially contaminated soil.

The health risks associated with petroleum hydrocarbon compounds are assessed using Health Screening Levels (HSLs) developed to be protective of human health by determining the reasonable maximum exposure from sources for a range of situations commonly encountered on contaminated sites. HSLs are derived for soil, groundwater and soil vapour and relate to exposure to petroleum hydrocarbons through the vapour inhalation exposure pathway only. Direct exposure pathways such as incidental soil ingestion and dermal exposure pathways are generally not the risk drivers when compared to inhalation exposure (NEPC, 1999). HSLs have been developed for BTEX and naphthalene plus four hydrocarbon fractions namely:

- C6 – C10- Fraction number F1
- >C10 – C16 less Naphthalene - Fraction number F2
- >C16 – C34 - Fraction number F3
- >C34 – C40 - Fraction number F4

Screening values published for polycyclic aromatic hydrocarbons (PAHs) consider the combined total concentration of all PAH compounds detected.

Although the primary concern in most site assessments is protection of human health, the assessment should also include consideration of ecological risks and protection of groundwater resources that may result from site contamination. EILs provide screening criteria to assess the effect of contaminants on a soil ecosystem and afford species level protection for organisms that frequent or inhabit soil and protect essential soil processes.

Ecological investigation levels (EILs) have been derived for common metallic contaminants in soil. The values selected for the evaluation of the heavy metals detected in the soil samples from the Subject Site considers the physicochemical properties of soil and contaminants and the capacity of the soil to accommodate increases in contaminant levels above natural background while maintaining ecosystem protection for identified land uses.

Table 7.1 presents a summary of the health-risk based criteria and ecological investigation levels selected for assessment of the detected metal, PAH and pesticide concentrations. Screening values for commercial land use are presented.

**Table 7.1: Human health and ecological risk screening levels for metals.**

Element	Health-based Investigation Levels	Ecological Investigation Levels (EIL)
	HIL D Commercial mg.kg <sup>-1</sup>	Commercial mg.kg <sup>-1</sup>
Arsenic (As)	3,000	160
Cadmium (Cd)	900	NA
Chromium (Cr) (Total)	NR	680
Copper (Cu)	240,000	320
Lead (Pb)	1,500	1,800
Mercury (Hg)	730	NA
Nickel (Ni)	6,000	460
Zinc (Zn)	400,000	460
Total PAH	4,000	NA
Dieldrin	45	NA

Note: NR=not relevant due to low human toxicity of Cr(III). NA=No applicable screening level. EILs selected for urban residential and commercial land use scenario.

Ecological risks associated with hydrocarbons are evaluated by using ecological screening levels (ESLs), which are based on EC<sub>25</sub> weight-of-evidence ecotoxicity data, evaluated for a residential land use scenario (NEPC, 1999). The ESLs (Table 7.2) are evaluated for the same four carbon chain fraction ranges (F1 to F4) listed above. Screening values for both commercial and residential exposure scenarios are listed.

**Table 7.2: Human health and ecological risk screening levels for hydrocarbon fractions.**

Fraction	Management limits for TPH in Soil	Health Screening Levels (HSLs) for vapour intrusion		Ecological Screening Levels (ESL)
	Residential/ Commercial	Commercial (sand)	Commercial	Commercial
	mg.kg <sup>-1</sup>	mg.kg <sup>-1</sup> (soil)		mg.kg <sup>-1</sup>
F1	700	260		215
F2	1,000	NA		170
F3	2,500	NA		2,500
F4	10,000	NA		6,600

NA=No applicable screening level.

It was confirmed that limits of detection reported by the laboratory are below the criteria values. All other contaminants analysed for in the soil samples that are reported below the limit of detection by the laboratory can therefore be excluded from further assessment.

## 7.2 Findings

The following findings are presented:

- Direct comparison of the analytical results presented in Table 6.2 with the assessment criteria for commercial land use (refer Table 7.1 and Table 7.2) show that concentrations for all elements and compounds detected in the samples of soil collected at the Subject Site are well below the commercial health-risk based and ecological screening values used for the assessment.
- Concentrations of hydrocarbon fractions were detected in the sample of sediment collected from the drainage channel as well as in one of the three samples collected from the stockpile of fill. The source of the hydrocarbons in the drainage channel sediment is likely off site as no evidence of hydrocarbon contamination was observed in the vicinity of the channel at the Subject Site. The source of the hydrocarbons in the sample of fill is uncertain as no hydrocarbons were detected in any of the other fill samples.
- The hydrocarbon concentrations detected in the sediment and fill are low, even compared to conservative screening levels. However, the presence of these compounds and the variety of compounds measured does indicate the drainage channel conveys contaminated runoff from other areas off-site and can, over time, accumulate in the sediments of the channel contaminants from this runoff.
- The general low concentrations of heavy metals detected in the soil samples at the Subject Site suggest naturally occurring element abundance and are most likely not related to contamination.
- No other contaminants evaluated were detected at concentrations exceeding commercial, screening criteria.
- The confirmatory soil samples thus support the assertion that significant and widespread chemical contamination is unlikely to be present within the Subject Site.

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

### 8.1 Conclusions

In accordance with the objectives stated in Section 1.2, and based on the information contained within this assessment, the following conclusions are presented (subject to the limitations noted in Section 1.5):

- Activities associated with the historical and current use of the Subject Site were identified as having a potential to contaminate surface soil at the site.
- The following potential sources of contamination were identified:
  - Historical structures
  - Vehicles accessing the Site
  - Unclassified fill
- A review of the available historical information, including contaminated sites databases and aerial photographs, indicated a low potential for significant environmental contamination to be present across the Subject Site.
- A site investigation and confirmatory soil sampling confirmed that concentrations of all contaminants investigated were below health-risk based screening criteria, for commercial land use, in all surface soil samples collected. Only traces of one persistent pesticide and hydrocarbons were detected in the samples of fill material.
- The highest concentrations of hydrocarbons were detected in the soil sample collected from the drainage channel. The concentrations detected were, however, still below both health and ecological screening levels for commercial land use.
- The screening criteria used in the evaluation of the contaminant concentrations were appropriately conservative and suitable for assessment of the proposed commercial land use.

### 8.2 Recommendations

- Based on the findings of the desktop review and site investigation it can be stated with a reasonable level of confidence that the Subject Site is suitable for the proposed re-development and land use.
- It is recommended that the stockpiles of fill material as well as demolition waste present at the Subject Site be removed and appropriately disposed, prior to the commencement of any earthworks or construction.
- It is recommended that any material excavated from the drainage channel or its banks be appropriately classified in terms of the Excavated Natural Materials Order ( (NSW EPA, 2014)) prior to being used on-site or removed off site.

## 9.0 REFERENCES

- NEPC. (1999). *National Environment Protection (Assessment of Site Contamination) Measure (as amended, 2013)*. National Environment Protection Council.
- NSW EPA. (1995). *Contaminated Sites: Sampling Guidelines*. NSW Environmental Protection Agency.
- NSW EPA. (2014). *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The excavated natural material order 2014*. Sydney: NSW Environmental Protection Authority.
- NSW EPA. (2020). *Consultants Reporting on Contaminated Land, Contaminated Land Guidelines*. Sydney: NSW Environmental Protection Authority.
- WaterNSW. (2021). *Real Time Data*. Retrieved June 17, 2021, from Water NSW: <https://realtimedata.watarnsw.com.au/water.stm>

## **Appendix A - Chain of Custody and Laboratory Report**



## CERTIFICATE OF ANALYSIS 264406

### Client Details

<b>Client</b>	Barnson (Mudgee)
<b>Attention</b>	Nardus Potgieter
<b>Address</b>	Unit 2/108-110 Market St, Mudgee, NSW, 2850

### Sample Details

<b>Your Reference</b>	<b>32342</b>
<b>Number of Samples</b>	4 soil
<b>Date samples received</b>	16/03/2021
<b>Date completed instructions received</b>	16/03/2021

### Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.  
 Samples were analysed as received from the client. Results relate specifically to the samples as received.  
 Results are reported on a dry weight basis for solids and on an as received basis for other matrices.  
**Please refer to the last page of this report for any comments relating to the results.**

### Report Details

<b>Date results requested by</b>	23/03/2021
<b>Date of Issue</b>	22/03/2021
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. <b>Tests not covered by NATA are denoted with *</b>	

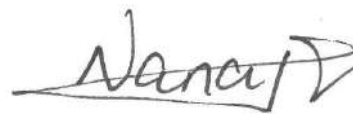
#### Asbestos Approved By

Analysed by Asbestos Approved Identifier: Lucy Zhu  
 Authorised by Asbestos Approved Signatory: Lucy Zhu

#### Results Approved By

Dragana Tomas, Senior Chemist  
 Ken Nguyen, Reporting Supervisor  
 Lucy Zhu, Asbestos Supervisor

#### Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		264406-1	264406-2	264406-3	264406-4
Your Reference	UNITS	BLF01	BLF02	BLF03	BLF04
Depth		0-100mm	0-100mm	0-100mm	0-100mm
Date Sampled		11/03/2021	11/03/2021	11/03/2021	11/03/2021
Type of sample		soil	soil	soil	soil
Date extracted	-	18/03/2021	18/03/2021	18/03/2021	18/03/2021
Date analysed	-	19/03/2021	19/03/2021	19/03/2021	19/03/2021
TRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25	<25
TRH C <sub>6</sub> - C <sub>10</sub>	mg/kg	<25	<25	<25	<25
vTPH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	105	102	106	86

svTRH (C10-C40) in Soil					
Our Reference		264406-1	264406-2	264406-3	264406-4
Your Reference	UNITS	BLF01	BLF02	BLF03	BLF04
Depth		0-100mm	0-100mm	0-100mm	0-100mm
Date Sampled		11/03/2021	11/03/2021	11/03/2021	11/03/2021
Type of sample		soil	soil	soil	soil
Date extracted	-	18/03/2021	18/03/2021	18/03/2021	18/03/2021
Date analysed	-	19/03/2021	20/03/2021	20/03/2021	20/03/2021
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	<50	<50	<50	74
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	140	<100	<100	420
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	110	<100	<100	440
TRH >C <sub>10</sub> -C <sub>16</sub>	mg/kg	<50	<50	<50	130
TRH >C <sub>10</sub> - C <sub>16</sub> less Naphthalene (F2)	mg/kg	<50	<50	<50	130
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	220	<100	<100	680
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	<100	<100	<100	360
Total +ve TRH (>C10-C40)	mg/kg	220	<50	<50	1,200
Surrogate o-Terphenyl	%	107	85	83	112

PAHs in Soil					
Our Reference		264406-1	264406-2	264406-3	264406-4
Your Reference	UNITS	BLF01	BLF02	BLF03	BLF04
Depth		0-100mm	0-100mm	0-100mm	0-100mm
Date Sampled		11/03/2021	11/03/2021	11/03/2021	11/03/2021
Type of sample		soil	soil	soil	soil
Date extracted	-	18/03/2021	18/03/2021	18/03/2021	18/03/2021
Date analysed	-	19/03/2021	19/03/2021	19/03/2021	19/03/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.2	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.2	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.2	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.1	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	0.82	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	100	104	104	100

Organochlorine Pesticides in soil					
Our Reference		264406-1	264406-2	264406-3	264406-4
Your Reference	UNITS	BLF01	BLF02	BLF03	BLF04
Depth		0-100mm	0-100mm	0-100mm	0-100mm
Date Sampled		11/03/2021	11/03/2021	11/03/2021	11/03/2021
Type of sample		soil	soil	soil	soil
Date extracted	-	18/03/2021	18/03/2021	18/03/2021	18/03/2021
Date analysed	-	19/03/2021	19/03/2021	19/03/2021	19/03/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	106	108	108	109

Organophosphorus Pesticides in Soil					
Our Reference		264406-1	264406-2	264406-3	264406-4
Your Reference	UNITS	BLF01	BLF02	BLF03	BLF04
Depth		0-100mm	0-100mm	0-100mm	0-100mm
Date Sampled		11/03/2021	11/03/2021	11/03/2021	11/03/2021
Type of sample		soil	soil	soil	soil
Date extracted	-	18/03/2021	18/03/2021	18/03/2021	18/03/2021
Date analysed	-	19/03/2021	19/03/2021	19/03/2021	19/03/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	106	108	108	109

PCBs in Soil					
Our Reference		264406-1	264406-2	264406-3	264406-4
Your Reference	UNITS	BLF01	BLF02	BLF03	BLF04
Depth		0-100mm	0-100mm	0-100mm	0-100mm
Date Sampled		11/03/2021	11/03/2021	11/03/2021	11/03/2021
Type of sample		soil	soil	soil	soil
Date extracted	-	18/03/2021	18/03/2021	18/03/2021	18/03/2021
Date analysed	-	19/03/2021	19/03/2021	19/03/2021	19/03/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	106	108	108	109

Acid Extractable metals in soil						
Our Reference		264406-1	264406-2	264406-3	264406-4	264406-5
Your Reference	UNITS	BLF01	BLF02	BLF03	BLF04	BLF01 - [TRIPLICATE]
Depth		0-100mm	0-100mm	0-100mm	0-100mm	0-100mm
Date Sampled		11/03/2021	11/03/2021	11/03/2021	11/03/2021	11/03/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/03/2021	19/03/2021	19/03/2021	19/03/2021	19/03/2021
Date analysed	-	19/03/2021	19/03/2021	19/03/2021	19/03/2021	19/03/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	14	12	13	21	14
Copper	mg/kg	29	16	11	16	24
Lead	mg/kg	42	54	51	11	36
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	8	7	7	16	8
Zinc	mg/kg	370	85	120	38	210



Moisture					
Our Reference		264406-1	264406-2	264406-3	264406-4
Your Reference	UNITS	BLF01	BLF02	BLF03	BLF04
Depth		0-100mm	0-100mm	0-100mm	0-100mm
Date Sampled		11/03/2021	11/03/2021	11/03/2021	11/03/2021
Type of sample		soil	soil	soil	soil
Date prepared	-	18/03/2021	18/03/2021	18/03/2021	18/03/2021
Date analysed	-	19/03/2021	19/03/2021	19/03/2021	19/03/2021
Moisture	%	11	8.1	7.1	11

Asbestos ID - soils					
Our Reference		264406-1	264406-2	264406-3	264406-4
Your Reference	UNITS	BLF01	BLF02	BLF03	BLF04
Depth		0-100mm	0-100mm	0-100mm	0-100mm
Date Sampled		11/03/2021	11/03/2021	11/03/2021	11/03/2021
Type of sample		soil	soil	soil	soil
Date analysed	-	19/03/2021	19/03/2021	19/03/2021	19/03/2021
Sample mass tested	g	Approx. 40g	Approx. 45g	Approx. 45g	Approx. 45g
Sample Description	-	Red fine-grained soil & rocks	Red fine-grained soil & rocks	Red fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
<b>ASB-001</b>	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
<b>Inorg-008</b>	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
<b>Metals-020</b>	Determination of various metals by ICP-AES.
<b>Metals-021</b>	Determination of Mercury by Cold Vapour AAS.
<b>Org-020</b>	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
<b>Org-020</b>	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.  F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.  Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
<b>Org-021</b>	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
<b>Org-021</b>	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PCBs" is simply a sum of the positive individual PCBs.
<b>Org-022</b>	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
<b>Org-022/025</b>	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
<b>Org-022/025</b>	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS.  Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

Method ID	Methodology Summary
<b>Org-022/025</b>	<p>Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.</p> <p>For soil results:-</p> <ol style="list-style-type: none"> <li>1. 'EQ PQL' values are assuming all contributing PAHs reported as &lt;PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present.</li> <li>2. 'EQ zero' values are assuming all contributing PAHs reported as &lt;PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL.</li> <li>3. 'EQ half PQL' values are assuming all contributing PAHs reported as &lt;PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above.</li> </ol> <p>Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.</p>
<b>Org-023</b>	<p>Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.</p>
<b>Org-023</b>	<p>Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.</p>
<b>Org-023</b>	<p>Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.</p> <p>Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.</p>

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	264406-2
Date extracted	-			18/03/2021	1	18/03/2021	18/03/2021		18/03/2021	18/03/2021
Date analysed	-			19/03/2021	1	19/03/2021	19/03/2021		19/03/2021	19/03/2021
TRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	25	Org-023	<25	1	<25	<25	0	103	97
TRH C <sub>6</sub> - C <sub>10</sub>	mg/kg	25	Org-023	<25	1	<25	<25	0	103	97
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	106	100
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	107	101
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	104	97
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	100	94
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	108	101
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	105	1	105	102	3	106	102

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	264406-2
Date extracted	-			18/03/2021	1	18/03/2021	18/03/2021		18/03/2021	18/03/2021
Date analysed	-			19/03/2021	1	19/03/2021	20/03/2021		19/03/2021	20/03/2021
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	50	Org-020	<50	1	<50	<50	0	111	106
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	100	Org-020	<100	1	140	150	7	77	81
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	100	Org-020	<100	1	110	120	9	92	81
TRH >C <sub>10</sub> -C <sub>16</sub>	mg/kg	50	Org-020	<50	1	<50	<50	0	111	106
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	100	Org-020	<100	1	220	240	9	77	81
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	100	Org-020	<100	1	<100	<100	0	92	81
Surrogate o-Terphenyl	%		Org-020	83	1	107	101	6	100	85

QUALITY CONTROL: PAHs in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	264406-2
Date extracted	-			18/03/2021	1	18/03/2021	18/03/2021		18/03/2021	18/03/2021
Date analysed	-			19/03/2021	1	19/03/2021	19/03/2021		19/03/2021	19/03/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	99
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	91	99
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	91	95
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	100
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	106
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	104
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	117
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	103	113
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	106	1	100	106	6	101	103

QUALITY CONTROL: Organochlorine Pesticides in soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	264406-2
Date extracted	-			18/03/2021	1	18/03/2021	18/03/2021		18/03/2021	18/03/2021
Date analysed	-			19/03/2021	1	19/03/2021	19/03/2021		19/03/2021	19/03/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	101
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	91	102
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	89
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	102
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	103
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	106
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	99	105
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	91	96
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	101
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	84
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	113	1	106	108	2	101	104



QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	264406-2
Date extracted	-			18/03/2021	1	18/03/2021	18/03/2021		18/03/2021	18/03/2021
Date analysed	-			19/03/2021	1	19/03/2021	19/03/2021		19/03/2021	19/03/2021
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	76	73
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	110
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	93
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	124	112
Chlorpyrifos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	102
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	94
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	111
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	113	1	106	108	2	101	104

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	264406-2
Date extracted	-			18/03/2021	1	18/03/2021	18/03/2021		18/03/2021	18/03/2021
Date analysed	-			19/03/2021	1	19/03/2021	19/03/2021		19/03/2021	19/03/2021
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	80	80
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	113	1	106	108	2	101	104

QUALITY CONTROL: Acid Extractable metals in soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	264406-2
Date prepared	-			19/03/2021	1	19/03/2021	19/03/2021		19/03/2021	19/03/2021
Date analysed	-			19/03/2021	1	19/03/2021	19/03/2021		19/03/2021	19/03/2021
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	108	104
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	107	96
Chromium	mg/kg	1	Metals-020	<1	1	14	13	7	104	100
Copper	mg/kg	1	Metals-020	<1	1	29	24	19	105	114
Lead	mg/kg	1	Metals-020	<1	1	42	35	18	102	91
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	106	112
Nickel	mg/kg	1	Metals-020	<1	1	8	8	0	105	96
Zinc	mg/kg	1	Metals-020	<1	1	370	240	43	106	85

**Result Definitions**

<b>NT</b>	Not tested
<b>NA</b>	Test not required
<b>INS</b>	Insufficient sample for this test
<b>PQL</b>	Practical Quantitation Limit
<b>&lt;</b>	Less than
<b>&gt;</b>	Greater than
<b>RPD</b>	Relative Percent Difference
<b>LCS</b>	Laboratory Control Sample
<b>NS</b>	Not specified
<b>NEPM</b>	National Environmental Protection Measure
<b>NR</b>	Not Reported

## Quality Control Definitions

<b>Blank</b>	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
<b>Duplicate</b>	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
<b>Matrix Spike</b>	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
<b>LCS (Laboratory Control Sample)</b>	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
<b>Surrogate Spike</b>	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

## Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

## Report Comments

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.

Note: Samples were sub-sampled from jars provided by the client.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 264406-1 for Zn. Therefore a triplicate result has been issued as laboratory sample number 264406-5.

### CHAIN OF CUSTODY AND ANALYTICAL REQUEST

Job Number	32342	Date	15/03/2021
Laboratory	Envirolab - Sydney	Report to	Nardus Potgieter npotgieter@barnson.com.au
Sample Temperature on Receipt			
22 °C	Signature: <i>[Signature]</i>		

Sample ID	Description	Sample Date	Analysis request					
			1	2	3	4	5	6
BLF 01 (1)	0-100mm dumped fill	10/03/2021		X				
BLF 02 (2)	0-100mm dumped fill	10/03/2021		X				
BLF 03 (3)	0-100mm dumped fill	10/03/2021		X				
BLF 04 (4)	0-100mm drainage line	10/03/2021		X				

Analysis Request	
1	Combo 5 (BTEX, TRH, PAH, OCP, OPP, PCB, 8metals)
2	Combo 6 (BTEX, TRH, PAH, OCP, OPP, PCB, 8metals) + asbestos ID
3	
4	
5	

Relinquished by / Affiliation	Accepted by / Affiliation	Date
Jim sarantzouklis / Barnson	A-BUI / Envirolab	15/03/2020

ENVIROLAB  
12 Ashley St  
Chatswood NSW 2067  
Ph: (02) 9910 8200

Job No: 264406

Date Received: 16/3/21

Time Received: 1630

Received By: AB

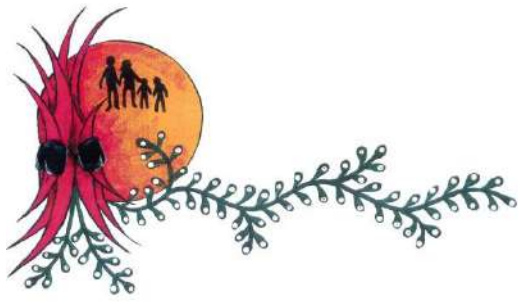
Temp: Cool/Ambient

Cooling: Ice/Repack

Seal: Intact/Broken/None

## Appendix K - Maari Ma Operational Plan





# **MAARI MA PRIMARY HEALTH CARE SERVICE, WILCANNIA**

## **OPERATIONAL SUMMARY**

June 2021 | version 1.0



## INTRODUCTION

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### Building and sustaining healthy individuals, families and communities.

Maari Ma exists so that the Aboriginal people it represents and serves re-establish a strong sense of cultural identity and build and sustain individual, family and community systems that engender self-respect, self-esteem and a sense of who we are and who we were through good health and wellbeing. We aim to achieve this by:

- (a) Using health as a tool to build leadership and initiative among our people.
- (b) Making the existing health system more accessible to Aboriginal people:
  - (i) Providing direct services in response to need;
  - (ii) Partnering and forming strategic alliances with other services so that we can meet a wider need;
  - (iii) Encouraging and supporting our people to use available services;
  - (iv) Providing services that otherwise would not be available;
  - (v) Facilitating a holistic view of Aboriginal health.
- (c) Improving Aboriginal health status and outcomes:
  - (i) Improving our people's health;
  - (ii) Facilitating healthy lifestyles for our communities;
  - (iii) Training Aboriginal health workers to work with our people.
- (d) Challenging the myths held by Aboriginal and non-Aboriginal people about Aboriginal people in our region:
  - (i) Building the capacity of our people and our communities;
  - (ii) Bringing self-help services and attitudes among our people;
  - (iii) Bringing an Aboriginal perspective to the development, management and delivery of the health system serving our people and our community;
  - (iv) Delivering a better understanding of health to Aboriginal people.

Maari Ma Health Aboriginal Corporation provides a quality service to the Aboriginal community of far western NSW. We have been providing health care for more than 25 years and more than 130 people work for Maari Ma across five communities, with more than 10 staff directly employed in Wilcannia. We liaise with mainstream health services to provide more appropriate, accessible health care. Any indigenous person can use our service.

Name of Health Service	Maari Ma Primary Health Care Service, Wilcannia
Street address	c/- Wilcannia Hospital, 1-7 Ross St Wilcannia NSW 2836
Postal address	c/- PO Box 339 Broken Hill NSW 2880
In hours phone number	08 8091 5122
After hours phone number	Broken Hill Health Service: 08 8080 1333
Fax number	08 8091 5895
Email address	<a href="mailto:info@maarima.com.au">info@maarima.com.au</a>
Web address	<a href="http://www.maarima.com.au">www.maarima.com.au</a>



## Team

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<b>Manager</b>	Trish Bell
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<b>Staff</b>	Loi Zanette
	Jason Gowin
	Amanda Everett
	Jenny Edwards
	Veronica Edwards
	Kevin Bates
	Katelyn Lawson
	Robbie Harris
	Lynley Rebbeck
	Christopher Hunter

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<b>Doctors</b>	Dr Penelope Roberts-Thomson
	Dr Victor Carroll
	Dr Stephen Gaggin
	Dr Michael Nugent
	Dr Vanessa Souter

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## Services

In addition to general medical consultations, Maari Ma offers the following services:

- Adult and child health checks
- Antenatal care
- Postnatal care
- Women's health check
- Chronic disease management
- Diabetes education
- Medication delivery
- Ophthalmology and optometry
- Podiatry
- Local medical appointment transport
- Dental clinic
- Immunisation
- Child dental fluoride treatment program
- Dietitian clinic
- Primary mental health clinic
- Alcohol and other drugs management clinic
- Medical specialists consultations
- Paediatric speech and occupational therapy

There are a range of posters, leaflets, and brochures about health issues relevant to the community available for all of our patients in the waiting room and the consultation rooms.

## Hours

Monday to Friday      9am to 5pm

Saturday and Sunday      Closed

Home visits      Home visits can be arranged for regular clients for routine care like a diabetes care plan.

## Fees

Maari Ma bulk bills most consultations at our service. The exceptions to this include pre-employment and insurance medicals, workers compensation injuries and legal reports.

We ask all clients to sign the pathology request forms to ensure this is bulk billed as well.

To assist in making an informed decision about their health care, patients are informed of the potential cost associated with investigations or consultation with medical specialists, allied health professionals or other allied health services.

Maari Ma staff aim to be aware of the billing policies of services they frequently refer patients to. This information is provided to patients when a referral is made.

Maari Ma informs patients of our bulk billing policy via the Practice Information Sheet and a sign displayed in the waiting area.



# HUMAN RESOURCE MANAGEMENT

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## Staff code of conduct

### Policy

Maari Ma Health has a formal Code of Conduct. Copies of the Code of Conduct are available on the Maari Ma intranet.

The key points of the Code of Conduct are summarised as:

### Introduction

The Code of Conduct outlines the standards of conduct and behaviour expected of employees of Maari Ma Health and provides guidelines for supervisors and managers in dealing with incidents of inappropriate behaviour, unsatisfactory performance and breaches of care and conduct by staff members.

Each member of Maari Ma Health's staff has an obligation to demonstrate a high standard of conduct and ethics in the provision of services, to maintain the integrity of Maari Ma Health and to ensure the safety of customers and colleagues.

### Scope and Purpose

The people of far west NSW have the right to expect that Maari Ma Health will carry out its activities efficiently, fairly, impartially, honestly and with integrity. We have a duty of care to all patients and customers receiving any of our services.

The purpose of Maari Ma Health's Code of Conduct is to provide a framework for decisions and actions in relation to conduct in employment. It underpins our commitment to a duty of care to all patients and clients receiving our services. This document explains the principles covering appropriate conduct in a variety of contexts and outlines the minimum standard of behaviour expected from employees.

The code of conduct refers to all activities carried out by an employee of Maari Ma Health as part of the conditions of his or her employment.

### Personal and Professional Behaviour

You should not behave in a way that may cause offence or embarrassment to other employees or the public.

When carrying out your duties, you will:

- not intentionally disobey or disregard any lawful direction from a person who has the authority to give the direction. If you have a dispute about carrying out a direction you may appeal, in writing, to the Executive Manager Primary Health or Chief Executive Officer;
- behave honestly and with integrity. You will avoid behaviour that could suggest that you are not following these principles. This may include a duty to report other employees who are behaving dishonestly;
- make sure that you carry out your work efficiently, economically and effectively, and that the standard of your work reflects favourably on the Maari Ma Health;
- follow the policies of Maari Ma Health, whether or not you approve of these policies. Should a situation arise in which you find a policy that you cannot carry out because of your personal views, you should discuss the matter with a senior officer or the Chief Executive Officer to have the situation resolved.

### Use of Maari Ma Resources

Staff should ensure that resources, funds, staff or equipment under their control, are used effectively and economically in the course of their duties for the purposes of Maari Ma Health business.



### **Security of Official Information**

Staff members are to make sure that confidential and sensitive information in any form (for example documents, computer files) cannot be accessed by unauthorised persons;

- Sensitive material should be securely stored overnight or when unattended;
- Information about staff members of the Health Service should not be released to external bodies without appropriate legal authority and the authorisation of the Chief Executive Officer or his delegate;
- Staff members must make sure that confidential information is only discussed with people who are authorised to have access to it, (either within or outside Maari Ma Health). It is considered a serious offence to deliberately release confidential documents or information to unauthorised persons.

### **Fairness and Equity**

Staff members should deal with issues or cases consistently, promptly and fairly. This involves dealing with matters in accordance with approved procedures, in an impartial, non-discriminatory manner.

### **Discrimination and Harassment**

Staff members must not harass, discriminate or support others who harass and discriminate against colleagues or members of the public on grounds of sex, pregnancy, age, race (including their colour, nationality, descent, ethnic or religious background), marital status, disability, homosexuality or transgender.

### **Work Health & Safety**

Managers are responsible for ensuring that their premises adequately provide for the health, welfare and safety of employees and members of the public who use them.

It is the responsibility of all employees to act in accordance with the occupational health and safety legislation and policies of their respective organisations and use security and safety equipment provided.

### **Procedure**

Maari Ma will counsel or discipline employees who fail to meet acceptable standard of conduct.

Details of disciplinary principles and procedures are contained in the Managing Performance Policy.



## Staff recruitment and induction

### Recruitment

Maari Ma's Human Resource/Workforce functions are centralised in Maari Ma's regional office in Broken Hill. Vacancies or new positions are approved to advertise by the CEO after a position description has been agreed/updated and funding for the position confirmed.

### Policy

Maari Ma acknowledges that a well-planned and executed induction program will help not only in retention of employees, but also in productivity. Health Services that have effective orientation programs get new people up to speed faster, assist them in adjusting to their jobs and work environment, instil a positive work attitude and motivation at the onset and have lower turnover rates.

Other benefits Maari Ma may experience as part of a well-coordinated induction program include increasing their understanding of:

- responsibilities and legal obligations
- the culture of Maari Ma (how we do things around here)
- reporting relationships in Maari Ma
- the layout and whereabouts of resources.

As a result, Maari Ma has an induction program for all new GPs and Health Service staff. Although it is not necessary to complete the induction program in one block of time, all components should be covered within a scheduled period. Maari Ma also requires the new GP or staff member to complete and sign the induction checklist as part of their employment agreement.

### Procedure

The induction program for all staff includes:

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#### Welcome to Maari Ma

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- Welcome meeting with the CEO
  - an introduction to other staff members
  - a tour of Maari Ma including bathroom facilities and tea room
  - personnel administration – direct report, hours of work, salary, job description, performance review, tax declaration form, payment arrangements
  - collection of required documentation as per letter of offer/contract (see **Appointment – medical staff** and **Appointment – non-medical staff**)
  - an overview of the organisation chart and direct reporting line
  - information about the culture of Maari Ma – particularly 'no blame' philosophy
  - the importance of asking questions when you are not sure how to do something
  - how/where to access policies and procedures
  - information about available resources
  - the opening and closing procedures of Maari Ma
  - provide keys to the new staff member (staff member to sign key register)
- 

#### About Maari Ma

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- the organisation of Maari Ma Health Aboriginal Corporation
- the Maari Ma Chronic Disease Strategy
- the background of Maari Ma – history and role within the organisation
- the Health Service profile – number of GPs, special interests, patient demographic
- services provided by Maari Ma

- operating hours of Maari Ma
- 

### **Practice administration**

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- an introduction to the front desk
  - how to handle incoming and outgoing correspondence
  - the location and procedure for ordering stationery and other office supplies
  - the process and staff member responsible for distributing faxes
  - the arrangements for home and other visits
  - the arrangements for care outside of normal opening hours
- 

### **Telephone procedures**

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- how to place callers on hold
  - when to transfer telephone calls to GPs and other clinical staff
  - information about each GP's policy on receiving and returning patient phone calls
  - the importance of not interrupting patient consultations unless an 'urgent situation'
  - a definition of an 'urgent situation'
  - how to take and deliver messages
  - an outline of what fees apply for phone calls (if appropriate)
- 

### **Appointment management**

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- information about the appointment system
  - how to determine the urgency of patient health care needs
  - how to accommodate patients with urgent, non-urgent, complex, planned chronic care and preventive health care needs
  - how to determine the most appropriate length and time of consultation at the point of booking
  - the types of appointments available at Maari Ma
  - the process for handling new patients of Maari Ma
  - how to offer patients the opportunity to request their preferred GP and other clinical staff
  - how to book appointments
  - how to handle patients who attend for their scheduled appointment
  - the importance of informing patients of waiting times
  - the process for handling did-not-attend and cancelled appointments
  - how to identify and care for patients in distress
- 

### **Triage and medical emergencies**

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- how and when to use the "alert" button system
  - how to handle a medical emergency – on the phone or in person and with or without a GP in attendance
  - who to refer to for assessment of level of urgency of patient health care needs
- 

### **Patient management**

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- the importance of respecting patient rights
  - the importance of treating patients with courtesy and respect
  - how to handle patient requests for repeat prescriptions and referrals
  - how to handle Webster Pack prescription requests from the pharmacy
  - how to handle incoming and outgoing pathology
  - how to handle difficult or angry patients
  - information about each GP's policy on receiving and returning patient emails
  - an outline of what fees apply for emails (if appropriate)
-





- how to access services to help communicate with patients who speak a language other than that of the GPs and/or those with a disability
  - information about local health, disability and community services
  - how to provide important information to patients
- 

### **Patient health records and confidentiality**

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- the importance of privacy, confidentiality and security of patient health information – including verbal, written and electronic information
  - the process for handling results, reports and clinical correspondence
  - information about the Health Service recall and reminder system
  - the Health Service policy on retention of records and archiving
  - the process for transferring patient health records
  - the Health Service security policy for prescription pads and computer generated prescription paper, letterhead, medical certificates, medications, patient health records and related patient health information including accounts
- 

### **Computer administration**

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- information about privacy, confidentiality and security issues
  - allocating the appropriate passwords and permissions
  - how to lock the computer and activate screensavers
  - our email and internet policy
  - our website policy
  - computer security procedures – firewall, disaster recovery procedures
  - how to scan documents and digital images (if applicable)
  - procedures for anti-virus management
  - procedures for backing-up electronic information
  - procedures for transferring patient health information over a public network – encryption
- 

### **Human resource management**

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- code of conduct
  - staff requirements for continuing professional development
  - Maari Ma policy on equal opportunity and harassment
  - the frequency and procedure for staff meetings
  - what to do in the event of an incident or injury
  - Maari Ma policy on lifting heavy objects
  - Maari Ma policy on smoking, drugs and alcohol
  - how to handle violent situations in the workplace
  - ways to maintain staff health and wellbeing
  - how to handle non-medical emergencies – fire, bomb threats
- 

### **Infection control**

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- information about the principles of infection control
  - the management of sharps injury
  - the management of blood and body fluid spills
  - information about hand washing and hand hygiene
  - information about the Health Service cleaning schedule
  - how to ensure instruments are sterile at point of use
  - our procedure for cleaning and sterilising instruments
  - our procedure for safe storage and disposal of clinical waste
-



- our procedure for handling, sorting, laundering and storing linen
  - information about implementing standard and additional precautions
  - information about how to prevent disease in the workplace by serology and immunisation
  - requesting current immunisation status of all staff and immunisation appropriate to their duties arranged if consented
  - our procedure on handling and using chemicals
  - our procedure for safe handling of pathology specimens
- 

### **Treatment room**

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- the process for using and maintaining Health Service equipment
  - the process for storing, ordering, documenting and disposing of controlled and restricted drugs
  - the process for storing, ordering, documenting and disposing of schedule 4 drugs and pharmaceutical samples
  - the process for checking, rotating and resupplying perishable medical supplies
- 

### **Cold-chain management**

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- the process for receiving and transporting vaccines
  - information about the importance of managing the cold-chain
  - how to manage the cold-chain
  - the name of the staff member responsible for managing the cold-chain
  - the actions to take in the event of a cold-chain breach
- 

### **Continuous quality improvement**

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- information about Health Service accreditation and what that means
  - the name of the staff member responsible for patient feedback
  - the name of the staff member responsible for investigation and resolution of complaints
  - the name of the staff member responsible for leading clinical improvements
-

# WORK HEALTH AND SAFETY

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## Policy

Maari Ma is committed to providing and maintaining a safe work environment for GPs, staff, patients and all other visitors, and also complying with relevant legislation.

Maari Ma is responsible for ensuring all incidents involving staff, patients and others are managed professionally and ethically, according to relevant medical standards, guidelines and State legislation; *Work Health and Safety Act 2011*.

Staff are instructed in safety and infection control protocols ensuring risks are known and precautions taken, including vaccinations during induction. All staff have a responsibility to ensure this education has been undertaken.

GPs and staff work together to maintain a safe physical work environment and all Health Service and office equipment is appropriate for its purpose.

## Procedure

To reduce work health and safety risks, Maari Ma:

- records accidents and incidents (including sharps injuries) in the incident register and complies with the NSW State legislation reporting requirements
- provides equipment and facilities appropriate to each staff member's role (ergonomics)
- rosters at least two staff members in the building during normal opening hours
- maintains immunisation and first aid records
- requires new staff to complete a staff induction program to indicate awareness of specific policies and procedures
- schedules regular breaks for all staff members including GPs
- provides product data sheets (PDS) and material safety data sheets (MSDS)
- labels containers of chemicals and cleaning agents
- keeps and maintain a register of hazardous substances
- provides staff with instructions on handling and documenting hazardous substances
- conducts regular risk assessment on the use of hazardous substances
- schedules maintenance checks on the extinguishers as per current NSW legislation
- arranges for equipment that requires calibration or that is electrically or battery powered (for example electrocardiographs, spirometers, autoclaves, vaccine fridges, scales, defibrillators) to be serviced
- retains a schedule of maintenance for key clinical equipment.

Each team across the organisation nominates two staff members to be trained as Work Health and Safety Committee representatives. Maari Ma's WH&S Committee meets 4 x per year. All teams must also have WH&S on the agenda of all team meetings to identify any issues or discuss near miss events.

## Smoking

Maari Ma is a Smoke-Free Workplace. Refer to Maari Ma's policy for more information.



## Security

### Policy

When not in attendance, staff must ensure that prescription pads, computer generated prescription paper, letterhead, medications, health records and related patient information are out of view. They must also be stored in areas only accessible to authorised persons.

Facsimile, printers and other electronic communication devices must only be accessible to authorised staff.

### Procedure

At Maari Ma, prescription pads, computer generated prescription paper and letterheads are kept locked in the server room. All medications are securely locked within the treatment room.

The facsimile, printers and other electronic communication devices are located in reception, away from public access.

At least two staff must be present in the building at all times.

Duress alarms are installed on computers in consult rooms and tested regularly.



## Environmental cleaning and disinfection

### Policy

Whilst operating in the Far West Local Health District facility, Maari Ma staff will follow the FWLHD policies regarding cleaning and disinfection.

## Handling and use of chemicals

### Policy

Maari Ma does not use cleaning agents or other chemicals, which are known to be toxic to the user, such as glutaraldehyde. Chemicals and cleaning agents used at Maari Ma are used according to the manufacturer's instructions.

All containers of chemical agents are appropriately labelled.

Material safety data sheets (MSDS) are made available for all substances used in Maari Ma as required by NSW legislation. The use and handling of chemicals, including cleaning agents, must comply with the manufacturer's instructions, and these can be found on the label or MSDS folder located in the treatment room.

Staff members who are required to handle chemicals are trained in their correct and safe use, and this includes the correct use of personal protective equipment (PPE).

### Procedure

Maari Ma has the listed chemical and cleaning products for the following uses:

Product	Use	Storage location	MSDS available
All over	Body wash & Shampoo	Cleaners Cupboard	X
Go Getter	Toilet Cleaner	Cleaners Cupboard	X
TaskForce	Cleaning agent and disinfectant for surfaces	Cleaners Cupboard	X
Sparkle	Glass Cleaner	Cleaners Cupboard	X
Techno-Wipes	Graffiti and marker removal	Cleaners Cupboard	X
Tuffie Wipes	Cleaning and disinfecting surfaces	Clinical Rooms and Clinical store	X
Dish detergent	Hand dishwashing	Below kitchen sink	X
Glen 20	Surface spray disinfectant	Clinical store	X

Material safety data sheets are located in the MSDS folder in the treatment room.



## **Offsite sterilisation**

Maari Ma avails itself of the FWLHD sterilisation service for the cleaning of re-usable equipment as per a service agreement between the two organisations.

## **Management of waste (including sharps disposal)**

Maari Ma avails itself of the FWLHD waste management service as per a service agreement between the two organisations.

## **Safe handling of pathology specimens**

Maari Ma follows best clinical practice regarding the safe handling of pathology specimens. Specimens are stored in a separate fridge and transported in closed cold storage boxes to Broken Hill for testing either by car or plane.

# PRIMARY HEALTH CARE SERVICE ADMINISTRATION

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## Appointment management

### Policy

Maari Ma uses PracSoft to manage appointments.

Every effort is made to make an appointment that is appropriate and suitable for patient needs.

A flexible appointment system with the ability to accommodate patients with urgent, non-urgent, complex planned chronic care and preventive health care is available at Maari Ma.

Emergencies are always given priority.

Reception staff assist the patient by offering longer consultations where required.

Interpreter services can be pre-arranged if required.

To facilitate appropriate care and to prevent delays, one appointment per person needs to be allocated, including multiple family members.

### Consultation length

Maari Ma encourages patients to consider whether or not they require longer consultations, which is also dependent on the patient's situation. Clients are advised of the availability of long consultations via the practice information sheet and signs in waiting room indicating possible reasons for longer consults. Methods of assessing the need for long consultations include asking the patient if they have more than one issue to discuss with the GP and outlining the different types of appointments and their length.

Patients with a diagnosed chronic disease are automatically booked a double appointment.

### Appointment with usual treating GP

To promote and facilitate continuity of care, Maari Ma encourages patients to access their usual treating GP.

Reception staff actively encourage patients with a chronic disease to book an appointment with their usual treating GP. The usual treating GP for patients with a chronic disease, is annotated in PracSoft.

### Wait times

Waiting patients need to be frequently monitored by reception staff in case their condition deteriorates. This is covered in **Managing medical emergencies and prioritising of patients**. Waiting patients also need to be informed periodically of any further delays.

## Procedure

### Consultation length

At Maari Ma, we offer the following types of appointments:

Appointment	Types of issues	Length (minutes)
Short	Prescription, repeat prescription	0-5 minutes
Standard	Routine care, preventive care, chronic care, referral letters to new specialists	15 minutes
Double	New patients, procedures, complex conditions	30 minutes
Long	Full medical check-ups, counselling, patient's carer or translator is present	Over 30 minutes



## Home and other visits

Home visits are possible in some circumstances. The request should go via the Practice admin staff, nurse or health worker to the GP.

## Managing medical emergencies and prioritising of patients

### Policy

Maari Ma classifies patients seeking medical consultations according to their priority of need. An adequate triage system will ensure that clinical care is provided to patients with urgent medical problems as a priority.

### Procedure

We identify patients with urgent medical needs by asking whether “it is an emergency?” when they request an appointment via telephone or over the counter. Our staff also observes the patient’s status by looking, listening and monitoring whether they are in distress.

Quick reference manuals with charts on CPR, Choking and Suspected Communicable Diseases are kept at each of the reception desks for reference by non-clinical staff.

Transport vehicles are equipped with a non-clinician’s copy of The Triage Support Guide (BLUE cover) to assist them in making decisions when on the road with an ill person. Copies of The Triage Support Guide manuals for clinical staff (RED cover) are kept in the treatment room and screening room. They are easily accessible by all clinical staff to triage and treat patients appropriately.

### **Doctor on site, medical transport required, urgent and time-critical ‘131 233’**

Maari Ma follows this procedure when a doctor is on site and providing treatment:

- dial 131 233
- press ‘1’ to book ambulance transport to an emergency department. Advise the operator that urgent/time-critical transport is required.
- Document in the patients notes that 131 233 was called and the time it was made.

### **No doctor on site, dial emergency ‘000’**

Maari Ma aims to have a GP on site at all times during opening hours, to facilitate this, a roster to cover GP lunchbreaks is in place.

However, if for some reason a GP is not on site, Maari Ma follows the following procedure:

- dial 000 (free call) and ask for the ambulance (patients are responsible for paying the ambulance call out fee should they need to be transferred to hospital from the PHC service – this information is included in the service brochure and displayed in the waiting room)
- advise the operator that you are calling from Maari Ma Primary Health Care Service
- answer the questions asked by the operator including:
  - the address where the ambulance is required
  - what the problem is
  - number of people injured
  - the patient’s age
  - the patient’s gender
  - if the patient is conscious
  - if the patient is breathing.
- follow pre-arrival advice provided by the operator





- do not hang up until the operator tells you to – you may have to hold while an ambulance is dispatched.
- Document in the patients notes that '000' was called recording the time it was made.

Template forms for the recording of medical emergencies are located in the quick reference and triage manuals. These once completed are to be scanned into the client's medical record after review by the GP or Nurse manager.

## **Wheelchair access and parking**

### **Policy**

Maari Ma has wheelchair access for disabled patients to reception, waiting areas, consultation, examination areas, and to the public toilets. Patients with a disability can also be picked up for their appointment and be dropped off right outside the front door, this includes transportation home. Transport is also available for those patients not having access to private or public transport.

Within a reasonable distance from the Health Service there is ample parking for patients. Parking, at no cost, is available in the streets surrounding the Health Service and is within easy walking distance (within 20 to 30 metres).

## **Care outside of normal opening hours**

### **Policy**

Maari Ma Primary Health Care Service, Wilcannia does not provide after-hours services.

An automated message is turned on after hours.

- Patients with non-urgent concerns are advised to contact the service on the next working day to obtain an appointment.
- Patients requiring after hours care for non-urgent concerns are directed to the Wilcannia Hospital.
- Patients with urgent concerns are directed to attend the emergency department at Wilcannia Hospital and/or call an ambulance.

## Patient rights

Maari Ma has adopted a Patient Charter:

# Patient Charter

### 01 Access

**I have a right to:**  
**Health care**  
I can access services to attend to my health care needs.

**It is important that I:**

- advise Maari Ma of any changes to my address and contact details
- be aware that I may need to wait for attention or treatment at times if staff are attending to other patients
- keep my appointments, or notify Maari Ma if I am unable to attend
- accept that some services I require may not be available at Maari Ma.

### 02 Safety

**I have a right to:**  
**Receive safe and high quality care**  
I can access services to attend to my health care needs.

**It is important that I:**

- provide accurate information about my health and anything else that may have an impact on my care (including alternative or complementary therapies)
- tell staff of changes I notice in my medical condition
- tell staff if I have concerns regarding any aspects of my care.

### 03 Communication

**I have a right to:**  
**Be informed about services, treatment, options and costs in a clear and open manner**  
I receive open, timely and appropriate communication about my health care in a manner I can understand.

**It is important that I:**

- be as open and honest as I can, and ask for more information if I do not understand
- tell staff if English is not my first language so I can be given access to an interpreter in person or by phone

### 04 Participation

**I have a right to:**  
**Be included in decisions and choices about my care**  
I may join in making decisions and choices about my care and about health service planning.

**It is important that I:**

- ask questions so I can be informed about my medical condition and my care options before giving my consent to any treatment
- discuss my concerns and decisions with my health care provider, for example, if I do not wish to continue treatment or I am unable to comply with treatment. Once I am made aware of the implications, I must accept responsibility for the consequences of my decisions
- provide a copy of advanced health care directives, enduring power of attorney or other legal documents which may be relevant to my care.

### 05 Respect

**I have a right to:**  
**Be shown respect, dignity and consideration**  
The care provided shows respect to me and my culture, beliefs and personal needs and requirements.

**It is important that I:**

- tell staff of circumstances concerning my culture and beliefs so they can respond to my needs
- treat Maari Ma staff, patients and visitors with respect and dignity
- respect other patients and staff, for example, by limiting noise or the number of people I have with me.

### 06 Privacy

**I have a right to:**  
**Privacy and confidentiality of my personal information**  
My personal privacy is maintained and proper handling of my personal health and other information is assured.

**It is important that I:**

- accept that my health information may be shared with appropriate health care providers and other agencies as authorised by law
- ask for my recorded health information to be corrected if it is inaccurate
- respect the privacy and confidentiality of others.

### 07 Comment

**I have a right to:**  
**Comment on my care and to have my concerns addressed**  
I can comment on or complain about my care and have my concerns investigated and responded to.

**It is important that I:**

- tell staff if I have a problem or any concerns so they can respond.

Adapted from Mater Misericordiae Health Service, South Brisbane, Queensland. <http://www.mater.org.au/Home/Patient-rights-and-responsibilities.aspx> (accessed 14 September 2011)

The Australian Charter of Healthcare Rights. <http://www.health.gov.au/internet/healthypublishing/ndf/Content/PrivacyProgram-01> (accessed 14 September 2011)

Aboriginal Artwork by: Guy Crawford

**MAARI MA HEALTH  
ABORIGINAL CORPORATION**



Copies are displayed in our waiting room, on our website and in brochures.

## Complaints

### Policy

Despite the best intentions complaints arise. Maari Ma deals with complaints in a courteous and understanding manner. Perceptions of what is reasonable and fair can change when patients are unwell or anxious.

Patient satisfaction affects health outcomes and Maari Ma acknowledges that patient complaints are an important source of customer feedback.

Maari Ma provides patients with the opportunity to provide compliments, complaints or suggestions. This may be through the provision of information in the practice information sheet or brochures/posters about the following:

- Health Service commitment to quality of care through responding to patient feedback
- Health Service process for receiving and responding to patient complaints
- The Health Care Complaints Commission (phone 1800 043 159 between 9-5pm EST, [www.hccc.nsw.gov.au](http://www.hccc.nsw.gov.au) )
- The Office of Australian Information Commissioner ([www.oaic.gov.au](http://www.oaic.gov.au) )

### Procedure

We provide patients with the opportunity to give compliments, complaints and suggestions. The Nurse Manager (or delegate) is responsible for the receipt, investigation and resolution of complaints.

When receiving complaints, staff should follow this process in order to minimise further patient anxiety and hostility, potentially leading to litigation:

- notify the Nurse Manager who is responsible for complaints
- take the patient to a private area (if the complaint is provided verbally)
- listen carefully to the patient, take notes and repeat the key messages to ensure that the complaint is understood
- assure the patient that the complaint will be taken seriously and thoroughly investigated
- document the complaint in a memorandum or file note format and scan a copy in the patient's health record
- alert the treating GP
- acknowledge the complaint in writing within 2 working days and scan a copy in the patient's health record
- provide the patient with updates during the investigation to assure them the matter has not been overlooked
- if a clinically-based complaint, alert the treating GP's medical defence organisation for appropriate action
- decide and action appropriate remedy, and notify the patient verbally and in writing
- record all contact with the patient including written responses in their health record
- notify the Regional Office Manager to include on organisational complaints register
- raise at the Maari Ma Management (MMM) Meeting to review the complaint and to see if it could have been prevented.



## Culturally appropriate care

### Policy

Maari Ma identifies the cultural background of our patients, particularly those of Aboriginal and Torres Strait Islander status to assist with disease prevention and delivering culturally appropriate care.

To do this, Maari Ma does the following activities:

- encourage and record self-identification of the cultural background of our patients (particularly those of Aboriginal and Torres Strait Islander status) when they register for the first time. See **New patient registration** for further information
- identify important/significant cultural groups within the Health Service to meet their needs
- be able to access guidelines for the specific clinical care of Aboriginal and Torres Strait Islander patients.

### Procedure

Maari Ma ensure culturally appropriate care of our patients by

- utilising the new patient registration form to encourage patients to self-identify their cultural background
- ask during the consultation if patients identify with a particular culture.

## PHCS information sheet

Brochures with information on Maari Ma and Maari Ma's services are available in the waiting room and consult rooms.

## Directory of local health and community services

Maari Ma has readily accessible information about local health, disability and community services available via written and electronic means.

Maari Ma engages with

- medical services such as diagnostic services, hospitals and specialist consultant services
- allied health services
- disability and community services
- health promotion and public health services and programs.

Maari Ma is aware of different referral arrangements for public and private providers. Copies of referrals to local health, community or disability services are kept in the patient health record.

### Emergency numbers

Police	000	Drugs of dependency	1800 422 599
Fire Brigade	000	Interpreter services	131 450
Ambulance	000	Accident tow truck service	08 8088 5488 (24 hours)
		Dental	1300 552 626

### Other administrative numbers/government departments

Broken Hill Health Service	08 8080 1333 (Switchboard)
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Australian Childhood Immunisation Register	1800 653 809
DVA Authority Approvals	1800 552 580
Emergency Psychiatric service	1800 011 511 08 8080 1364 (BHHS ED)
Western NSW PHN	1300 699 697
Medical Indemnity Protection Society (medico-legal enquiries)	1800 021 223
Medicare hotline	132 011
Medicare Claims inquiries	1300 788 008
Medicare / DVA Claim Form orders fax:	02 6230 0477
NSW Health Department	<a href="http://www.health.nsw.gov.au">www.health.nsw.gov.au</a>
PBS Authority Approvals	1800 888 333
Poisons information	13 11 26
Prescription Pad reorders	02 9895 3295
Workers compensation/Workcover (information)	13 10 50

### Broken Hill Health Service

Broken Hill Hospital Thomas Street Broken Hill NSW 2880	08 8080 1333
Broken Hill Community Health Centre Sulphide Street Broken Hill NSW 2880	08 8080 1100

**Services include:** Medical and Surgical Specialists, Dietitians, Mental Health and Drug and Alcohol workers, Occupational Therapists, Physiotherapists, Psychologists (both adult and child), Speech Pathologist, and Social Workers.

### Health providers in BROKEN HILL

<b>General Practices</b>	Nachiappan Surgery	4 Chloride Street	08 8087 3620
	Broken Hill Super GP Clinic	235 Thomas Street	08 8088 7044
	Williams Street Surgery	139 Williams Street	08 8087 2285
<b>Dentists</b>	Mines Dental Clinic	168 Beryl Street	08 8088 1022
	The Dental Centre	51 Iodide Street	08 8087 3576
<b>Nursing Homes</b>	St Annes Nursing Home	Eyre Street	08 8088 2267
	Aruma Lodge Hostel	229 Beryl Street	08 8088 1630
<b>Optometrists</b>	OPSM	249 Argent Street	08 8087 3202
	EYERYS I CARE	Westside Plaza	08 8087 8099
	Blue Frog Optics	393c Argent Street	08 8088 7800
<b>Pharmacists</b>	Outback Pharmacies	323 Argent Street	08 8087 3326
	Tembys Pharmacy	235 Thomas Street	08 8087 3452
	Netting Chemist	274 McCulloch Street	08 8087 4283



<b>Others</b>	Good Price Pharmacy Warehouse	Broken Hill Village	08 8087 2266
	Priceline Pharmacy	Westside Plaza	08 8088 4800
	Synergy Physiotherapy & Pilates Clinic	174 Williams Street	08 8087 7749
	Thrive Medical (formally Interhealth)	170 Crystal Street	08 8087 9383
	Next Revolution Group (NRG)	7/41-79 Crystal Street	08 8088 2612
	Susanne Olsen Podiatrist	342 Morgan Street	08 8087 1477

### **Maari Ma specialists and other regional staff**

All these specialists provide services at the Primary Health Care Service. Referrals and appointments are managed by different people with Maari Ma. Each one is detailed in the **Maari Ma Specialists Referral Quick Reference**.

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<b>Cardiology</b>	Genesis Care, Adelaide
<b>Ear Nose and Throat</b>	Dr Rowan Valentine (accessed in Broken Hill)
<b>Endocrinology</b>	Prof Stephen Twigg
<b>Echocardiographer</b>	Genesis Care, Adelaide (accessed in Broken Hill)
<b>Dental</b>	Visiting Dentist for RFDS
<b>Dental therapist</b>	Maari Ma Regional Oral Health team Ms Meg Hurst Ms Jayde Fletjar Ms Robyn Cattermole
<b>Dietitian</b>	Maari Ma Regional Dietetics team Ms Arnika Andrews Ms Catherine Sim
<b>Hearing</b>	Hearing Australia (access in Broken Hill)
<b>Optometrist</b>	Mr Luke Higgins
<b>Paediatrician</b>	Dr Robyn Shaw
<b>Pain management</b>	Pain management team (accessed in Broken Hill) Dr Amanda Johns (Physician) Ms Peta Bevan (Physiotherapist)
<b>Podiatry</b>	UniSA
<b>Physician</b>	Dr Paul Snelling
<b>Psychiatry – Adult</b>	Dr Jonathan Carne
<b>Psychiatry – Child and Adolescent</b>	Dr Colleen Barker (accessed in Broken Hill)
<b>Psychiatry – Perinatal</b>	Dr Ros Powrie (accessed in Broken Hill)

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<b>Renal medicine</b>	Dr Paul Snelling
<b>Respiratory medicine</b>	Dr Simone Barry (accessed in Broken Hill)
<b>Smoking cessation</b>	Prof Renee Bittoun
<b>Social and Emotional Wellbeing (Primary Mental Health and Drug and Alcohol)</b>	Maari Ma Regional SEWB team
<b>Speech pathology</b>	Ms Charlotte Bertleson

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### **Broken Hill hospital specialists**

All these specialists are available at the Specialist Clinic at Broken Hill Health Service. The contact phone number is **08 8080 1421**.

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<b>Cardiology</b>	Dr Georgy Chacko Dr Peter Steele Dr Luay Samaraie Dr Glenn Young (Pacemaker Checks)
<b>Dermatology</b>	Dr Murray
<b>Ears, Nose and Throat</b>	Dr Rowan Valentine
<b>Endocrinology</b>	Dr Fulcher
<b>Gastroenterologists</b>	Dr Christopher Rayner
<b>General Surgery</b>	Locums & Surgical Registrars
<b>Haematology</b>	Dr Boey
<b>Obstetrics/Gynaecology</b>	Locums
<b>Oncology</b>	Dr Hogan-Doran
<b>Ophthalmology</b>	Dr Ashish Agar (glaucoma) Dr Karaconji (glaucoma) Dr Massella (glaucoma) Dr Botovic (corneal) Dr Edwin Figueira (ocularplastics) Dr Simon Nothling (retinal) Dr Drew (retinal) Dr Terrance Tan (retinal) Dr Gavin Stringfellow (general) Dr Ruan (retinal) + Ophthalmology Registrars
<b>Orthopaedics</b>	Dr Wallace (hips, knees) Dr Alexander (hands, wrists, shoulders)
<b>Paediatrics</b>	Dr Miriam Codarini Dr Ian Haines Dr Margaret Kummerow

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<b>Physicians</b>	Dr Olumiywa Komolafe + Locums
<b>Plastic Surgery</b>	Dr Amy Jeeves Dr Roy
<b>Renal medicine</b>	Dr Irish
<b>Rheumatology</b>	Dr Ian Portek
<b>Urology</b>	Dr Tania Hossack

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# CLINICAL MANAGEMENT

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## Clinical Autonomy in Decision Making

### Policy

Maari Ma Health Aboriginal Corporation works within a GP lead multidisciplinary team model of care.

Maari Ma Health Aboriginal Corporation expects that all clinical decisions are based on current standards of best practice and are within the scope of their registration/role and in line with the protocols and procedures of the service. This includes Aboriginal Health Practitioners.

All clinical staff have the right to be autonomous in making decisions regarding clinical patient care but must report all actions and findings according to the model of care. And all staff are ultimately responsible to the GP under the organisation's clinical governance structure.

Maari Ma Health Aboriginal Corporation recognises that medical, dental, nursing, pharmacy and Aboriginal Health Practitioner graduates employed by the service are trained professionals. Therefore, they are ultimately answerable to their appropriate registration body for clinical decisions which are made.

All professionals are required to attain and maintain clinical competence as directed by the relevant registration authority and as required by the organisation. This includes (but is not restricted to) attending updates and information sessions and complying with the on-going educational requirements for individual registration.

In addition, all staff are expected to act in a professional manner at all times: all patients are treated in a caring and compassionate manner, interactions with colleagues and other service providers are constructive and positive, and working as a team with all other members of the primary care health service.

## Courtesy and respect

### Policy

GPs, clinical and non-clinical staff need to respect the rights and needs of patients. Friendliness, fairness and open communication are considered the best antidote to the risk of patient dissatisfaction, grievance, complaint or legal action.

It is for these reasons that the following apply:

- staff need to be courteous at all times
- patients should be spoken to clearly with information repeated where necessary
- staff need to be understanding of patients who may be anxious, frightened or unfamiliar with Maari Ma
- patients need to be treated with warmth, empathy and consideration
- staff must attempt to ascertain all of the facts by giving patients time to communicate in difficult situations.

### Procedure

GPs, clinical and non-clinical staff respect patients' rights and needs by treating them with courtesy and respect. We provide training to ensure GPs, clinical and non-clinical staff communicate in a clear, understanding and considerate manner.

## Informed consent

### Policy

GPs and other clinical staff must inform patients of the purpose, benefit and risks of proposed treatment or investigations. It is crucial that patients receive sufficient information to allow them to make informed decisions about their care. This must be documented in the patient's health record.

Information provided must be clear and given in a form that is easy to understand, whether it be verbally, in a diagram with explanation, brochure, other handout/leaflet or poster.

GPs must take into consideration the patient's ethnicity and principal language spoken. Steps should be taken to ensure an interpreter is utilised where necessary and at the patient's request. Issues of personality, personal fears and expectations, beliefs and values also need to be considered.

Patient consent should be obtained for the following:

- operative procedures onsite (express consent)
- research projects where the patient can be identified (written consent)
- clinical training programs (verbal consent)
- third party observation or participation in patient consultation (verbal consent prior to the patient entering the consultation room).

### Types of consent

The *Privacy Amendment (Private Sector) Act 2000* states that consent may be 'express' or 'implied'. The definitions for express and implied are:

- express consent – is given explicitly, either verbally or in writing
- implied consent – is agreement that can be inferred from an individual's conduct.

### Procedure

We ensure patients are provided with clear information to allow them to make informed decisions about their care prior to requesting their consent. The patient's or their legal guardian's consent is to be documented in the health records.

Documented verbal and implied consent is the main form of consent obtained for the majority of client contact. Written consent can be obtained as deemed necessary by the treating clinician. This may include consent for minor surgical procedure such as Implanon and intra uterine devices.

## Transmissible Diseases and Precautions

### Policy

Under the *NSW Public Act 2010* and regulation, GPs are required to notify the NSW Ministry of Health via the local Public Health Unit of certain infectious and communicable diseases.

### Procedure

The following diseases must be notified on **presumptive diagnosis** by telephone to the local Public Health Unit (08 8080 1499) as soon as possible

- Avian Influenza
- Food borne illness ( $\geq 2$  linked cases)
- Gastroenteritis among people of any age, in an institution (for example Among persons in educational or residential institutions)
- Measles
- Severe Acute Respiratory Syndrome (SARS)



- Smallpox
- COVID

The following disease are to be notified on **confirmed diagnosis** by phone or mail to the local Public Health Unit (PO Box 457 Broken Hill or 08 8080 1499)

- HIV/Acquired immunodeficiency syndrome (AIDS)
- Acute viral hepatitis
- Adverse event following immunisation
- Creutzfeldt-Jakob disease (CJD) and variant Creutzfeldt-Jakob disease
- Leprosy
- Syphilis
- Tuberculosis
- COVID

Maari Ma also has a policy for the management of pandemics.

In order to protect patient confidentiality, notifications must not be made by facsimile except in exceptional circumstances and when confidentiality is ensured. All notifications are strictly confidential. Other infectious diseases are notified directly by laboratories.

Infectious disease notification forms are available from the local Public Health Unit.

All additional precautions should be adhered to if there is a presumptive diagnosis of an infectious disease.

## Refusal to treat a patient and withdrawal of services

### Policy

Maari Ma has the right to refuse to treat patients and withdraw services in the following circumstances:

- When a patient demonstrates unacceptable behaviour towards GPs or other health professionals this can result in a breakdown in the therapeutic relationship. When such a breakdown occurs the GPs or other health professionals are not able to effectively treat the patient.
- When a patient behaves in an unacceptable manner towards GPs, staff, patients or visitors and people may feel unsafe as a result. Maari Ma is committed to providing and maintaining a safe work environment under the *Work Health and Safety Act 2011* and behaviour that affects any person's health and safety will not be tolerated.

Unacceptable behaviour includes but is not limited to the following conduct: aggressive and threatening behaviour, humiliation and intimidation, physical abuse (eg, unwanted physical contact), verbal abuse (eg, inappropriate personal, sexual, vindictive, offensive or cruel comments and language), making unrealistic demands, tampering with Maari Ma's property.

In these circumstances, the GPs or other health professionals do not need to persevere with the care of the patient and services may be withdrawn from the patient in accordance with the procedures set out below.

### Patient education

Maari Ma will provide information to patients to explain what is meant by unacceptable behaviour and explain that services are likely to be withdrawn if a patient demonstrates unacceptable behaviour. The information will be included in the service brochure which will be given to all patients and displayed in the service waiting room in the form of a poster.

## Procedure

The procedure for withdrawing services from a patient is:

- GP or other health professional advises the Nurse Manager in writing of the incident (unacceptable behaviour).
- Nurse Manager investigates the incident and interviews the parties' witnesses. As part of the investigation the Nurse Manager meets with the patient, provides feedback to the patient about the reported incident, and provides the patient with the opportunity to respond. The patient is provided with an opportunity to bring a support person to the meeting. The Nurse Manager will be accompanied by a senior member of staff.
- Nurse Manager completes investigation, makes a finding of fact (whether unacceptable behaviour has occurred) and recommendations for action in written report to Executive Manager Primary Health and Director Medical Services. If the Executive Manager Primary Health and Director Medical Services endorse the recommended actions, the Service Manager meets for a second time with the patient; provides feedback to the patient about the investigation finding; provides feedback about their behaviour and the impact on the GPs, staff, and visitors. The Nurse Manager explains the behaviour change required in order for the patient to continue to access the service. The patient can use this opportunity to explain their experience and understanding of the incident from their perspective. The Nurse Manager explains the healthcare services that will be provided. The Nurse Manager explains that any further demonstration of unacceptable behaviour will result in services being withdrawn. These arrangements are documented in an agreement, signed by the patient and Nurse Manager. At this second meeting the patient will be provided with an opportunity to bring a support person and the Nurse Manager will be accompanied by another senior member of staff.
- If the patient is proved to have breached the agreement, the Nurse Manager consults with the Executive Manager Primary Health and Director Medical Services regarding the action to be taken. The organisation's obligations under the *Work Health and Safety Act 2011* and the impact of the patient's behaviour on the therapeutic relationship with GPs and other health professional are considered in determining whether or not services are withdrawn. A decision by the Executive Manager Primary Health and Director Medical Services to withdraw services is made based on the seriousness of the breach.
- If a decision is made to withdraw services, the Nurse Manager will communicate this in writing to the patient in person. The patient will be provided with an opportunity to be accompanied by a support person and the Nurse Manager will be accompanied by a senior member of staff. Services will not cease until the patient's care has been transferred to another healthcare provider or has agreed to access care via the Hospital.
- The Nurse Manager will make every effort to work with the patient to identify a suitable alternative healthcare provider. The Nurse Manager will work with the patient and new healthcare provider to arrange for the patient's health record to be transferred. Where a suitable healthcare provider (for example a private GP) cannot be secured within one month, the patient will be supported to transfer their care to the Hospital.

## Storage and management of medication (including controlled and restricted drugs)

As per FWLHD and Maari Ma operational policy.

## Checking, rotating and resupplying perishable medical supplies

### Policy

Perishable medical supplies including vaccines, pharmaceutical consumables, medical consumables and supplies in the doctor's bags must be correctly stored with stock rotated and not kept or used beyond their expiry dates.

All substances, consumables, drugs and vaccines are to be maintained in surroundings or conditions that will ensure optimal efficacy upon delivery to consumers.



Consumables are to be stored in a manner that minimises risks or hazards to patients and visitors as many substances used at Maari Ma are toxic or harmful if swallowed.

## Procedure

Any items that are due to expire within the designated review period are:

- clearly marked “expired”
- In the case of medicines and vaccines, returned to the pharmacy in a medicines disposal bin located in the treatment room.
- In the case of dressings and other equipment are to either be donated to charity, veterinary clinics or for training labs.

It is the responsibility of the visiting pharmacist or delegate to check expiry dates when rotating and checking stock and also the responsibility of all staff prior to using any product.

These items are checked on a monthly basis or as new stock arrive.



# HEALTH RECORDS AND CONFIDENTIALITY

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## Patient health records

### Policy

Maari Ma has a linked electronic appointment, billing and medical record system. Maari Ma uses PracSoft and Medical Director.

A patient health record is a detailed, confidential document compiled by a health professional over a period of time on a particular person. Its primary purpose is to:

- identify a person accurately
- record symptoms and signs
- support diagnosis
- justify management decisions.

Each patient has their own individual file. This record contains:

- all clinical information relating to the patient
- contact and demographic information including the patient's full name, date of birth, gender and contact details
- self-identified cultural background (Aboriginal and Torres Strait Islander)
- the patient's preferred contact details in an emergency (located on scanned patient information sheet under documents).

### Procedure

#### Content of health records

Maari Ma has the ability to produce on demand a health summary including:

- adverse medicines events
- current medicines list
- past health history
- risk factors
- immunisations
- relevant family history
- relevant social history.

Maari Ma also ensures that:

- health records contain a record of allergies in the health summary
- significant face-to-face, telephone or electronic communication is recorded in the patient record
- health records are updated to show recent important events including immunisations, births and family history changes

'Active health records' are considered to be records of a patient who has attended Maari Ma 3 or more times in the past 2 years for non-Indigenous clients or 1 or more times in the last two years for Indigenous clients. If a client is known to have moved away from town then their file is made inactive.

When an inactive client re-attends the service once their file is opened it automatically returns to 'active' status.

#### Consultation notes

Maari Ma staff document all consultations including those outside normal opening hours, home or other visits and clinically significant telephone or electronic consultations. Identification of who conducted the consultation is identified by the user login.



Consultation notes must include the following:

- date of consultation
- reason for consultation
- relevant clinical findings
- diagnosis
- recommended management plan and where appropriate expected process of review
- prescribed medicine (including medicine name, strength, directions for use/dose frequency, number of repeats, and date medicine started/ceased/changed)
- any relevant preventive care undertaken
- documentation of referral to other health care providers or health service
- any special advice or other instructions
- evidence that problems raised in previous consultations are followed up.

Patient health records must show evidence that problems raised in previous consultations are followed up.

To ensure that quality consultations continue in the event of computer failure, Maari Ma has printed templates for ATSI Health Checks and GPMPs. These can then be used during the consultation together with hand written notes. These are then scanned with a notation in progress notes directing the reader to the scanned notes. Alternatively, hand written notes can be re-typed into Medical Director when the computers are restored. Further information can be found in the **Disaster recovery plan**.

## Patient requests for personal health information

### Policy

Patients of Maari Ma have the right to access their personal health information under the *Health Records and Information Act (2002)*.

Maari Ma informs patients that they are able to access their health information. This is done via the practice information sheet, a notice in the waiting area and on the Maari Ma website.

Requests for access to personal health information will be in writing. We document each request and endeavour to assist patients in granting access where possible and according to the privacy legislation. We forward the patient request to the patient's GP to check for exemptions. Exemptions to access must be noted and each patient or legally nominated representative must have their identification checked prior to access being granted.

### Procedure

Maari Ma follows the following procedure on request for access to personal health information in accordance with the privacy legislation.

- Patients are asked to provide their request in writing.
- The request is forwarded to the Service Manager who will ask the patient's GP to check for exemptions.
- Where there is an exemption Maari Ma will provide this advice within 45 days. The GP will note the exemption in the patient's medical record.
- Where an exemption does not exist Maari Ma will provide the requested information within 45 days.
- The written request will be scanned into the patient's medical record.
- Where health information will be provided the Service Manager will check the patient's or legally nominated representative's (for example next of kin) identification prior to access being granted.

# COMPUTER ADMINISTRATION

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## Computer security

### Policy

Maari Ma has systems in place to protect the privacy, security, quality and integrity of the data held. Appropriate staff are also trained in computer security policies and procedures.

Maari Ma has the following areas documented in the computer security policy:

- All staff have personal passwords to authorise appropriate levels of access to health information
- Computers have the ability to be locked when not in use
- backups of electronic information are performed daily both onsite and offsite and is at a frequency consistent with a documented information disaster recovery plan
- offsite backups of electronic information are stored in a secure environment
- backups are verified and checked for corruption
- antivirus software is installed and automatically updated
- The Maari Ma Network is protected by a hardware firewall and all systems have software firewalls enabled
- disaster recovery plan that has been developed, tested and documented
- data transmission of patient information over a public network is encrypted.

Maari Ma has the following information to support the computer security policy:

- current asset register documenting hardware and software specifications and locations, network information, technical support
- electronic logs of maintenance, backup including test restoration, faults, virus scans
- database of warranties, invoices/receipts, maintenance agreements.
- onsite IT support provided by the Manager, IT.

### Procedure

We employ a Manager, IT to provide and coordinate the IT security of our who is responsible for the following activities:

- overseeing the development of documented IT security policies and procedures
- overseeing the development of a computer disaster recovery plan
- ensuring that there are test runs of disaster recovery procedures at specified intervals
- ensuring revision of the disaster recovery plan at specified intervals
- keeping an IT assets register (hardware, software, manuals and technical support)
- ensuring that there is an access control policy in place
- ensuring that staff are aware of maintaining password security
- establishing a routine back-up procedure
- ensuring that restoration of data is tested at specified intervals
- ensuring that anti-viral software is installed on all computers and the virus definitions are updated daily
- ensuring that computers, especially the servers and storage, are adequately maintained
- ensuring that the computer system can deal with fluctuations in the power supply
- investigating the appropriate means of encrypting confidential information prior to electronic transfer
- coordinating the application, use and storage of digital certificates
- ensuring Maari Ma understands encryption
- arranging computer security training for members of Maari Ma





- Securing Maari Ma documentation and data with the correct permissions on the intranet and shared folders.

## Computer system maintenance

### Policy

To protect against data corruption, Maari Ma has an uninterruptible power supply (UPS) on the server PC to prevent unexpected shutdowns in the event of a mains power failure.

Electrical surge protection filters are used to protect Maari Ma's PCs and other hardware from power fluctuations and failures.

Disks and computer equipment are positioned away from environmental hazards such as extreme heat or cold, direct sunlight, high or low humidity and magnetic fields.

GPs and staff members exercise care to safeguard any electronic equipment and data assigned to them, as if reasonable care is not taken, they may be accountable for any loss or damage that occurs.

Computer equipment is maintained by the IT Manager on a daily basis including:

- checking remaining hard disk drive capacity
- checking logs for errors
- checking for the installation of unauthorised programs
- reviewing anti-virus scanning software to ensure it is working effectively and to make sure that the latest update is installed on all machines
- deploying required windows and application security updates/fixes.

### Procedure

The Manager, IT maintains the computer system continually through the use of computer/network management software.

## Access control

### Policy

Maari Ma has different levels of access to patient health information for different staff members appropriate to their duties.

### Procedure

The positions of staff that are authorised to access patient health information include:

Position of staff member	Level of access
<b>Service Manager</b>	MD – Full access but can't prescribe or create investigation requests. PS – Basic Access
<b>Doctor</b>	MD – Full Access including prescribing and investigation requests. Including user list edit. PS – Basic access Clinical Audit Tools – full access
<b>Nursing staff</b>	MD – Full access but can't prescribe or create investigation requests. PS – Basic Access
<b>Aboriginal Health Workers</b>	MD – Full access but can't prescribe or create investigation requests. PS – Basic Access



Position of staff member	Level of access
<b>Practice Administration Assistants</b>	MD – Full access but can't prescribe or create investigation requests. PS – Full access but not user list edit
<b>System Support staff</b>	MD – Full access with ability to edit user list, but can't prescribe or create investigation requests PS – Full access including user list edit. Clinical Audit Tools – full access

## Data security

### Policy

Data security in the consulting room is more about GP activities than technical matters. For example, some GPs like their computer screens to be clearly visible to their patients during consultations.

GPs need to consider if there might be sensitive information on the screen, which should not be seen. Examples include parents seeing a sensitive past history of their teenage child such as a sexually transmitted disease, or patients viewing the clinical record of the person previously consulted.

Similarly, receptionists need to be careful that patients do not have visual access to confidential information on computer screens at the 'front desk'.

There are various methods by which the information can be kept confidential. Some have to do with screen positioning, but screen locking and the use of a function key which instantly closes down an open file, are useful technical options.

### Procedure

We keep personal health information secure by screen locking, anti-viral software, passwords, hard and soft firewalls, onsite and offsite data backups and ongoing regular maintenance.

## Backup and restore

### Policy

To avoid loss of data, the data held on Maari Ma's computer system (including clinical, financial and administrative data) is backed up on a daily and weekly basis. With backups periodically tested to verify that the data can be restored if necessary. All backup data is stored securely when in use and destroyed when no longer used.

### Procedure

Maari Ma back up process is image based. A full image (or picture) of all servers is taken weekly. Twice daily incremental images (of changed data only) of the entire infrastructure are also conducted and placed on the redundant storage system.

Multiple images are then copied across to the offsite network attached storage on a weekly basis providing full offsite backup and disaster recovery.

Also, daily shadow copies of all changed data are captured. This allows for rapid and accurate partial restore of data files or folders from up to 4 weeks prior without reverting to the back-up images.



## Backup testing

To ensure that data backup is working, all backup are verified by image management software to confirm viability. In addition, IT support periodically browse image backups as a virtual hard drive to manually test viability.

## Website

### Policy

Maari Ma does not use its website to collect personal information about its clients or those who view the site. The site is for information sharing purposes and to provide contact details for the Regional Office and the Maari Ma Primary Health Care Service.

The website is kept up to date and holds accurate information about services provided.

### Procedure

The Manager, IT is responsible for website maintenance to ensure the website is kept current and up to date.

The website is continually monitored to ensure it is up to date. Any changes to the practice information sheet are also reflected on the website.

## Email

### Policy

Maari Ma does not transfer patient information via email unless it is encrypted. Communication with patients via electronic means (email) is conducted with appropriate regard to the privacy and confidentiality of the patient's health information.

### Procedure

#### Online Security and Technology

The Health Insurance Commission (HIC) has developed a security system for health care electronic transactions using Public Key Infrastructure (PKI) technology. Using digital certificates, transactions are digitally signed and encrypted and sent to the HIC and other health professionals and locations that also have PKI.

We use two types of digital certificate in the HIC's PKI:

- location certificates which relate to the location of the Maari Ma Primary Health Care Service building
- individual certificates for those staff that correspond electronically with the HIC and other health care professionals and locations.

Both Location certificates and Individual certificates are associated with a valid unique email address. Individual certificate details are stored on a token (a Smart Card or Key Ring). Location certificates are securely stored on the network and backed-up by IT.

#### Secure communications

Internet and email users are responsible for ensuring that the provided facilities are used in an effective, ethical and lawful manner. Internet and email users do not use the internet and email for purposes that are illegal, unethical, harmful to Maari Ma or the medical profession or non-productive. Acceptable use includes obtaining information from medical and business websites, using email for Health Service business, and accessing online databases.



Unacceptable use includes forwarding chain emails and viruses, transmitting copyrighted materials without permission, visiting websites with obscene or objectionable content; transmitting any offensive, harassing or fraudulent messages or conducting personal business.

Any executable files downloaded from the internet or by email (for example software patches or any files with an .exe, .bat or .com extension) are scanned for viruses following download. Only the IT department can install any downloaded software on a computer.

As information from the internet can be out-dated, incorrect or misleading, any information obtained from the internet is verified for accuracy with other information sources before being used.

Confidential information is not sent over the internet unless encrypted.

### **Email disclaimer**

Maari Ma uses the following confidentiality and privilege notice on outgoing emails that are affiliated with the Health Service:

'This message is confidential and should only be used by the intended addressee. If you were sent this email by mistake, please inform us by reply email and then destroy this message. The contents of this email are the opinions of the author and do not necessarily represent the views of Maari Ma Health.'

Maari Ma configures software so that the confidentiality and privilege notice is automatically added to each outgoing email.



# CONTINUOUS QUALITY IMPROVEMENT

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## *Risk assessment and management*

### *Policy*

Maari Ma has a system of risk assessment and management that ensures proper systems and procedures are in place. These systems and procedures are documented and regularly reviewed.

The aim of these systems and procedures are to:

- identify all strategic risks using a risk management process
- ensure risk management becomes part of day to day management
- provide staff with policies and procedures necessary to manage risk
- ensure employees are aware of risks and how to manage them
- assign accountability for risk
- monitor risk profile and implement continuous improvement approach to risk management.

Examples of these systems include:

- achievement of the RACGP standards via the accreditation process
- records of staff qualifications and training
- patient feedback obtained through surveys and analysis of complaints and comments
- documentation of sterilisation procedures including servicing, validation, details of individual loads/cycles and staff training
- patient health records
- documentation and tracking of abnormal results
- regular reviews of systems and procedures
- policy on telephone exchanges with patients.

Maari Ma undertakes a regular formal risk assessment and management in the areas of financial services, human resources, facilities (computers, telephones, storage, and infection control), clinical services and patient services.

### *Procedure*

It is the responsibility of the Team Leader, Practice Administration to facilitate regular formal risk assessment and management in the areas of financial services, human resources, facilities, clinical services and patient services.

Annual risk assessment reviews are conducted.



## Accreditation and continuous improvement

### Policy

Maari Ma is committed to attaining and exceeding the 4<sup>th</sup> Edition of the RACGP Standards for General Practices, as well as other quality improvement activities. To develop, maintain and enhance the business and clinical management aspects of Maari Ma, quality review activities are used to monitor progress. These activities include audits, routine data checks, account reviews and health record reviews.

Maari Ma aims to continually improve processes that will result in the following outcomes:

- improved and increased documentation of routine monitoring and specific improvements in health care
- increased participation in continuing education for effective and personal work output
- identification and resolution of actual and potential deficiencies and risks in Health Service administration, care and management of patients
- improved staff communication
- increased staff awareness, participation and management of patient care, occupational health and safety, infection control and medico-legal standards
- increased safety for staff and patients of Maari Ma
- improved quality of care for patients.

Maari Ma is able to demonstrate an aspect of activities that has been identified for improvement, and we have a planned approach to improvement. We utilise information from quality improvement outcomes and use it as part of risk assessment and management program activities

Data about Maari Ma population is collected and used by Maari Ma for quality improvement. We use other information (for example the Australian Immunisation Register) to enhance our understanding and identification of opportunities for improvement.

### Procedure

We use both annual and rapid quality improvement cycles to identify areas for quality improvement. We use data from clinical audits extraction tools to improve and report this information in regular staff feedback sessions.

We use the Plan-Do-Study-Act methodology to underpin our Continuous Quality Improvement work.

We have a register of CQI activities. This register documents all work done to improve how we deliver care to improve health outcomes.



## Research and quality program

### Policy

Maari Ma participates in research that is considered of value to the Aboriginal population and the Health Service.

Wherever possible, patient data will be de-identified, however if it is unavoidable, Maari Ma ensures:

- the patient provides explicit and documented written consent
- the patient receives a written and verbal explanation about the research
- the patient can withdraw their consent at any time
- the project is approved by a relevant Human Research Ethics Committee (HREC) established under the National Health and Medical Research Council guidelines
- privacy laws are followed.

Maari Ma will determine where HREC approval is required. Maari Ma will consider every research project on its merit and projects will be assessed as to their usefulness and benefit to the Organisation.

Patient consent for de-identified audits is neither sort nor required under the *Health Records and Information Act (2002)*. De-identified audits of clinical notes is an expected use of patient health information and as such do not require explicit consent.

### Procedure

Maari Ma retains a record of the request for participation in any research project, including the research protocol, consent and withdrawal procedures and process for resolving problems in the corresponding site folder located in the manager's office.