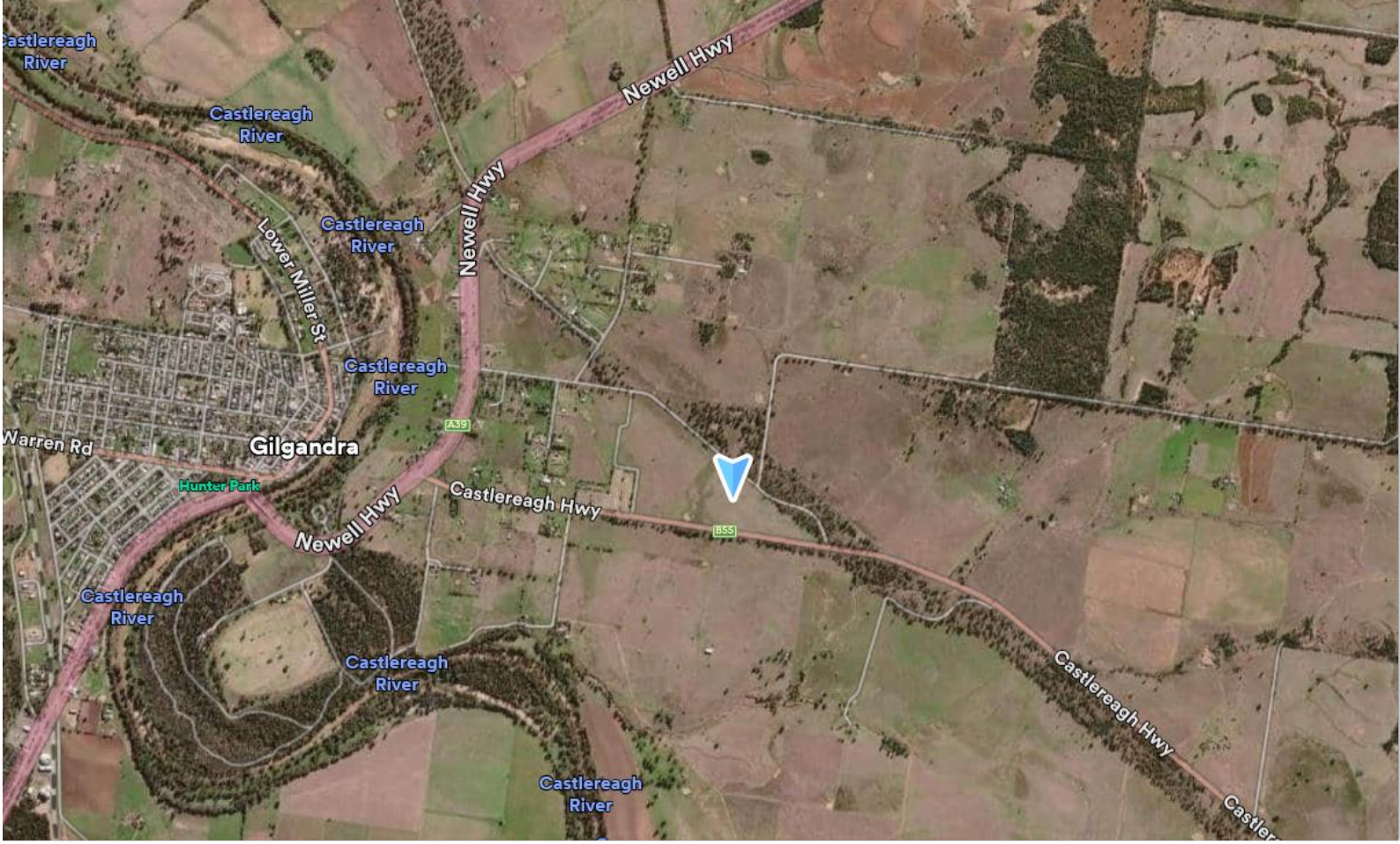


barnson.
DESIGN . PLAN . MANAGE

Statement of Environmental Effects

Client: Serenity Developments Pty Ltd

Site Address: 172 Quealeys Rd, Gilgandra

13 June 2024

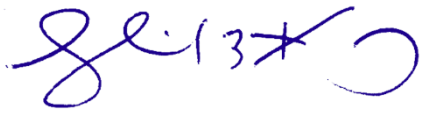
Our Reference : 43626-PR01_A

DISCLAIMER

This report has been prepared solely for **Serenity Developments Pty Ltd** in accordance with the scope provided by the client and for the purpose(s) as outlined throughout this report.

Barnson Pty Ltd accepts no liability or responsibility for or in respect of any use or reliance upon this report and its supporting material by anyone other than the client.

Project Name:	Subdivision at 172 Quealeys Rd, Gilgandra
Client:	**Serenity Developments Pty Ltd**
Project Number:	43626
Report Reference:	43626-PR01_A
Date:	13 June 2024

Prepared by:	**Reviewed by:**
	
Jack Massey B. Urb & Reg. Planning Senior Town Planner	Jim Sarantzouklis MAIBS (Assoc.) MEHA MAICD RPIA Director

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1. INTRODUCTION

1.1. Background

Barnson Pty Ltd has been engaged by Serenity Developments Pty Ltd to prepare information in support of a Development Application (DA) for the subdivision of Lot 93 DP 753382, known as 172 Quealeys Road, Gilgandra.

The subject site is located on the northern side of the Castlereagh Highway with Quealeys Road running along the north eastern boundary. The site has an area of 18.21 hectares and is vacant.

The project will consist of the Torrens Title subdivision of Lot 93 DP 753382 into nine (9) Lots. All proposed Lots will be vacant ready for future residential development.

The site is zoned R5 Large Lot Residential under *Gilgandra Local Environmental Plan 2011*. The proposed development is defined as subdivision, which is permissible with consent pursuant to Clause 2.6 of the LEP.

This application consists of:

- A completed NSW Planning Portal development application form; and
- PDF Copy of this written statement, including plans and supporting documents.

1.2. Proponent

The proponent for the DA is Serenity Developments Pty Ltd.

1.3. Consultant

Barnson Pty Ltd

Jack Massey

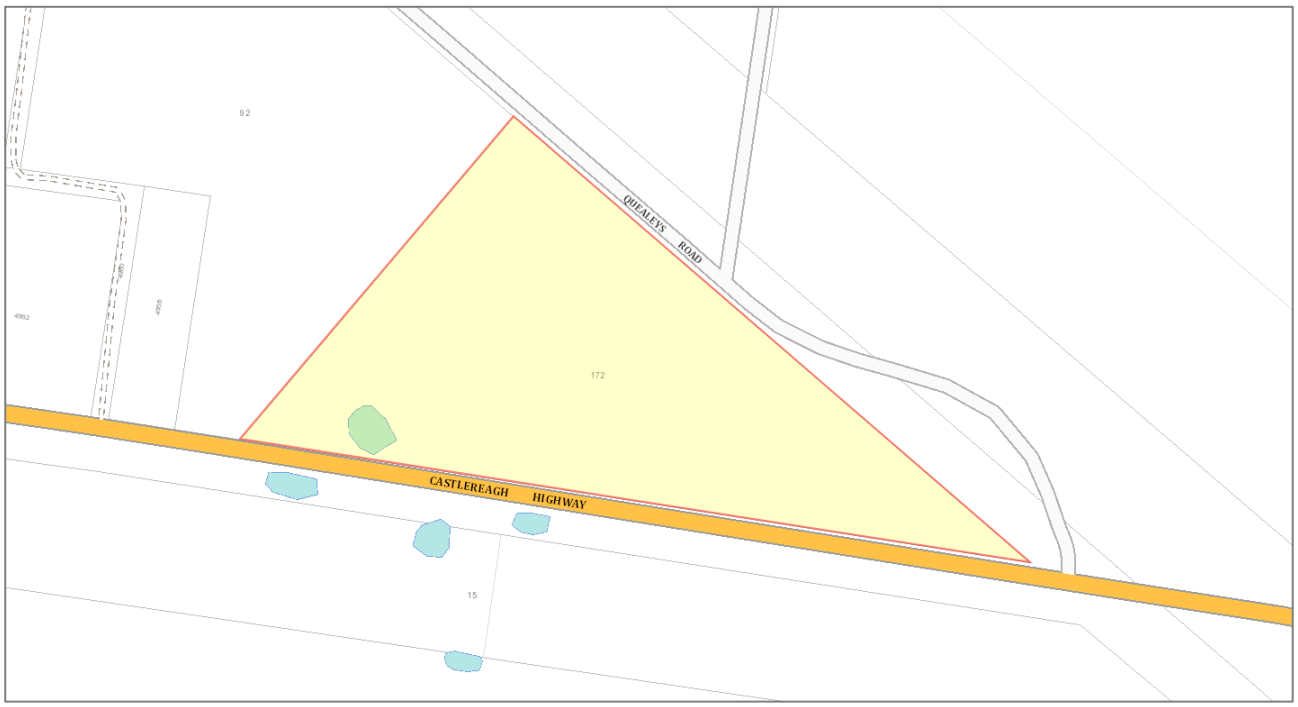
Suite 8 / 11 White Street

Tamworth NSW 2340

2. EXISTING ENVIRONMENT

2.1. Location and Title

The subject site of this application is Lot 93 DP 753382, known as 172 Quealeys Road, Gilgandra. The site is located on the south western side of Quealeys Road, as shown in Figure 1 below.



Source: (NSW Government Spatial Services, 2024)

Figure 1 – Site Location

The site has an overall area of 18.21 hectares (refer to Deposited Plan in Appendix A). The site has frontage to the Castlereagh Highway and Quealeys Road. The site is vacant and has historically been heavily grazed/managed. Refer to Figure 2 and Plates 1-3 below.

Source: (NSW Government Spatial Services, 2024)

Figure 2 – Site Aerial

Plate 1 – View of the site and Quealeys Road

Plate 2 – Internal view of the site

Plate 3 – View of an existing dam located on the site

2.2. Land Use

The subject site is located on the outskirts of Gilgandra in an area characterised by vacant lands and semi-rural activities. The subject site has been used for agricultural grazing purposes for an extended period of time and is currently vacant. There are similar uses surrounding the subject site.

2.3. Topography

The subject site is relatively flat throughout.

2.4. Flora and Fauna

The site has historically been used for grazing purposes and predominately consists of managed grasslands and self-sown weeds. There are no densely vegetated areas positioned on the subject site.

2.5. Natural Hazards

The subject site is not mapped within a Flood Planning Area of bushfire prone under the *Gilgandra Local Environmental Plan 2011* or ePlanning Spatial Viewer.

2.6. Services

There are no services connected to the property.

2.7. Access and Traffic

Access to the subject site is gained off the south western side of Quealeys Road, which is a gravel road. An existing gravel crossover provides suitable 2WD access to the subject site.

2.8. Heritage

The site is not identified in Schedule 5 of the *Gilgandra Environmental Plan 2011.*

An Aboriginal Heritage Information System (AHIMS) search was undertaken for the site and immediate surrounds. The AHIMS search revealed that there are no Aboriginal sites recorded on the subject site. Refer to AHIMS search in Appendix B of this report.

3. PROPOSED DEVELOPMENT

The proposed development includes the Torrens Title subdivision of Lot 93 DP 753382 into nine (9) Lots. Plans of the proposed subdivision are provided in Appendix C of this report.

The proposed Lots and their sizes are shown in Table 1 below.

Table 1 – Subdivision Details

Proposed Lot	Road Frontage	Area	Use of land
Lot 1	Castlereagh Highway	2ha	Vacant land
Lot 2	Quealeys Road	2ha	Vacant land
Lot 3	Castlereagh Highway	2ha	Vacant land
Lot 4	Quealeys Road	2ha	Vacant land
Lot 5	Castlereagh Highway	2ha	Vacant land
Lot 6	Quealeys Road	2ha	Vacant land
Lot 7	Castlereagh Highway	2ha	Vacant land
Lot 8	Castlereagh Highway	2ha	Vacant land
Lot 9	Castlereagh Highway	2.21ha	Vacant land

New boundary fencing is proposed to suit the proposed Lot layout and shall be established via a rural fencing approach (steel posts and wire etc). The proposed fencing is exempt development under Subdivision 18 Section 2.35 - 2.36 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*.

As a result of the subdivision, the opportunity for dwellings shall be established on all proposed Lots. Future applications for dwellings on these Lots shall be submitted separately.

Preliminary Civil Designs have been prepared for stormwater management of the site and are provided in Appendix D of this report. Sheet C03 of the designs provided the following:

- Construction of a new open table drain on Lots 1, 2 and 3; and
- Construction of a new open table drain on Lots 5, 7, 8 and 9.

The proposed open table drains will consist of a 5m wide open channel approximately 0.3m in depth. These table drains shall manage overland stormwater across the site and easements shall be established for each and formalised on the new Deposited Plan. Construction works are minimal considering the proposed depth of the open channels.

New access points shall be provided as required and subject to a separate Section 138 application/s under the *Roads Act 1993*. It is noted that some of the access points/driveways to the proposed Lots will traverse over the open table drains. However, considering that these channels are only 0.3m in depth, vehicles will be capable of traversing through the channel without any issues. A gravel base will be used at these points to ensure the table drain retains its structure as a result of the ongoing vehicular movements.

Refer to Subdivision Sketch Plan in Appendix C and Preliminary Civil Designs in Appendix D of this report.

An Onsite Effluent Management Assessment has been prepared for the proposed development, which provides an assessment of the onsite sewage management serviceability of the resultant Lots. The assessment is provided in Appendix E of this report.

A preliminary electrical layout/sketch has also been prepared and is provided in Appendix F of this report.

The existing dam on the site is intended to be retained.

4. LAND USE ZONING

The subject site is zoned R5 Large Lot Residential pursuant to the *Gilgandra Local Environmental Plan 2011* (LEP). The proposed development is for a subdivision, which is permissible with consent pursuant to Clause 2.6 of the LEP.

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 R5 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.

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 a semi-rural locality, in an area dominated by agricultural activities including grazing and cropping and residential activities. The site has been used for agricultural purposes (grazing) for an extended period of time.

The following images show the vegetation formations on the site:

Plate 4 – View of existing vegetation on the site

Plate 5 – View of existing vegetation on the site

Plate 6 – View of existing vegetation on the site

As shown in Plates 4-6, the site is highly modified and frequently grazed by cattle. The current BAM-related Guidelines specify that grassland with native cover of <15% are to be treated as non-native and cannot be considered a native grassland environment. As such, for the purposes of this subdivision, it is unlikely that the proposed works are clearing any 'native vegetation'.

Therefore, the proposed development is not likely to significantly affect threatened species or ecological communities, or their habitats.

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: As discussed above, the site is highly modified and unlikely to support any significant native biodiversity.

Declared Area of Outstanding Biodiversity Value

The site is not mapped on the Biodiversity Value Map as being land with a high biodiversity value as defined by the BC Act, as shown in Figure 4 below.

Source: (NSW Government, 2024)

Figure 3 – Biodiversity Value 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. Therefore, a Biodiversity Development Assessment Report is not required to accompany the application for development consent.

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 *Fisheries Management Act 1994* does not apply to the subject proposal.

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 *Fisheries Management Act 1994* does not apply to the subject proposal.

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.

5.3.2. 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

(iv) 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

(vi) 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,

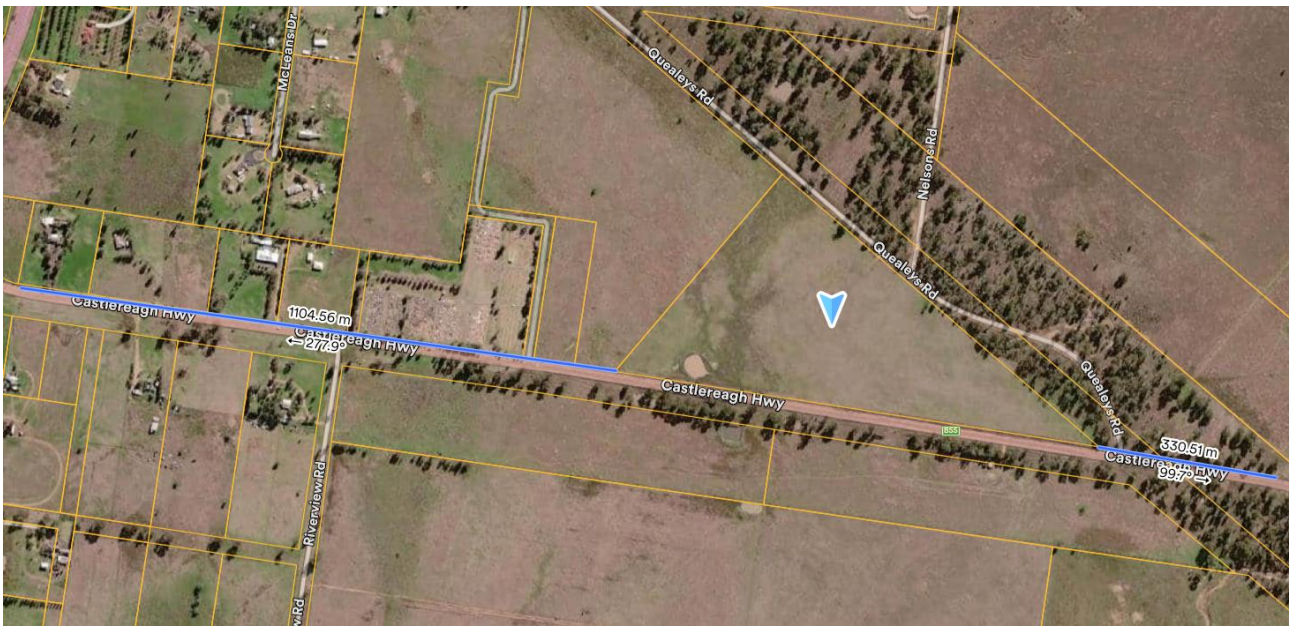
(e) The public interest.

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

5.3.3. Integrated Development

Development that requires both development consent and another approval listed under Section 4.46 of the EP&A Act is 'Integrated Development'. The proposed development is Integrated Development by virtue of requiring a Section 138 approval under the Roads Act 1993 to carry out with within the classified road reserve. The work involved would be providing access off the northern side of the Castlereagh Highway to proposed Lots 1, 3, 5, 7, 8 and 9. Each Lots shall have its own access point off the highway and constructed to TfNSW requirements. All other Lots shall be accessed via Quealey's Road.

This section of the highway has a speed limit of 100km/h. In accordance with Table 5.5 of Austroads Guide to Road Design Part 3: Geometric Design (2016), the most conservative stopping distance measurement is 205m (R2.5s). As shown in Figure 4 below, the site is located on a straight stretch of the Castlereagh Highway. There is approximately 1100m of clear sight distance to the west of the site and approximately 330m of clear sight distance east of the site. Therefore, vehicles have ample sight distance to slow down for any turning vehicles and it is considered that there would be no detrimental impact on the road network for any turning vehicles (entering or existing) for proposed Lots 1, 3, 5, 7, 8 and 9.



Source: Nearmaps Limited

Figure 4 - Aerial Image

Further to the above, the RTA's Guide to Generating Traffic Developments provides a weekday peak hour vehicle trip of 0.85 per dwelling. Therefore, the six Lots are anticipated to generate an average of 5.1 or 6 trips per hour, which is considered negligible in terms of the context of the traffic environment.

5.4. Environmental Planning Instruments

5.4.1. State Environmental Planning Policy (Koala Habitat Protection) 2020

Whilst the subject site is located within the Gilgandra LGA, it is not considered to comprise potential koala habitat as defined by *State Environmental Planning Policy (Koala Habitat Protection) 2020.* Therefore this SEPP does not require any further consideration.

5.4.2. State Environmental Planning Policy (Resilience and Hazards) 2021

Clause 4.6 of *State Environmental Planning Policy (Resilience and Hazards) 2021* 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 historically been used for grazing purposes. The *Managing Land Contamination Planning Guidelines SEPP 55 – Remediation of Land* makes it clear as to what land is potentially contaminated. The Guidelines suggest an indicative list of activities that may cause contamination (Table 1 – Page 12). No known cropping or uses that involve chemicals have been used on the site as listed in Appendix A of the Guidelines.

5.4.3. State Environmental Planning Policy (Transport and Infrastructure) 2021

Clause 2.119 of *State Environmental Planning Policy (Transport and Infrastructure) 2021* requires Council to consider the following before granting consent to a DA:

(2) The consent authority must not grant consent to development on land that has a frontage to a classified road unless it is satisfied that—

(a) where practicable and safe, vehicular access to the land is provided by a road other than the classified road, and

(b) the safety, efficiency and ongoing operation of the classified road will not be adversely affected by the development as a result of—

(i) the design of the vehicular access to the land, or

(ii) the emission of smoke or dust from the development, or

(iii) the nature, volume or frequency of vehicles using the classified road to gain access to the land, and

(c) the development is of a type that is not sensitive to traffic noise or vehicle emissions, or is appropriately located and designed, or includes measures, to ameliorate potential traffic noise or vehicle emissions within the site of the development arising from the adjacent classified road.

Comment: Development by virtue of requiring a Section 138 approval under the Roads Act 1993 to carry out with within the classified road reserve. The work involved would be providing access off the northern side of the Castlereagh Highway to proposed Lots 1, 3, 5, 7, 8 and 9. Each Lots shall have its own access point off the highway and constructed to TfNSW requirements. All other Lots shall be accessed via Quealey's Road. Works shall be undertaken with the future Section 138 approval.

5.4.4. Gilgandra Local Environmental Plan 2011

Land Use Table

The subject site is zoned R5 Large Lot Residential pursuant to the *Gilgandra Local Environmental Plan 2011* (LEP). The objectives of the R5 zone are:

- *To provide residential housing in a rural setting while preserving, and minimising impacts on, environmentally sensitive locations and scenic quality.*

- *To ensure that large residential lots do not hinder the proper and orderly development of urban areas in the future.*
- *To ensure that development in the area does not unreasonably increase the demand for public services or public facilities.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*

Comment: The proposed development is defined as a subdivision, which is considered to be consistent with the zone objectives as provides for residential housing in a rural setting. The subdivision is permissible with consent in the R5 zone pursuant to Clause 2.6 of the LEP.

Subdivision – Consent Requirements

Clause 2.6 of the LEP allows for land to be subdivide, but only with development consent.

Minimum Lot Size

Clause 4.1(3) of the LEP states:

> *(3) The size of any lot resulting from a subdivision of land to which this clause applies is not to be less than the minimum size shown on the Lot Size Map in relation to that land.*

Comment: As shown in Table 1 and the plans in Appendix C of this report, each proposed Lot shall meet the specified minimum lot size of 2 hectares.

Subdivision of, or dwellings on, land in certain rural, residential or conservation zones

Clause 5.16 of the LEP states:

> *(3) A consent authority must take into account the matters specified in subclause (4) in determining whether to grant development consent to development on land to which this clause applies for either of the following purposes—*
>
> *(a) subdivision of land proposed to be used for the purposes of a dwelling,*
>
> *(b) erection of a dwelling.*
>
> *(4) The following matters are to be taken into account—*
>
> *(a) the existing uses and approved uses of land in the vicinity of the development,*
>
> *(b) whether or not the development is likely to have a significant impact on land uses that, in the opinion of the consent authority, are likely to be preferred and the predominant land uses in the vicinity of the development,*
>
> *(c) whether or not the development is likely to be incompatible with a use referred to in paragraph (a) or (b),*
>
> *(d) any measures proposed by the applicant to avoid or minimise any incompatibility referred to in paragraph (c).*

Comment: The proposed subdivision will allow for the erection of a dwelling on each proposed Lot, therefore the provisions under this clause apply. No developments or uses in the vicinity of the site shall be impacted.

Terrestrial Biodiversity

Clause 7.1 'Biodiversity Protection' applies as the subject site mapped as containing parts of ''Biodiversity Sensitivity'', as shown in Figure 5 below.

The aerial imagery shown in Figure 2 of this report confirms that there are no tracts of established vegetation on the subject site. The mapped biodiversity protection areas appear to be from the adjoining road reserve to the north east of the subject site. It is not proposed to impact the vegetation within the road reserve. Therefore, as no vegetation will be removed, the provisions under this clause have been complied with and the subdivision shall be carried out in accordance with the objectives of the clause.

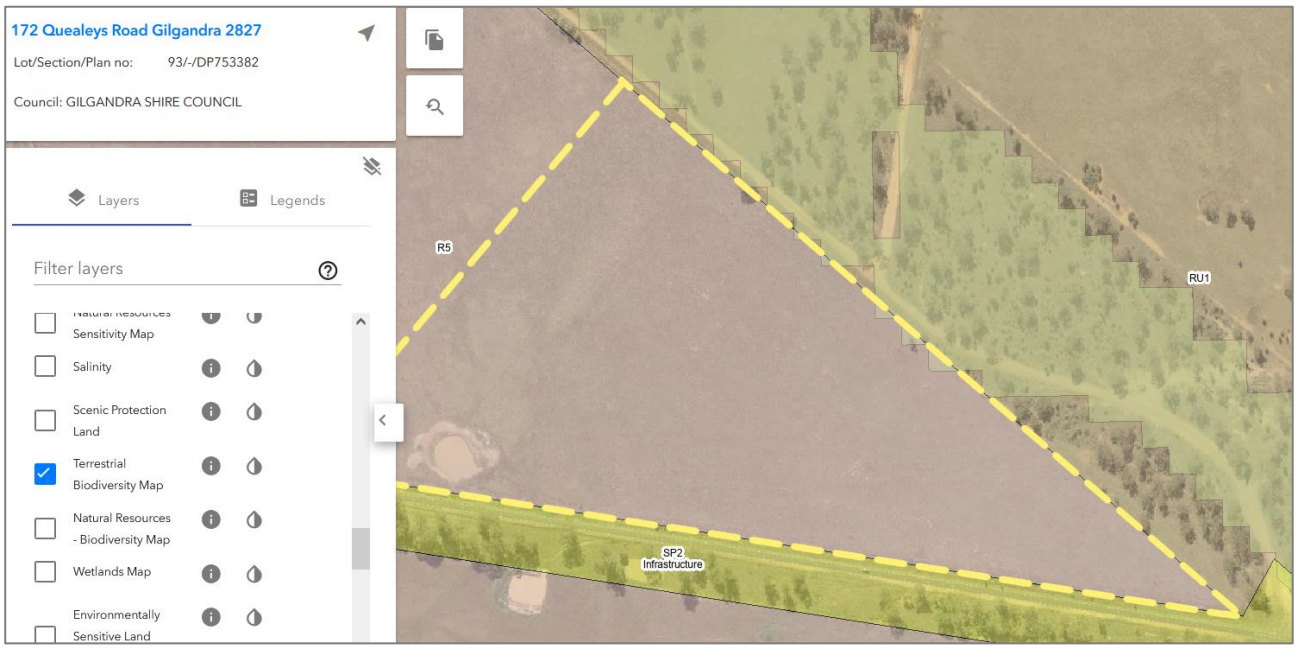


Figure 5 – Terrestrial Biodiversity Map

Essential Services

Clause 7.6 of the LEP states:

> *Development consent must not be granted to development unless the consent authority is satisfied that any of the following services that are essential for the proposed development are available or that adequate arrangements have been made to make them available when required—*
>
> *(a) the supply of water,*
>
> *(b) the supply of electricity,*
>
> *(c) the disposal and management of sewage,*
>
> *(d) stormwater drainage or on-site conservation,*
>
> *(e) suitable road access.*

Comment: The proposed development includes adequate arrangements for essential services. The following services are provided:

- Water shall be supplied via onsite rainwater tanks and subject to future approvals for dwellings on the vacant lots;
- Future dwellings shall be serviced via onsite effluent management systems;
- All stormwater shall be managed in accordance with the Preliminary Civil Designs in Appendix D of this report; Each Lot shall be connected to electricity. An Electrical Sketch has been prepared and is provided in Appendix F of this report; and
- Suitable road access is provided.

5.5. Draft Environmental Planning Instruments

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

5.6. Development Control Plans

The *Gilgandra Shire Development Control Plan 2011* (DCP) applies to the proposed subdivision. Table 2 below considers the provisions of Section 5 (Subdivision) of the DCP and how the development responds.

Table 2 – DCP Compliance Table

Provision	Comment
Section 5 – Subdivision *General Requirements for Subdivision*	
Lot Size	The proposed subdivision complies with the minimum lot size requirements.
Topography and landform	Noted.
Solar access	Each Lot is a minimum of 2 hectares in size, and as such, solar access is available for future residential dwellings on the resultant Lots. The is a plethora of space on each Lot to achieve solar access and BASIX requirements.
Battleaxe lots	Not applicable - Nil proposed.
Road and access	Not applicable - No new roads are proposed.
Landscaping	Not applicable - No new roads are proposed.

Vegetation	The subject site predominately consists of grazed grasses and self-sown weeds. There are no tracts of trees or other formations of vegetation on the subject site. As such, no clearing of any significant vegetation is proposed.
Bushfire	The subject site is not mapped as bushfire prone land. However, prelodgement discussions with Council determined that a Bushfire Report should be prepared regardless. Refer to Bush Fire Assessment Report in Appendix G of this report. The report provides recommendations in accordance with the requirements under *Planning for Bushfire Protection 2019*. Note. The subject site is not mapped as bushfire prone land and as such concurrence from the NSW RFS pursuant to Section 100B of the Rural Fires Act 1997 is not required in this instance.
Cut, fill and earthworks	Minimal earthworks are proposed other than the following: • Stormwater Management mechanisms designed on the Preliminary Civil Designs in Appendix D of this report; • Access points to each proposed Lot (subject to separate Section 138 applications); and • Provision for electrical services to each proposed Lot. The required earthworks are minimal and would not impact on any adjoining lands or services in the locality.
Services	The following services are provided: • Water shall be supplied via onsite rainwater tanks and subject to future approvals for dwellings on the vacant lots; • Each Lot shall be connected to electricity. An Electrical Sketch has been prepared and is provided in Appendix F of this report. A Notice of Arrangement from Essential Energy shall be provided to Council at the Subdivision Certificate stage; • Wireless NBN shall be utilised for telecommunications. No physical infrastructure is considered necessary in this instance. A letter shall be produced from NBN to confirm that the resultant Lots are capable of utilising the wireless NBN network; • Future dwellings shall be serviced via onsite effluent management systems; • All stormwater shall be managed in accordance with the Preliminary Civil Designs in Appendix D of this report; and • Suitable road access is provided to each resultant lot and subject to separate Section 138 applications.
Buffers	There are no noise generating development located within proximity to the site. As such, buffers are not considered necessary, especially considering the size of the proposed Lots.

5.7. Any Planning Agreement entered into

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

5.8. 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. None of which apply to the proposed development.

5.9. Any Likely Impacts of the Development

5.9.1. Context & Setting

The subject site is located in a semi-rural locality which is characterised by small scale primary production/gazing and scattered residential activities. The proposed subdivision meets the specified minimum lot size and shall facilitate the future residential use of the subject land. The development is therefore considered suitable for the context and setting.

5.9.2. Access, Transport & Traffic

It is unlikely that there would be an adverse impact on local traffic as a result of the proposed subdivision. The increase in Lots/traffic is expected to be negligible and there shall be no detrimental impact on the performance of the local road network and any nearby intersections as a result of the generated traffic as part of this development. The access points shall be constructed in accordance with Council's/TfNSW requirements and subject to separate Section 138 applications.

5.9.3. Utilities

Existing services on the site shall remain unchanged as part of the proposed subdivision and provision of services have been made to make them available when required, as discussed throughout this report. There are no anticipated impacts to the existing utility infrastructure systems in the area.

5.9.4. Heritage

The site is not identified in Schedule 5 of the Mid-Western Regional Local Environmental Plan 2012. An Aboriginal Heritage Information System (AHIMS) search was undertaken for the site and immediate surrounds. The AHIMS search revealed that there are no Aboriginal sites recorded within 200m of the subject site. Refer to Appendix B.

5.9.5. Flora & Fauna

The proposed development is not expected to adversely impact on flora or fauna as a result of the proposed development. there is minimal clearing required and no known clearing of native vegetation proposed as part of subdivision works.

5.9.6. Bushfire

A Bush Fire Assessment Report (refer to Appendix G) has been prepared in accordance with the provisions under Planning for Bushfire Protection 2019. The recommendations within the BFAR shall be adopted.

5.9.7. Air and Microclimate

The proposed construction works for access points, rural fencing and electricity provisions will generate some air pollution, primarily from the extra vehicles on the site and some dust pollution. The incidence of air pollution can be reduced by using appropriate equipment; employing good work practice and utilising a water spray, especially in conditions where dust is likely to be a nuisance.

5.9.8. Social & Economic Impacts in the Locality

The proposed development creates the capacity for future residential development on semi-rural landholdings, that will provide for additional housing opportunities to support the growth of the Gilgandra Local Government Area. The proposed development promotes affordability in the middle of a competitive residential market locally with the provision of additional residential land, promotes diversity in rural residential land stock, as well as creates an increase of economic activity in the area with potential new land to develop providing employment for local businesses in the building industry.

5.9.9. Site Design & Internal Design

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 proposed subdivision is suitable for the locality.

5.9.10. Other

There are no other issues such as flooding impact that would result from the proposed subdivision.

5.10. 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.

5.11. The Public Interest

The proposed development is considered to be in the public interest as it provides for a small-scale subdivision. As outlined throughout this report the development is consistent with the minimum lot size for the area and is not expected to have any adverse off-site impacts.

6. CONCLUSION

It is recommended that the proposed subdivision of Lot 93 DP 753382, known as 172 Quealeys Road, Gilgandra 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 *Gilgandra Local Environmental Plan 2011*;
- The proposal complies with the relevant provisions of the *Gilgandra Shire Council Development Control Plan 2011*;
- The proposed development is not anticipated to generate any adverse impacts in the locality; and
- The proposed development is considered suitable for the site and its surrounds.

7. REFERENCES

NSW Government. (2024, May 15). *Biodiversity Value Map*. Retrieved from https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap

NSW Government Spatial Services. (2024, May 15). *Six Maps*. Retrieved from http://maps.six.nsw.gov.au/

NSW Rural Fire Service. (2019). *Planning for Bush Fire Protection: A Guide for Council's, Planners, Fire Authorities and Developers.* Sydney: NSW RFS.

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APPENDIX A

Title and Deposited Plan

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 93/753382

SEARCH DATE	TIME	EDITION NO	DATE
24/11/2023	9:30 AM	6	26/7/2021

LAND

LOT 93 IN DEPOSITED PLAN 753382
LOCAL GOVERNMENT AREA GILGANDRA
PARISH OF ERINGANERIN COUNTY OF GOWEN
(FORMERLY KNOWN AS PORTION 93)
TITLE DIAGRAM CROWN PLAN 1794.1797

FIRST SCHEDULE

SERENITY PROPERTIES (AUST) PTY LTD (T AR273211)

SECOND SCHEDULE (1 NOTIFICATION)

1 LAND EXCLUDES MINERALS (S.171 CROWN LANDS ACT 1989)

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Barnson Pty Ltd (Mudgee) PRINTED ON 24/11/2023

* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title.
Warning: the information appearing under notations has not been formally recorded in the Register.

STANDARD TRACING PREPARED

27 APR 1911 02046

PLAN OF PORTION 93

County of Gowen — *Parish of Eringanerin*

Land District of Coonamble — *Land Board District of Dubbo*

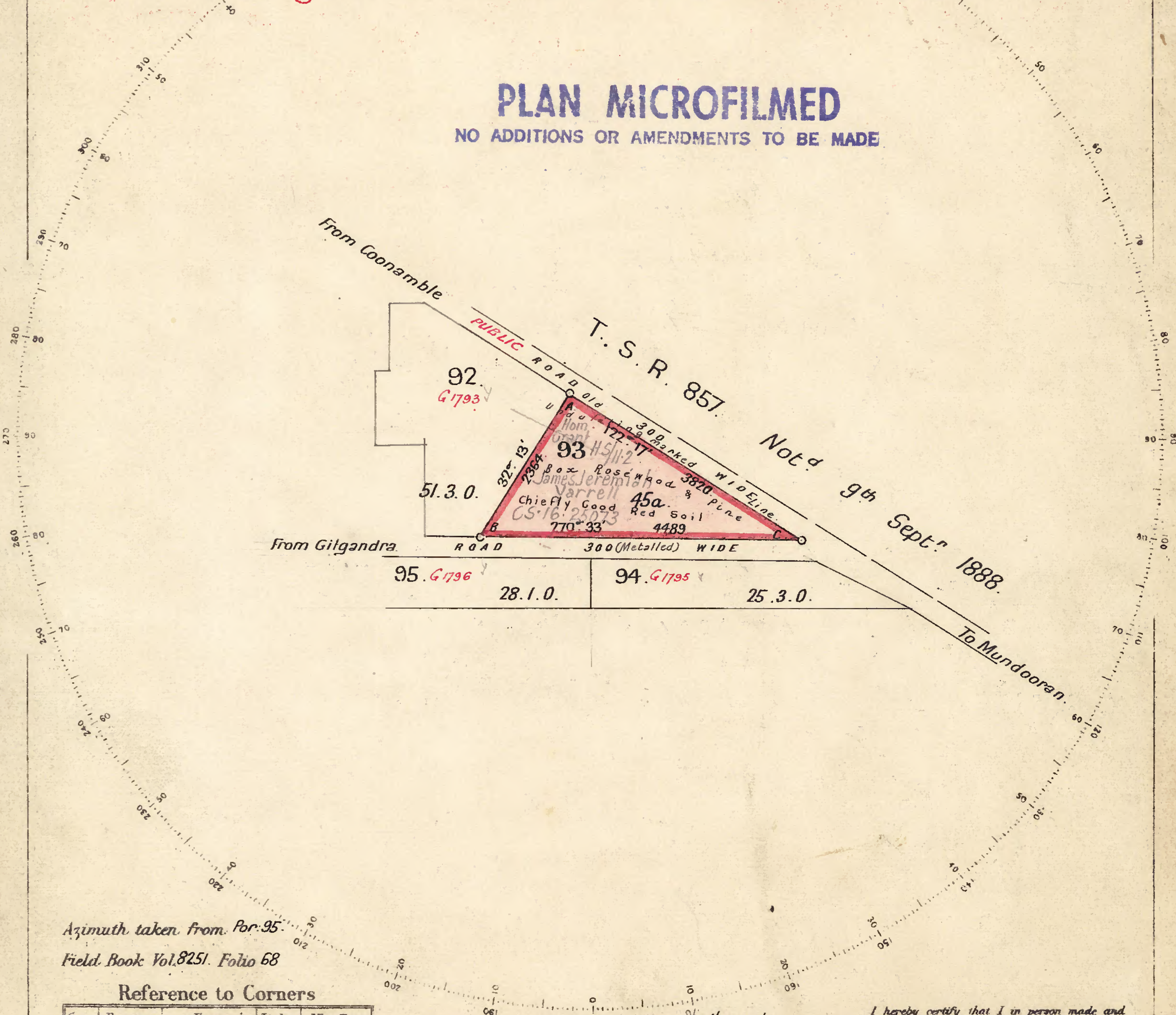
Resumed Area No — *Pastoral Holding Central Division*

Applied for under the Section of the Crown Lands Act of by

Measured for Original Homestead Selection.

Within V.R. 18120 Notified 12th July 1893 Revoked 26th July 1911.
Within Homd Seln Area No 1033 (Cap: Value £135.0.0. at £3.0.0 p.a.) notd 26th July 1911.
Within R. 46777 fr: Sale, other than Sale by Homestead Selection, notd 26th July 1911. Revoked 1st Novr 1911
Por. 93: H.S. 11-2, Aug 28th, James Jeremiah Yarrell Now Hom Grant Vide CS 16 25073

PLAN MICROFILMED
NO ADDITIONS OR AMENDMENTS TO BE MADE



Azimuth taken from Por. 95
Field Book Vol. 8251. Folio 68

Reference to Corners

Corner	Bearing	From	Links	Nos on Tree
A	275° 40'	Box	87.3	92 93.
B	252. 20	Box	23.3	92 93.
C	138 33.	Box	118.4	93.

Reference to Traverse

Line	Bearing	Distance

I hereby certify that I in person made and on the 27th Feby. 1911 completed the survey represented on this plan on which are written the bearings and lengths of the lines measured by me and I declare that the survey has been executed in accordance with the regulations published for the guidance of Licensed Surveyors and the practice of the Department of Lands

D. M. Nash
Licensed Surveyor

Transmitted to the District Surveyor with my letter of 26th April No 38

Voucher No 1146 Passed [signature] 13/6/11 £3.18.7
Calculation Book No — Folio —
Checked and Charted [signature] 10/6/11
Examined and Plan approved [signature] 13th June, 1911.

Draftsman-in-Charge

Value of Improvements Nil.

Charted on Head Office Maps [signature] 1911
Examined [signature] 21 June 11

Scale 20 Chains to an Inch.

G 1794 1797

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APPENDIX B

AHIMS Search

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : h

Client Service ID : 899806

Barnson

Date: 11 June 2024

Suite 6 11 White Street
Tamworth New South Wales 2340

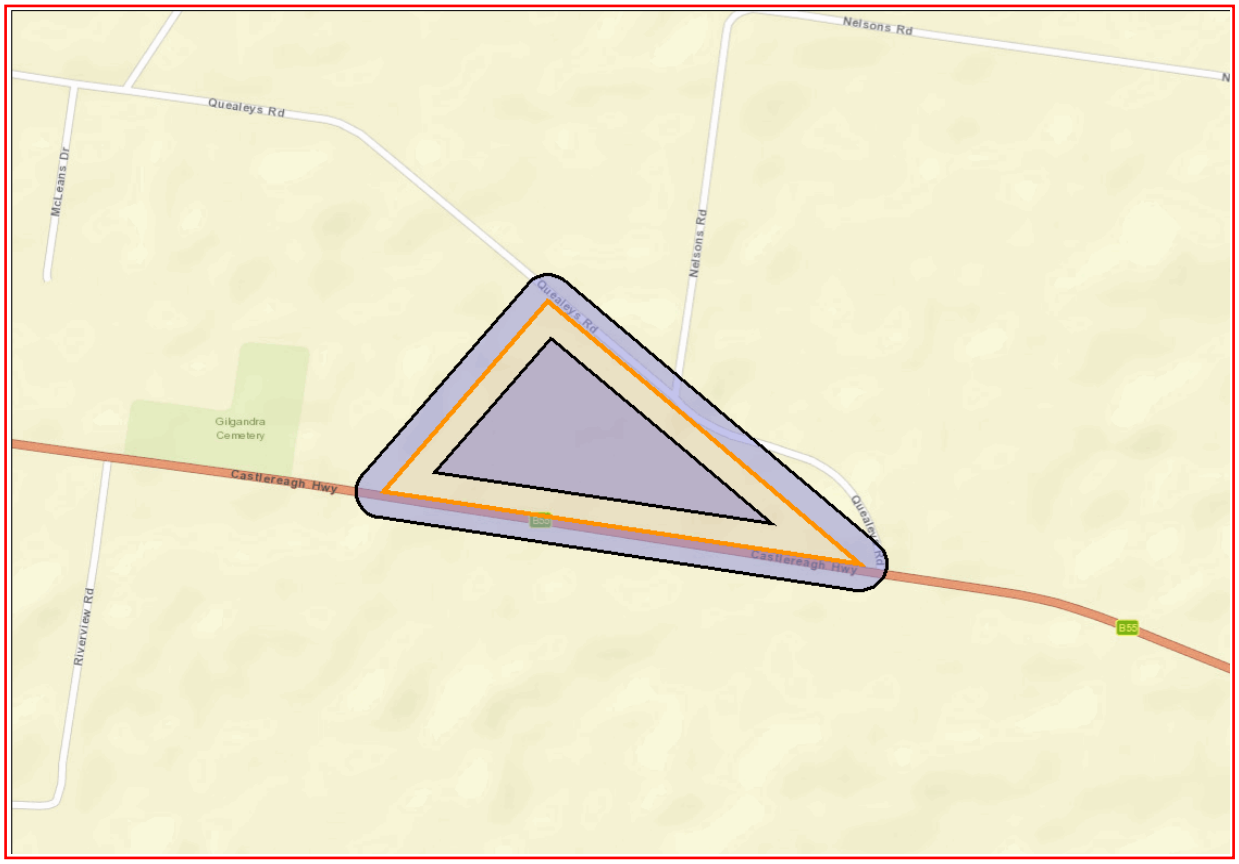
Attention: Jack Massey

Email: jmassey@barnson.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 93, DP:DP753382, Section : - with a Buffer of 50 meters, conducted by Jack Massey on 11 June 2024.

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



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

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

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

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

Important information about your AHIMS search

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

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

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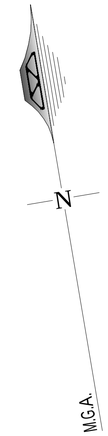
APPENDIX C

Development Plans

DIAL BEFORE YOU DIG
www.1100.com.au

THIS IS A DRAFT PLAN ONLY AND IS SUBJECT TO FINAL SURVEY



LOT 922
DP 1236985

473.55 (BY TITLE)

QUEALEYS 60.35 WIDE **ROAD**

768.46 (BY TITLE)

No. 172 Quealeys Road

LOT 93
DP 753382
18.21ha (BY TITLE)

903.045 (BY TITLE)

CASTLEREAGH 60.35 WIDE **HIGHWAY**

EXISTING SITE PLAN

REDUCTION RATIO 1:1,250 @ A1
1:2,500 @ A3

SCALE 1:1250(A1)

0 25 50 75 100 125

0 25 50 75 100 125

SCALE 1:2500(A3)

ISSUED TO CLIENT

barnson
DESIGN . PLAN . MANAGE

BARNSON PTY LTD

phone 1300 BARNSON (1300 227 676)
email generalenquiry@barnson.com.au
web barnson.com.au

Rev	Date	Description
A	13-02-2024	ISSUED TO CLIENT

Project
PROPOSED SUBDIVISION SKETCH OF LOT 93 IN DP 753382
Site Address
172 QUEALEYS ROAD
GILGANDRA NSW 2827
Client
STEPHAN BROZIC

Drawing Title
EXISTING SITE PLAN

Survey RB
Drawn JS
Check RB

Original Sheet Size A1
Revision A

Certification

Project No 43626
Drawing No L01

DIAL BEFORE YOU DIG
www.1100.com.au

THIS IS A DRAFT PLAN ONLY AND IS SUBJECT TO FINAL SURVEY

PROPOSED SUBDIVISION SKETCH PLAN

REDUCTION RATIO 1:1,250 @ A1
1:2,500 @ A3

SCALE 1:1250(A1)
0 25 50 75 100 125
0 25 50 75 100 125
SCALE 1:2500(A3)

ISSUED TO CLIENT

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DESIGN . PLAN . MANAGE

BARNSON PTY LTD

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A	13-02-2024	ISSUED TO CLIENT

Project
PROPOSED SUBDIVISION SKETCH OF LOT 93 IN DP 753382
Site Address
172 QUEALEYS ROAD
GILGANDRA NSW 2827
Client
STEPHAN BROZIC

Drawing Title
PROPOSED SUBDIVISION SKETCH PLAN

Survey RB
Drawn JS
Check RB

Original Sheet Size A1
Revision A

Certification

Project No 43626
Drawing No L02

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APPENDIX D

Civil Design Plans

Civil Design Documentation

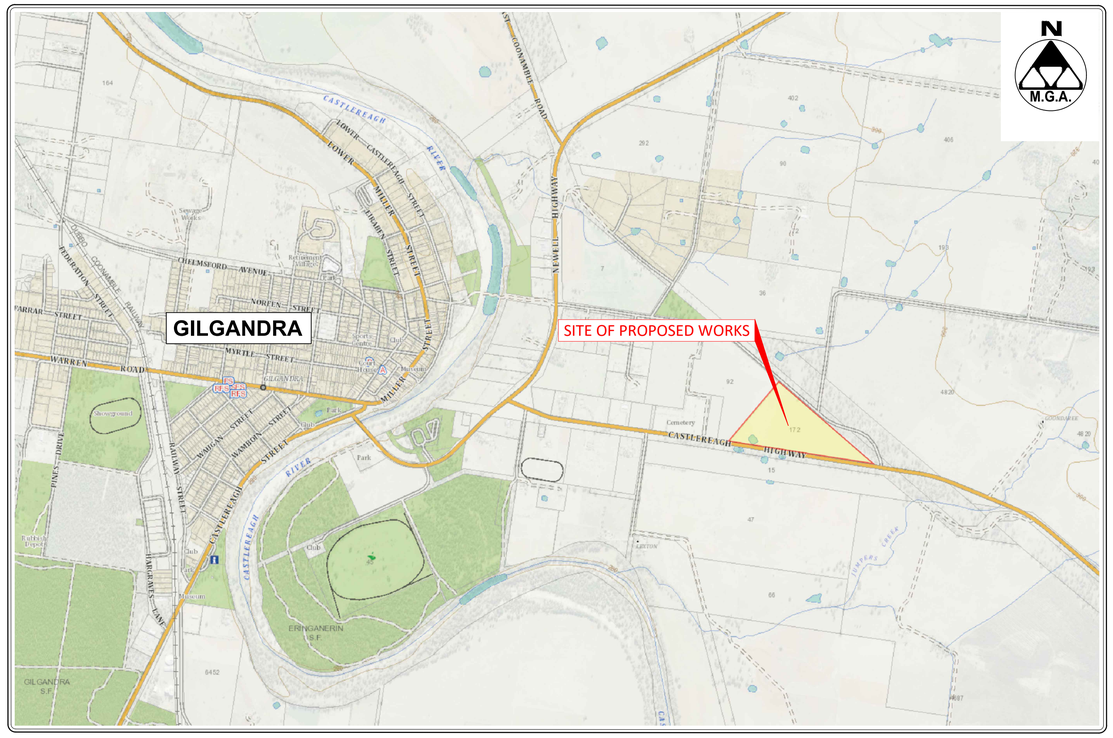
Proposed Subdivision

Lot 93 in DP 753382

172 Quealeys Road, Gilgandra NSW 2827

SCHEDULE OF DRAWINGS

SHEET No.	DESCRIPTION
43626-C00	COVER SHEET AND DRAWING SCHEDULE
43626-C01	EXISTING SITE PLAN
43626-C02	PROPOSED SITE PLAN
43626-C03	PROPOSED STORMWATER MANAGEMENT PLAN
43626-C04	PROPOSED STORMWATER MANAGEMENT DETAILS



LOCALITY PLAN

NOT TO REDUCTION RATIO

SUBMISSION FOR DA

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DESIGN . PLAN . MANAGE

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email generalenquiry@barnson.com.au
web barnson.com.au

Rev	Date	Description
A	12-05-2024	ISSUED FOR DA

Project
CIVIL DESIGN DOCUMENTATION
PROPOSED SUBDIVISION
Site Address
172 QUEALEYS ROAD
GILGANDRA NSW 2827
Client
SERENITY DEVELOPMENTS PTY LTD

Drawing Title
COVER SHEET & DRAWING SCHEDULE

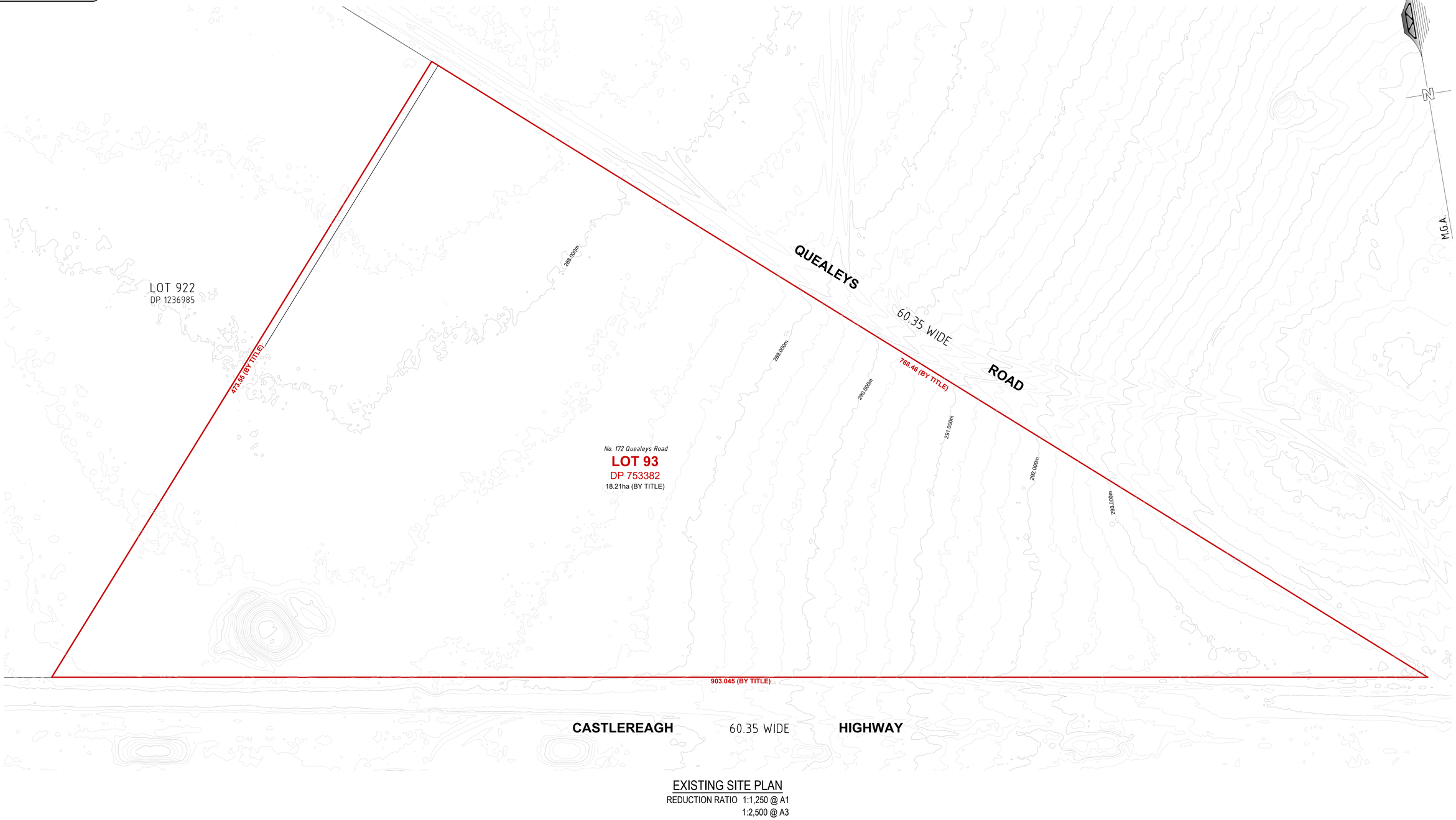
Design	LM	Original Sheet Size	A1
Drawn	JS		
Check	LM	Revision	A

Certification

Project No 43626

Drawing No C00

BEFORE YOU DIG
www.byda.com.au



EXISTING SITE PLAN
REDUCTION RATIO 1:1,250 @ A1
1:2,500 @ A3

SCALE 1:1250(A1)
0 25 50 75 100 125
0 25 50 75 100 125
SCALE 1:2500(A3)

SUBMISSION FOR DA

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DESIGN . PLAN . MANAGE

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web barnson.com.au

Rev	Date	Description
A	12-05-2024	ISSUED FOR DA

Project
CIVIL DESIGN DOCUMENTATION
PROPOSED SUBDIVISION
Site Address
172 QUEALEYS ROAD
GILGANDRA NSW 2827
Client
SERENITY DEVELOPMENTS PTY LTD

Drawing Title
EXISTING SITE PLAN

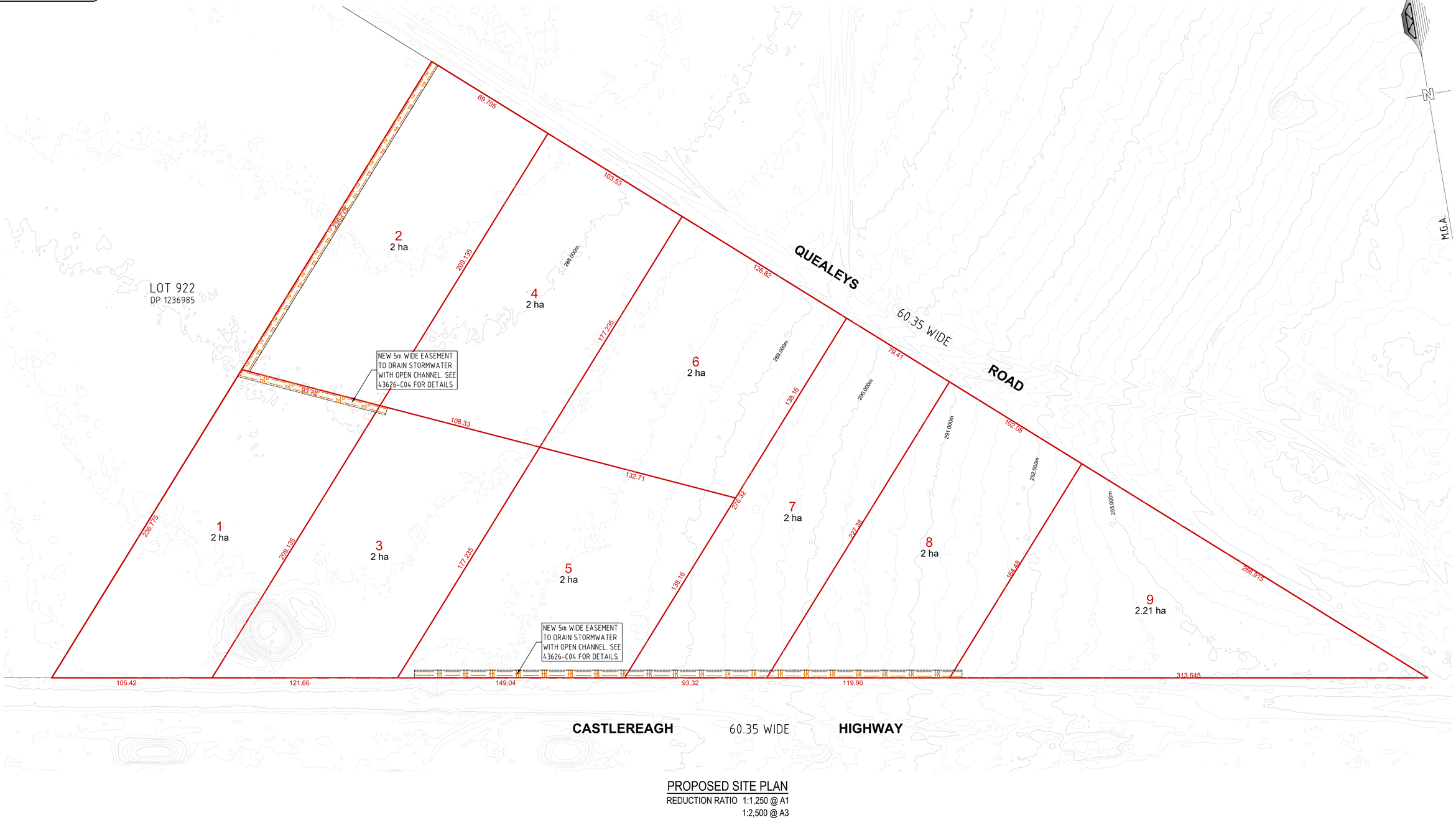
Design LM
Drawn JS
Check LM

Original Sheet Size A1
Revision A

Certification

Project No 43626
Drawing No C01

BEFORE YOU DIG
www.byda.com.au



PROPOSED SITE PLAN

REDUCTION RATIO 1:1,250 @ A1
1:2,500 @ A3

SCALE 1:1250(A1)
0 25 50 75 100 125
0 25 50 75 100 125
SCALE 1:2500(A3)

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web barnson.com.au

Rev	Date	Description
A	12-05-2024	ISSUED FOR DA

Project
CIVIL DESIGN DOCUMENTATION
PROPOSED SUBDIVISION
Site Address
172 QUEALEYS ROAD
GILGANDRA NSW 2827
Client
SERENITY DEVELOPMENTS PTY LTD

Drawing Title
PROPOSED SITE PLAN

Design	LM	Original Sheet Size	A1
Drawn	JS		
Check	LM	Revision	A

Certification

Project No 43626
Drawing No C02

BEFORE YOU DIG
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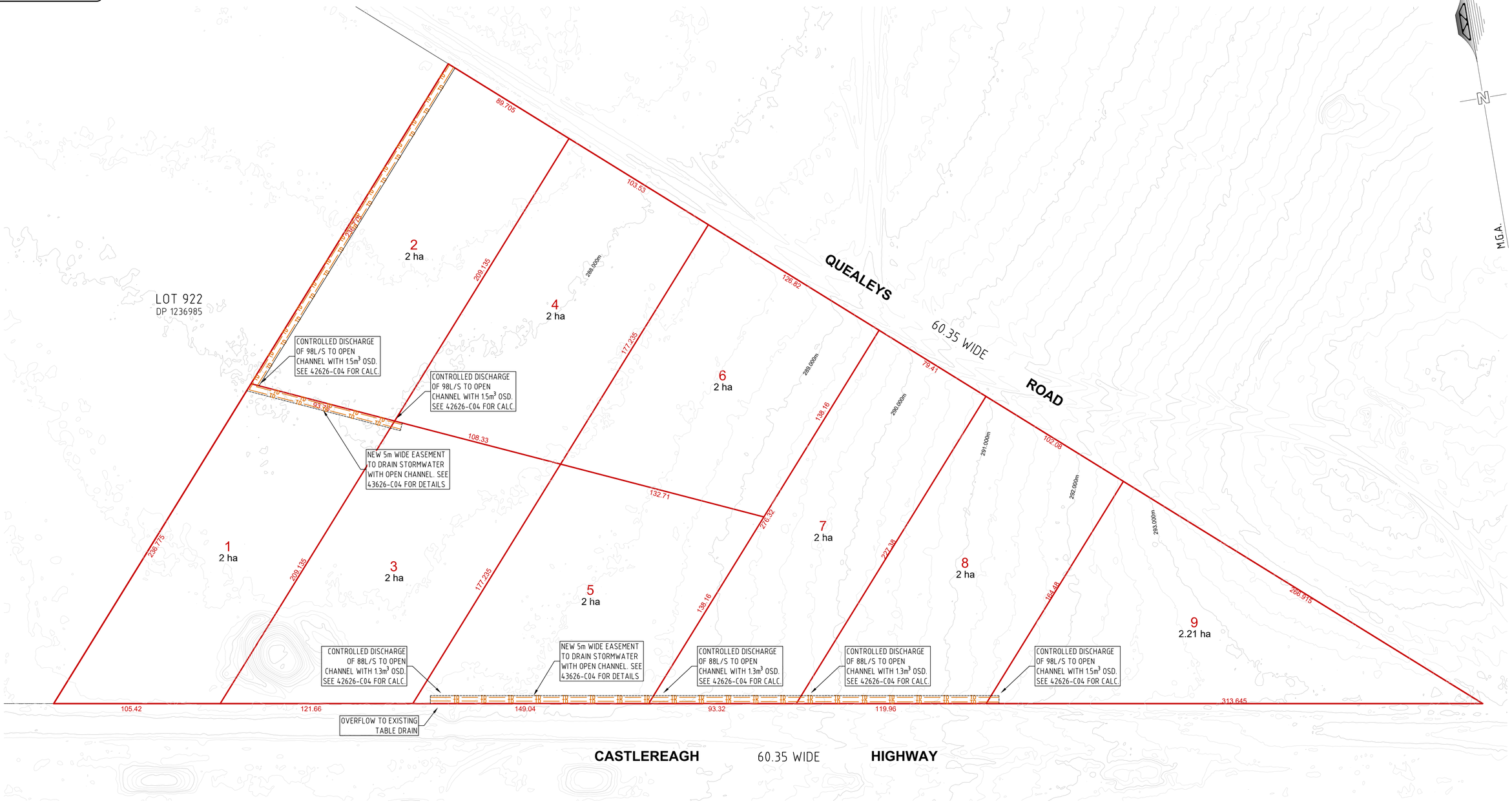


PROPOSED STORMWATER MANAGEMENT PLAN

REDUCTION RATIO 1:1,250 @ A1
1:2,500 @ A3

SCALE 1:1250(A1)
0 25 50 75 100 125
0 25 50 75 100 125
SCALE 1:2500(A3)

SUBMISSION FOR DA

barnson
DESIGN . PLAN . MANAGE

BARNSON PTY LTD

phone 1300 BARNSON (1300 227 676)
email generalenquiry@barnson.com.au
web barnson.com.au

Rev	Date	Description
A	12-05-2024	ISSUED FOR DA

Project
CIVIL DESIGN DOCUMENTATION
PROPOSED SUBDIVISION
Site Address
172 QUEALEYS ROAD
GILGANDRA NSW 2827
Client
SERENITY DEVELOPMENTS PTY LTD

Drawing Title
PROPOSED STORMWATER MANAGEMENT PLAN

Design LM
Drawn JS
Check LM

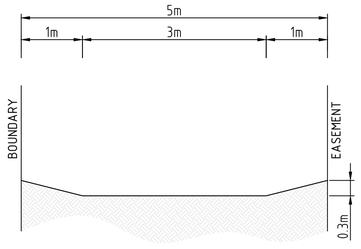
Original Sheet Size A1
Revision A

Certification

Project No 43626
Drawing No C03

SITEWORKS NOTES

1. ORIGIN OF LEVELS :- AHD.
2. SUB-CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK.
3. ALL WORK IS TO BE UNDERTAKEN IN ACCORDANCE WITH THE DETAILS SHOWN ON THE DRAWINGS, THE SPECIFICATIONS AND THE DIRECTIONS OF THE SUPERINTENDENT.
4. EXISTING SERVICES HAVE BEEN OBTAINED FROM SURFACE INSPECTION ONLY. IT'S THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPER-INTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY.
5. WHERE NEW WORKS ABUT EXISTING THE SUB-CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS OBTAINED.
6. THE SUB-CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR.
7. CARE IS TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATIONS ARE TO BE UNDERTAKEN OVER TELECOM OR ELECTRICAL SERVICES. HAND EXCAVATE IN THESE AREAS.
8. ON COMPLETION OF CONSTRUCTION, ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AND GRASSED AREAS AND ROAD PAVEMENTS.
9. THE SUB-CONTRACTOR SHALL PROVIDE ALL TEMPORARY DIVERSION DRAINS AND MOUNDS TO ENSURE THAT AT ALL TIMES EXPOSED SURFACES ARE FREE DRAINING AND WHERE NECESSARY EXCAVATE SUMPS AND PROVIDE PUMPING EQUIPMENT TO DRAIN EXPOSED AREAS. ALL WORK TO BE UNDERTAKEN WITH ADHERENCE TO THE REQUIREMENTS OF THE STORMWATER MANAGEMENT PLAN.
10. THESE PLANS SHALL BE READ IN CONJUNCTION WITH APPROVED ARCHITECTURAL, STRUCTURAL, HYDRAULIC AND MECHANICAL DRAWINGS AND SPECIFICATIONS.



PROPOSED OPEN CHANNEL

Mudgee Office
ABN: 43 088 348 625
4/108-110 Market Street MUDGEE NSW 2850
t 1300 138 657 f 02 6372 1688
e admin@barnson.com.au w www.barnson.com.au
Office Locations - Dubbo - Mudgee - Bathurst - Parkes
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Overland Flow Analysis

Gilgandra

Design Calcs for the overland flow-path:

Kinematic Wave Equation for Overland Flow

$$t = 6.94(L.n^*)^{0.6} / I^{0.4}.S^{0.3}$$

where:
- t = time of concentration (minutes)
- L = is flow path length (m)
- n* = retardance coefficient
- I = rainfall intensity (mm/hr)
- S = slope (m/m)

$$t\,I^{0.4} = 6.94(L.n^*)^{0.6} / S^{0.3}$$

Segment	*I (mm/hr)*	*L (m)*	*n**	*S*	$t\,I^{0.4}$
$t_1(L_1)$	TBA	763	0.15	0.007	538
				t_{total} =	538

GILGANDRA I.F.D

Duration (hrs)	*1yr*	*2yrs*	*5yrs*	*10yrs*	*20yrs*	*50yrs*	*100yrs*
5 mins	70.1	91.7	121	140	165	200	228
6 mins	65.2	85.3	112	130	153	186	212
10 mins	53.1	69.5	91.6	106	125	151	173
20 mins	38.9	50.9	67	77.4	91.3	111	126
30 mins	31.5	41.2	54.3	62.6	73.9	89.5	102
1 hour	20.9	27.3	35.9	41.4	48.7	59	67.2
2 hours	13.1	17.1	22.4	25.8	30.3	36.6	41.7
3 hours	9.81	12.8	16.7	19.2	22.6	27.2	31
6 hours	5.93	7.71	10	11.5	13.5	16.2	18.4
12 hours	3.61	4.7	6.08	6.97	8.15	9.79	11.1
24 hours	2.23	2.9	3.75	4.29	5.02	6.02	6.82
48 hours	1.36	1.77	2.28	2.6	3.05	3.66	4.14
72 hours	0.978	1.27	1.64	1.87	2.19	2.62	2.96

$t.I^{0.4}$

Duration (mins)	*1yr*	*2yrs*	*5yrs*	*10yrs*	*20yrs*	*50yrs*	*100yrs*
5	27.37	30.47	34.05	36.09	38.54	41.63	43.87
6	31.90	35.52	39.61	42.05	44.88	48.52	51.13
10	48.98	54.55	60.92	64.58	68.99	74.40	78.56
20	86.50	96.32	107.51	113.90	121.68	131.57	138.41
30	119.25	132.76	148.27	156.95	167.72	181.07	190.79
60	202.40	225.22	251.30	266.04	283.90	306.54	322.92
120	335.81	373.58	416.18	440.38	469.63	506.49	533.62
180	448.68	499.06	555.08	586.94	626.49	674.68	710.91
360	733.71	814.94	904.28	956.27	1019.61	1096.75	1154.06
720	1203.19	1337.12	1482.16	1565.40	1666.46	1793.27	1885.65
1440	1984.65	2204.56	2443.29	2578.37	2745.64	2952.58	3103.68
2880	3256.93	3618.94	4004.67	4220.67	4498.96	4839.33	5083.85
4320	4281.73	4753.41	5265.28	5549.07	5911.01	6350.45	6668.07

Therefore:

		Rainfall (mm/hr)	
Duration (100yr) =	120 mins	41.7	mm/hr

The Rational Formula

$$Q = C.I.A / 360$$

where:
- Q = design flowrate (m^3/s)
- C = dimensionless runoff co-efficient
- I = rainfall intensity (mm/hr)
- A = catchment area (ha)

and

$$C_{10} = 0.9 \times f + C^1_{10} \times (1 - f)$$

f = fraction impervious

$$C^1_{10} = 0.1 + 0.0133 \times ({}^{10}I_1 - 25)$$
$$= 0.31812$$

Therfore;

$$C_{10} = 0.31812$$

$$C_{100} = 1.20 \times C_{10}$$

Pre Development Flow

Catchment	*I (mm/hr)* 1 in 100yr	*Area (ha)*	*f* fraction impervious	*C* 1 in 100yr	*Q* (m^3/s) 0 in 100yr	
Estate	41.7	18.21	0.00	0.382	0.8052	
					0.8052	(m^3/s)

OVERLAND FLOW ANALYSIS

Lot	*Ha*	*Intensity mm/hr*	Pre-Developed *C*	*Pre-Developed Flowrate m^3/s*	Post-Developed *C*	*Post-Developed Flowrate m^3/s*	OSD Required m^3
1	2.00	41.7	0.382	0.088	0.500	0.116	1.230
2	2.00	41.7	0.382	0.088	0.500	0.116	1.230
3	2.00	41.7	0.382	0.088	0.500	0.116	1.230
4	2.00	41.7	0.382	0.088	0.500	0.116	1.230
5	2.00	41.7	0.382	0.088	0.500	0.116	1.230
6	2.00	41.7	0.382	0.088	0.500	0.116	1.230
7	2.00	41.7	0.382	0.088	0.500	0.116	1.230
8	2.00	41.7	0.382	0.088	0.500	0.116	1.230
9	2.21	41.7	0.382	0.098	0.500	0.128	1.502

ON-SIRE DETENTION VOLUME CALCULATIONS

SUBMISSION FOR DA

barnson DESIGN . PLAN . MANAGE

BARNSON PTY LTD

phone 1300 BARNSON (1300 227 676)
email generalenquiry@barnson.com.au
web barnson.com.au

Rev	Date	Description
A	12-05-2024	ISSUED FOR DA

Project
CIVIL DESIGN DOCUMENTATION
PROPOSED SUBDIVISION
Site Address
172 QUEALEYS ROAD
GILGANDRA NSW 2827
Client
SERENITY DEVELOPMENTS PTY LTD

Drawing Title
PROPOSED STORMWATER MANAGEMENT DETAILS

Design LM
Drawn JS
Check LM

Original Sheet Size A1
Revision A

Certification

Project No 43626
Drawing No C04

barnson.

APPENDIX E

Onsite Effluent Management Assessment

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DESIGN . PLAN . MANAGE

On-Site Effluent Management Report

Client: Serenity Developments Pty Ltd
Site Address: 127 Quealeys Road, Gilgandra

6 June 2024

Our Reference : 43626-ER01_A

DISCLAIMER

This report has been prepared solely for Serenity Developments (the Client) in accordance with the scope provided and for the purpose(s) as outlined throughout this report. Barnson Pty Ltd accepts no liability or responsibility for or in respect of any use or reliance upon this report and its supporting material by anyone other than the client.

Installation must be by a licensed plumber and Barnson will not be liable for the incorrect installation and/or construction of the system. Installation and construction of the system must hold true to the design recommendations presented in this report. Installation should be in accordance with the prescriptions within AS 1547:2012.

Unless otherwise stated in this report, Barnson has not verified the accuracy or completeness of the data retrieved from online databases and guidance documents. The recommendations for the proposed system as presented in this report are based on historical data obtained for the area. Barnson will not be liable in relation to incorrect recommendations should any information provided by the client be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed.

The accuracy of the advice provided in this report may be limited by unobserved variations in ground conditions across the site in areas between and beyond test locations and by any restrictions in the sampling and testing which was able to be carried out, as well as by the amount of data that could be collected given the project and site constraints. These factors may lead to the possibility that actual ground conditions and materials behaviour observed at the test locations may differ from those which may be encountered elsewhere on the site. If the sub-surface conditions are found to differ from those described in this report, we should be informed immediately to evaluate whether recommendations should be reviewed and amended if necessary.

Project Name:	On-Site Effluent Management Report 127 Quealeys Road, Gilgandra
Client:	Serenity Developments Pty Ltd
Project Number:	43626
Report Reference:	43626 ER01_A
Date:	6/06/2024

Prepared by:	Reviewed by:
	
Nardus Potgieter **MSc(Chem) BSc(Hons)(Env.Tech.)** Senior Environmental Scientist	**Jeremy Wiatkowski** **AdvDip Laboratory Operations** Senior Laboratory Technician

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1. INTRODUCTION

1.1 Overview

This report has been prepared by Barnson Pty Ltd on behalf of Serenity Developments Pty Ltd (the Client), for submission to the Gilgandra Shire Council in support of a planning proposal for the subdivision of Lot 93 DP 753382, known as 127 Quealeys Road, Gilgandra (hereafter referred to as the Subject Site).

The subject site is located on the southwestern side of Quealeys Road, east of the intersection with the Castlereagh Highway, and occupies an area of 18.21 hectares (see Figure 1.1). The site is unoccupied except for a surface water dam located near the southwestern corner of the property. The site is mainly used for grazing cattle. The proposed subdivision will see the Subject Site sub-divided into nine (9) new Lots of approximately 2 hectares each.

In accordance with the Gilgandra Shire Council Development Control Plan, Council will require a report for the subdivision which identifies that there is a suitable area in each lot capable of disposal of on-site wastewater.

The purpose of this report is to present a plan showing a nominal effluent management area for each of the proposed lots in relation to site characteristics and based on geotechnical testing undertaken on samples of soil collected from the Subject Site. The design recommendations presented is based on the assumption of an on-site wastewater management system in each lot, capable of accommodating effluent from a three bedroom dwelling accommodating four persons.

1.2 Key References

The following key references were utilised as part of this assessment:

- AS/NZS 1547:2012. *On-site Domestic Wastewater Management;*
- NSW Government 1998. *On site Sewerage Management for Single Households* (The Silver Book/OSMSH);
- NSW Government 2000. *The Easy Septic Tank Guide*. Developed by Social Change Media for the NSW Department of Local Government;
- NSW Health, 2001. 'Septic Tank and Collection Well Accreditation Guidelines";
- Gilgandra Shire Council Local Environmental Plan, 2011;
- Gilgandra Shire Council Development Control Plan, 2011;
- Sydney Catchment Management Authority, 2019. *Designing and Installing On-Site Wastewater Systems*

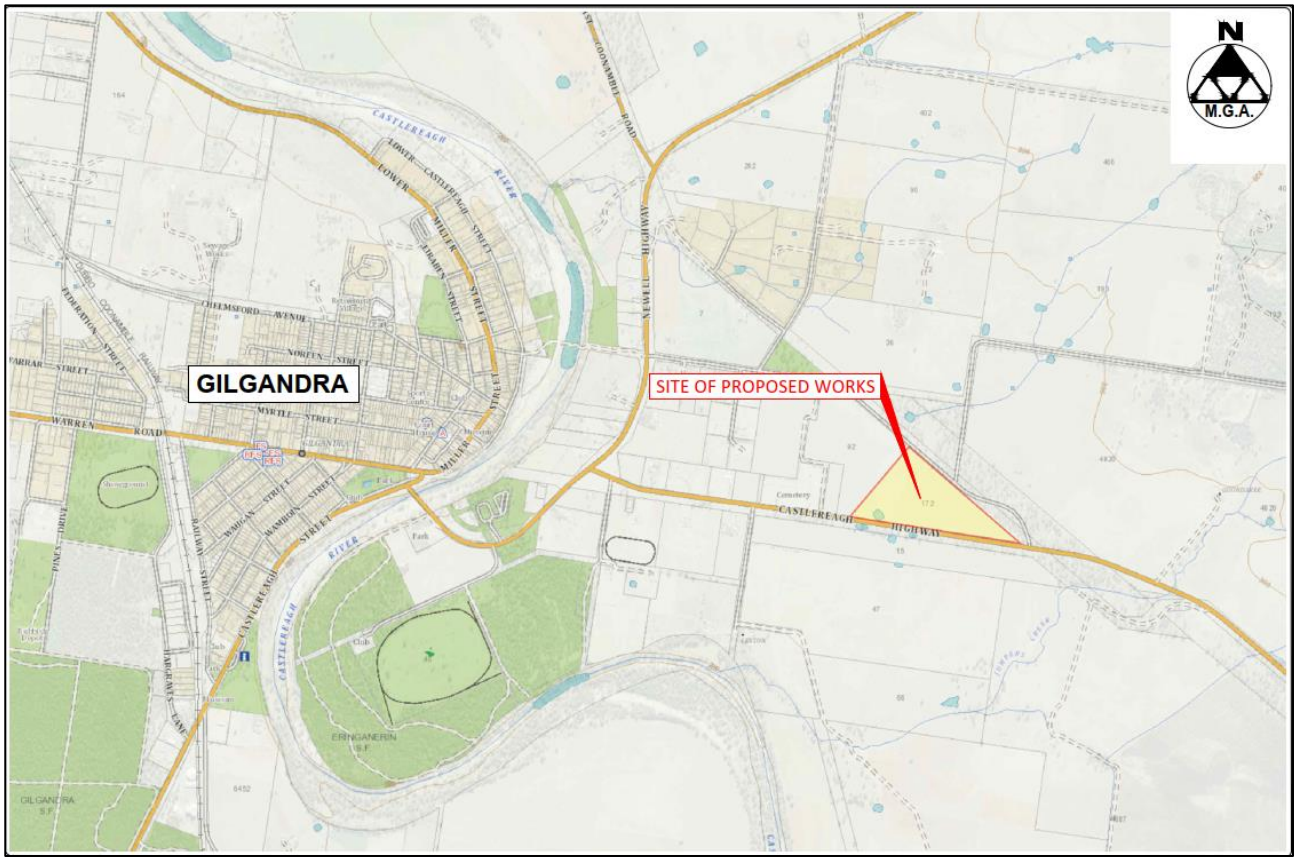

Figure 1.1: Site location plan.

1.3 System Requirements

1.3.1 Design Allowances

The purpose of this assessment is to evaluate the capabilities of each of the proposed allotments to accommodate an on-site wastewater management system. The evaluation considers a generic three bedroom dwelling with two bathrooms for assessment of the site constraints. The wastewater generated from the residence is assumed to consist of grey- and blackwater domestic effluent.

In accordance with AS/NZS1547:2012 Table H1, the recommended design flow allowance for use in Australia, using on site rainwater roof collection supply is 120L/person/day. Assuming a three bedroom dwelling can accommodate a maximum of 4 persons, the estimated daily maximum volume of wastewater generated 480 L/day.

1.3.2 Gilgandra Shire Council Setback Requirements

Gilgandra Shire Council 'Development Control Plan (2011) Section 23.3', provides recommended buffer distances. For this design, the following must be taken into consideration.

All Land Application Systems

- 100m to permanent surface waters (e.g. river, streams, lakes, etc.);

- 250m to domestic groundwater well;
- 40m to other waters (e.g. farm dams, intermittent waterways and drainage channels, etc.)

Absorption Systems

- 12m if area up-grade and 6m if area down gradient of property boundary;
- 6m if area is up-gradient and 3m if area is down gradient of swimming pools, driveways and building.

Surface Spray Irrigation

- 6m if area up-gradient and 3m if area down-gradient of driveways and property boundaries;
- 15m to dwellings;
- 3m to paths & walkways;
- 6m to swimming pools;

Surface, Trickle & Subsurface Irrigation

- 6m if area up-gradient and 3m if area down-gradient of swimming pools, property boundaries, driveways and buildings;

Other site setback requirement as per AS/NZS 1547:2012 are provided in Appendix A.

Actual siting of the effluent application area is the responsibility of a licenced plumber. The prescribed buffer areas/setbacks are to be adhered to unless specified by council otherwise.

2. SITE AND SOIL EVALUATION

2.1. Site Evaluators Details

Table 2.1 provides an overview of the evaluator's particulars.

Table 2.1: Details

Name / Role	Nardus Potgieter
Role/ Qualifications	Environmental Scientist
Company	Barnson Pty Ltd
Company Address	Unit 4 108-110 Market St, Mudgee NSW 2850
Contact Details	Phone: 1300 BARNSON
Date of Assessment	6/06/2024

2.2. Site Information

Table 2.2 provides an overview of the site information.

Table 2.2: Site Particulars

Address/Locality	127 Quealeys Road, Gilgandra Lot 93 DP 753382	
Local Government Area	Gilgandra Shire Council	
Owner	Serenity Developments Pty Ltd	
Proposed Block Configuration	Lot 1 to Lot 6	20,000m^2
	Lot 9	22,100m^2
	See proposed subdivision plan attached as Appendix A	
Intended Water Supply	Rainwater roof collection	
Intended Power Supply	Supplied	
Local Experience	Care needs to be taken to minimise runoff and erosion. Systems commonly malfunction due to lack of ongoing maintenance. The system is to be inspected and maintained regularly in accordance with manufacturer details, Council requirements, and prescriptions identified in this report.	

2.3. Site Parameters and Constraints

The following information (Table 2.3) was obtained via desktop review of the site.

Table 2.3: Desktop Assessment Details

Climate Overview[1]		Annual Average Rainfall for Gilgandra is 566.7mm. Warm summers with large evaporative deficit, cool winters with small evaporative deficit. The mean summer monthly rainfall (January) is 64.1mm. The mean winter rainfall (July) is 42.6mm.
Soil Landscape Reference[2]	Area has been mapped within the 'Castlereigh' Landscape Group. The main soils alluvial materials constituted of clay loams to silty clay loams, and light medium clay and light clay.	
	Surface Conditions	Hardsetting
	Drainage	Moderately well drained
	Available water holding capability	Low
	Water table depth	>100cm
	Depth to bedrock	20m
	Flood hazard	Nil
	Expected Nutrient deficiencies	Nitrogen, Phosphorous
	Soil Salinity	Moderate
	Erosion Hazard	High
Underlying Geology[3]		Residual and colluvial materials derived from Cretaceous sediments of the Drildool and Keelindi beds and minor Cenozoic volcanics of the Warrumbungles.

[1] Bureau of Meteorology online Climate Data website

[2] NSW Soil and Land Information System

[3] New South Wales 1:1000000

2.4. Groundwater Review

A desktop review of the NSW Office of Water online groundwater information for the local area identified no water bores within the boundary of the Subject Site. However, there are two (one stock watering and one commercial use) boreholes located to the west of the Subject Site. No other bores were identified within 500m of the proposed subdivision area (see Figure 2.1).

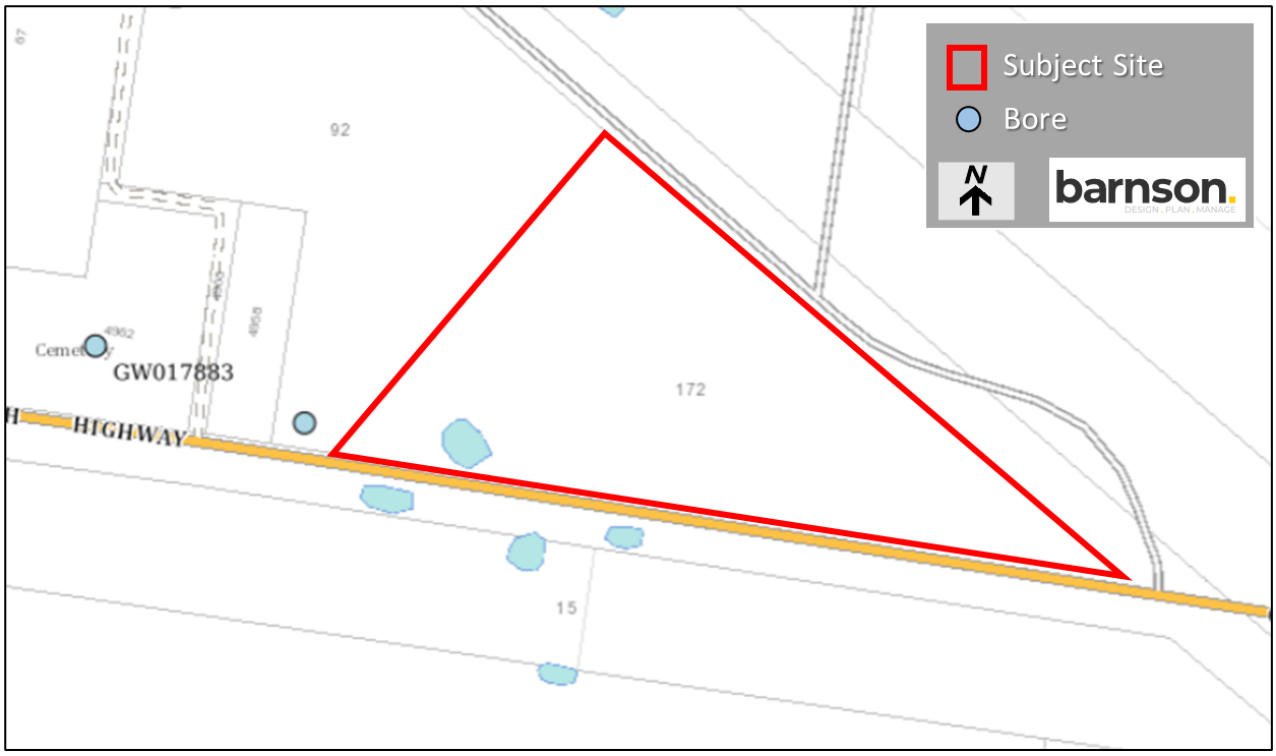

Figure 2.1: Groundwater bore location

The commercial use bore (GW017883) is located at the Gilgandra Cemetary and is likely used for landscape maintenance. Table 2.4 present details for both the noted bores with the closest (the stock watering bore, GW006876) located at a distance of approximately 50m west of the Subject Site. The Gilgandra Local Environmental Plan (LEP) mapping show the Subject Site as outside the area identified as potentially groundwater vulnerable, but inside the area identified as Sensitive Wetlands (see Figure 2.2).

Table 2.4: Groundwater Review

Groundwater Bore Reference	Total Depth (m)	Water Bearing Zones (m)	Standing Water Level (m)	Yield (L/s)	Salinity
GW017883 Bore, Domestic >300m from Site	64	17.3 64.0	15.2	0.13 0.15	Fresh
GW006876 Bore, Stock Watering 50m from Site	17.4	16.7	11.2	0.15	NA

NA - Information not provided in database

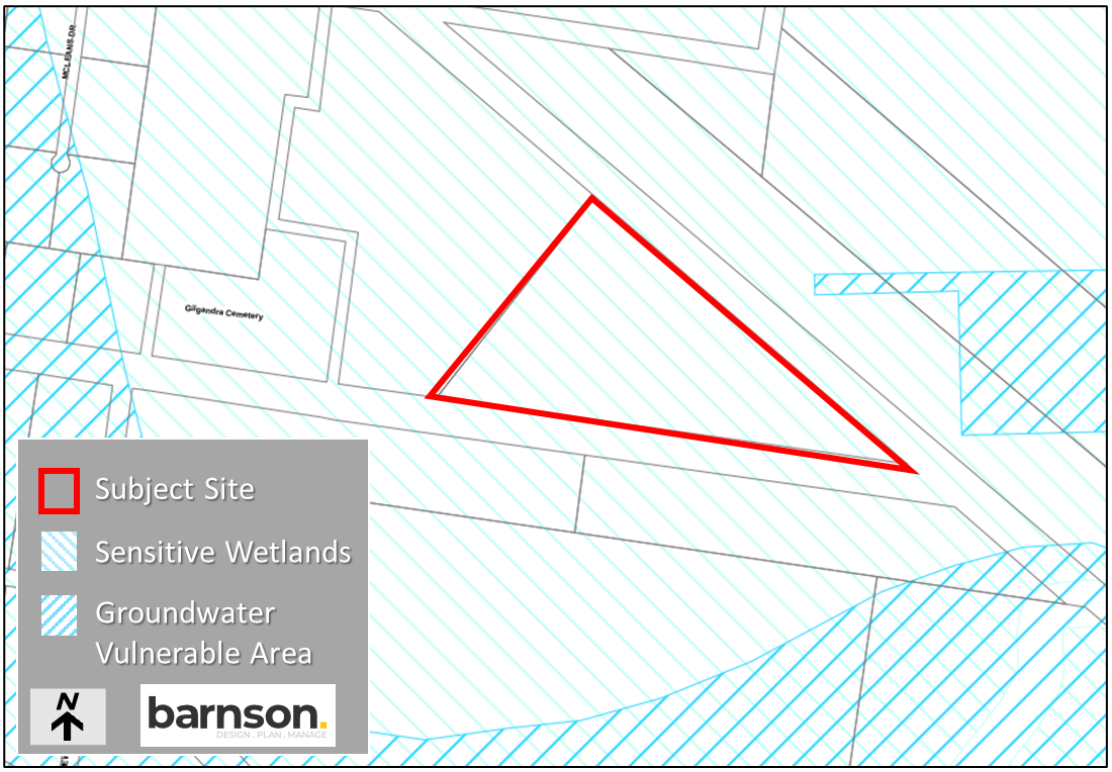

Figure 2.2: Groundwater Vulnerability Map

2.5. Surface Water

The Lawsons Creek is located at a distance of approximately 420m to the northeast of the Subject Site. There is one farm dam identified inside the Subject Site, with an unnamed drainge line from the dam extending to the Lawson Creek (see Figure 2.1).

2.6. Topography

The Subject Site generally slopes toward the east. A survey undertaken of the site identified contours across the Subject Site. Figure 2.3 present a summary of the direction of likely down-gradient flow for each of the proposed lots in the Subject Site. The overall slope in any of the proposed Lots does not exceed 10%.

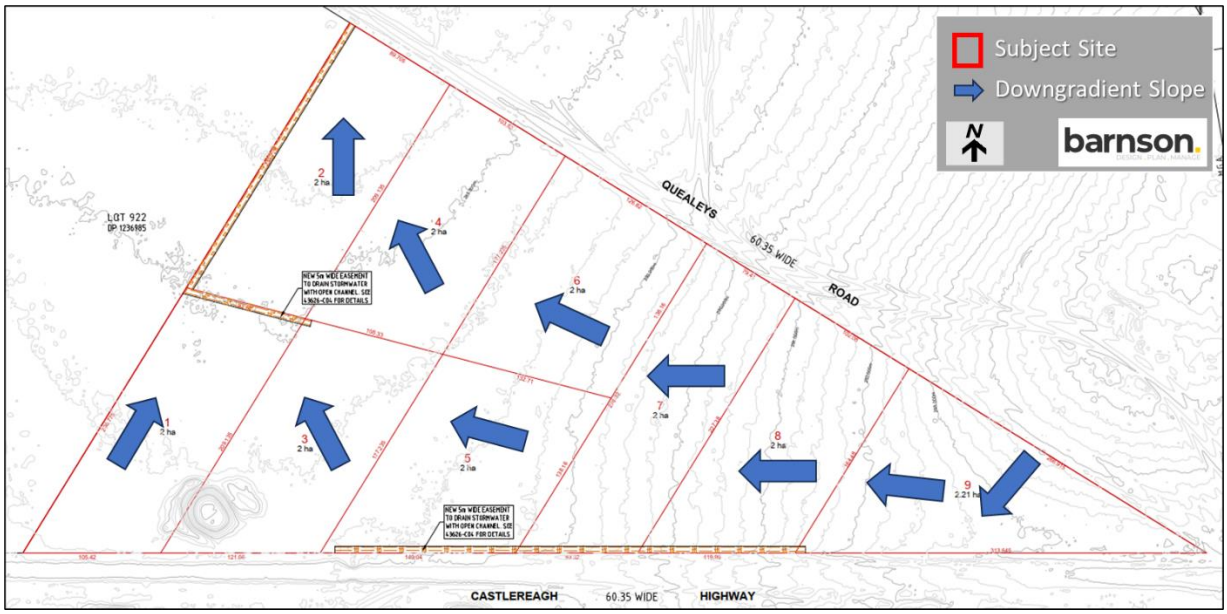

Figure 2.3: Site topography

2.7. Field Assessment Information

A field inspection was conducted on 07/05/2024. Samples of soil were collected at three locations at regular distance across the site. Figure 2.4 show the locations at which samples were collected. At each location samples were collected from surface (200mm), and at a depth of 700 to 800mm, as per AS1289.1.2.1.6.5.3.

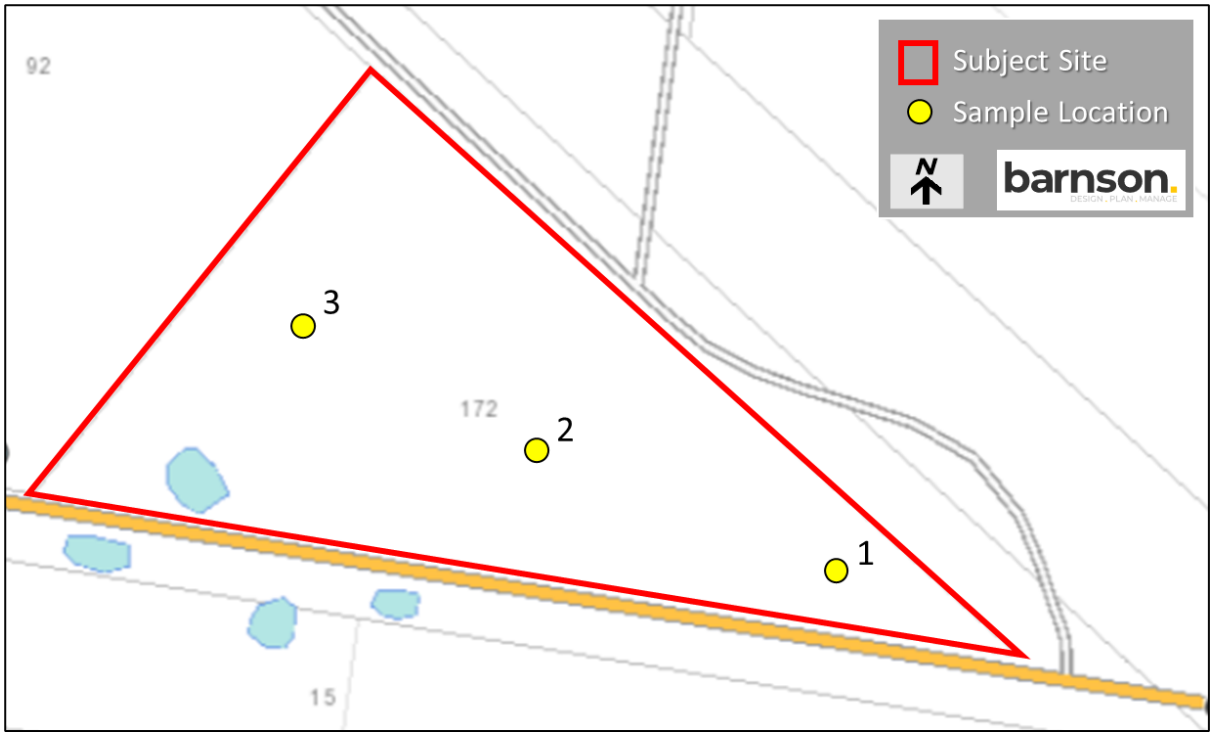

Figure 2.4: Locations of soil samples.

The soil excavated at the three locations were identical in appearance. Samples from location 1 and location 3 were submitted to the Australian Laboratroy Services laboratory in Mudgee for analysis on 08/05/2024.. Laboratory results summarised in Table 2.5. Material test reports are provided at Appendix B.

Field assessment parameters were also obtained.

Table 2.6 provides detail on the findings of the site assessment as well as the field and laboratory results. A bore log for geotechnical bores undertaken of the investigation area is attached as Appendix B in confirmation of the observed soil horizons.

Table 2.5: Soil Assessment Details

Depth to bedrock or hardpan via field assessment			>300cm	
Depth to high soil water table via field assessment			>300cm	
Results			Location 1	Location 2
	pH (1:5)	-surface soil -sub-surface soil	6.8 7.9	7.0 8.4
	Emerson Test Result	-surface soil - sub-surface soil	3 2	3 2
	Soil Classification,	surface soil	Clay: 23% Silt: 4% Fine sand: 43% Course sand: 25% Gravel (>2mm): 5%	Clay: 22% Silt: 4% Fine sand: 45% Course sand: 28% Gravel (>2mm): 1%
		sub-surface soil	Clay: 42% Silt: 2% Fine sand: 32% Course sand: 21% Gravel (>2mm): 3%	Clay: 36% Silt: 4% Fine sand: 37% Course sand: 22% Gravel (>2mm): 1%
	Soil Category	- surface soil - sub-surface soil	3 (Silty Loam) 6 (Medium Heavy Clay)	3 (Silty Loam) 6 (Medium Heavy Clay)
	Structure:	- surface soil - sub-surface soil	moderate structured moderate structured	moderate structured moderate structured
	Soil Particle Density (Clay/Silt/Sand)	- surface soil - sub-surface soil	2.48 g/cm^3 2.59 g/cm^3	2.50 g/cm^3 2.598 g/cm^3
	Exchangeable Sodium	- surface soil - sub-surface soil	6.6% 13.9%	6.0% 20.8%
	Phosphate Sorption Capacity	- surface soil	1930 mg P sorbed/kg	294 mg P sorbed/kg
	Sub soil Permeability (from table 5.2 of AS 1547:2012)		<0.06 (k_{sat}) (m/d) = 2.5 (mm/hr) (Infiltration is slow)	<0.06 (k_{sat}) (m/d) = 2.5 (mm/hr) (Infiltration is slow)

	Recommended Hydraulic Loading for drip or spray irrigation disposal system (from Table 5.2 of AS 1547:2012)	4mm per day (conservative rate for spray irrigation)	4mm per day (conservative rate for spray irrigation)

Table 2.6: Site Assessment Details

Water Balance Attached		See *Appendix C*
Exposure		Good exposure.
Slope		The site slopes in a westerly to north westerly direction.
Elevation		Approximately 560m.
Run-On		Minimal
Seepage		None
Erosion Potential		Soils are of high erodibility but erosion potential is low due to vegetation cover.
Site Drainage		The site is expected to drain in a westerly direction.
Fill		None encountered
Surface rock/Outcrops?		None encountered
Is there sufficient land area for:	Application system, including buffers in each proposed lot.	Yes
	Reserve application system	Yes

3. SITE AND SOIL LIMITATION ASSESSMENT

The following two limitation tables are a standardised guide to the site and soil characteristics which may limit the suitability of the site for effluent disposal and which require attention through specific management practises. The tables have been reproduced from the NSW Government endorsed '*On-Site Sewerage Management for Single Households*' (1998), Table 3.1 and Table 3.2. The highlighted categories represent site and soil conditions of the land covered in this report.

Table 3.1: Site Limitation Assessment

Site Feature	Relevant System	Minor Limitation	Moderate Limitation	Major Limitation	Restrictive Feature
Flood Potential	All land application systems	> 1 in 20 years		Frequent below 1 in 20 years	Transport in wastewater off site
	All treatment application systems	Components above 1 in 100 years		Components below 1 in 100 years	Transport in wastewater off site system failure
Exposure	All land application systems	High sun and wind exposure		Low sun and wind exposure	Poor evaporation transpiration
Slope %	Surface Irrigation	0-6	6-12	>12	Runoff, erosion potential
	Sub-surface irrigation	0-10	10-20	>20	Runoff, erosion potential
	Absorption	0-10	10-20	>20	Runoff, erosion potential
Landform	All systems	Hillcrests, convex side slopes and plains	Concave side slopes and foot slopes	Drainage plains and incised channels	Groundwater pollution hazard, resurfacing hazard
Run-on and upslope seepage	All land Application Areas	None-low	Moderate	High, diversion not practical	Transport of wastewater off site
Erosion potential	All land application systems	No sign of erosion potential		Indications of erosion e.g. rils, mass failure	Soil degradation and off-site impact
Site drainage	All land application systems	No visible signs of surface dampness		Visible signs of surface dampness, such as moisture-tolerant veg	Groundwater pollution hazard, resurfacing hazard
Fill	All systems	No fill	Fill present		Subsidence
Land area	All systems	Area available	Area not available		Health and pollution risk
Rock and rock outcrop	All land application systems	<10%	10-20%	>20%	Limits system performance
Geology	All land application systems	None		Major geological discontinuities, fractured or highly porous regolith	Groundwater pollution hazard

Table 3.2: Soil Limitation Assessment

Soil feature	Relevant system	Minor limitation	Moderate limitation	Major limitation	Restrictive feature
Depth to bedrock or hardpan (m)	Surface and sub-surface irrigation	> 1.0	0.5-1.0	< 0.5	Restricts plant growth
	Absorption	> 1.5	1.0-1.5	< 1.0	Groundwater pollution hazard
Depth to seasonal water table (m)	Surface and sub-surface irrigation	> 1.0	0.5-1.0	< 0.5	Groundwater pollution hazard
	Absorption	> 1.5	1.0-1.5	< 1.0	Groundwater pollution hazard
Permeability Category	Surface and sub-surface irrigation	2b, 3 and 4	2a, 5	1 and 6	Excessive runoff and waterlogging
	Absorption	3, 4		1, 2, 5, 6	Percolation
Coarse fragments %	All systems	0-20	20-45	>40	Restricts plant growth, affects trench installation
Bulk density (g/cc) SL L, CL C	All land application systems	 < 1.8 < 1.6 < 1.4	 > 1.8 > 1.6 >1.4		restricts plant growth, indicator of permeability
pH	All land application systems	> 6.0	4.5-6.0	-	Reduces plant growth
Electrical conductivity (dS/m)	All land application systems	<4	4-8	>8	Restricts plant growth
Sodicity (ESP)	Irrigation 0-40cm; absorption 0-1.2mtr	0-5	5-10	> 10	Potential for structural degradation
CEC mequiv/100g	Irrigation systems	> 15	5-15	< 5	Nutrient leaching
P sorption kg/ha	All land application systems	> 6000	2000-6000	< 2000	Capacity to immobilise P
Modified Emerson Aggregate Test – depressiveness	All land application systems	Classes 3-4	Class 2	class1	Potential for Structural degradation.

The sub-surface soil permeability represents a major limitation to the application of absorption based effluent disposal at the subject site. Other site characteristics present minor to moderate limitations and it is therefore recommended that advanced water treatment with surface irrigation be implemented for on-site wastewater management.

4. SEPTIC TANK SELECTION AND CALCULATION

4.1. Silver Book/ NSW Health Guidelines

The '*On-Site Sewerage Management for Single Households*' (1998) guideline is based on the NSW Health guideline for septic tank capacity. Therefore, the calculation is the same.

Primary effluent treated will be provided by an NSW Health accredited septic tank. The NSW Health '*Septic Tank and Collection Well Accreditation Guidelines*' (2001), set a sludge allowance of 1,550L irrespective of the number of persons or which the septic tank is to be designed. It should be noted that in accordance with this guideline, a septic tank designed for a minimum of 4 persons needs to be de-sludge approximately every 4 years.

The general formula to calculate the minimum septic system capacity in litres is:

$$S + (DF\ x\ N) = C$$

$$Sludge + (Daily\ Flow\ X\ No.of\ Persons) = Capacity\ of\ the\ tank$$

Residence - When DF = 120L/per person/per day and N =4, therefore DF x N =480L

$$1{,}550L + 480L = 2{,}030L$$

Table 2 in the NSW Health Guidelines recommends a minimum of 2,300L tank capacity.

4.2. AS/NZS 1547:2012 Requirements

A more conservative approach is outlined in AS/NZS1547:2012, Appendix J. A more conservative figure of 200L per person for all waste tanks is provided, giving a daily flow volume of 800L for the proposed residence. In accordance Table J1 of the standard, a minimum capacity tank of 3,000L is recommended for a residence with a design flow of up to 1,000L. This conservative rate is to ensure that the unit has capacity to cope with peak discharge rates or for temporary or unusual overloads and includes no allowance for food waste disposal units. This tank design capacity also allows for the storage of sludge and scum at a rate of 80L/person/year. It should be noted that the higher cost of installing a larger septic tank may be offset by a reduced pump out frequency. Too frequent pump out removes microorganisms needed for degradation of wastewater solids. The longer pump out interval has beneficial implications for conservation of resources in that the volume of seepage requiring treatment and disposal can be reduced significantly.

4.3. System Recommendations

Table 4.1 provides details on the system selection.

Table 4.1: System Selection Details

Consideration of connection to centralised sewerage system	Distance to sewer	>20km
	Potential for future connection?	None planned
	Potential for reticulated water?	None planned
Expected Wastewater volume (litres/day)	Residence – Three bedroom, potential occupancy of 4 people. Typical wastewater design flow is 120L/person per day in accordance with Table H3 of AS/NZS1547:2012 for households with full water reduction facilities, supplied by rainwater roof collection supply. Therefore, 4 people at 120L per person per day gives a total load of 480L/day	
Type of Treatment system best suited	As per site and soil limitations assessment, an accredited Aerated Wastewater Treatment System with a capacity of minimum 3,000L – as per NSW Health accredited system https://www.health.nsw.gov.au/environment/domesticwastewater/Pages/stcw.aspx, with secondary treated effluent to be disposed to surface spray irrigation fields.	

Water conservation measures should be adapted to the greatest extent possible in any residence proposed for the Subject Site, particularly in relation to the high water use activities of showering, clothes washing and toilet flushing. AAA rated plumbing appliances and fittings should be used. Measures including use of front-loading washing machines, low volume shower roses and dual flush toilets can reduce water usage by 30-40%. Detergents low in phosphorous and sodium should be used as much as possible. Following these measures will ensure the greatest lifespan for this effluent treatment and disposal system.

5. EFFLUENT MANAGEMENT

Barnson Pty Ltd has analysed the proposed on-site waste management system in accordance with the NSW Government endorsed *'Silver Book'* (1998) and the ANZ Standard 1547:2012 On-site Domestic Wastewater Management', with additional advice sought from the NSW Water '*Designing and installing On-site Wastewater Systems'* 2019 guideline. For this site, given the climate and soil constraints, irrigation is considered the most appropriate effluent management device.

5.1.1. Irrigation Area Calculation

In accordance with these documents, the irrigation area for surface and subsurface irrigation must be the largest area calculated considering nutrient and liquid loading.

For calculation purposes, the nutrient balances assume a maximum effluent irrigation rate of 480L per day.

5.1.2. Nitrogen Loading

The following formula is provided:

$$A = (C \times Q)/Ln$$

Where: A = land area (m^2)
C = concentration of nutrient (mg/L)
Q = treated wastewater flow rate (L/d)
L_n = critical loading rate of nutrient ($mg/m^2/d$)

It is appropriate to assume 20% loss by, denitrification. Given nitrogen has a nominal value of 32mg/L in treated effluent, C = 32 X 0.8 = 25.6 mg/L.

In this case, Ln can be determined as 240kg/ha/yr. – this figure is obtained from Appendix 1 of the Sydney Catchment Management Authority 'Designing and installing On-site Wastewater Systems' 2019 guideline, for lawn grass for the uptake of nitrogen.

Ln = 240kg/ha/yr. = 24000mg/m^2/year

Therefore

$$A = (25.6 \times 480 \times 365)/24{,}000$$

A= 186.9m^2

5.1.3. Phosphorus Loading

The general formula used to determine irrigation size based on Phosphorous loading is:

$$A = \ Pgenerated/(\ PAbsorbed\ +\ PUptake)$$

The nominal Phosphorus Sorption Capacity (mg/kg) of 600mg/kg together with the nominal bulk density value of Clayey Loams being 1.5g/cm^3 (nominal value as per *Interpreting soil results*), the Phosphorus sorption capacity was estimated to be 9000 kg/ha.

Pgenerated = the amount of phosphorus generated over time, and is calculated as –

Pgenerated = total phosphorous (TP) concentration x volume of wastewater produced over 50 years

= TP X Q L/day X 365 days X 50years, where 10mg/L (concentration of phosphorous in treated sewage effluent as per the 'Silver book) and Q of 480L/day

= 10 X 480 X 365 X 50

= 87.6kg

Where Pabsorbed = the amount of phosphorus that can be absorbed without leaching over 50 years. As per the 'Silver Book', this is typically 1/3 of the P sorption Value.

= PSorb X 1/3

= 9,000kg/ha X 1/3

= 3,000.kg/ha

= 0.3kg/m^2

P $_{Uptake}$ = the amount of P uptake by vegetation over 50 years.

For lawn grass, a phosphorous uptake value of 30 kg/ha/year will be used (as per SCA, 2019), which is equivalent to 0.0024kg/m^2/year.

Therefore, P Uptake = 0.0024 (kg/m^2/year) x 50 (years)

= 0.15kg/m^2

$$A = \ Pgenerated/(\ PAbsorbed\ +\ PUptake)$$

Where, Pgen = 87.6g, PAbs = 0.3kg/m^2 and Puptake = 0.15kg/m^2

$$A\ = 87.6/\ (0.3 + 0.15)$$

$$\boldsymbol{A\ = 194.7}\text{m}^2$$

5.1.4. Water Balance & Irrigation Area Size

The purpose of the water balance is to assess the sensitivity of the design to the various inputs and outputs of the system. An irrigation area too small will result in saturated soils for long periods. An irrigation area too large will result in poor dispersal of effluent over the area and during dry periods will result in vegetation dying.

A water balance for the area is attached as Appendix C. This balance utilises the 70th percentile monthly rainfall data as provided in the *Bureau of Meteorology*. The water balance calculation utilised is this report is the minimum area method as per Table A6.2 of the *Silver Book*. Based on the average annual liquid loading, H (the amount of wastewater that maybe applied per year, is calculated as 1586.5mm/year. Therefore, using historical data, the land area required is:

$$A = 365 \times \frac{Q}{H}$$

A = land area (m^2)

Q = average treated wastewater flow rate (L/day) – 480L/day

H = average annual liquid loading (mm/yr.) –856.5mm/year

$$A = \frac{365 \times 480}{1586.5}$$

A= 110.4m^2

Therefore, based on the largest required minimum area, the Phosphorous Loading requirement of 194.7m^2 is used for sizing of the effluent disposal requirement. Irrigation fields are most effective in approximately 200m^2 sections. It is therefore recommended that in each lot, 1 fields of 195m^2 be utilised for effluent disposal.

6. CONCLUSIONS & RECOMMENDATIONS

6.1. Setback Recommendations

The primary limitation with regard to setbacks is the nearby borehole located at a distance of approximately 50m to the west of the subject site. The Gilgandra Shire Council requirements is an offset of 250m from a domestic use bore. The Australian standard (AS/NZS1547:2012) in Appendix R allow for setback distances from a groundwater bore or well ranging from 15 to 50m, noting that setback distances from water supply bores should be reviewed on a case-by-case basis.

Given the proposed treatment and quality of the secondary treated effluent that will be produced from the proposed AWTS system, the maximum setback of 50m recommended by the Australian standard would be appropriate for the environmentally sustainable management of the secondary treated effluent at the Subject Site.

In preparation of the site and soil assessment report, Barnson undertook a thorough investigation of the Subject Site and it is our opinion that the proposed treated effluent disposal area will not pose a risk to groundwater, any adjoining property or the environment in general. We believe that a reduced buffer distance of 50m can safely be applied for the off-site groundwater bore.

The range of buffers recommended in the Australian standard (AS/NZS1547:2012, Appendix R) can be used to select a suitable distance based on treatment type, method of disposal, and the site and soil characteristics. The factors considered in the standard (Table R2), for which property buffers are applied as mitigative measure, include:

- the microbial quality of the effluent (A, Table R2),
- the groundwater pollution hazard (C, Table R2),
- the geology (H, Table R2) and
- the selected method of effluent application (J, Table R2).

With regard to the microbial quality of the effluent, the proposed AWTS will produce an effluent of very low microbial content, while the sub-surface pressure dosed effluent disposal will ensure absorption and immobilisation of the treated effluent, eliminating the risk of exposure to the effluent.

The standard further notes that in category 5 or 6 soils, the groundwater pollution hazard is low as soils are less permeable and groundwater resources are also of lower value. The geology of the Gilgandra area is alluvial in nature and it is only in deeper layers, perched atop bedrock that groundwater is likely to be found. The surface layers of the area are high in clay content and infiltration of water, and any contaminants contained in the effluent, is not expected to reach groundwater resources. The Subject Site further slopes away from the groundwater bore (slopes in a north westerly direction) which implies that any groundwater encountered under the Subject Site would be down gradient from the groundwater bore.

The spray irrigation method recommended further limits the amount of liquid introduced to the sub-soil environment by being designed to disperse treated effluent to the surface where vegetation and evaporation takes up the majority of the liquids.

Accordingly, Appendix D presents a map noting the setbacks applicable to each of the proposed lots of the Subject Site, assuming that a 50m setback from the off-site groundwater bore is accepted The presented setback plan includes contours (at 0.25m elevation intervals), to show the direction of the gradient over the Subject Site. The placement of the proposed irrigation fields is

along the contours of each lot. The size of the Subject Site allows for adherence to the 6m down gradient and 3m up gradient boundary buffer. The building envelope remaining in each lot should be sufficient for the siting of a dwelling and adhering to the required 15m offset.

6.2. System Recommendations

- Calculation of the system requirements for on-site wastewater management of effluent generated from an assumed residential dwelling was based on conservative assumptions of daily flow, as well as site specific measurements from samples of soil collected from the likely drainage area.
- The system requirements derived from this assessment is an accredited an aerated wastewater treatment system capable of accommodating a minimum of 3,000L of sewage effluent and disposal of the treated effluent to irrigation fields of minimum 195m^{2}in each Lot
- The irrigation area is to be protected from disturbances and will not be suitable for play areas and foot traffic.
- The area should be fenced off and protected from vehicles, livestock, domestic animals and children.
- Vegetation (pasture grass) cover of the area is recommended and should be slashed, removed and kept well maintained.
- Shrub species can also be used in the land application area. Appendix E provides a list of species suitable for use, taking into consideration Appendix 7 of the Silver Book and the Upper Macquarie Catchment Revegetation Species Guideline.
- The effluent disposal area should be protected from potential run on and stormwater via an upslope diversion drain or beam. An example from the Design and Installation of On Site Wastewater Treatment (2012) guideline is provided at Appendix F.
- As per the 'On-Site Sewerage Management for Single Households' (1998) publication, stakeholders should be aware that all on site systems and components have a finite life and at some point will require replacement. Septic tanks and AWTSs generally require replacement as per the '*On-Site Sewerage Management for Single Households*' (1998) publication, stakeholders should be aware that all on site systems and components have a finite life and at some point will require replacement. Septic tanks and AWTS' generally require replacement every 25 years, whereas effluent disposal systems can have an expected life between 5-15 years. The owner is encouraged to obtain a copy of the NSW Government "The Easy Septic Guide" (2000) available from - http://www.olg.nsw.gov.au/sites/default/files/Easy-septic-guide.pdf
- AS1547-2012 section 5.5.3.4, recommends that a reserve application area of similar size to the current design should be considered as part of the risk management process to be available on a site for expansion or for resting of the land application system. Although a reserve application is not a requirement it is advised for consideration where the site allows for location of an additional area.

- It is recommended that a registered plumber be engaged to install the system, in accordance with the recommendations of this report.

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APPENDIX A

Site Setback Requirements

TABLE R1
GUIDELINES FOR HORIZONTAL AND VERTICAL SETBACK DISTANCES
(to be used in conjunction with Table R2)

Site feature	**Setback distance range** (m) (See Note 1)	**Site constraint items of specific concern** (from Table R2) (see Note 1)
	Horizontal setback distance *(m)*	
Property boundary	1.5 – 50 (see Note 2)	A, D, J
Buildings/houses	2.0 – > 6 (see Note 3)	A, D, J
Surface water (see Note 4)	15 – 100	A, B, D, E, F, G, J
Bore, well (see Notes 5 and 6)	15 – 50	A, C, H, J
Recreational areas (Children's play areas, swimming pools and so on) (see Note 7)	3 – 15 (see Notes 8 and 9)	A, E, J
In-ground water tank	4 – 15 (see Note 10)	A, E, J
Retaining wall and Embankments, escarpments, cuttings (see Note 11)	3.0 m or 45° angle from toe of wall (whichever is greatest)	D, G, H
	Vertical setback distance *(m)*	
Groundwater (see Notes 5, 6, and 12)	0.6 – > 1.5	A, C, F, H, I, J
Hardpan or bedrock	0.5 – ≥ 1.5	A, C, J

NOTES:

1 The overall setback distance should be commensurate with the level of risk to public health and the environment. For example, the maximum setback distance should be adopted where site/system features are on the high end of the constraint scale. The setback distance should be based on an evaluation of the constraint items and corresponding sensitive features in Table R2 and how these interact to provide a pathway or barrier for wastewater movement.

2 Subject to local regulatory rules and design by a suitably qualified and experienced person, the separation of a drip line system from an upslope boundary, for slopes greater than 5%, may be reduced to 0.5 m.

TABLE R1
GUIDELINES FOR HORIZONTAL AND VERTICAL SETBACK DISTANCES
(to be used in conjunction with Table R2) (continued)

3	Setback distances of less than 3 m from houses are appropriate only where a drip irrigation land application system is being used with low design irrigation rates, where shallow subsurface systems are being used with equivalent low areal loading rates, where the risk of reducing the bearing capacity of the foundation or damaging the structure is low, or where an effective barrier (designed by a suitably qualified and experienced person) can be installed. This may require consent from the regulatory authority.
4	Setback distance from surface water is defined as the areal edge of the land application system to the edge of the water. Where land application areas are planned in a water supply catchment, advice on adequate buffer distances should be sought from the relevant water authority and a hydrogeologist. Surface water, in this case, refers to any fresh water or geothermal water in a river, lake, stream, or wetland that may be permanently or intermittently flowing. Surface water also includes water in the coastal marine area and water in man-made drains, channels, and dams unless these are to specifically divert surface water away from the land application area. Surface water excludes any water in a pipe or tank.
5	Highly permeable stony soils and gravel aquifers potentially allow microorganisms to be readily transported up to hundreds of metres down the gradient of an on-site system (see R3, Table 1 in Pang et al. 2005). Maximum setback distances are recommended where site constraints are identified at the high scale for items A, C, and H. For reading and guidance on setback distances in highly permeable soils and coarse-grained aquifers see R3. As microbial removal is not linear with distance, data extrapolation of experiments should not be relied upon unless the data has been verified in the field. Advice on adequate buffer distances should be sought from the relevant water authority and a hydrogeologist.
6	Setback distances from water supply bores should be reviewed on a case-by-case basis. Distances can depend on many factors including soil type, rainfall, depth and casing of bore, direction of groundwater flow, type of microorganisms, existing quality of receiving waters, and resource value of waters.
7	Where effluent is applied to the surface by covered drip or spray irrigation, the maximum value is recommended.
8	In the case of subsurface application of primary treated effluent by LPED irrigation, the upper value is recommended.
9	In the case of surface spray, the setback distances are based on a spray plume with a diameter not exceeding 2 m or a plume height not exceeding 0.5 m above finished surface level. The potential for aerosols being carried by the wind also needs to be taken into account.
10	It is recommended that land application of primary treated effluent be down gradient of in-ground water tanks.
11	When determining minimum distances from retaining walls, embankments, or cut slopes, the type of land application system, soil types, and soil layering should also be taken into account to avoid wastewater collecting in the subsoil drains or seepage through cuts and embankments. Where these situations occur setback clearances may need to be increased. In areas where slope stability is of concern, advice from a suitably qualified and experienced person may be required.
12	Groundwater setback distance (depth) assumes unsaturated flow and is defined as the vertical distance from the base of the land application systems to the highest seasonal water table level. To minimise potential for adverse impacts on groundwater quality, minimum setback distances should ensure unsaturated, aerobic conditions in the soil. These minimum depths will vary depending on the scale of site constraints identified in Table R2. Where groundwater setback is insufficient, the ground level can be raised by importing suitable topsoil and improving effluent treatment. The regulatory authority should make the final decision in this instance. (See also the guidance on soil depth and groundwater clearance in Tables K1 and K2.)

TABLE R2
SITE CONSTRAINT SCALE FOR DEVELOPMENT OF SETBACK DISTANCES

(used as a guide in determining appropriate setback distances from ranges given in Table R1)

Item	Site/system feature	**Constraint scale** (see Note 1) **LOWER** ⟷ **HIGHER** **Examples of constraint factors** (see Note 2)		Sensitive features
A	Microbial quality of effluent (see Note 3)	Effluent quality consistently producing ≤ 10 cfu/100 mL *E. coli* (secondary treated effluent with disinfection)	Effluent quality consistently producing ≥ 10^6 cfu/100 mL *E. coli* (for example, primary treated effluent)	Groundwater and surface pollution hazard, public health hazard
B	Surface water (see Note 4)	Category 1 to 3 soils (see Note 5) no surface water down gradient within > 100 m, low rainfall area	Category 4 to 6 soils, permanent surface water <50 m down gradient, high rainfall area, high resource/environmental value (see Note 6)	Surface water pollution hazard for low permeable soils, low lying or poorly draining areas
C	Groundwater	Category 5 and 6 soils, low resource/environmental value	Category 1 and 2 soils, gravel aquifers, high resource/environmental value	Groundwater pollution hazard
D	Slope	0 – 6% (surface effluent application) 0 – 10% (subsurface effluent application)	> 10% (surface effluent application), > 30% subsurface effluent application	Off-site export of effluent, erosion
E	Position of land application area in landscape (see Note 6).	Downgradient of surface water, property boundary, recreational area	Upgradient of surface water, property boundary, recreational area	Surface water pollution hazard, off-site export of effluent
F	Drainage	Category 1 and 2 soils, gently sloping area	Category 6 soils, sites with visible seepage, moisture tolerant vegetation, low lying area	Groundwater pollution hazard
G	Flood potential	Above 1 in 20 year flood contour	Below 1 in 20 year flood contour	Off-site export of effluent, system failure, mechanical faults
H	Geology and soils	Category 3 and 4 soils, low porous regolith, deep, uniform soils	Category 1 and 6 soils, fractured rock, gravel aquifers, highly porous regolith	Groundwater pollution hazard for porous regolith and permeable soils
I	Landform	Hill crests, convex side slopes, and plains	Drainage plains and incise channels	Groundwater pollution hazard, resurfacing hazard
J	Application method	Drip irrigation or subsurface application of effluent	Surface/above ground application of effluent	Off-site export of effluent, surface water pollution

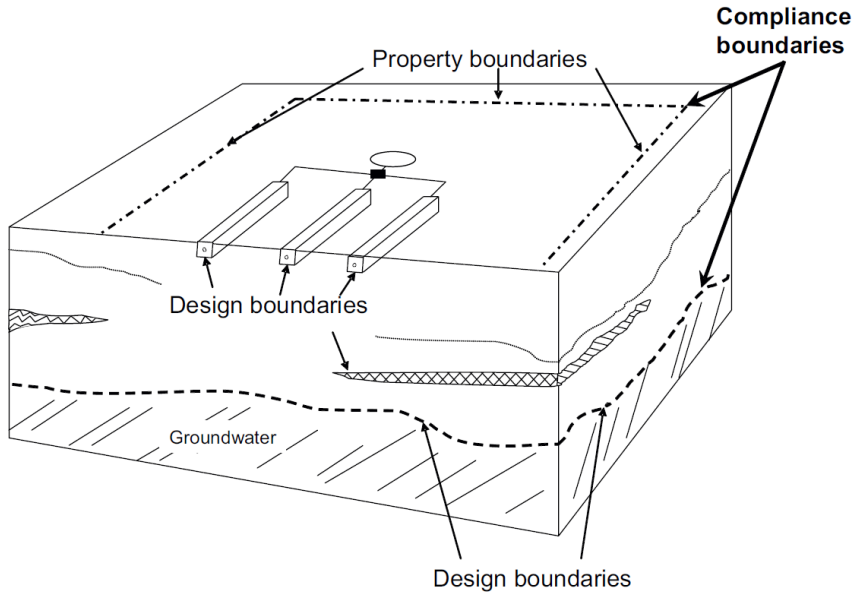
NOTES:

1 Scale shows the level of constraint to siting an on-site system due to the constraints identified by SSE evaluator or regulatory authority. See Figures R1 and R2 for examples of on-site system design boundaries and possible site constraints.

2 Examples of typical siting constraint factors that may be identified either by SSE evaluator or regulatory authority. Site constraints are not limited to this table. Other site constraints may be identified and taken into consideration when determining setback distances.

TABLE R2
SITE CONSTRAINT SCALE FOR DEVELOPMENT OF SETBACK DISTANCES
(used as a guide in determining appropriate setback distances from ranges given in Table R1) (continued)

3	The level of microbial removal for any on-site treatment system needs to be determined and it should be assumed that unless disinfection is reliably used then the microbial concentrations will be similar to primary treatment. Low risk microbial quality value is based on the values given in ARC (2004), ANZECC and ARMCANZ (2000), and EPA Victoria *(Guidelines for environmental management: Use of reclaimed water* 2003).
4	Surface water, in this case, refers to any fresh water or geothermal water in a river, lake, stream, or wetland that may be permanently or intermittently flowing. Surface water also includes water in the coastal marine area and water in man-made drains, channels, and dams unless these are to specifically divert surface water away from the land application area. Surface water excludes any water in a pipe or tank.
5	The soil categories 1 to 6 are described in Table 5.1. Surface water or groundwater that has high resource value may include potable (human or animal) water supplies, bores, wells, and water used for recreational purposes. Surface water or groundwater of high environmental value include undisturbed or slightly disturbed aquatic ecosystems as described in ANZECC and ARMCANZ (2000).
6	The regulatory authority may reduce or increase setback distances at their discretion based on the distances of the land application up or downgradient of sensitive receptors.



(Adapted from USEPA 2002)

FIGURE R1 EXAMPLE OF DESIGN AND COMPLIANCE BOUNDARIES FOR APPLICATION OF SETBACK DISTANCES FOR A SOIL ABSORPTION SYSTEM

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APPENDIX B

Laboratory Report and Borelog

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Geotechnical Log - Borehole

Borehole 1

Easting	: 0.00	**Location**	: 127 Quealeys Road, Gilgandra NSW	**Job Number**	: 43626
Northing	: 0.00	**Logged By**	: NP	**Client**	: Serenity Developments Pty Ltd
Total Depth	: 3 m	**Date**	: 07/05/2024	**Project**	: Septic Design

Drilling Method	Depth (m)	Graphic Log	Classification Code	Material Description	DCP graph	Samples: Disturbed sample	Remarks
Auger drill with TC bit	0.2		TS	Topsoil SAND (TS) : loose, brown, fine grained, slightly moist.	4		
			SP	Alluvial Silty SAND (SP) : dense to very dense, brown, fine grained, slightly moist.	4 3 5 7 9		
	0.6		SC	Alluvial Sandy CLAY (CI) : medium dense to dense, medium plasticity clay, brown-grey, fine grained, slightly moist.	11 14 16 19 23		
	1						
	1.2		CI	Alluvial Sandy CLAY (CI) : hard, medium plasticity, red mottled grey, fine grained sand,			
	1.8		CI	Alluvial Sandy to silty CLAY (CI) : hard, medium plasticity, brown mottled grey, fine grained sand, w < pl.			
	2			**Borehole 1 Terminated at 3m**			

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Geotechnical Log - Borehole

Borehole 1

Easting	**: 0.00**	**Location**	**: 127 Quealeys Road, Gilgandra NSW**	**Job Number**	**: 44546**
Northing	**: 0.00**	**Logged By**	**: NP**	**Client**	**: Serenity Developments Pty Ltd**
Total Depth	**: 3 m**	**Date**	**: 07/05/2024**	**Project**	**: Septic Design**

Drilling Method	Depth (m)	Graphic Log	Classification Code	Material Description	DCP graph	Samples	Remarks
Auger drill with TC bit	0.3		TS	Topsoil SAND (TS) : loose, brown, fine grained, slightly moist.	4 4 3		
	0.6		SP	Alluvial Silty SAND (SP) : dense to very dense, brown, fine grained, slightly moist.	5 7 9		
	1		SC	Alluvial Sandy CLAY (CI) : medium dense to dense, medium plasticity clay, brown-grey, fine grained, slightly moist.	11 14 16 19 23		
	1.2		CI	Alluvial Sandy CLAY (CI) : hard, medium plasticity, red mottled grey, fine grained sand, w < pl.			
	1.8		CI	Alluvial Sandy to silty CLAY (CI) : hard, medium plasticity, brown mottled grey, fine grained sand, w < pl.			
	2			**Borehole 3 Terminated at 3m**			

Environmental Division
Mudgee
Work Order Reference
ME2400783

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Telephone : 02 6372 6735

CHAIN OF CUSTODY AND ANALYTICAL REQUEST

Job Number	43626	Date	8/05/2024
Laboratory	ALS Mudgee	Report to	Nardus Potgieter npotgieter@barnson.com.au
Sample Temperature on Receipt		Notes	
15~17 °C	Signature:		

Sample ID	Sample Description	Sample Date	Sample type	Analysis request					
				1	2	3	4	5	6
TP1-A	Surface soil	8/05/2024	Soil (3 jars)	X	X	X	X		
TP1-B	Sub-soil	8/05/2024	Soil (3 jars)	X		X	X		
TP3-A	Surface soil	8/05/2024	Soil (3 jars)	X	X	X	X		
TP3-B	Sub-soil	8/05/2024	Soil (3 jars)	X		X	X		

Analysis request		Method Code
1	pH, EC (Saturated Paste), Exchangeable Cations, ECEC, ESP	AG-1
2	P Sorption Capacity	EK072
3	Soil Classification by Particle Size Analysis (Sieve Hydrometer and SPD analysis to "Yellow Book" spec)	EA150H-Y
4	Emerson Aggregate Testing	EA058
5		
6		

Relinquished by / Affiliation	Accepted by / Affiliation	Date
/ Barnson	/ ALS Mudgee	8/05/2024 1207

Esky x1 icebricks

CERTIFICATE OF ANALYSIS

Work Order	: **ME2400783**	Page	: 1 of 4
Client	: **BARNSON**	Laboratory	: Environmental Division Mudgee
Contact	: Nardus Potgieter	Contact	: Mary Monds (ALS Mudgee)
Address	: Unit 4 108-110 Market Street MUDGEE NSW 2850	Address	: 1/29 Sydney Road Mudgee NSW Australia 2850
Telephone	: 0429 464 067	Telephone	: +61 2 6372 6735
Project	: Soil	Date Samples Received	: 08-May-2024 12:07
Order number	: ----	Date Analysis Commenced	: 15-May-2024
C-O-C number	: ----	Issue Date	: 20-May-2024 16:21
Sampler	: Client Sampler		
Site	: ----		
Quote number	: SY/053/14		
No. of samples received	: 4		
No. of samples analysed	: 4		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Aleksandar Vujkovic	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Layla Hafner	Acid Sulphate Soils - Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP1-A Surface soil	TP1-B Sub-soil	TP3-A Surface soil	TP3-B Sub-soil	----
			Sampling date / time	08-May-2024 00:00	08-May-2024 00:00	08-May-2024 00:00	08-May-2024 00:00	----
Compound	CAS Number	LOR	Unit	ME2400783-001	ME2400783-002	ME2400783-003	ME2400783-004	--------
				Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	6.8	7.9	7.0	8.4	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	12	44	18	144	----
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Brown (7.5YR 4/2)	Reddish Brown (5YR 5/3)	Brown (7.5YR 4/2)	Reddish Gray (5YR 5/2)	----
Texture	----	-	-	Silty Loam	Medium Heavy Clay	Silty Loam	Medium Heavy Clay	----
Emerson Class Number	EC/TC	-	-	3	2	3	2	----
EA150: Soil Classification - National Committee on Soil and Terrain (2009)								
Clay (<2 µm)	----	1	%	23	42	22	36	----
Silt (2-20 µm)	----	1	%	4	2	4	4	----
Fine Sand (0.02-0.2 mm)	----	1	%	25	21	28	22	----
Coarse Sand (0.2-2.0 mm)	----	1	%	43	32	45	37	----
Gravel (>2mm)	----	1	%	5	3	1	1	----
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.48	2.59	2.50	2.59	----
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	----	1.6	----	3.8	----
ø Exchangeable Magnesium	----	0.2	meq/100g	----	1.4	----	4.4	----
ø Exchangeable Potassium	----	0.2	meq/100g	----	<0.2	----	<0.2	----
ø Exchangeable Sodium	----	0.2	meq/100g	----	0.5	----	2.1	----
ø Cation Exchange Capacity	----	0.2	meq/100g	----	3.6	----	10.3	----
ø Exchangeable Sodium Percent	----	0.2	%	----	13.9	----	20.8	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	3.2	----	3.3	----	----
Exchangeable Magnesium	----	0.1	meq/100g	1.8	----	2.1	----	----
Exchangeable Potassium	----	0.1	meq/100g	0.3	----	0.6	----	----
Exchangeable Sodium	----	0.1	meq/100g	0.4	----	0.4	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	TP1-A Surface soil	TP1-B Sub-soil	TP3-A Surface soil	TP3-B Sub-soil	----
				Sampling date / time	08-May-2024 00:00	08-May-2024 00:00	08-May-2024 00:00	08-May-2024 00:00	----
Compound	CAS Number	LOR	Unit		ME2400783-001	ME2400783-002	ME2400783-003	ME2400783-004	--------
					Result	Result	Result	Result	----
ED007: Exchangeable Cations - Continued									
Cation Exchange Capacity	----	0.1	meq/100g		**5.7**	**----**	**6.4**	**----**	**----**
Exchangeable Sodium Percent	----	0.1	%		**6.6**	**----**	**6.0**	**----**	**----**
EK072: Phosphate Sorption Capacity									
Phosphate Sorption Capacity	----	250	mg P sorbed/kg		**1930**	**----**	**294**	**----**	**----**

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(SOIL) EA058: Emerson Aggregate Test

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(SOIL) EA150: Soil Classification - National Committee on Soil and Terrain (2009)

(SOIL) EA152: Soil Particle Density

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(SOIL) EA002: pH 1:5 (Soils)

(SOIL) EA010: Conductivity (1:5)

(SOIL) EK072: Phosphate Sorption Capacity

(SOIL) ED007: Exchangeable Cations

(SOIL) ED006: Exchangeable Cations on Alkaline Soils

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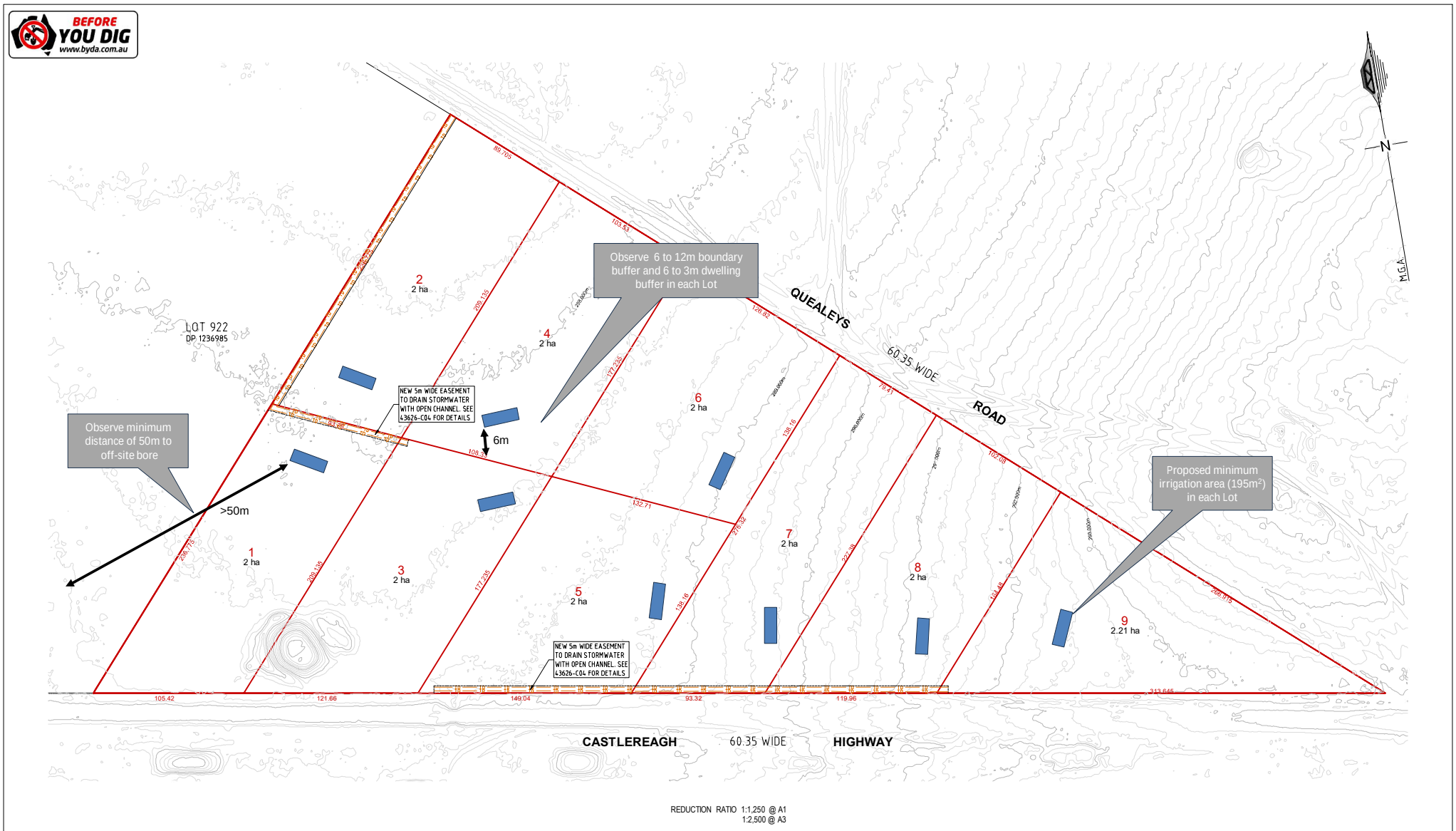
APPENDIX C

Water and Nutrient Balances



REDUCTION RATIO 1:1,250 @ A1
1:2,500 @ A3

SCALE 1:1250(A1)
0 25 50 75 100 125
0 25 50 75 100 125
SCALE 1:2500(A3)

SUBMISSION FOR DA

barnson
DESIGN . PLAN . MANAGE

BARNSON PTY LTD
phone 1300 BARNSON (1300 227 676)
email generalenquiry@barnson.com.au
web barnson.com.au

Rev	Date	Description
A	06-06-2024	ISSUED FOR DA

Project
ON-SITE WASTEWATER MANAGEMENT PLAN
Site Address
172 QUEALEYS ROAD
GILGANDRA NSW 2827
Client
SERENITY DEVELOPMENTS PTY LTD

Drawing Title
SITE BUFFER PLAN

Design NP
Drawn
Check NP

Original Sheet Size A1
Revision A

Certification

Project No 43626
Drawing No E01

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APPENDIX D

Site Setback Plan

Minimum Area Method Water Balance an Wet Weather Storage Calculations

Barnson Job No	43626		
Location :	Gilgandra		

Design Wastewater Flow	**Q**	**l/day**	480
Design Percolation Rate	**R**	**mm/day**	4

Climate Zone	3 C	*As per Soil Landscapes of Dubbo 1:250 000* **Dropdown Box**

Paramter	Symbol	Formula	Units	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Days in Month	**(D)**	**n/a**	**days**	**31**	**28**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**365**
Precipitation (70th percentile)	**(P)**	**n/a**	**mm/month**	94	86	76	64	70	75	60	66	60	81	78	96	906
Evaporation	**(E)**	**n/a**	**mm/month**	229	178	155	104	51	46	41	58	89	130	165	229	1475
Crop Factor (as per Silver Book)	**(C)**	**n/a**	**n/a**	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Outputs																
Evapotranspiration	**(ET)**	**E X C**	**mm/month**	160.3	124.6	108.5	72.8	35.7	**32.2**	28.7	40.6	62.3	91	115.5	160.3	1032.5
Percolation	**(B)**	**(R/7)xD**	**mm/month**	124.0	112.0	124.0	120.0	124.0	120.0	124.0	124.0	120.0	124.0	120.0	124.0	1460.0
Outputs		**(ET +B)**	**mm/month**	284.3	236.6	232.5	192.8	159.7	152.2	152.7	164.6	182.3	215.0	235.5	284.3	2492.5
Inputs																
Precipitation (70th percentile)	**(P)**	**n/a**	**mm/month**	94	86	76	64	70	75	60	66	60	81	78	96	906
Possible Effluent Irrigation	(W)	**(ET + B) -P**	**mm/month**	190.3	150.6	156.5	128.8	89.7	77.2	92.7	98.6	122.3	134.0	157.5	188.3	**1586.5**
Actual Effluent Production	(I)	**H/12**	**mm/month**	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2
Inputs		**(P +I)**	**mm/month**	226.2	218.2	208.2	196.2	202.2	207.2	192.2	198.2	192.2	213.2	210.2	228.2	1038.2
Storage	(S)	**(P+I) - (ET+B)**	**mm/month**	-58.1	-18.4	-24.3	3.4	42.5	55.0	39.5	33.6	9.9	-1.8	-25.3	-56.1	
Cumulative Storage	(M)	**n/a**	**mm**	0.0	0.0	0.0	3.4	45.9	100.9	140.4	174.0	**184.0**	182.2	156.9	100.8	

Note - H = sum of W

Irrigation Area	**(L)**	**365 x Q/H**	**m²**	**110.4**
Storage	**(v)**	**Largest M**	**mm**	**184.0**
		(V xL)/1000	**m³**	**20.3**

Phosphours Balance

Job Number 43626

Phosphorus Sorption capacity - calculated to a depth of 1m if possible

Weighted pSorb from lab results - as per SCA pg 203

Soil Depth	pSorption (mg/	pSorption/soil layer
0-20	250	5000
20-40	420	8400
40-70	560	16800
70-100	580	17400

Weighted Psorp = Column C/thickness

Weighted Psorp = 600 mg/kg

OR USE Psorption Uptake values for soil type as per Appendix 1 of SCA pg 207

BULK Density - use the following, unless determined by lab/field (SCM pg, 207)

Soil Type	g/cm3
Sandy Soil	1.8
Fine sandy loam*	1.6
Intermediate	1.5
clay	1.3

*Interpruting soil test results

Need to calculate the pSorption of the soil in kg/ha, using the bulk density and Weighted Psorb mg/kg

Note - use top 1m of the soil

1 hecatre = 10,000m2

Therefore in the top 1m of soil = 10,000m2 X 1m X Bulk density

15000 tonnes/hectare of soil (update with Bulk density)

Convert tonnes to kg 15000000 kg

Therefore the pSorption is value mg/kg X kg of soil you have

9000000000 mg/hectare

Convert mg/ha to kg/ha	9000

Irrigation Area = $P_{generated}$ / $P_{absorbed}$ + P_{uptake})

$P_{generated}$ = total phosphorus (TP) concentration x volume (V)of wasewater produced in 50 years

TP = 10mg/L (from Sydney Catchment Management Authority, 2019. Designing and Installing On-Site Wastewater Systems)

V = Q x 365 days x 50 years, where Q is daily flow L/d

Q L/day =	480	
$P_{generated}$ =	87600000	mg
Convert to kg	87.60	kg

$P_{absorbed}$ = in soil is between 1/4 and 1/2 of the the phosphorus sorption capacity, therefore in accordance with the silver book, use 1/3

Is value x 1/3 =	3000	kg/ha
convert to kg/m2	0.300	kg/m2

P_{uptake} = the amount of vegetation uptake over 50 years

Is value from SCA pg207 X 365 days X50 years

Value (kg/ha/year) 30 (choose from SCM Appendix 1… or use 12 for unmaintained lawn)

Convert to mg/m2/day 8.21373 (using conversion factor from per year to per day)

Therefore total = amount mg/m2/day X 365 days X 50 years

Which is 149900.532

Convert to kg/m2 0.14990 kg/m2

Irrigation Area = $P_{generated}$ / $P_{absorbed}$ + P_{uptake})

$P_{generated}$ =	87.60	
$P_{absorbed}$ =	0.300	
P_{uptake} =	0.1499	
Irrigation Area =	194.7	m2

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APPENDIX E

Recommended Species List

APPENDIX 7

VEGETATION SUITABLE FOR LAND APPLICATION AREAS

Botanical Name	Approximate Height	Common Name or Variety
Grasses		
Carex spp.		
Lomandra longifolia		
Microlaena stipoides		
Oplismenus imbecillis		
Pennisetum alopecuroides	40 - 80 cm	Available as lawn turf
Poa lab		
Stipa spp.		
Ground cover/ climbers		
Hibbertia scandens		Snake vine
Hibbertia stellaris		
Isotoma fluviatalis	Prostrate	
Kennedia rubicunda	Climber	Dusky coral pea
Scaevola albida		
Scaevola ramosissima		
Veronica plebeia		
Viola hederacea		Native violet
Sedges/ grasses/ small plants		
Anigozanthus flavidus	2m	Kangaroo Paw
Baumea acuta		
Baumea articulata	Sedge	
Baumea juncea	Sedge	
Baumea nuda	Sedge	
Baumea rubiginosa	Sedge	
Baumea teretifolia	Sedge	
Blandfordia grandiflora	30-90cm	Christmas Bell
Blandfordia nobilis	30-90cm	Christmas Bell
Brachyscome diversifolia	Clump	Native Daisy
Carex appressa	Sedge	
Cotula coronopifolia	10-20cm	Waterbutton
Crinum pedunculatum	<2m	Swamp Lily
Cyperus polystachyos	Sedge	
Dianella caerulea	Low plant	Blue Flax Lily
Epacris microphylla	50cm -1m	
Ferns		
Gahnia spp.	Tall Grass	
Juncus spp.	0.5 m Rush	
Lobelia trigonocaulis	5-10cm	
Lomandra spp.	Grass	
Patersonia fragilis		Native Iris
Patersonia glabrata		Native Iris
Patersonia occidentalis		Native Iris
Ranunculus graniticola	5cm	
Restio australis	Reed	
Restio tetraphyllus	1m	
Sowerbaea juncea	Sedge	Rush Lily
Tetratheca juncea	<30cm	
Xyris operculata	<1m	Tall Yellow Eye

Botanical Name	Approximate Height	Common Name or Variety
Shrubs		
Agonis flexuosa nana		
Baekea linifolia	1 - 2.5 m	
Baekea utilis	1-2.5 m	
Baekea virgata	< 4 m	
Banksia aemula	1 - 7 m	
Banksia robur	0.5 - 2 m	
Bauera ruboides	0.5 - 1.5 m	
Callistemon	2 - 3 m	Burgundy
Callistemon	2 - 4 m	Eureka
Callistemon	3 - 4 m	Harkness
Callistemon	3 - 4.5 m	Kings Park Special
Callistemon	2 - 3 m	Mauve Mist
Callistemon	1 - 2.5 m	Red Clusters
Callistemon	2 - 3 m	Reeves Pink
Callistemon citrinus	50 - 80 cm	Austraflora Firebrand
Callistemon citrinus	2 - 4 m	Splendens
Callistemon citrinus	60cm – 1m	White Ice
Callistemon linearis	1 - 3 m	
Callistemon macropunctatus	2 - 4 m	
Callistemon pachyphyllus	2 - 3 m	
Callistemon pallidus	1.5 - 4 m	
Callistemon paludosus	3 - 7 m	
Callistemon pinifolius	1 - 3 m	
Callistemon rigidus	1.5 - 2.5 m	
Callistemon salignus	3 – 10m	
Callistemon shiresii	4 - 8 m	
Callistemon sieberi	1.5 - 2 m	
Callistemon sieberi	50 - 80 cm	Austraflora Little Cobber
Callistemon subulatus	1 - 2 m	
Callistemon viminalis	1 - 2 m	Captain Cook
Callistemon viminalis	5 - 10 m	Dawson River
Callistemon viminalis	3 - 5 m	Hannah Ray
Callistemon viminalis	50 cm - 1 m	Little John
Callistemon viminalis	1.5 - 2 m	Rose Opal
Callistemon viminalis	2 - 3 m	Western Glory
Goodenia ovata	1 - 1.5 m	
Hibiscus diversifolius	1 - 2 m	Swamp hibiscus
Kunzea capitata	1 - 2 m	
Leptospermum flavescens	< 2 m	Tea-tree
Leptospermum juniperinum	1 m	Tea-tree
Leptospermum lanigerum	1 - 2 m	Woolly tea-tree
Leptospermum squarrosum	< 2 m	Tea-tree
Melaleuca alternifolia	4 - 7 m	
Melaleuca decussata	1 - 2 m	Cross-leaved honey myrtle
Melaleuca lanceolata	4 - 6 m	
Melaleuca squamea	1 - 2 m	
Melaleuca thymifolia		

Botanical Name	Approx Height	Common Name or Variety
Trees		
Acacia elongata	> 2 m	
Acacia floribunda	2 - 4 m	Gossamer wattle
Agonis flexuosa	5 - 6 m	Willow myrtle
Allocasuarina diminuta	1.5 m	
Allocasuarina paludosa	0.5 - 2 m	
Angophora floribunda	Large tree	
Angophora subvelutina	Large tree	
Callicoma serratifolia	< 4m	
Casuarina cunninghamiana	10 - 30 m	River she-oak
Casuarina glauca	6 - 12 m	Swamp oak
Elaeocarpus reticulatis	Large tree	Blueberry ash
Eucalyptus amplifolia	Large tree	
Eucalyptus botryoides (coastal areas)	10 - 30 m	
Eucalyptus camaldulensis (west of ranges)	15 - 20 m	River red gum
Eucalyptus deanei	Large tree	Blue Mountains blue gum
Eucalyptus elata	Large tree	River Peppermint
Eucalyptus grandis	10 - 20 m	Flooded gum
Eucalyptus longifolia	20 m	Woollybutt
Eucalyptus pilularis	30 - 40 m	Blackbutt
Eucalyptus punctata	< 35 m	Greygum
Eucalyptus robusta	20 - 30 m	Swamp mahogany
Eucalyptus saligna (coastal)	30 - 50 m	Sydney blue gum
Eucalyptus tereticornis	30 - 40 m	Forest red gum
Eucalyptus viminalis (ranges)	20 - 40 m	Ribbon gum
Acmena smithii	10 - 20 m	Lilli pilli
Flindersia australis	< 40 m	Native teak
Hymenosporum flavuum	3 - 6 m	Native frangipani
Melaleuca armillaris	3 - 4 m	Bracelet honey myrtle
Melaleuca decora	4 - 7 m	
Melaleuca ericifolia	6 m	
Melaleuca halmaturorum	4 - 6 m	
Melaleuca hypericifolia	2 - 3 m	
Melaleuca linariifolia	4 - 8 m	Snow in summer
Melaleuca quinquenervia	5 - 7 m	Broad paperbark
Melaleuca squarrosa	6 m	
Melaleuca stypheloides	6 - 15 m	
Melia azedarach	15 - 20 m	
Pittosporum spp.		
Syzgium paniculatum	8 - 10 m	Bush cherry
Tristania laurina	5 - 15 m	Kanuka
Viminaria juncea	2 - 3 m	Golden spray

Source: Australian Plants Society

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APPENDIX F

Concept Design Sketches – Irrigation System

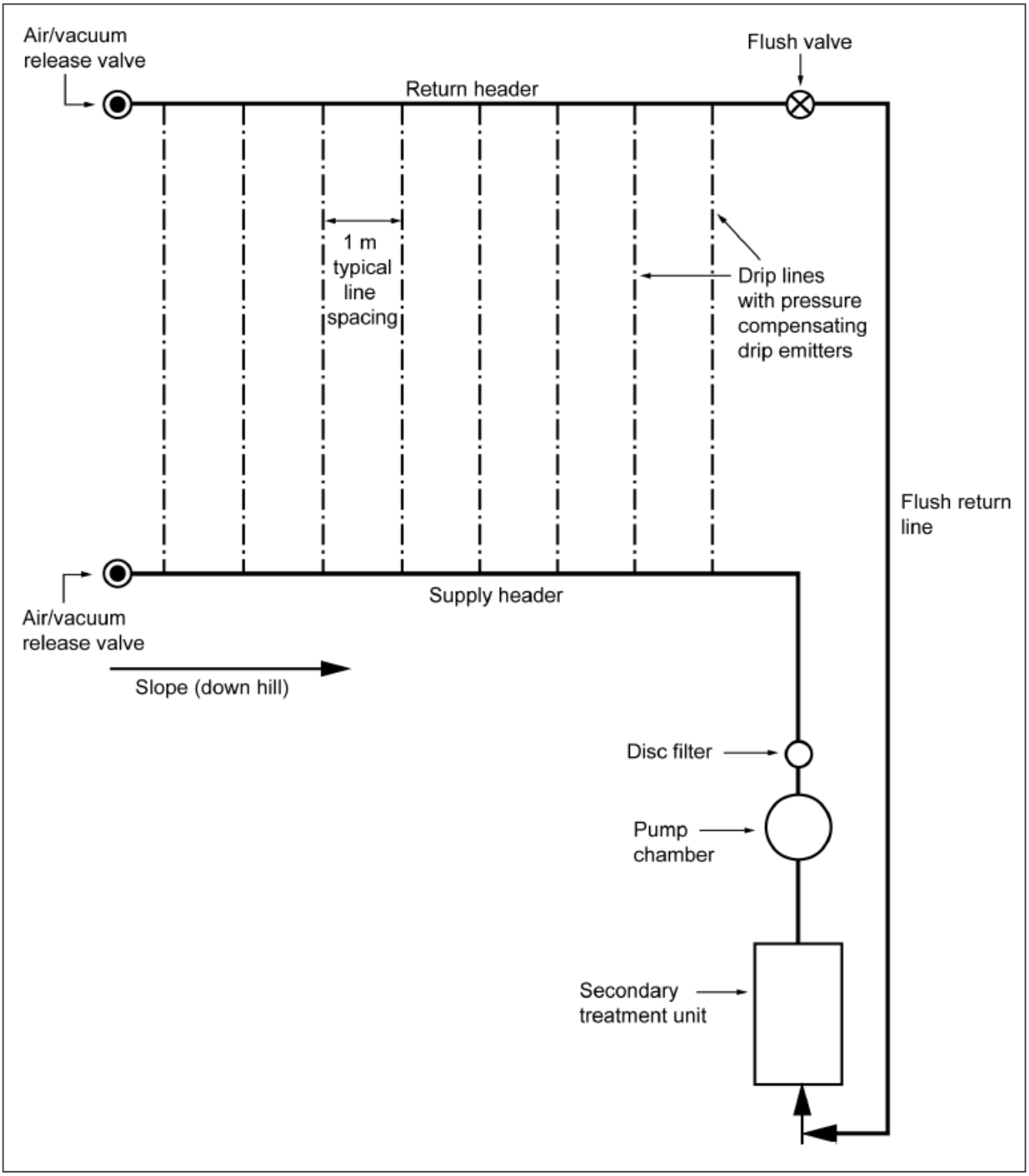


FIGURE M1 DRIP IRRIGATION SYSTEM – EXAMPLE LAYOUT OF COMPONENTS

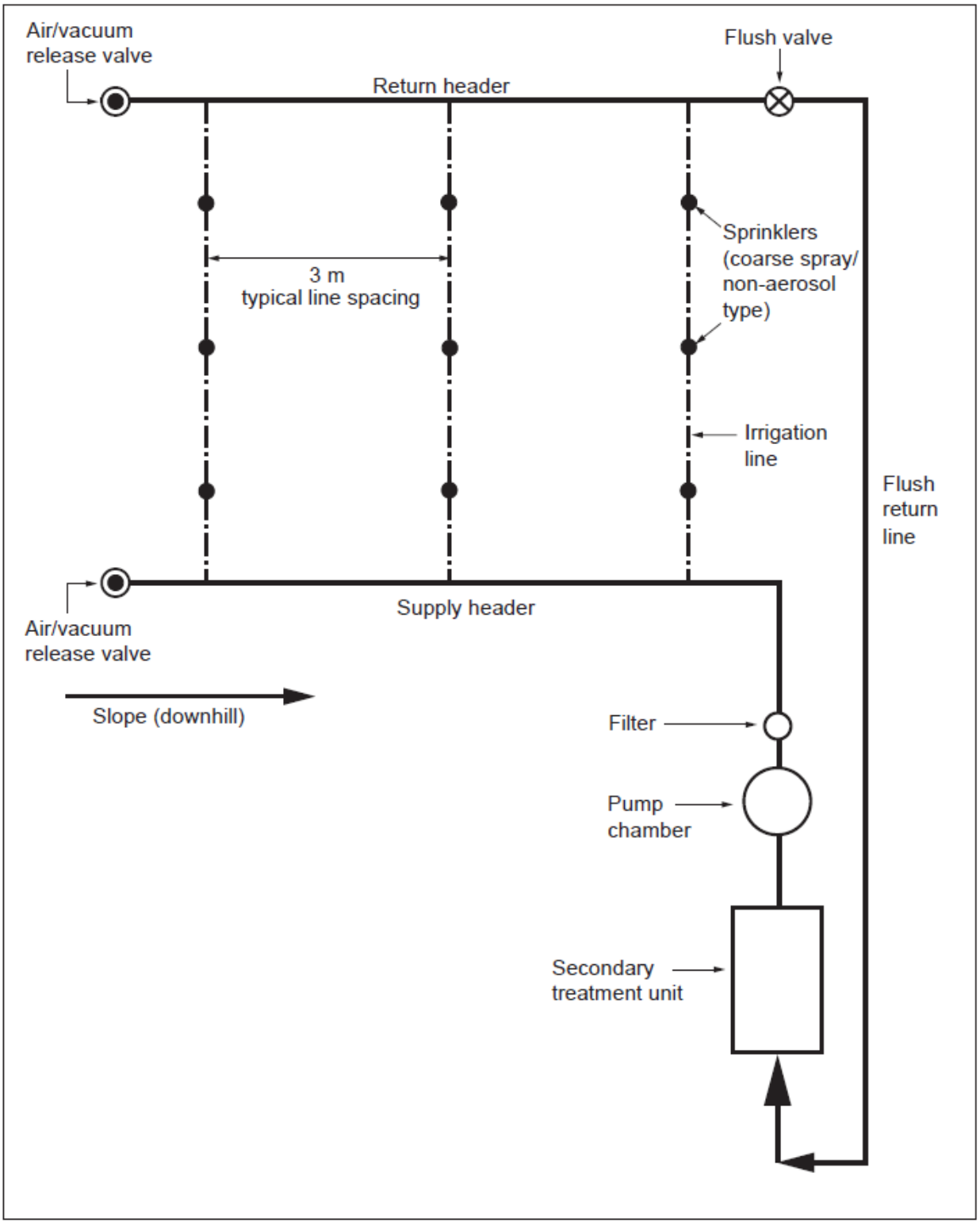
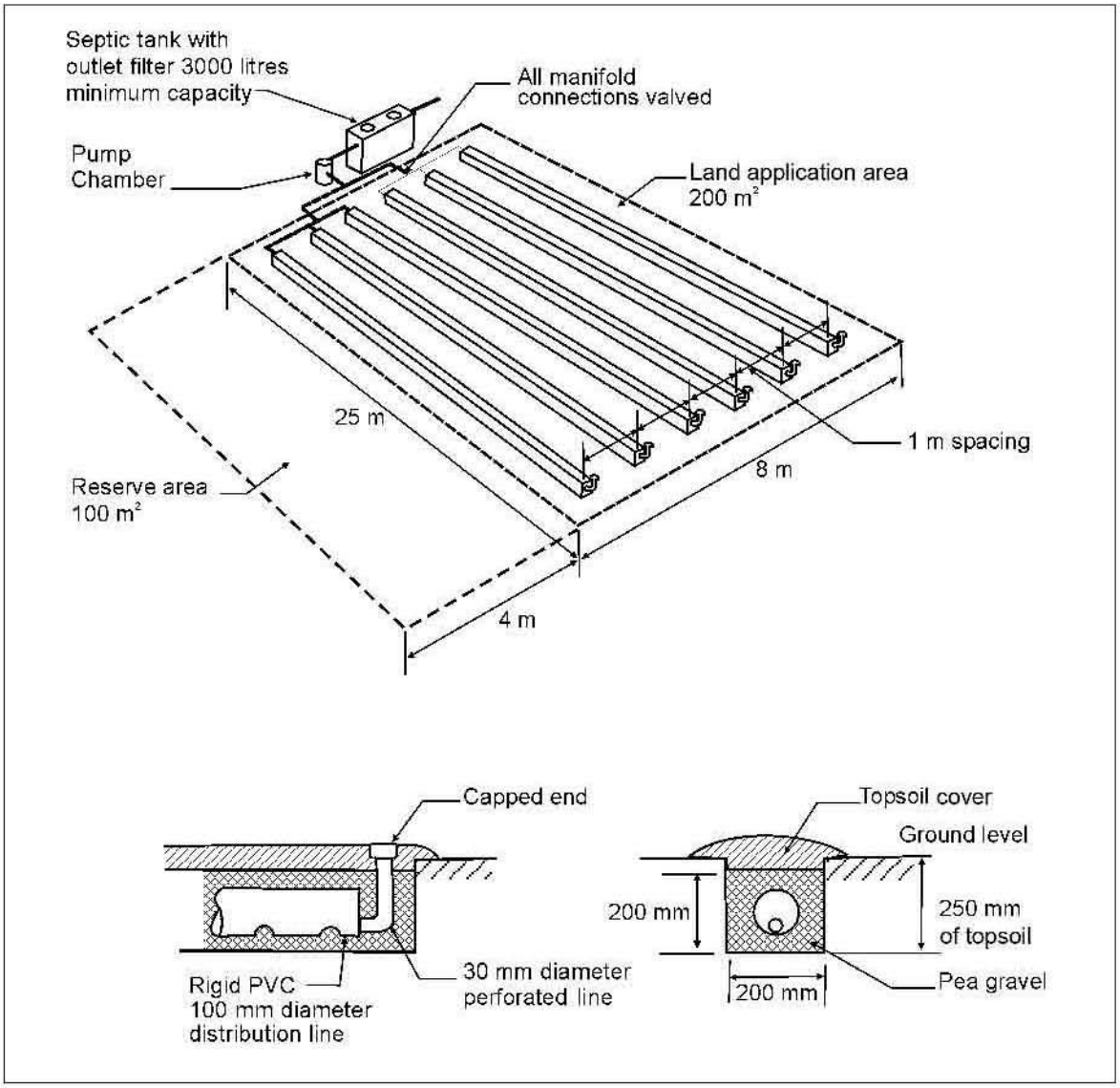


FIGURE M2 SPRAY IRRIGATION SYSTEM – EXAMPLE LAYOUT OF COMPONENTS



NOTES:

1 Example system sized for 700 L/d and DIR of 3.5 mm/d in soil Category 3 (see Table M1).

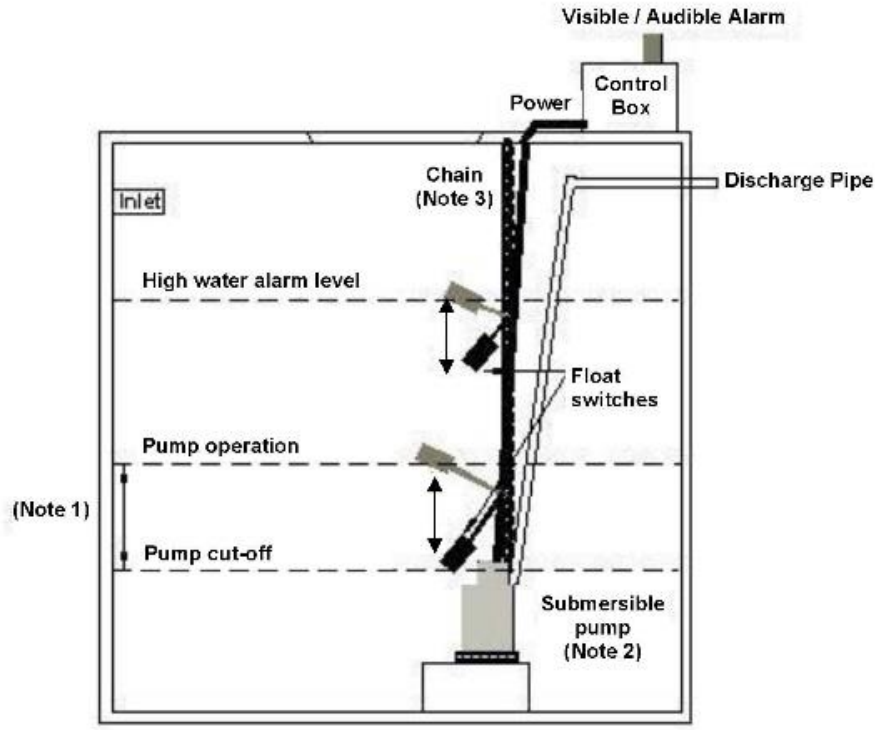
2 Preferred dosing method is by a 6-way automatic sequencing valve.

3 Good quality topsoil to 250 mm depth is required.

4 Flexible 100 mm diameter corrugated drainage line can be used in place of rigid PVC.

5 Distribution aggregate of 10 mm to 15 mm size can be used in place of pea gravel.

FIGURE M3 SHALLOW SUBSURFACE LPED IRRIGATION – EXAMPLE SYSTEM



Notes

1 The depth of effluent pumped within each cycle of the float switch (ie the depth between pump Cut-off and Operation) is calculated by:

depth of pumped effluent (m) x basal tank area (m^2) x 1,000 = discharge volume (litres per pump cycle).

This volume must match the hydraulic capabilities of the receiving component based on flow rate and total dynamic head.

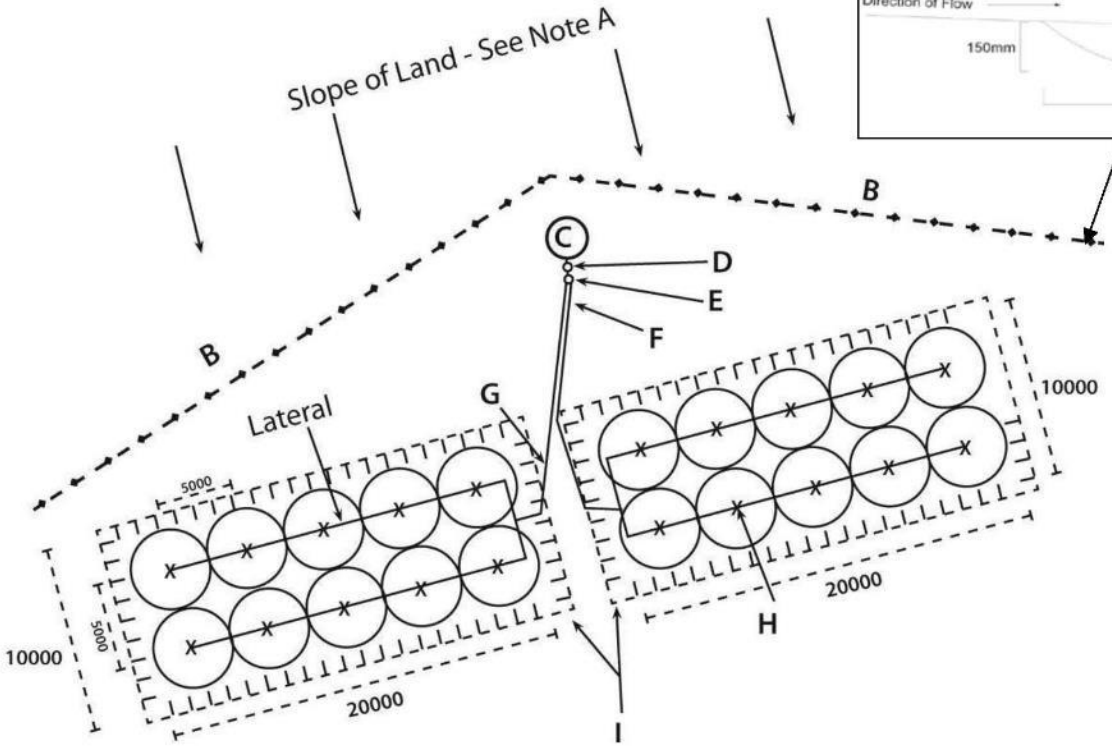
2 Submersible pump used as an example only. The pump will need to be selected based on the specific task. It may be a centrifugal pump or vortex pump depending on the type of effluent being pumped and the hydraulic characteristics of the system. It may sit on top of the tank and draw effluent from the tank.

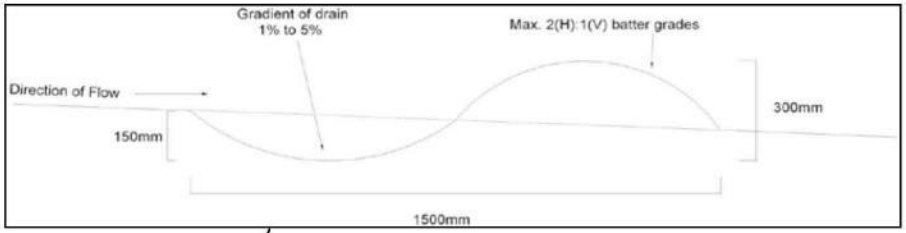
3 Submersible pumps must not be removed from a tank by their power cord. Heavier pumps may require the installation of a solid steel bar configuration according to manufacturer's specifications.

4 Cumulative storage must be assessed carefully to ensure that the pump well is large enough to buffer peak loads without the level exceeding that at which the high level alarm is triggered. The pump well should be sized to ensure that the volume of storage in the pump well reaches the low-level cut-off depth at least once every week.

Standard Drawing 12B - Demand Dose Pump well

(not to scale)





Surface Irrigation Area Construction

A Slope should not exceed 7% over the irrigation area. Landscaping may be required where appropriate.

B An earth bank diversion drain should be constructed upslope of the area to divert stormwater run-on if this is appreciable (see Inset A and Standard Drawing No.12B).

C Secondary treatment system (with disinfection) – the irrigation pump must provide adequate head at the highest sprinkler in the irrigation system at a flow rate that matches the output of the system. This figure will vary when alternative sprinklers are used - check with council and the supplier that alternative sprinklers are acceptable. A full hydraulic design should be carried out on each system.

D A 100-150 micron cylindrical filter should be installed prior to the sequencing valve and cleaned regularly.

E An automatic, hydraulically operated sequencing valve should be installed to deliver effluent evenly to the two (or more) areas. If preferred the valve can be set up to deliver effluent to the four laterals independently.

F In situations where the irrigation areas are above the pump well non-return valves should be installed.

G The effluent distribution pipe from the tank to the irrigation area should be buried a minimum of 300 mm below the ground surface. The manifold and laterals within the effluent irrigation area should be 25 mm polyethylene pipe buried 100-150 mm below the ground surface. Exact layout will depend on individual circumstances. Lateral and sprinkler spacing is typically 5 m.

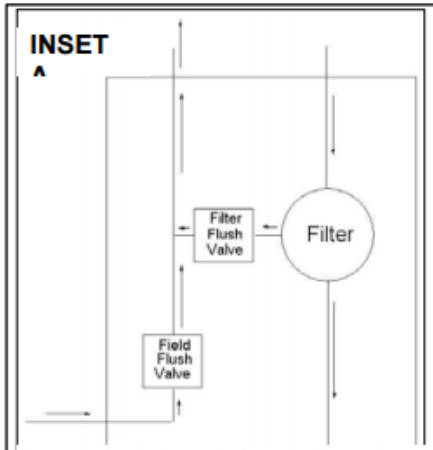
H Standard design based on use of typical heavy droplet rotary sprinklers with design throw radius 2 m, height 400 mm, flow rate 0.05 L/s and operating pressure of 80-100 kPa. Some pop-up and/or gear driven models may have different characteristics. Approval will be at the discretion of council.

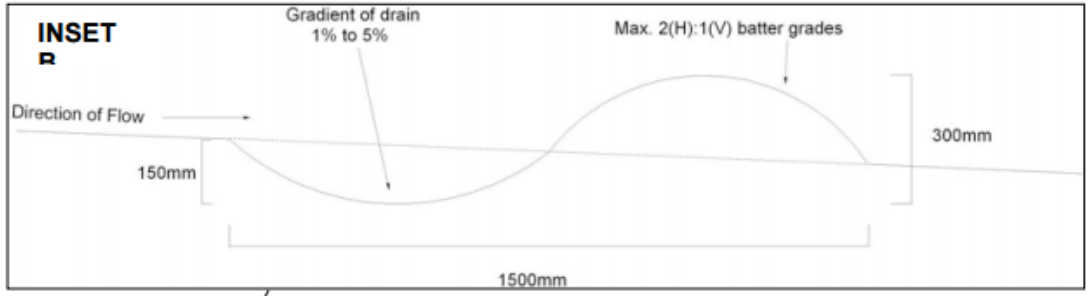
I Irrigation areas can be either landscaped garden beds or lawn areas. The irrigation area should be planted with species appropriate for effluent irrigation (see the 'Silver Book', Department of Local Government, 1998).

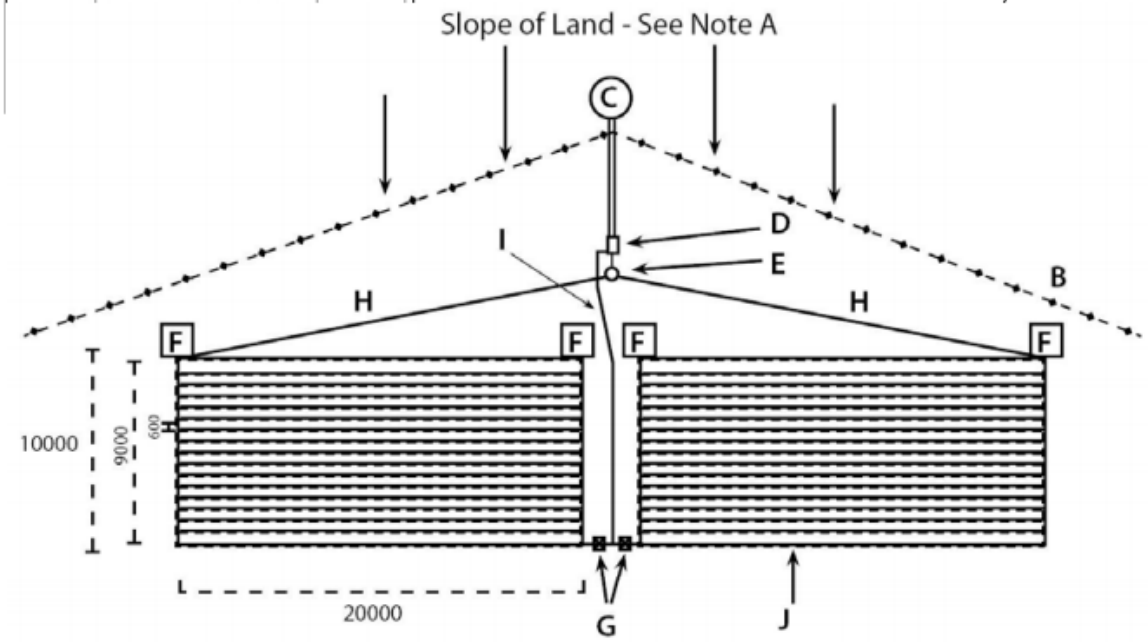
This standard design has been based on a generic area of 400m^2 for irrigation based on typical conditions. It does not eliminate the need for a site and soil evaluation to be carried out or any additional consideration of site specific issues. It should be used as a generic guide only.

Standard Drawing 12C - Surface Irrigation of Effluent

(not to scale)







This standard design has been based on a generic area of 400 m² for irrigation based on typical conditions. It does not eliminate the need for a site and soil evaluation to be carried out or any additional consideration of site specific issues. It should be used as a generic guide only.

Subsurface Irrigation Area Construction

A Design for relatively uniform slope. Additional design work may be required where slope exceeds 12% or if system is to be installed over undulating ground.

B An earth bank diversion drain must be constructed upslope of the area to divert stormwater run-on if this is appreciable (see Inset B and Standard Drawing No.13A).

C Secondary treatment system – the irrigation pump must provide a *minimum* 20 m head and a flow rate that matches the design output of the selected dripline. Flow rate will vary depending on emitter spacing, flow rate and lineal metres of line. A full hydraulic design must be carried out. Each area should be capable of discharging a minimum of 80 L/min.

D Filtration and flushing mechanism (see Inset A) – a field flush valve must be installed on the return line to facilitate periodic flushing to the treatment tank. An additional filter flush valve should be installed downstream of the field flush valve. A 100-150 micron cylindrical filter should be installed and cleaned regularly. Where there are potential problems in returning irrigation field flush back to the treatment tank, a small (approximately 3 m x 0.6 m) absorption area sited below the effluent irrigation area can be used to accommodate the flushed effluent.

E An automatic, hydraulically operated sequencing valve should be installed to deliver effluent evenly to the two areas.

F Air release valves must be installed at high points in each area. Additional air release valves may be required in undulating terrain.

G Check valves are required for each irrigation field to facilitate periodic flushing.

H Distribution manifolds should be 25 mm uPVC or polyethylene pipe buried 300 mm below the ground surface.

I Flushing return manifold should be 25 mm uPVC or polyethylene pipe buried 100-150 mm below the ground surface within the irrigation area. Outside this area, the pipe must be buried at a minimum of 300 mm depth.

J Pressure compensating (PC) subsurface drip line laterals (typically 16 mm) with emitters and laterals at approximately 600 mm spacings (maximum 1,000 mm spacings) and buried to a depth 100-150 mm. Only subsurface dripline specifically designed for effluent irrigation must be used.

Standard Drawing 13B - Subsurface Effluent Irrigation

(not to scale)

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APPENDIX F

Preliminary Electrical Sketch

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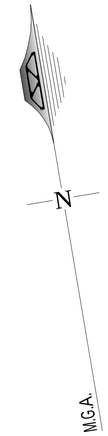

LOT 922
DP 1236985

473.55 (BY TITLE)

QUEALEYS 60.35 WIDE **ROAD**

768.46 (BY TITLE)

No. 172 Quealeys Road

LOT 93
DP 753382
18.21ha (BY TITLE)

903.045 (BY TITLE)

CASTLEREAGH 60.35 WIDE **HIGHWAY**

EXISTING SITE PLAN

REDUCTION RATIO 1:1,250 @ A1
1:2,500 @ A3

SCALE 1:1250(A1)

0 25 50 75 100 125

0 25 50 75 100 125

SCALE 1:2500(A3)

ISSUED TO CLIENT

barnson
DESIGN . PLAN . MANAGE

BARNSON PTY LTD

phone 1300 BARNSON (1300 227 676)
email generalenquiry@barnson.com.au
web barnson.com.au

Rev	Date	Description
A	13-02-2024	ISSUED TO CLIENT

Project
PROPOSED SUBDIVISION SKETCH OF LOT 93 IN DP 753382
Site Address
172 QUEALEYS ROAD
GILGANDRA NSW 2827
Client
STEPHAN BROZIC

Drawing Title
EXISTING SITE PLAN

Survey RB
Drawn JS
Check RB

Original Sheet Size A1
Revision A

Certification

Project No 43626
Drawing No L01

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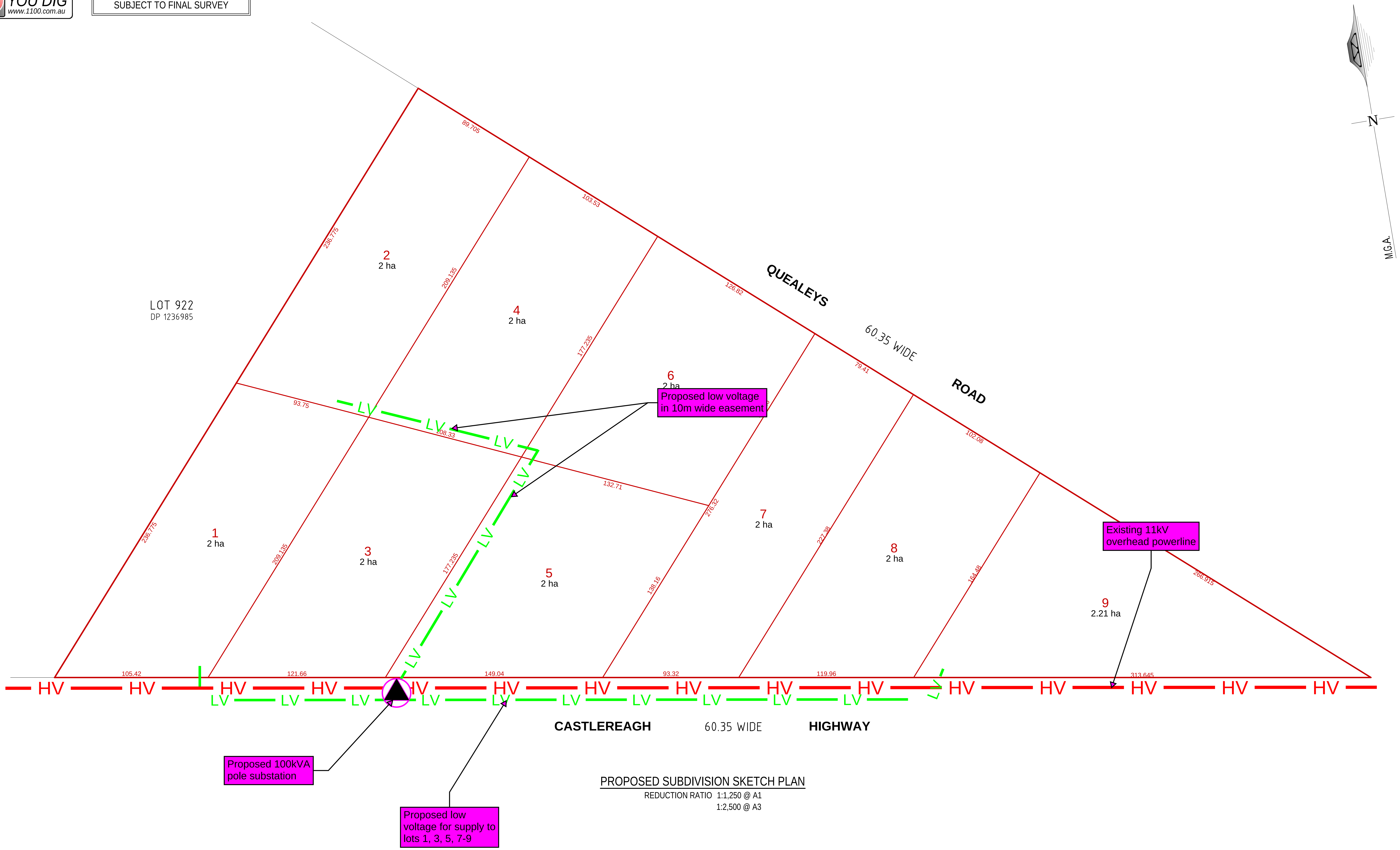
THIS IS A DRAFT PLAN ONLY AND IS SUBJECT TO FINAL SURVEY



PROPOSED SUBDIVISION SKETCH PLAN

REDUCTION RATIO 1:1,250 @ A1
1:2,500 @ A3

SCALE 1:1250(A1)
0 25 50 75 100 125
SCALE 1:2500(A3)

ISSUED TO CLIENT

barnson. DESIGN . PLAN . MANAGE

BARNSON PTY LTD

phone 1300 BARNSON (1300 227 676)
email generalenquiry@barnson.com.au
web barnson.com.au

Rev	Date	Description
A	13-02-2024	ISSUED TO CLIENT

Project
PROPOSED SUBDIVISION SKETCH OF LOT 93 IN DP 753382

Site Address
172 QUEALEYS ROAD
GILGANDRA NSW 2827

Client
STEPHAN BROZIC

Drawing Title
PROPOSED SUBDIVISION SKETCH PLAN

Survey RB
Drawn JS
Check RB

Original Sheet Size A1
Revision A

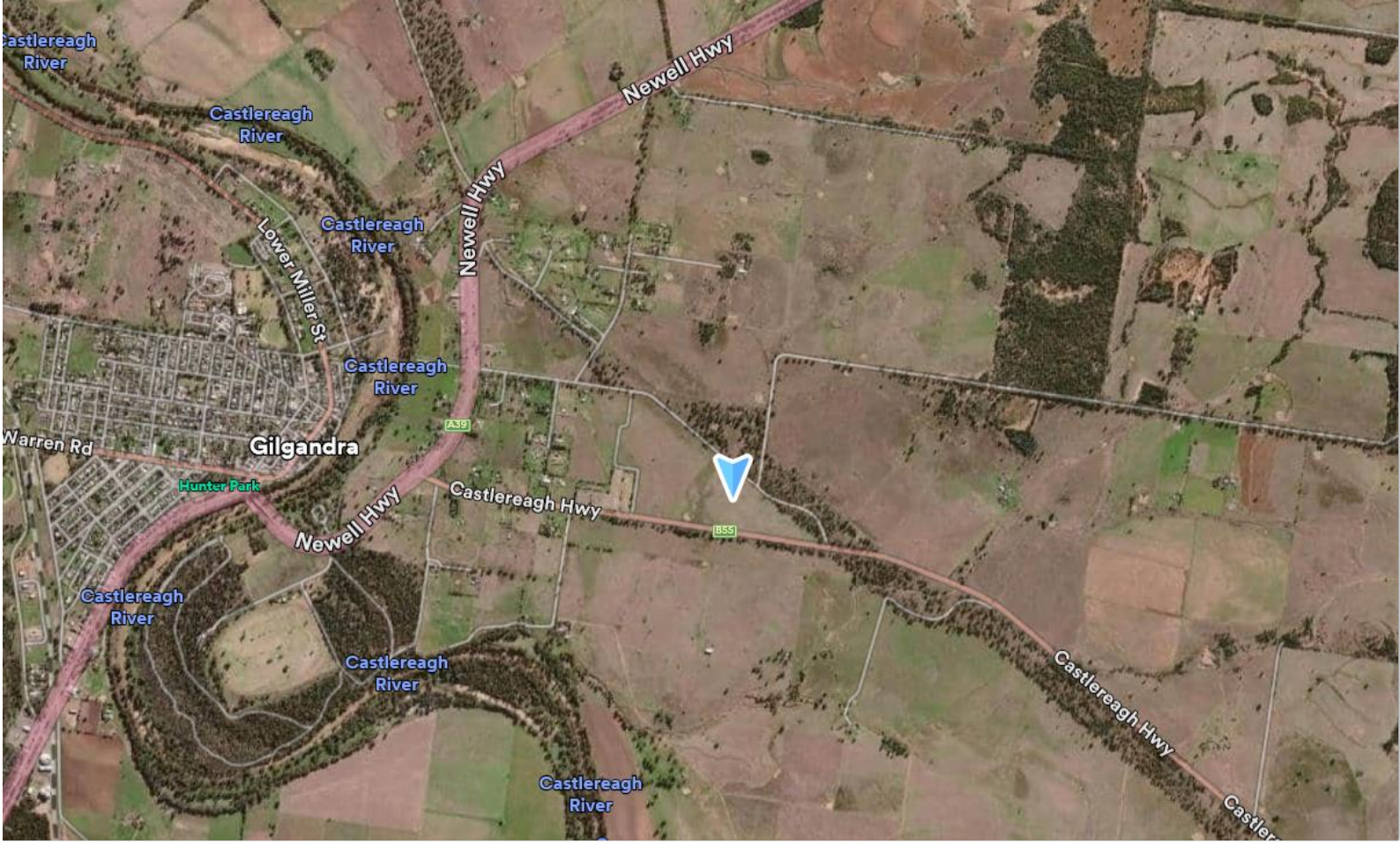
Certification

Project No 43626
Drawing No L02

barnson.

APPENDIX G

Bush Fire Assessment Report



barnson.
DESIGN . PLAN . MANAGE

Bush Fire Assessment Report

Client: Serenity Developments Pty Ltd

Site Address: 172 Quealeys Rd, Gilgandra

13 June 2024

Our Reference: 43626-BR01_A

DISCLAIMER

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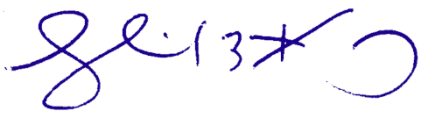
Barnson Pty Ltd accepts no liability or responsibility for or in respect of any use or reliance upon this report and its supporting material by anyone other than the client.

Project Name:	Bush Fire Assessment Report for Subdivision - 172 Quealeys Rd, Gilgandra
Client:	**Serenity Developments Pty Ltd**
Project Number:	43626
Report Reference:	43626-BR01_A
Date:	13 June 2024

Prepared by:	**Reviewed by:**
	
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1. INTRODUCTION

1.1. Background

Barnson Pty Ltd has been engaged by Serenity Developments Pty Ltd to prepare a Bush Fire Assessment Report (BFAR) in support of a Development Application (DA) for the subdivision of Lot 93 DP 753382, known as 172 Quealeys Road, Gilgandra.

The subject site is located on the northern side Castlereagh Highway with Quealeys Road running along the northeastern boundary. The site has an area of 18.21 hectares and is vacant.

The project will consist of the subdivision of the subject site into nine Lots.

The purpose of this report is to provide a bushfire assessment for the proposed development, and to ensure the development is consistent with *Planning for Bushfire Protection 2019*.

1.2. Proposed Development

The proposed development will consist of the Torrens Title subdivision of the site (1 Lot into 9 Lots). Refer to the Subdivision Plans in Appendix A of this report.

1.3. Legislative Requirements

1.3.1. Environmental Planning and Assessment Act 1979

Integrated Development

The subject site is not mapped as bushfire prone land, however during prelodgement discussions with Council, it was requested that a Bushfire Report be prepared regardless. As such, this report forms the assessment. The application will not be considered as integrated development as the site is not mapped as bushfire prone land.

Bush Fire Prone Land

The subject site is not mapped as bushfire prone land. Considering the presence of grassland vegetation, Council requested that a Bushfire Assessment be prepared to support the application. Council's prelodgement comment is provided below:

- *Bushfire report to be prepared addressing rural residential subdivisions for Class 3 (grass lands), noting not integrated development as not 'mapped' land.*

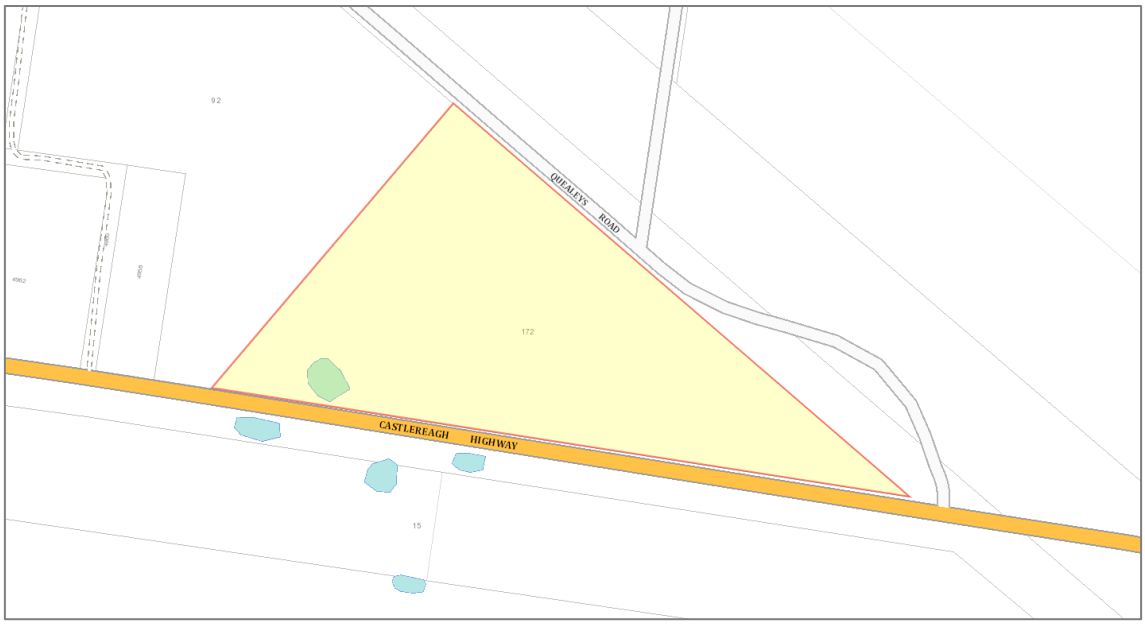
Planning for Bush Fire Protection

This report has been prepared to address the requirements of the *Planning for Bushfire Protection 2019* (PBP) and as a subdivision that could lawfully contain residential development. Specifically, Section 5 of PBP has been addressed throughout this report.

2. THE SITE & ITS SURROUNDS

2.1. Site Location

The subject site of this application is Lot 93 DP 753382, known as 172 Quealeys Road, Gilgandra. The site is located on the southwestern side of Quealeys Road, as shown in Figure 1 below. The site is located in the Gilgandra Local Government Area.



Source: (NSW Government Spatial Services, 2024)

Figure 1 – Site Location

2.2. Site Details

The subject site of this application is Lot 93 DP 753382, commonly known as 172 Quealeys Road, Gilgandra. The site has an overall area of approximately 16.31ha (refer to Deposited Plans in Appendix B). The site is generally used for agricultural grazing purposes.

The site has direct frontage to the Castlereagh Highway and Quealeys Road, which is a gravel sealed road. The site contains grassland vegetation.

Source: (NSW Government Spatial Services, 2024)

Figure 2 – Site Aerial

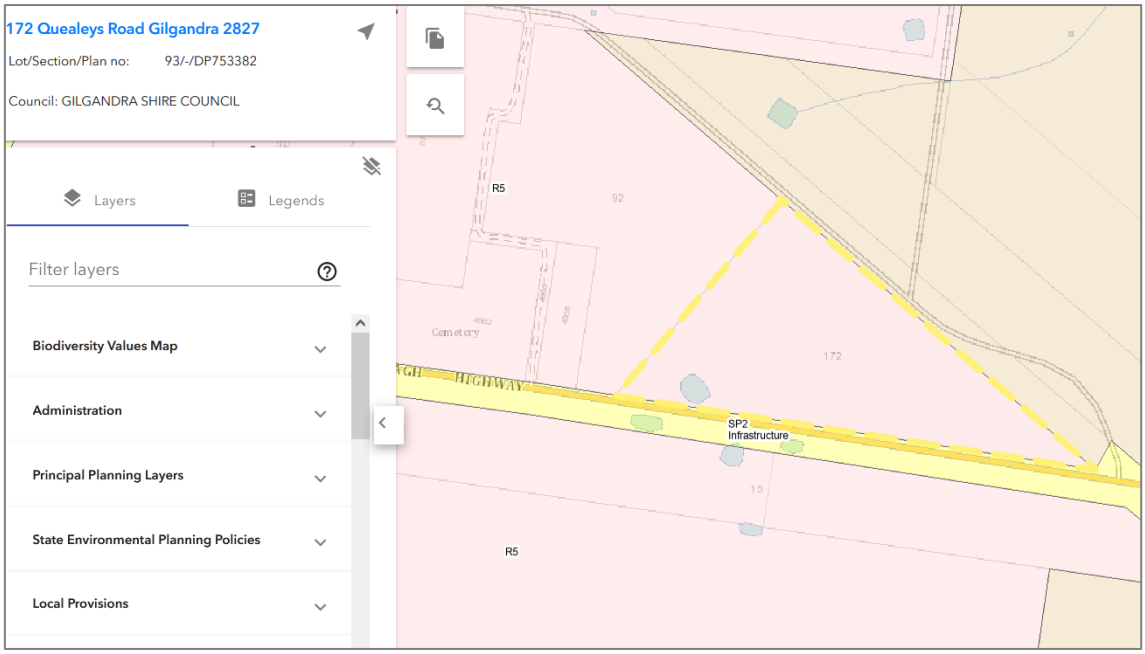


Figure 3 – Zoning Map

The site is zoned R5 Large Lot Residential, pursuant to the provisions under the *Gilgandra Local Environmental Plan 2011* as shown in Figure 3 above. The wider locality is generally zoned R5 Large Lot Residential and RU1 Primary Production.

2.3. Environmental Considerations

2.3.1. Environmentally Significant Features

The subject site is not identified as containing any environmentally sensitive features under the LEP mapping.

2.3.2. Threatened Species, Populations and Ecological Communities

The subject site is not identified as land containing high biodiversity values pursuant to the Biodiversity Values mapping. The proposed development does not involve any clearing of significant vegetation.

2.3.3. Indigenous Heritage

The subject site is not identified as containing a heritage listed item pursuant to Schedule 5 of the *Gilgandra Local Environmental Plan 2011* or State Heritage Register. An AHIMS search was undertaken and there are no known artefacts or sites recorded in the vicinity of the development.

3. BUSH FIRE ASSESSMENT

3.1. Introduction

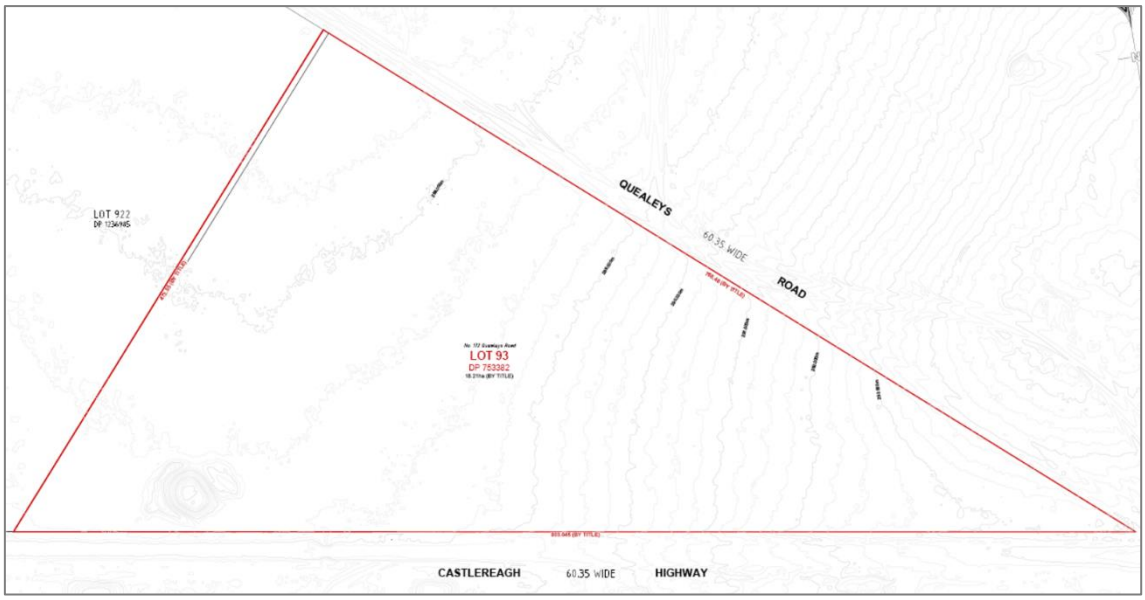
Council provided the following comments regarding bushfire during prelodgement discussions:

- Bushfire report addressing rural residential subdivisions for Class 3 (grass lands), noting not integrated development as not 'mapped' land.

As such, the following assessment is based on the grassland provisions under Planning for Bushfire Protection 2019.

3.2. Topography

Pursuant to Appendix 1.4 of PBP, contour data has been sourced from LiDAR data. The contour data was verified by ground truthing during the site inspection. Refer also to Figure 4.



Source: Barnson Pty Ltd

Figure 4 – Topography

3.3. Fire Weather Area

The subject site is located within the Gilgandra Local Government Area. Pursuant to the RFS NSW Local Government Areas FDI, the relevant Forrest Fire Danger Index (FFDI), for the site is 80.

3.4. 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	Grasslands	Upslope/Flat	11m
2	Grasslands	Downslope 0-5°	11m
3	Grasslands	Downslope 0-5°	11m
4	Grasslands	Downslope 0-5°	11m

The worst case APZ required for any existing or proposed structures is 11m. As such, a minimum 11m APZ shall be adopted for future dwellings on the subject Lots.

3.5. Grassland

As there are grasslands located within the subject site, Section A1.3 of PBP applies. This section of PBP provides the following:

- If the vegetation formation is grassland and a 20m-49m APZ can be applied, the Grassland Deeming Provisions may be applicable. There would be no need for further assessment (refer to Section 7.9 of PBP);
- Where a 20m APZ cannot be provided, a full assessment against A1.4-1.7 would be required.
- Where a 50m APZ can be provided, there are no further requirements.

3.6. Grassland Deeming Provisions

Section A1.3 of PBP provides the relevant requirements for grassland areas. This section states that if a 20m APZ cannot be provided, a full assessment A1.4-1.7 would be required. Given the large size of the resultant Lots, it is considered that a 20m APZ can be applied around future dwellings on each Lot, therefore, an assessment against A1.4-1.7 is not required.

Section 7.9 of BP provides the following options for grassland areas:

1. Where an APZ of 50m can be provided, no further Bushfire Protection Measures are required.
2. Where an APZ of 20-50m can be provided, the set of provisions shown in Table 7.9a apply.

Figure 5 below provides an extract of the relevant provisions in Table 7.9a.

BUSH FIRE PROTECTION MEASURE	GRASSLAND DEEMING PROVISIONS
APZ	› limited to a maximum of 15 degrees downslope; › minimum APZ of 20m is provided between the building and the hazard; › the APZ is wholly within the boundaries of the development site; and › the APZ is maintained as a mown area with grass heights less than 100mm.
Construction	› construction in accordance with BAL-12.5 of AS 3959 and section 7.5 of PBP.
Access	› comply with the property access provisions in Table 5.3b.
Water supply	› comply with the water supply provisions in Table 7.4a.
Landscaping	› comply with the relevant provisions in Appendix 4, noting that other vegetation bush fire hazards cannot be present if these provisions are to apply.

Source: Planning for Bushfire Protection 2019

Figure 5 – PBP Grassland Deeming Provisions

It is understood that a 50m APZ could easily be applied in perpetuity of future dwellings on the resultant Lots. However, the Grassland Deeming Provisions could be applied should future owners determine that a lesser APZ is to be adopted.

The following Bushfire Protection Measures, in accordance with Table 7.9a of BPB shall be applied to future dwellings on the resultant lots which have an APZ of between 20-50m:

- The APZ is to be provided wholly within the boundaries of the Lot and the APZ is to be maintained as a mown area with grass heights less than 100mm;
- Construction standards are to be in accordance with BAL-12.5 of AS3959 and Section 7.5 of PBP;
- Access to be provided in accordance with Table 5.3b of PBP;
- Water to be provided in accordance with table 7.4a of PBP; and
- Landscaping to comply with Appendix 4 of PBP.

The above does not apply to dwellings that have an APZ of 50m or more.

4. BUSH FIRE PROTECTION MEASURES

4.1. Introduction

The proposed development, being a subdivision, is required to comply with the Bush Fire Protection Measures (BPMs) outlined in Section 5.3 of PBP. There are three key BPMs outlined by PBP for subdivisions:

- Asset Protection Zones;
- Access;
- Services – Water Electricity and gas.

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 objectives of PBP are to:

afford buildings and their occupants protection from exposure to a bush fire;

- *provide for a defendable 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 BPMs;*
- *and ensure that utility services are adequate to meet the needs of firefighters.*

The proposal has considered radiant heat levels of less than 29kW/m² 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 residents, as well as sufficient water supply. Therefore, the proposed development is considered to be consistent with the objectives of PBP.

4.3. Objectives for Infill Development

Section 5.2 of PBP contains the specific objectives for subdivisions:

- *minimise perimeters of the subdivision exposed to the bush fire hazard (hourglass shapes, which maximise perimeters and create bottlenecks should be avoided);*
- *minimise vegetated corridors that permit the passage of bush fire towards buildings;*
- *provide for the siting of future dwellings away from ridge-tops and steep slopes, within saddles and narrow ridge crests;*
- *ensure that APZs between a bush fire hazard and future dwellings are effectively designed to address the relevant bush fire attack mechanisms;*
- *ensure the ongoing maintenance of APZs;*
- *provide adequate access from all properties to the wider road network for residents and emergency services;*
- *provide access to hazard vegetation to facilitate bush fire mitigation works and fire suppression;*
- *and ensure the provision of an adequate supply of water and other services to facilitate effective firefighting.*

In complying with the BPMs, the proposed development complies with objectives for subdivisions outlined above.

4.4. Asset Protection Zones

The intent of measures for the Asset Protection Zone (APZ) BPM is:

> *to provide sufficient space and maintain reduced fuel loads to ensure radiant heat levels at the buildings are below critical limits and prevent direct flame contact.*

The following table outlines the Performance Criteria and associated Acceptable Solutions for the APZ BPM, and how the development responds.

Table 2 – Asset Protection Zones

Performance Criteria	Acceptable Solution	Development Response			
The intent may be achieved where:		Acceptable Solution	Performance Solution	N/A	Comment
Potential building footprints must not be exposed to radiant heat levels exceeding 29 kW/m² on each proposed lot.	APZs are provided in accordance with Tables A1.12.2 and A1.12.3 based on the FFDI.	☒	☐	☐	Future dwellings have two (2) options; 1. Provide a 50m APZ with no further Bushfire Protection Measures; or 2. Provide a 20-49m APZ and comply with the Grassland Deeming Provisions under Table 7.9a of PBP. Future dwellings shall comply with the APZ requirements listed above. APZ's can be achieved in all directions subject to setbacks to allotment boundaries.

Table 2 – Asset Protection Zones					
Performance Criteria	Acceptable Solution	Development Response			
The intent may be achieved where:		Acceptable Solution	Performance Solution	N/A	Comment
APZs are managed and maintained to prevent the spread of a fire towards the building.	APZs are managed in accordance with the requirements of Appendix 4.	☒	☐	☐	APZ's are capable of being maintained in accordance with this part.
The APZs is provided in perpetuity.	APZs are wholly within the boundaries of the development site.	☒	☐	☐	APZ's can be positioned entirely within the property boundaries of each proposed Lot, subject to the options chosen for future dwellings, as discussed on the previous page.
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	APZs are located on lands with a slope less than 18 degrees.	☒	☐	☐	There are no lands in excess of 18 degrees on the site.
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Landscaping is in accordance with Appendix 4.	☒	☐	☐	Future landscaping shall be compliant with this part.
	Fencing is constructed in accordance with section 7.6.	☒	☐	☐	The new boundary fencing is proposed to be a steel post and wire arrangement and therefore made of non-combustible material, in accordance with section 7.6 of PBP.

4.5. Access Standards

The intent of measures for access BPMs is:

> *to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area.*

The following table outlines the Performance Criteria and associated Acceptable Solutions for the Access BPM, and how the development responds.

Table 3 – Access

Performance Criteria	Acceptable Solution	Development Response			
The intent may be achieved where:		**Acceptable Solution**	**Performance**	**N/A**	**Comment**
Firefighting vehicles are provided with safe, all-weather access to structures.	Property access roads are two-wheel drive, all-weather roads.	☒	☐	☐	Each resultant Lot is to be provided with two-wheel drive all weather access roads, as required.
	Perimeter roads are provided for residential subdivisions of three or more allotments.	☐	☐	☒	N/A – considering the nature of the subdivision and available access to the road networks, a perimeter road is not considered necessary.
	Subdivisions of three or more allotments have more than one access in and out of the development.	☐	☐	☒	The subdivision is surrounded by road networks.

Table 3 – Access					
Performance Criteria	**Acceptable Solution**	**Development Response**			
The intent may be achieved where:		**Acceptable Solution**	**Performance**	**N/A**	**Comment**
	Traffic management devices are constructed to not prohibit access by emergency services vehicles.	☒	☐	☐	Traffic management devices shall be designed and constructed to support heavy vehicles, including emergency service vehicles.
	Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.	☒	☐	☐	Driveways shall comply.
	All roads are through roads.	☐	☐	☒	N/A - No new roads proposed.
	Dead end roads are not recommended, but if unavoidable, are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end.	☐	☐	☒	N/A - No new roads proposed.
	Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road.	☐	☐	☒	N/A - No new roads proposed.

Table 3 – Access					
Performance Criteria	**Acceptable Solution**	**Development Response**			
The intent may be achieved where:		**Acceptable Solution**	**Performance ...**	**N/A**	**Comment**
	Where access/egress can only be achieved through forest, woodland and heath vegetation, secondary access shall be provided to an alternate point on the existing public road system.	☒	☐	☐	Access is directly off the local road network and through managed lands/grasslands.
	One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.	☐	☐	☒	N/A – no new roads.
The capacity of access roads is adequate for firefighting vehicles.	The capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/ causeways are to clearly indicate load rating.	☒	☐	☐	The driveways shall have the capacity to carry fully loaded firefighting vehicles up to 23 tonnes. No bridges are required/proposed.
There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility	☐	☐	☒	N/A - Non reticulated area.

Table 3 – Access					
Performance Criteria	**Acceptable Solution**	**Development Response**			
The intent may be achieved where:		**Acceptable Solution**	**Performance ...**	**N/A**	**Comment**
	to reticulated water for fire suppression.				
	Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005 - Fire hydrant installations System design, installation and commissioning.	☐	☐	☒	N/A
	There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	☒	☐	☐	Future dwellings on the resultant Lots shall comply with this part.
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during	Are two-way sealed roads.	☐	☐	☒	Not applicable.
	Minimum 8m carriageway width kerb to kerb.	☐	☐	☒	Not applicable.
	Parking is provided outside of the carriageway width.	☐	☐	☒	Not required.
	Hydrants are located clear of parking areas.	☐	☐	☒	Not required.

Table 3 – Access					
Performance Criteria	**Acceptable Solution**	**Development Response**			
The intent may be achieved where:		**Acceptable Solution**	**Performance**	**N/A**	**Comment**
firefighting and emergency management on the interface.	Are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	☐	☐	☒	Not applicable to this type of subdivision.
	Curves of roads have a minimum inner radius of 6m.	☒	☐	☐	Noted.
	The maximum grade road is 15 degrees and average grade of not more than 10 degrees.	☒	☐	☐	Noted.
	The road crossfall does not exceed 3 degrees.	☒	☐	☐	Noted.
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	☒	☐	☐	The driveways shall be established and managed in accordance with this requirement.
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	Minimum 5.5m carriageway width kerb to kerb.	☐	☐	☒	Not applicable to this type of subdivision.
	Parking is provided outside of the carriageway width.	☐	☐	☒	Not applicable to this type of subdivision.
	Hydrants are located clear of parking areas.	☐	☐	☒	Not applicable to this type of subdivision.

Table 3 – Access					
Performance Criteria	**Acceptable Solution**	**Development Response**			
The intent may be achieved where:		**Acceptable Solution**	**Performance ...**	**N/A**	**Comment**
	Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	☐	☐	☒	Not applicable to this type of subdivision.
	Curves of roads have a minimum inner radius of 6m.	☐	☐	☒	Not applicable to this type of subdivision.
	The road crossfall does not exceed 3 degrees.	☐	☐	☒	Not applicable to this type of subdivision.
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	☐	☐	☒	Not applicable to this type of subdivision.
Firefighting vehicles can access the dwelling and exit the property safely.	There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles.	☐	☐	☒	The subject site is located in a semi-rural area, therefore the provisions under this part do not apply.

Table 3 – Access					
Performance Criteria	**Acceptable Solution**	**Development Response**			
The intent may be achieved where:		**Acceptable Solution**	**Performance**	**N/A**	**Comment**
	In circumstances where this cannot occur, the following requirements apply: • minimum 4m carriageway width; • in forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay; • a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; • provide a suitable turning area in accordance with Appendix 3; • curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; • the minimum distance between inner and outer curves is 6m; • the crossfall is not more than 10 degrees;				

Table 3 – Access					
Performance Criteria	**Acceptable Solution**	**Development Response**			
The intent may be achieved where:		**Acceptable Solution**	**Performance ...**	**N/A**	**Comment**
	• maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; • and a development comprising more than three dwellings has access by dedication of a road and not by right of way.				

4.6. Services – Water, Electricity and Gas

The intent of measures for the Services – Water, Electricity and Gas BPMs is:

> *To provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.*

The following table outlines the Performance Criteria and associated Acceptable Solutions for the Services – Water, Electricity and Gas BPM, and how the development responds.

Table 4 – Water, Electricity & Gas					
Performance Criteria	**Acceptable Solution**	**Development Response**			
The intent may be achieved where:		**Acceptable Solution**	**Performance ...**	**N/A**	**Comment**
Adequate water supplies is provided for firefighting purposes.	Reticulated water is to be provided to the development where available.	☐	☐	☒	Reticulated water not available in this area.
	A static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed.	☒	☐	☐	Future dwellings shall be provided with rainwater tanks with at least 20,000L dedicated for dire fighting purposes (unless a 50m APZ is applied and no further BPM's applicable). The tanks shall be fitted with a Storz outlet/Value to support RFS vehicles.
	Static water supplies shall comply with Table 5.3d.	☒	☐	☐	Noted. Refer to above.
Water supplies are located at regular intervals; and The water supply is accessible and reliable for firefighting operations.	Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2005.	☐	☐	☒	Not applicable.
	Hydrants are not located within any road carriageway.	☐	☐	☒	Not applicable.
	Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	☐	☐	☒	Not applicable to this type of subdivision.

Table 4 – Water, Electricity & Gas					
Performance Criteria	**Acceptable Solution**	**Development Response**			
The intent may be achieved where:		**Acceptable Solution**	**Performance ...**	**N/A**	**Comment**
Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.	☐	☐	☒	Not applicable.
The integrity of the water supply is maintained.	All above-ground water service pipes are metal, including and up to any taps.	☒	☐	☐	All aboveground pipe work for future dwellings shall be of metal construction.
	Above-ground water storage tanks shall be of concrete or metal.	☒	☐	☐	Future tanks will be of metal or concrete construction.
Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	where practicable, electrical transmission lines are underground.	☒	☐	☐	Noted.
	where overhead, electrical transmission lines are proposed as follows: • lines are installed with short pole spacing of 30m, unless crossing gullies, gorges or riparian areas; and • no part of a tree is closer to a power line than the distance set out in ISSC3 Guideline for	☒	☐	☐	Noted. If overhead lines are chosen, they shall comply with the provisions under this part.

Table 4 – Water, Electricity & Gas					
Performance Criteria	**Acceptable Solution**	**Development Response**			
The intent may be achieved where:		**Acceptable Solution**	**Performance**	**N/A**	**Comment**
	Managing Vegetation Near Power Lines.				
Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 - The storage and handling of LP Gas, the requirements of relevant authorities, and metal piping is used.	☒	☐	☐	Future dwellings connected to gas shall comply with this part.
	All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side.	☒	☐	☐	Future dwellings connected to gas shall comply with this part.
	Connections to and from gas cylinders are metal.	☒	☐	☐	Noted.
	Polymer-sheathed flexible gas supply lines are not used.	☒	☐	☐	Noted.
	Above-ground gas service pipes are metal, including and up to any outlets.	☒	☐	☐	Noted.

4.7. Emergency Management Arrangements

PBP does not provide any specific Emergency Management Arrangement requirements for residential subdivisions or residential developments. Nevertheless, it is strongly recommended that a Bush Fire Survival Plan be prepared by the future residents of the new Lots in accordance with the NSW RFS' guidelines located on the following webpage http://www.rfs.nsw.gov.au/resources/bush-fire-survival-plan.

4.8. Landscaping

Landscaping measures are detailed within the Tables of this report, as required under Table 5.3A of PBP 2019.

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 recommended 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:
    - Future dwellings are provided with the following options:
        1. Where an APZ of 50m can be provided around future dwellings, no further Bushfire Protection Measures are required.
        2. Where an APZ of 20-50m can be provided around future dwellings, the set of provisions shown in Table 7.9a apply.
    - If future dwellings do cannot achieve the 50m APZ, a minimum of 20m as an APZ shall be applied.
    - All APZ's shall be entirely within the boundaries of each Lots;
    - The above shall be based on future assessment for dwellings on each individual Lot.

The following shall be applied to future dwellings which have an APZ of under 50m.

- Construction Standards:
    - Any future dwellings on the proposed Lots shall be constructed to a BAL-12.5 standard in accordance with AS3959-2009.
- Access
    - The proposed access road (driveways) for each proposed Lot is to be two-wheel drive, all-weather road and maintained to allow for passing of vehicles.
    - Traffic management devices shall be designed and constructed to support heavy vehicles and to not prohibit access.
    - Access roads (driveways) shall not prohibit access by emergency vehicles.
    - Driveways are to have the capacity to carry fully loaded firefighting vehicles up to 23 tonnes.
- Services

- Water:
  - Any future dwellings shall be provided with at least 20,000L of rainwater storage to be dedicated or retained for firefighting purposes. Any future tanks would need to be constructed of steel or concrete;
  - Future tanks would need to be provided with connections for firefighting purposes including a 65mm Storz outlet with gate/ball value;
  - Valves and pipes would need to be metal and adequate for water flow;
  - All above ground pipes and taps would need to be metal; and
  - Pumps would need to be shielded.

- 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 future gas bottles shall be installed and maintained in accordance with AS/NZS 1596:2004 with metal piping used;
  - All future 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.
- Landscaping:
  - For future dwellings, the applied Asset Protection Zone 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 future structures and new plantings shall be established to ensure that there are no continuous tree canopies.
- Emergency Evacuation Plans
  - Preparation of a Bush Fire Survival Plan for the existing dwellings and future dwelling, in accordance with RFS requirement.

6. CONCLUSION

The construction of the proposed subdivision will ensure that the habitable development is located in an aera that has a low to moderate bushfire hazard level. With the implementation of the recommendations, as outlined in Section 5 and identified throughout this report, the proposed development is considered to be appropriately protected from bushfire and complies with the requirements of PBP. The proposal development is not expected to increase the bushfire risk on the site.

7. REFERENCES

NSW Government Spatial Services. (2024, May 22). *Six Maps*. Retrieved from http://maps.six.nsw.gov.au/

NSW Government Spatial Services. (2024, May 22). *Six Maps*. Retrieved from http://maps.six.nsw.gov.au/

NSW Planning & Environment. (2024, May 22) *Planning Viewer*. Retrieved from https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/lot

NSW Rural Fire Service. (2019). *Planning for Bush Fire Protection: A Guide for Council's, Planners, Fire Authorities and Developers.* Sydney: NSW RFS.

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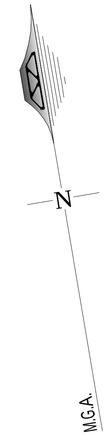
APPENDIX A

Subdivision Plans

DIAL BEFORE YOU DIG
www.1100.com.au

THIS IS A DRAFT PLAN ONLY AND IS SUBJECT TO FINAL SURVEY



LOT 922
DP 1236985

473.55 (BY TITLE)

QUEALEYS 60.35 WIDE **ROAD**

768.46 (BY TITLE)

No. 172 Quealeys Road

LOT 93
DP 753382
18.21ha (BY TITLE)

903.045 (BY TITLE)

CASTLEREAGH 60.35 WIDE **HIGHWAY**

EXISTING SITE PLAN

REDUCTION RATIO 1:1,250 @ A1
1:2,500 @ A3

SCALE 1:1250(A1)

0 25 50 75 100 125

0 25 50 75 100 125

SCALE 1:2500(A3)

ISSUED TO CLIENT

barnson
DESIGN . PLAN . MANAGE

BARNSON PTY LTD

phone 1300 BARNSON (1300 227 676)
email generalenquiry@barnson.com.au
web barnson.com.au

Rev	Date	Description
A	13-02-2024	ISSUED TO CLIENT

Project
PROPOSED SUBDIVISION SKETCH OF LOT 93 IN DP 753382
Site Address
172 QUEALEYS ROAD
GILGANDRA NSW 2827
Client
STEPHAN BROZIC

Drawing Title
EXISTING SITE PLAN

Survey RB
Drawn JS
Check RB

Original Sheet Size A1
Revision A

Certification

Project No 43626
Drawing No L01

DIAL BEFORE YOU DIG
www.1100.com.au

THIS IS A DRAFT PLAN ONLY AND IS SUBJECT TO FINAL SURVEY

PROPOSED SUBDIVISION SKETCH PLAN

REDUCTION RATIO 1:1,250 @ A1
1:2,500 @ A3

SCALE 1:1250(A1)
0 25 50 75 100 125
0 25 50 75 100 125
SCALE 1:2500(A3)

ISSUED TO CLIENT

barnson.
DESIGN . PLAN . MANAGE

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Client
STEPHAN BROZIC

Drawing Title
PROPOSED SUBDIVISION SKETCH PLAN

Survey RB
Drawn JS
Check RB

Original Sheet Size A1
Revision A

Certification

Project No 43626
Drawing No L02

barnson.

APPENDIX B

Deposited Plan

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 93/753382

SEARCH DATE	TIME	EDITION NO	DATE
24/11/2023	9:30 AM	6	26/7/2021

LAND

LOT 93 IN DEPOSITED PLAN 753382
LOCAL GOVERNMENT AREA GILGANDRA
PARISH OF ERINGANERIN COUNTY OF GOWEN
(FORMERLY KNOWN AS PORTION 93)
TITLE DIAGRAM CROWN PLAN 1794.1797

FIRST SCHEDULE

SERENITY PROPERTIES (AUST) PTY LTD (T AR273211)

SECOND SCHEDULE (1 NOTIFICATION)

1 LAND EXCLUDES MINERALS (S.171 CROWN LANDS ACT 1989)

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Barnson Pty Ltd (Mudgee) PRINTED ON 24/11/2023

* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title.
Warning: the information appearing under notations has not been formally recorded in the Register.

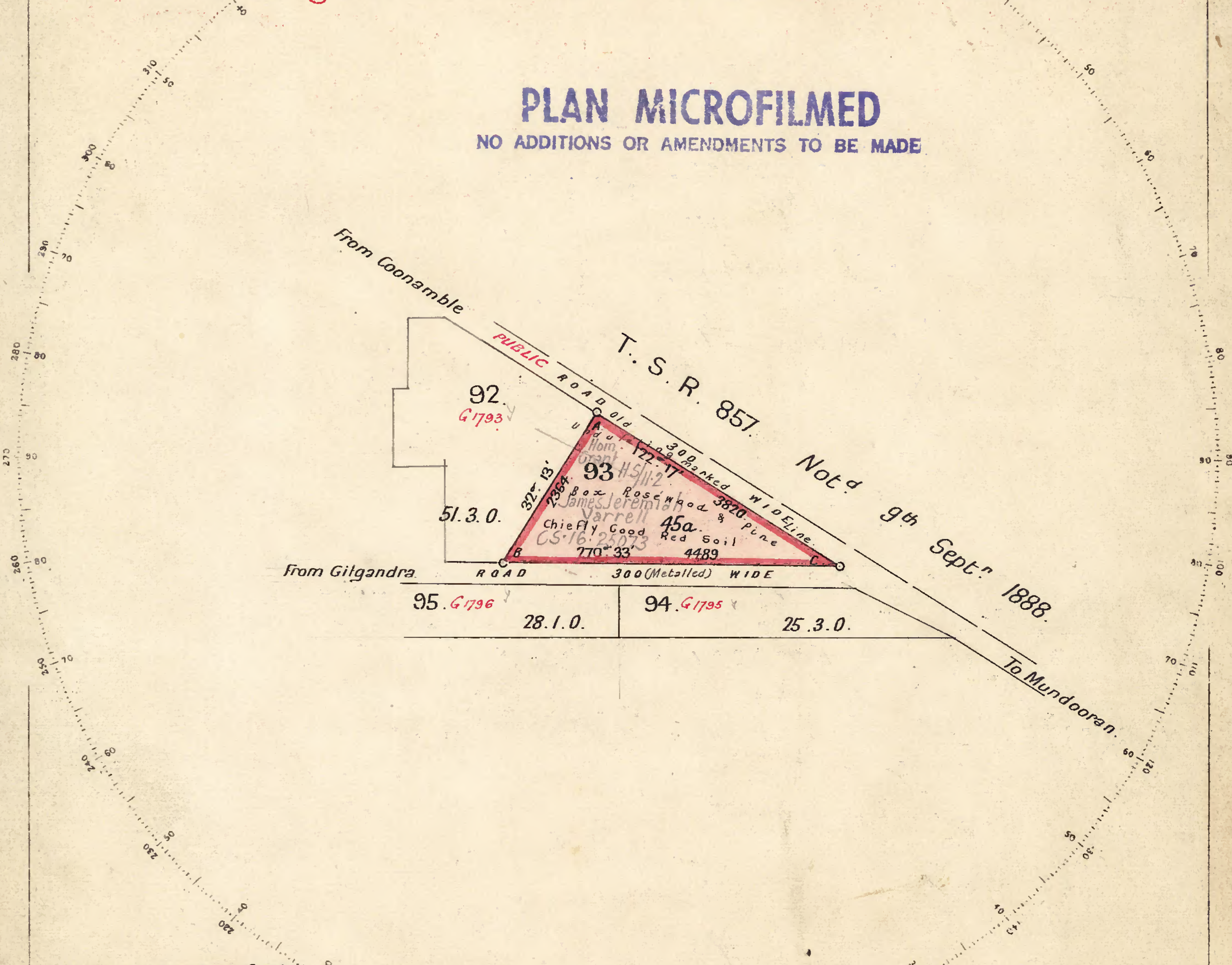
STANDARD TRACING PREPARED

27 APR 1911 02046

Plan of Portion 93

County of Gowen — Parish of Eringanerin
Land District of Coonamble — Land Board District of Dubbo
Resumed Area No — Pastoral Holding Central Division
Applied for under the Section of the Crown Lands Act of 1 by
Measured for Original Homestead Selection.

Within V.R. 18120 Notified 12th July 1893 Revoked 26th July 1911.
Within Homd. Seln. Area No. 1033 (Cap: Value £135.0.0. at £3.0.0. p.a.) notd. 26th July 1911.
Within R. 46777 fr: Sale, other than Sale by Homestead Selection, notd. 26th July 1911. Revoked 1st Novr. 1911
Por. 93: H.S. 11-2, Aug 28th, James Jeremiah Yarrell Now Hom Grant Vide CS 16 25073



Azimuth taken from Por. 95.
Field Book Vol. 8251. Folio 68

Reference to Corners

Corner	Bearing	From	Links	No. on Tree
A	275° 40'	Box	87.3	92. 93.
B	252. 20.	Box	23.3	92. 93.
C	138 33.	Box	118.4	93.

Reference to Traverse

Line	Bearing	Distance

Value of Improvements Nil.

I hereby certify that I in person made and on the 27th Feby. 1911 completed the survey represented on this plan on which are written the bearings and lengths of the lines measured by me and I declare that the survey has been executed in accordance with the regulations published for the guidance of Licensed Surveyors and the practice of the Department of Lands.

D. M. Nash
Licensed Surveyor

Transmitted to the District Surveyor with my letter of 26th April No. 38

Voucher No. 1146 Passed C.W.B. 13/6/11 £3.18.7
Calculation Book No. — Folio —
Checked and Charted O.E. Rients 10/6/11
Examined and Plan approved } C.W. Ballhausen 13th June, 1911.
Draftsman-in-Charge

Charted on Head Office Maps
Examined 21 June 11

Scale 20 Chains to an Inch.

G 1794 1797