Attachment to item number 5.1 -

Bushfire Hazard Report;

Traffic Impact Assessment;

Flood Report;

Onsite Wastewater Assessment; and

Stormwater Management Plan

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BUSHFIRE HAZARD REPORT

25 Lot Subdivision

223 Carlton River Road, Carlton.

December 2023

Job number: L210420
WS129
Prepared by: James Stewart
Town Planner & Bushfire Hazard Practitioner BFP 157

Rev. no	Description	Date
1	FINAL	23rd May 2023
2	UPDATE	7th December 2023

Disclaimer
This report deals with the potential bushfire risk only, all other statutory assessments sit outside of this report. This report is not to be used for future or further development on the site, other then what has been specifically provided for in the certified plans attached. Woolcott Surveys Pty Ltd accepts no responsibility to any purchaser, prospective purchaser or mortgagee of the property who in any way rely on this report. This report sets out the owner's requirements and responsibilities and does not guarantee that buildings will survive in the event of a bushfire event. If characteristics of the property change or are altered from those which have been identified, the BAL classification may be different to that which has been identified as part of this report. In this event the report is considered to be void.

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Executive Summary

Development of a 25-lot subdivision is proposed for 223 Carlton River Road, Carlton. The site at 223 Carlton Road, Carlton, currently consists of three titles. The proposed subdivision will provide a new cul-de-sac road off Carlton River Road. Lots will be accessed via the new road.

The site is entirely within the boundary of a bushfire prone area shown on an overlay on a planning scheme map for the *Tasmanian Planning Scheme –Sorell*. A bushfire event at this site or within the immediate area is likely to impact on future buildings at this location and subject development to considerable radiant heat and ember attack.

A bushfire hazard management plan has been prepared and is provided as an appendix to this report. The plan sets out the owner's responsibilities to maintain a managed area for each lot, taking into consideration the relevant requirements under Australian Standard *AS3959-2018 Construction of buildings in bushfire-prone areas*.

Conclusions and recommendations

a) Hazard management areas meeting the requirements of BAL 19 can be achieved for lots 1-11, and lots 24-25. Lots 12-23 meet the requirements of BAL LOW, being over 100m from forest and over 50m from grassland.

b) Future dwellings on lots 1-25 must maintain Hazard Management Areas and follow recommendations as outlined in the Bushfire Hazard Management Plan and section 5.2 of this report. Maintenance of these hazard management areas is to be in perpetuity.

c) The proposed roads must be in compliance with Table C13.1, Element A, outlined in section 5.3 of this report, with the exception of a 12m outer radius turning head and 7m carriageway width. No parking signage is to be provided at both the end of the cul de sac, and on one side of the cul de sac road.

d) Future dwellings on lots 1-11, and lots 24-25 must establish a dedicated firefighting onsite water supply of 10,000L, ensuring tank and fittings are compliant with standards for building in a bushfire prone area. A static water supply must comply with section 5.4 of this report.

e) Prior to sealing of the final plan for stage 2, a 50m wide hazard management area is to managed on the balance lot. A temporary gravel turning head on the balance lot is required as part of stage 2 works.

f) Prior to the sealing of the final plan for each stage, lots are to be cleared and managed as low threat vegetation. These lots are to be managed in perpetuity.

Signed:

Author: James Stewart
Position: Town Planner and Accredited Bushfire Practitioner BFP 157

Table of Contents

1. Introduction

This Bushfire Hazard Report and Bushfire Hazard Management Plan (BHMP) has been prepared in support of a proposed 25 lot subdivision at 223 Carlton River Road, Carlton.

1.1 The subject site

The following is a summary of the application information:

Property address	223 Carlton River Road
Certificate of title	CT126930/1, CT126929/2, CT126929/1
Property ID (PID)	5914397
Property Owners	Stagar Pty Ltd
Existing Use and Development	Vacant land, dwelling, vacant buildings (hall, commercial shop etc)
Zoning	Low Density Residential Zone
Specific Area Plan	Southern Beaches Onsite Wastewater and Stormwater Plan.
Planning Scheme	Tasmanian Planning Scheme – Sorell
Identified on a Bushfire Overlay Map	Yes
Priority Habitat identified	No
Proposed Works	25 Lot subdivision, road and stormwater works.
Water Supply	Static Water Supply.
Vehicular Access	Carlton River Road and proposed new road.

1.2 Bushfire Assessment

A bushfire assessment is a process of analysing information about the potential impacts on a proposed development that is likely to have in a bushfire hazard scenario. A 'bushfire-prone area' is an area where a bushfire event is likely to occur that may result in significant adverse impact on buildings and even lives. In Tasmania, most local Councils have a planning scheme overlay map that identifies bushfire-prone areas. Subdivision within a bushfire-prone area triggers the assessment of the Bushfire-Prone Areas Code under the planning schemes and subsequently requires assessment against the provisions of the Code. The assessment generally requires a BHMP to be provided as part of the application.

The bushfire assessment will determine the Bushfire Attack Level (BAL) for the future lots, which measures the possible exposure of a building to bushfire hazard. The BAL is assessed in accordance with Australian Standard *AS 3959-2018 construction of buildings in bushfire-prone areas.*

The subject site falls within the municipal area of Sorell Council. The assessment has been undertaken in accordance with C13.0 Bushfire-Prone Areas Code and to accompany a subdivision application under the *Tasmanian Planning Scheme – Sorell*. Please refer to Section 6 of the report for detail. It is also required to understand the fuel management requirements for the subject site and to demonstrate that future new buildings within each proposed new lots can be constructed to a BAL19 level under the *Building Act 2016*.

1.3 References

The following documents were referred in the preparation of, and should be read in connection with, this bushfire assessment report:

- C13.0 Bushfire-Prone Areas Code – Tasmanian Planning Scheme.
- Tasmanian State Government, Director's Determination – Bushfire Hazard Areas
- Tasmanian Planning Scheme – Sorell Council
- Australian Standard, AS3959-2018 construction of buildings in bushfire-prone areas.
- Building Act 2016
- Tasmanian Fire Service, Bushfire Hazard Advisory Notes

2. Site Description

2.1 Site context

The subject site is located at 223 Carlton River Road, Carlton. The land currently consists of three titles, details of the three titles are as follows:

Address:	Title Number:	Lot Size	Existing buildings
223 Carlton River Road, Carlton	126930/1	3.31ha	Vacant Land
223 Carlton River Road, Carlton	126929/1	6738m^2	• Vacant building (hall and facilities) • Single Dwelling
223 Carlton River Road, Carlton	126929/2	1242m^2	Vacant building (commercial tenancy)

The existing buildings and infrastructure are in the northern portion of the site. The balance area of the lot is currently vacant, being covered in native vegetation, generally established forest, and scrub. There is an existing vehicular track that runs from north to south through the centre of the site.

The land itself is generally rectangular, with a north south orientation.

Figure 1 - Aerial view of the subject site (source: The LIST Map)

2.2 Planning controls

The site is within the municipal area of Sorell Council. Therefore, the planning instrument is the *Tasmanian Planning Scheme – Sorell* (The Scheme).

The subject site is within the low-density residential zone. Land adjoining the subject site is also within the low density zone, while land beyond is within the Rural Living Zone.

The subject site falls within the Bushfire-Prone Areas Overlay.

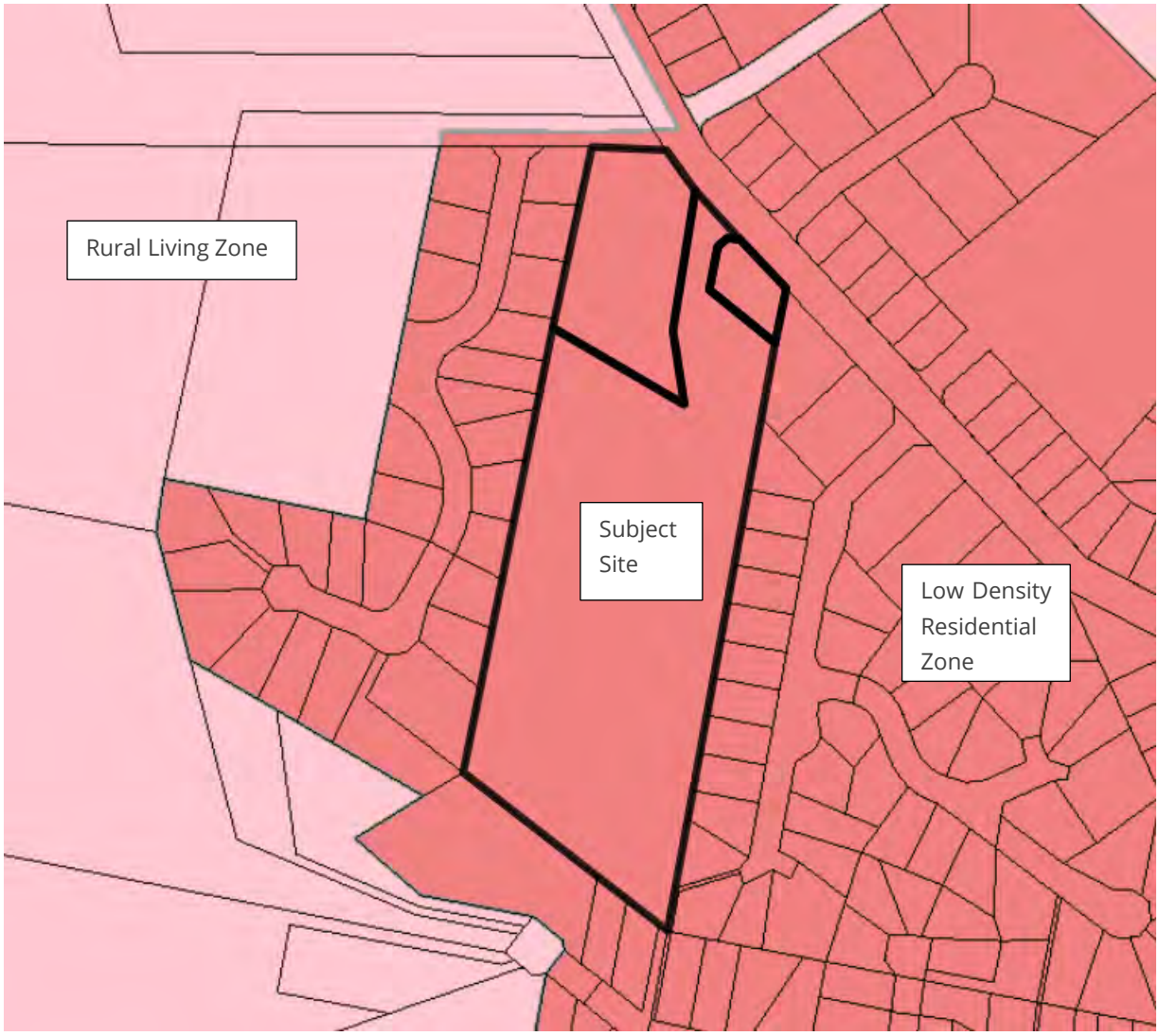


Figure 2 - Zoning map of subject site.

3. The Proposal

It is proposed to subdivide the subject site into 25 lots. There will be one road/cul-de-sac lot through the centre of the site, and a public walkway/stormwater detention lot between lots 14 and 15. Existing buildings will be retained on three lots in the northern part of the site. The development will be completed over three stages.

Figure 3 - Extract of proposal plan for 25 lot subdivision

4. Bushfire Site Assessment

4.1 Vegetation Analysis

4.1.1 TasVeg Mapping

The TasVeg map 4.0 provides general information indicating potential bushfire prone vegetation in the area.

The mapping shows the primary vegetation community within 120m of the site is FUR (urban). There is a section of native shrubs, established trees, and rushes which have regenerated approximately 80m to the west of the site. There is a section of forest to the north which mapping shows as urban land.

The subject site itself contains unmanaged scrub and forest, however will be cleared as part of the subdivision works.

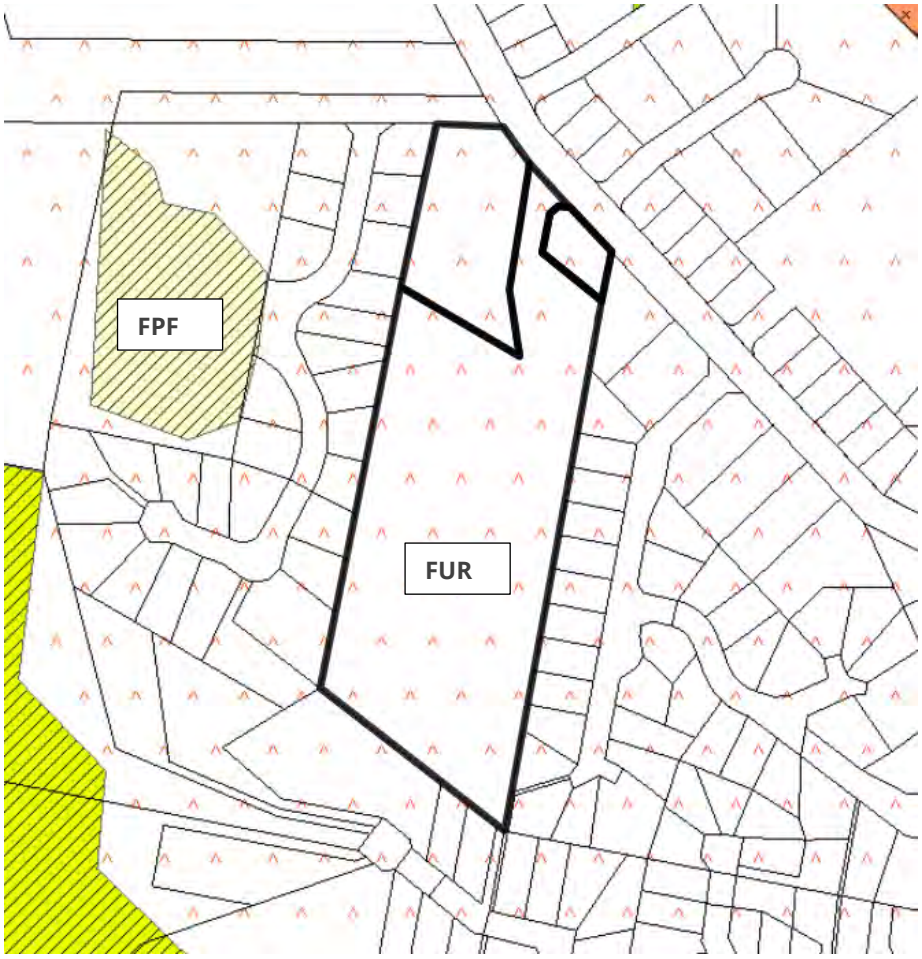


Figure 4 - Extract of vegetation mapping from TasVeg 4.0

It is noted that there were two lots located to the east, at number 2 and 19 Joel Ave, which were not developed. The lots were less than 1000m^2 in size, however contained unmanaged vegetation. In line with the Sorell Council Fire Abatement Policy, it was reasonable that these lots were considered low threat. As per the Councils Fire Hazard Abatement Policy dated June 2019, lots under 2000m^2 would be abated on a yearly basis. The lots on Joel Ave adjoin existing residential dwellings and are within an established residential environment. The lots are

therefore considered low threat under clause 2.2.3.2 f) of AS3959:2018.

Land directly to the south of lots 13 and 14 was considered low threat, after visually inspecting the site. Grass was under 100mm and contained only the occasional tree.

The vegetation identified within 120m of the subject site is shown below.

Figure 5 - Vegetation analysis within 100-120m of subject site

4.2 Slope Analysis

Figure 6 below shows the slope of land under the classified vegetation in relation to the subject site. Surrounding Land has a gentle fall to the south. The bushfire prone vegetation to the north is generally upslope, while vegetation identified to the west was classified as flat. Land to the south, approximately 70m from the site was classified as downslope between 0-5°.

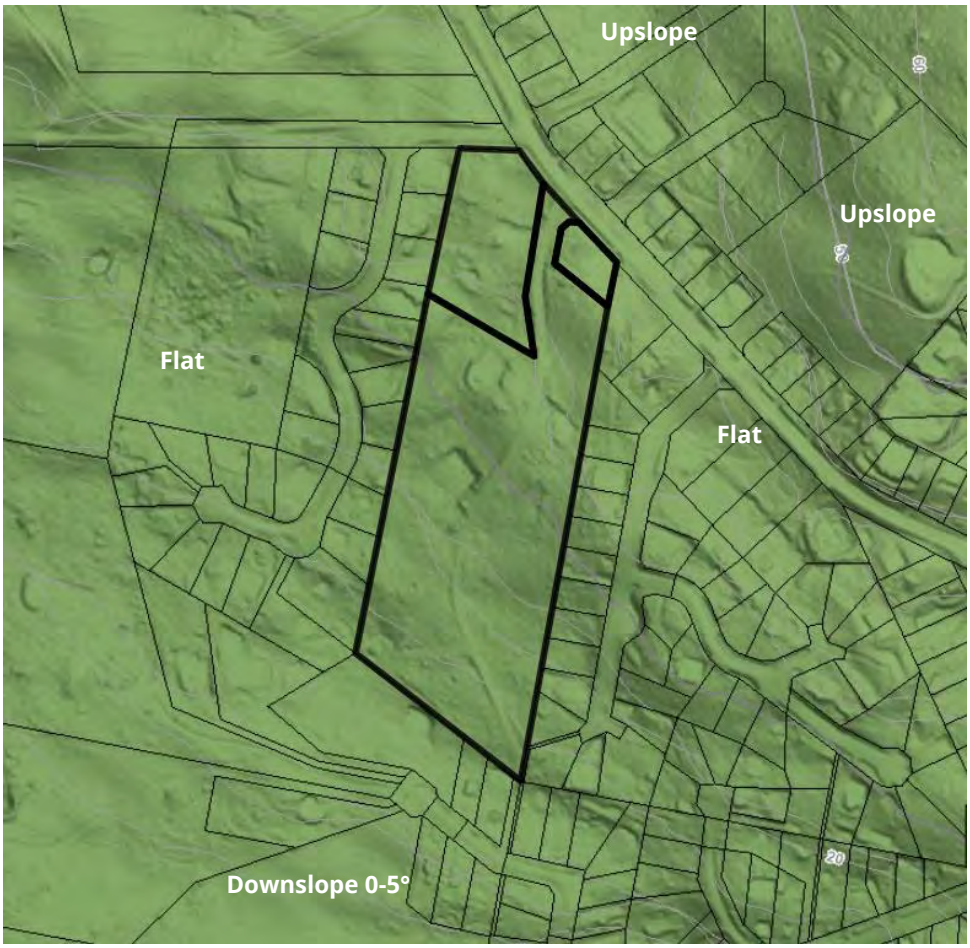


Figure 6 - Slope under bushfire prone vegetation

4.3 Photos

Figure 7 – Access track running through the site centrally.

Figure 8 – Land to the south of lot 13, classified as managed.

Figure 9 – Vegetation west of the site, classified as forest.

Figure 10 – Land west of the site, on Carlton River Road, classified as managed due to mown understory.

Figure 11 – Adjoining lot at 2 Joel Ave, due to size (900m2) and abatement policy has been considered as managed.

Figure 12 – Looking south at the front of the site.

5. Bushfire Protection Measures

5.1 BAL Rating and Risk Assessment

The purpose of the BAL rating assessment in this report is to identify the minimum separation between the bushfire prone vegetation to a building area within each proposed lot. The assessment aims to achieve the requirements of **BAL 19** (as per the acceptable solution C13.6.1 A1b under the Scheme, see Section 6 below for detail) and/or lower rating in a bushfire event that hazard management areas can be implemented.

The definition of BAL 19 and BAL 12.5 is highlighted as follows:

Bushfire attack level (BAL)	**Predicted bushfire attack and exposure level**
BAL-LOW	Insufficient risk to warrant specific construction requirements
BAL-12.5	Ember attack, radiant heat below 12.5kW/m^2
BAL-19	Increasing ember attack and burning debris ignited by windborne embers together with increasing heat flux between 12.5-19kW/m^2
BAL-29	Increasing ember attack and burning debris ignited by windborne embers together with increasing heat flux between 19-29kW/m^2
BAL-40	Increasing ember attack and burning debris ignited by windborne embers together with increasing heat flux between 29-40kW/m^2
BAL-FZ	Direct exposure to flames radian heat and embers from the fire front.

The distances from each building area to the classified vegetation are presented below, along with the slope and type of vegetation. Lots 12-23 are classified as BAL LOW, being over 100m from bushfire prone vegetation (forest) and over 50m from grassland.

Lot 1	**North**	**East**	**South**	**West**
Vegetation within 100m of building area	0m-60m Managed 60m-100m+ Forest	0m-100m+ Managed	0m-100m+ Managed	0m-87m Managed 87m-100m+ Forest
Slope (degrees, over 100m)	Upslope	NA	NA	Flat
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 2	North	East	South	West
Vegetation within 100m of building area	0m-60m Managed 60m-100m+ Forest	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed
Slope (degrees, over 100m)	Upslope	NA	NA	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 3	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed	0m-87m Managed 87m-100m+ Forest
Slope (degrees, over 100m)	NA	NA	NA	Flat
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 4	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed	0m-73m Managed 73m-100m+ Forest
Slope (degrees, over 100m)	NA	NA	NA	Flat
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 5	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed	0m-73m Managed 73m-100m+ Forest
Slope (degrees, over 100m)	NA	NA	NA	Flat
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 6	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed	0m-76m Managed 76m-100m+ Forest
Slope (degrees, over 100m)	NA	NA	NA	Flat
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 7	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed	0m-76m Managed 76m-100m+ Forest
Slope (degrees, over 100m)	NA	NA	NA	Flat
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 8	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed	0m-76m Managed 76m-100m+ Forest
Slope (degrees, over 100m)	NA	NA	NA	Flat
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 9	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed	0m-83m Managed 83m-100m+ Forest
Slope (degrees, over 100m)	NA	NA	NA	Flat
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 10	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed	0m-86m Managed 86m-100m+ Forest
Slope (degrees, over 100m)	NA	NA	NA	Flat
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 11	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed	0m-99m Managed 99m-100m+ Forest
Slope (degrees, over 100m)	NA	NA	NA	Flat
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 12	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-99m Managed 99m-100m+ Grassland	0m-100m+ Managed
Slope (degrees, over 100m)	NA	NA	Downslope 0-5°	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 13	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-73m Managed 73m-100m+ Grassland	0m-100m+ Managed
Slope (degrees, over 100m)	NA	NA	Downslope 0-5°	Flat
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 14	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-60m Managed 60m-100m+ Grassland	0m-100m+ Managed
Slope (degrees, over 100m)	NA	NA	Downslope 0-5°	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 15	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-80m Managed 80m-100m+ Grassland	0m-100m+ Managed
Slope (degrees, over 100m)	NA	NA	Downslope 0-5°	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 16	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed
Slope (degrees, over 100m)	NA	NA	NA	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 17	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed	0m-100m+ Managed
Slope (degrees, over 100m)	NA	NA	NA	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 18	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-82m Managed 82m-100m+ Grassland	0m-100m+ Managed	0m-100m+ Managed
Slope (degrees, over 100m)	NA	Flat	NA	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 19	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-70m Managed 70m-100m+ Grassland	0m-100m+ Managed	0m-100m+ Managed
Slope (degrees, over 100m)	NA	Flat	NA	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 20	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-57m Managed 57m-100m+ Grassland	0m-100m+ Managed	0m-100m+ Managed
Slope (degrees, over 100m)	NA	Flat	NA	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 21	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-55m Managed 55m-100m+ Grassland	0m-100m+ Managed	0m-100m+ Managed
Slope (degrees, over 100m)	NA	Flat	NA	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 22	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-55m Managed 55m-100m+ Grassland	0m-100m+ Managed	0m-100m+ Managed
Slope (degrees, over 100m)	NA	Flat	NA	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 23	North	East	South	West
Vegetation within 100m of building area	0m-100m+ Managed	0m-60m Managed 60m-100m+ Grassland	0m-100m+ Managed	0m-100m+ Managed
Slope (degrees, over 100m)	NA	Flat	NA	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 24	North	East	South	West
Vegetation within 100m of building area	0m-90m Managed 90m-100m+ Forest	0m-69m Managed 69m-100m+ Grassland	0m-100m+ Managed	0m-100m+ Managed
Slope (degrees, over 100m)	Upslope	Flat	NA	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

Lot 25	North	East	South	West
Vegetation within 100m of building area	0m-50m Managed 50m-100m+ Forest	0m-90m Managed 90m-100m+ Grassland	0m-100m+ Managed	0m-100m+ Managed
Slope (degrees, over 100m)	Upsloe	Flat	NA	NA
BAL 19 Setbacks	NA	NA	NA	NA
BAL 12.5 Setbacks	NA	NA	NA	NA

5.2 Hazard Management Areas

As outlined in C13.0 *Bushfire-Prone Areas Code*, a Bushfire Hazard Management Area (BHMA) will be managed in accordance with the provided plan. Existing vegetation needs to be strategically modified and then maintained within this area in accordance with the Bushfire Hazard Management Plan (BHMP) to achieve the following outcomes:

- to reduce the quantity of windborne sparks and embers reaching buildings;
- to reduce radiant heat at the building; and
- to halt or check direct flame attack.

The BHMA will be developed within and up to the property boundaries to provide access to a fire front for firefighting, which is maintained in a minimal fuel condition and in which there are no other hazards present that will significantly contribute to the spread of a bushfire.

The BHMA will be achieved by adoption of the following strategies:

Maintenance of Fuel Management Areas

It is the responsibility of the property owner to maintain and manage the landscaping in accordance with the BHMP.

This area is to be regularly managed and maintained. Landscaping in this area will be minimised:

- Grass maintained to a maximum height of 100mm, with fuel loads kept to less than 2 tonnes per hectare which will be maintained at this level.
- Trees and any undergrowth will be clear of (BCA) class 1 – 9 buildings on all sides.
- All undergrowth and understorey of trees (up to 2m) will be removed within the bushfire hazard management area.
- Pathways to 1 metre surrounding the buildings and landscaping material, will be non-combustible (stone, pebbles etc.).
- The total shrub cover will be a maximum of 20% of the available area.
- There will be a clear space from the buildings of at least four (4) times the mature height of any shrubs planted.
- Shrubs will not be planted in clumps, this is to avoid build-up of debris and dead vegetation materials.

Landscaping

- vegetation along the pathways to comprise non-flammable style succulent ground cover or plants (avoid plants that produce fine fuel which is easily ignited, plants that produce a lot of
  debris, trees and shrubs which retain dead material in branches or which shed long strips of bark, rough fibrous bark or drop large quantities of leaves in the spring and summer, vines on walls or tree canopies which overhang roofs)
- timber woodchip and flammable mulches cannot be used and brush and timber fencing should be avoided where possible

5.3 Roads

Table C13.1 - Roads must be constructed as per the following table. Performance criteria have been addressed due to the size of the cul-de-sac outer radius and carriageway width being <7m with a road length >200m.

Element		Requirement
A.	Roads	Unless the development standards in the zone require a higher standard, the following apply: (a) two-wheel drive, all-weather construction; (b) load capacity of at least 20t, including for bridges and culverts; (c) minimum carriageway width is 7m for a through road, or 5.5m for a dead-end or cul-de-sac road; (d) minimum vertical clearance of 4m; (e) minimum horizontal clearance of 2m from the edge of the carriageway; (f) cross falls of less than 3 degrees (1:20 or 5%); (g) maximum gradient of 15 degrees (1:3.5 or 28%) for sealed roads, and 10 degrees (1:5.5 or 18%) for unsealed roads; (h) curves have a minimum inner radius of 10m; (i) dead-end or cul-de-sac roads are not more than 200m in length unless the carriageway is 7 meters in width; (j) dead-end or cul-de-sac roads have a turning circle with a minimum 12m outer radius; and carriageways less than 7m wide have 'No Parking' zones on one side, indicated by a road sign that complies with *Australian Standard AS1743-2001 Road signs-Specifications*.

5.4 Property Access

Private access roads must be constructed as per the following table C13.2. Crossovers will need to be provided as part of the subdivision works, however private access for future dwellings does not need to completed as part of the subdivision. Compliant property access is not required for those lots classified as BAL LOW.

Element		Requirement
A.	Property access length is less than 30m; or access is not required for a fire appliance to access a fire fighting water point.	There are no specified design and construction requirements.
B.	Property access length is 30m or greater; or access is required for a fire appliance to a fire fighting water point.	The following design and construction requirements apply to property access: (a) all-weather construction; (b) load capacity of at least 20t, including for bridges and culverts; (c) minimum carriageway width of 4m; (d) minimum vertical clearance of 4m;

		(e) minimum horizontal clearance of 0.5m from the edge of the carriageway; (f) cross falls of less than 3 degrees (1:20 or 5%); (g) dips less than 7 degrees (1:8 or 12.5%) entry and exit angle; (h) curves with a minimum inner radius of 10m; (i) maximum gradient of 15 degrees (1:3.5 or 28%) for sealed roads, and 10 degrees (1:5.5 or 18%) for unsealed roads; and (j) terminate with a turning area for fire appliances provided by one of the following: (i) a turning circle with a minimum outer radius of 10m; or (ii) a property access encircling the building; or (iii) a hammerhead "T" or "Y" turning head 4m wide and 8m long.
C.	Property access length is 200m or greater.	The following design and construction requirements apply to property access: (a) the requirements for B above; and (b) passing bays of 2m additional carriageway width and 20m length provided every 200m.
D.	Property access length is greater than 30m, and access is provided to 3 or more properties.	The following design and construction requirements apply to property access: (a) complies with requirements for B above; and (b) passing bays of 2m additional carriageway width and 20m length must be provided every 100m.

5.5 Fire Fighting Water Supply

Table C13.5 Static water supply for fire fighting. A static fire fighting water supply for future dwellings is not required to be installed as part of the subdivision works. A fire fighting water supply is not required for those lots classified as BAL LOW.

Element		Requirement
A.	Distance between building area to be protected and water supply	The following requirements apply: (a) The building area to be protected must be located within 90 metres of the firefighting water point of a static water supply; and (b) The distance must be measured as a hose lay, between the firefighting water point and the furthest part of the building area.
B.	A static water supply:	a) May have a remotely located offtake connected to the static water supply; b) May be a supply for combined use (fire fighting and other uses) but the specified minimum quantity of fire fighting water must be available at all times; c) Must be a minimum of 10,000 litres per building area to be protected. This volume of water must not be used for any other purpose including fire fighting sprinkler or spray systems; d) Must be metal, concrete or lagged by non-combustible materials if above ground; and e) If a tank can be located so it is shielded in all directions in compliance with Section 3.5 of AS 3959-2009, the tank may be constructed of any material provided that the lowest 400 mm of the tank exterior is protected by: (i) metal; (ii) non-combustible material; or (a) fibre-cement a minimum of 6 mm thickness
C	Fittings, pipework and accessories (including stands and tank supports)	Fittings and pipework associated with a fire fighting water point for a static water supply must: a) Have a minimum nominal internal diameter of 50mm; b) Be fitted with a valve with a minimum nominal internal diameter of 50mm; c) Be metal or lagged by non-combustible materials if above ground; d) Where buried, have a minimum depth of 300mm; e) Provide a DIN or NEN standard forged Storz 65 mm coupling fitted with a suction washer for connection to fire fighting equipment; f) Ensure the coupling is accessible and available for connection at all times; g) Ensure the coupling is fitted with a blank cap and securing chain (minimum 220 mm length); h) Ensure underground tanks have either an opening at the top of not less than 250 mm diameter or a coupling compliant with this Table; and

		i) Where a remote offtake is installed, ensure the offtake is in a position that is (i) Visible; (ii) Accessible to allow connection by firefighting equipment; (iii) At a working height of 450 – 600mm above ground level; and Protected from possible damage, including damage by vehicles.
D	Signage for Static Water Connections	The firefighting water point for a static water supply must be identified by a sign permanently fixed to the exterior of the assembly in a visible location. The sign must: a) Comply with tank signage requirements within AS2304:2019; or Comply with the Tasmanian Fire Service Water Supply Signage Guidelines published by the Tasmania Fire Service.
E	Hardstand	A hardstand area for fire appliances must be: (a) no more than 3m from the firefighting water point, measured as a hose lay (including the minimum water level in dams, swimming pools and the like) (b) no closer than 6m from the building area to be protected; (c) a minimum width of 3m constructed to the same standard as the carriageway; and (d) connected to the property access by a carriageway equivalent to the standard of the property access.

6. Bushfire-Prone Areas Code Assessment

An assessment of C13.0 Bushfire-Prone Areas Code under the Scheme is provided as follows.

C13.6 Development Standards for Subdivision

C13.6.1 Subdivision: Provision of hazard management areas

Objective

Subdivision provides for hazard management areas that:

(a) facilitate an integrated approach between subdivision and subsequent building on a lot;

(b) provide for sufficient separation of building areas from bushfire-prone vegetation to reduce the radiant heat levels, direct flame attack and ember attack at the building area; and

(c) provide protection for lots at any stage of a staged subdivision.

Acceptable solutions	Proposed solutions
A1 (a) TFS or an accredited person certifies that there is an insufficient increase in risk from bushfire to warrant the provision of hazard management areas as part of a subdivision; or (b) The proposed plan of subdivision: (i) shows all lots that are within or partly within a bushfire-prone area, including those developed at each stage of a staged subdivision; (ii) shows the building area for each lot; (iii) shows hazard management areas between bushfire-prone vegetation and each building area that have dimensions equal to, or greater than, the separation distances required for BAL 19 in Table 2.6 of *Australian Standard AS3959:2018 Construction of buildings in bushfire-prone areas*; and (iv) is accompanied by a bushfire hazard management plan that addresses all the individual lots and that is certified by the TFS or accredited person, showing hazard management areas equal to, or greater than the separation distances required for BAL 19 in Table 2.6 of *Australian Standard AS3959:2018 Construction of buildings in bushfire-prone Areas*; and (c) If hazard management areas are to be located on land external to the proposed subdivision the application is	A1a) Not applicable. A1b) The acceptable solution is achieved. The BHMP: i) shows all lots within the bushfire prone area. The subdivision will be completed over three stages. ii) Each lot can provide for a building area. iii) shows a HMA associated with each building area demonstrating the separation distances required for BAL 19 in Table 2.4.4 of AS 3959 – 2018 *Construction of buildings in bushfire-prone area*. iv) is prepared by an accredited bushfire hazard practitioner. A1c) not applicable as Part 5 agreement is not required.

accompanied by the written consent of the owner of that land to enter into an agreement under section 71 of the Act that will be registered on the title of the neighbouring property providing for the affected land to be managed in accordance with the bushfire hazard management plan.	

C13.6.2 Subdivision: Public and firefighting access

Objective

Access roads to, and the layout of roads, tracks and trails, in a subdivision:

(a) allow safe access and egress for residents, fire fighters and emergency service personnel;

(b) provide access to the bushfire-prone vegetation that enables both property to be defended when under bushfire attack and for hazard management works to be undertaken;

(c) are designed and constructed to allow for fire appliances to be manoeuvred;

(d) provide access to water supplies for fire appliances; and

(e) are designed to allow connectivity, and where needed, offering multiple evacuation points.

Acceptable solutions	**Proposed solutions**
P1 A proposed plan of subdivision shows access and egress for residents, fire-fighting vehicles and emergency service personnel to enable protection from bushfires, having regard to: a) appropriate design measures, including: i) two way traffic; ii) all weather surfaces iii) height and width of any vegetation clearances iv) load capacity v) provision of passing bays vi) traffic control devices vii) geometry, alignment and slope of roads, tracks and trails viii) use of through roads to provide for connectivity ix) limits on the length of cul-de-sacs and dead-end roads x) provision of turning areas xi) provision for parking areas xii) perimeter access; and xiii) fire trails b) the provision of access to	P1) Performance criteria is relied upon due to the outer radius of the proposed cul-de-sac and width of the road. It is proposed to have a LGAT standard, 9m outer radius turning head, thus not providing 12m outer radius suitable for turning. The proposed road has a length of approximately 300m, with a 5.5m seal as per Rural Road standards. Due to the above reasons, performance criteria is relied upon. The criteria is addressed below: a) It is considered that the plan provides sufficient egress and access design measures for residents and emergency service personal including: (i) Two way traffic can be provided on the proposed road. No parking signage will be required on one side of the cul de sac road and at the end of the cul de sac.. (ii) The road will be sealed. (iii) There is suitable vegetation clearance between residential lots and the areas identified as a threat. These areas are

i) bushfire-prone vegetation to permit the undertaking of hazard management works; and i. fire fighting water supplies; and any advice from the TFS.	separated by >100m. There is no bushfire prone vegetation contained onsite. (iv) The load capacity is appropriate and will be a sealed Council maintained road. (v) Passing bays are not provided, however there is room for passing due to no parking requirements on one side of the proposed road and at the end of the cul de sac. (vi) There are no proposed traffic control devices. (vii) The road has a gentle slope to the south. The maximum gradient is approximately 8%, which is considered suitable. (viii) There is no scope to provide through roads, based on adjoining land being entirely developed. (ix) The only way the land can be developed is via a long cul-de-sac, the cul de sac has been extended as far as practicable. (x) Provision for turning areas is provided in the cul de sac at the end of the road. The road verges around the cul de sac can be used for turning, along with the double crossover for lots 13 and 14. (xi) Parking areas are not formally provided. No parking signage is required on one side of the road and at the end of the cul de sac. (xii) Perimeter access is provided via adjoining residential properties and roads. The cul de sac road is approximately 300m. (xiii) There are no proposed fire trails. b) There is no bushfire prone vegetation contained on the subject site. The closest bushfire prone vegetation is over >100m from the site. The vegetation can be readily accessed via trucks. Firefighting water tanks will be provided for those lots that are subject to a BAL assessment, noting that a number of lots are subject to BAL LOW.

C13.6.3 Subdivision: Provision of water supply for fire fighting purposes

Objective

Adequate, accessible and reliable water supply for the purposes of fire fighting can be demonstrated at the subdivision stage and allow for the protection of life and property associated with the subsequent use and development of bushfire-prone areas.

Acceptable solutions	Proposed solutions
A1 In areas serviced with reticulated water by the water corporation: (a) TFS or an accredited person certifies that there is an insufficient increase in risk from bushfire to warrant the provision of a water supply for fire fighting purposes; (b) A proposed plan of subdivision showing the layout of fire hydrants, and building areas, is included in a bushfire hazard management plan approved by the TFS or accredited person as being compliant with Table C13.4; or (c) A bushfire hazard management plan certified by the TFS or an accredited person demonstrates that the provision of water supply for fire fighting purposes is sufficient to manage the risks to property and lives in the event of a bushfire.	A1 Not applicable. The subdivision is not located within an area serviced by reticulated water
A2 In areas that are not serviced by reticulated water by the water corporation: (a) The TFS or an accredited person certifies that there is an insufficient increase in risk from bushfire to warrant provision of a water supply for fire fighting purposes; (b) The TFS or an accredited person certifies that a proposed plan of subdivision demonstrates that a static water supply, dedicated to fire fighting, will be provided and located compliant with Table C13.5; or (c) A bushfire hazard management plan certified by the TFS or an accredited person demonstrates that the provision of water supply for fire fighting purposes is sufficient to manage the risks to property and lives in the event of a bushfire.	A2a) Not applicable. A2b) Acceptable solution achieved. The proposed plan of subdivision demonstrates that a static water supply can be provided and located compliant with Table C13.5. The existing dwelling on lot 1 is required to provide a compliant water supply in accordance with table C13.5. A2c) Not applicable.

7. Staging of Subdivision

Hazard management areas include the areas to protect buildings, as well as those areas that include the access and water supply. Low threat vegetation includes maintained lawns, gardens and orchards. Staging of a subdivision is common, especially where market factors are unknown and there is a significant infrastructure investment.

At any stage, all developed lots, roads and the balance lot within 50m of a developed lot, must be managed as low threat vegetation from sealing of titles and in perpetuity. The owner of a lot is responsible for management of vegetation within a lot. The developer is to provide a temporary gravel turning head on the balance lot prior to the sealing of the final plan for each stage. An example of staging and required works needed is shown below.

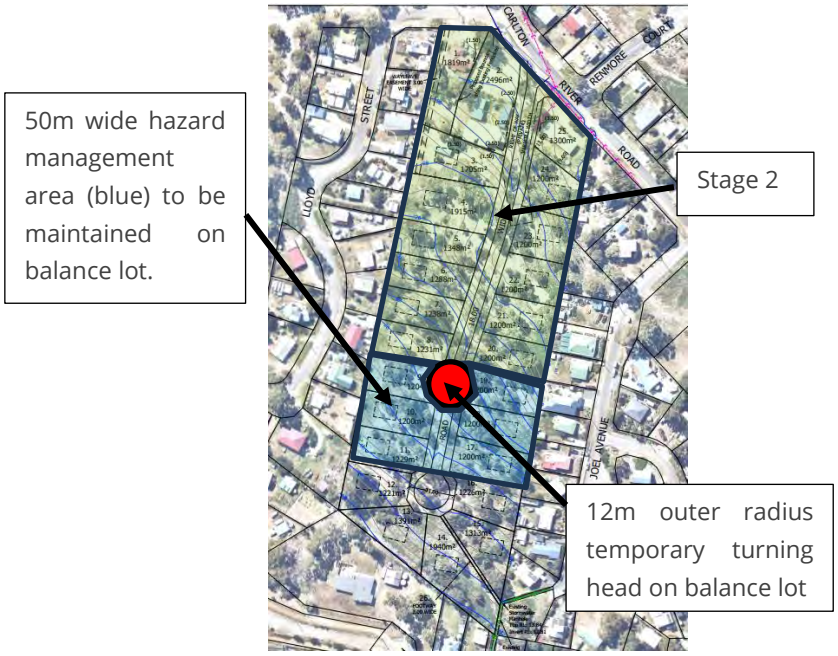


Figure 13 - Example of staging and bushfire works for stage.

8. Conclusions and Recommendations

The proposal seeks planning approval for a 25-lot subdivision of land at 223 Carlton River Road, Carlton. The site and its surrounding land falls within the bushfire prone area.

The bushfire hazard management plan demonstrates that lots can achieve the minimum requirements of BAL 19, subject to suitable controls such as implementation of a bushfire hazard management area.

The report provides the following conclusions:

a) Hazard management areas meeting the requirements of BAL 19 can be achieved for lots 1-11, and lots 24-25. Lots 12-23 meet the requirements of BAL LOW, being over 100m from forest and over 50m from grassland.

b) Future dwellings on lots 1-25 must maintain Hazard Management Areas and follow recommendations as outlined in the Bushfire Hazard Management Plan and section 5.2 of this report. Maintenance of these hazard management areas is to be in perpetuity.

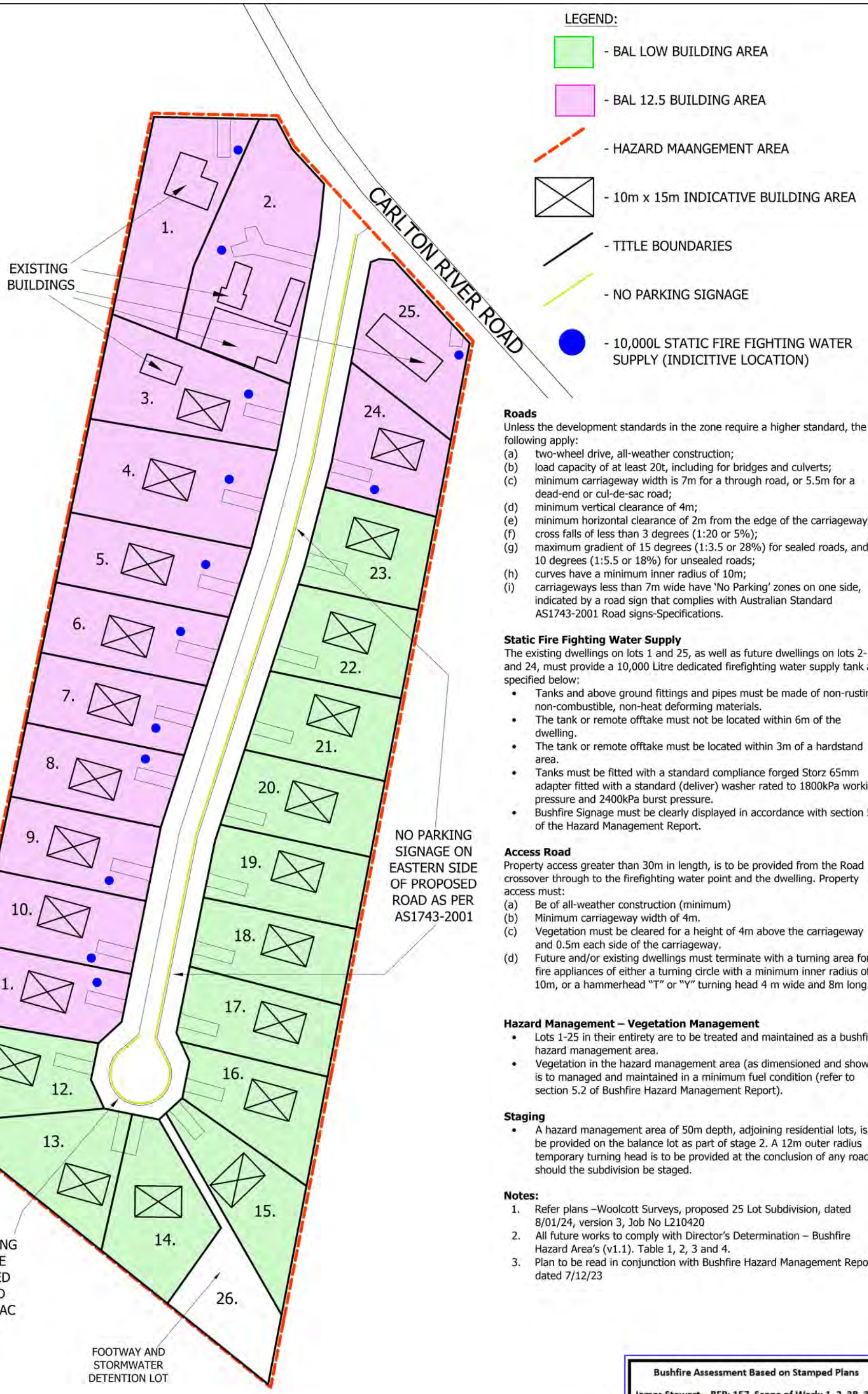
c) The proposed roads must be in compliance with Table C13.1, Element A, outlined in section 5.3 of this report, with the exception of a 12m outer radius turning head and 7m carriageway width. No parking signage is to be provided at both the end of the cul de sac, and on one side of the cul de sac road.

d) Future dwellings on lots 1-11, and lots 24-25 must establish a dedicated firefighting onsite water supply of 10,000L, ensuring tank and fittings are compliant with standards for building in a bushfire prone area. A static water supply must comply with section 5.4 of this report.

e) Prior to sealing of the final plan for stage 2, a 50m wide hazard management area is to managed on the balance lot. A temporary gravel turning head on the balance lot is required as part of stage 2 works.

f) Prior to the sealing of the final plan for each stage, lots are to be cleared and managed as low threat vegetation. These lots are to be managed in perpetuity.

Annexure 1 – Bushfire Hazard Management Plan



Roads

Unless the development standards in the zone require a higher standard, the following apply:

(a) two-wheel drive, all-weather construction;
(b) load capacity of at least 20t, including for bridges and culverts;
(c) minimum carriageway width is 7m for a through road, or 5.5m for a dead-end or cul-de-sac road;
(d) minimum vertical clearance of 4m;
(e) minimum horizontal clearance of 2m from the edge of the carriageway;
(f) cross falls of less than 3 degrees (1:20 or 5%);
(g) maximum gradient of 15 degrees (1:3.5 or 28%) for sealed roads, and 10 degrees (1:5.5 or 18%) for unsealed roads;
(h) curves have a minimum inner radius of 10m;
(i) carriageways less than 7m wide have 'No Parking' zones on one side, indicated by a road sign that complies with Australian Standard AS1743-2001 Road signs-Specifications.

Static Fire Fighting Water Supply

The existing dwellings on lots 1 and 25, as well as future dwellings on lots 2-11 and 24, must provide a 10,000 Litre dedicated firefighting water supply tank as specified below:

- Tanks and above ground fittings and pipes must be made of non-rusting, non-combustible, non-heat deforming materials.
- The tank or remote offtake must not be located within 6m of the dwelling.
- The tank or remote offtake must be located within 3m of a hardstand area.
- Tanks must be fitted with a standard compliance forged Storz 65mm adapter fitted with a standard (deliver) washer rated to 1800kPa working pressure and 2400kPa burst pressure.
- Bushfire Signage must be clearly displayed in accordance with section 5.4 of the Hazard Management Report.

Access Road

Property access greater than 30m in length, is to be provided from the Road crossover through to the firefighting water point and the dwelling. Property access must:

(a) Be of all-weather construction (minimum)
(b) Minimum carriageway width of 4m.
(c) Vegetation must be cleared for a height of 4m above the carriageway and 0.5m each side of the carriageway.
(d) Future and/or existing dwellings must terminate with a turning area for fire appliances of either a turning circle with a minimum inner radius of 10m, or a hammerhead "T" or "Y" turning head 4 m wide and 8m long.

Hazard Management – Vegetation Management

- Lots 1-25 in their entirety are to be treated and maintained as a bushfire hazard management area.
- Vegetation in the hazard management area (as dimensioned and shown) is to managed and maintained in a minimum fuel condition (refer to section 5.2 of Bushfire Hazard Management Report).

Staging

- A hazard management area of 50m depth, adjoining residential lots, is to be provided on the balance lot as part of stage 2. A 12m outer radius temporary turning head is to be provided at the conclusion of any road, should the subdivision be staged.

Notes:

1. Refer plans –Woolcott Surveys, proposed 25 Lot Subdivision, dated 8/01/24, version 3, Job No L210420
2. All future works to comply with Director's Determination – Bushfire Hazard Area's (v1.1). Table 1, 2, 3 and 4.
3. Plan to be read in conjunction with Bushfire Hazard Management Report dated 7/12/23

Bushfire Assessment Based on Stamped Plans

James Stewart – BFP: 157, Scope of Work: 1, 2, 3B, 3C.

WOOLCOTT SURVEYS

BUSHFIRE HAZARD MANAGEMENT PLAN

PROPOSED 25 LOT SUBDIVISION
OWNER: STAGAR PTY LTD
223 CARLTON RIVER ROAD, CARLTON, 7173
C.T.126930-1, C.T.126929-2, C.T.126929-1, PID 5914397

N

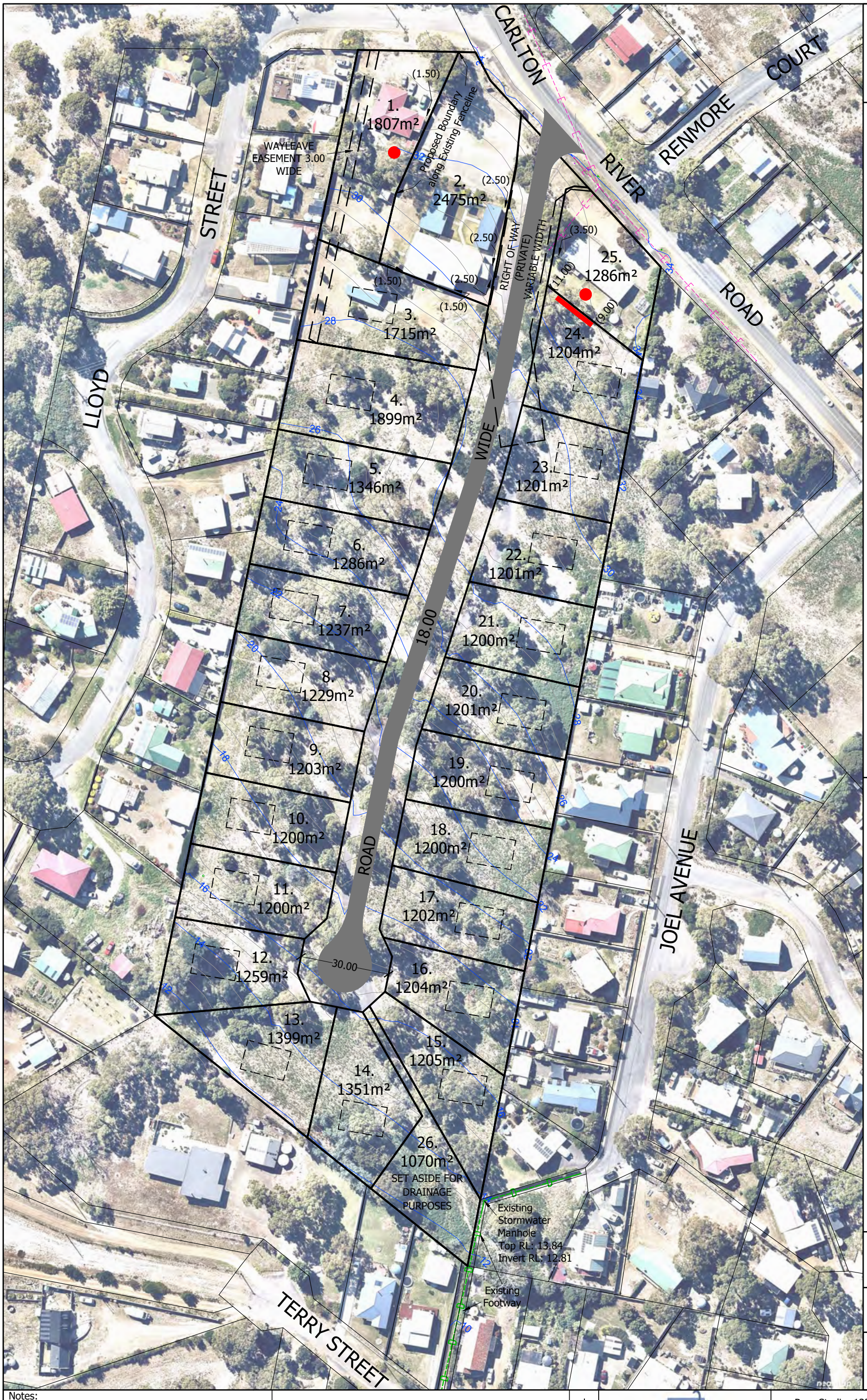
WOOLCOTT SURVEYS
10 Goodman Court Invermay TAS 7248
PO Box 593 Mowbray Heights TAS 7248
Phone (03) 6332 3760
Fax (03) 6332 3764
Email: office@woolcottsurveys.com.au

Job Number L210420

Drawn	File name	Date	Scale	Edition	Sheet
JAG	L210420_BHMP_V2.0_080124.dwg	8/01/24	1:1250@A3	V2.0	1 of 1

Annexure 2 – Subdivision Proposal Plan

THIS PLAN HAS BEEN PREPARED TO ACCOMPANY A PLANNING APPLICATION TO COUNCIL AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.



LEGEND:

- LOT BOUNDARY
- INDICATIVE 10x15m BUILDING AREA
- STORMWATER MAIN
- ELECTRICITY LINE OVERHEAD
- PROPOSED ROAD
- EXISTING SEPTIC TANK
- EXISTING ABSORPTION TRENCH

NOTE: Refer to onsite wastewater report by Geoenvironmental Solutions for further information on existing wastewater infrastructure.

NOTE: Dimensions in brackets are setbacks from existing buildings to the proposed lot boundaries.

NOTE: Contours shown have been derived from a combination of survey data and lidar data obtained from Geoscience Australia.

Notes:
1. All dimensions and areas are approximate only and subject to survey.
2. Horizontal datum is plane based on MGA'2020.
3. Vertical datum is AHD'83.
4. Contour interval is 0.5m, index is 2.0m.
5. Not all services have been measured by this survey and some are shown for diagrammatic purposes only.

PROPOSED SUBDIVISION
25 LOTS & 1 ROAD
223 CARLTON RIVER ROAD, CARLTON
C.T.126930/1, C.T.126929/1 & C.T.126929/2

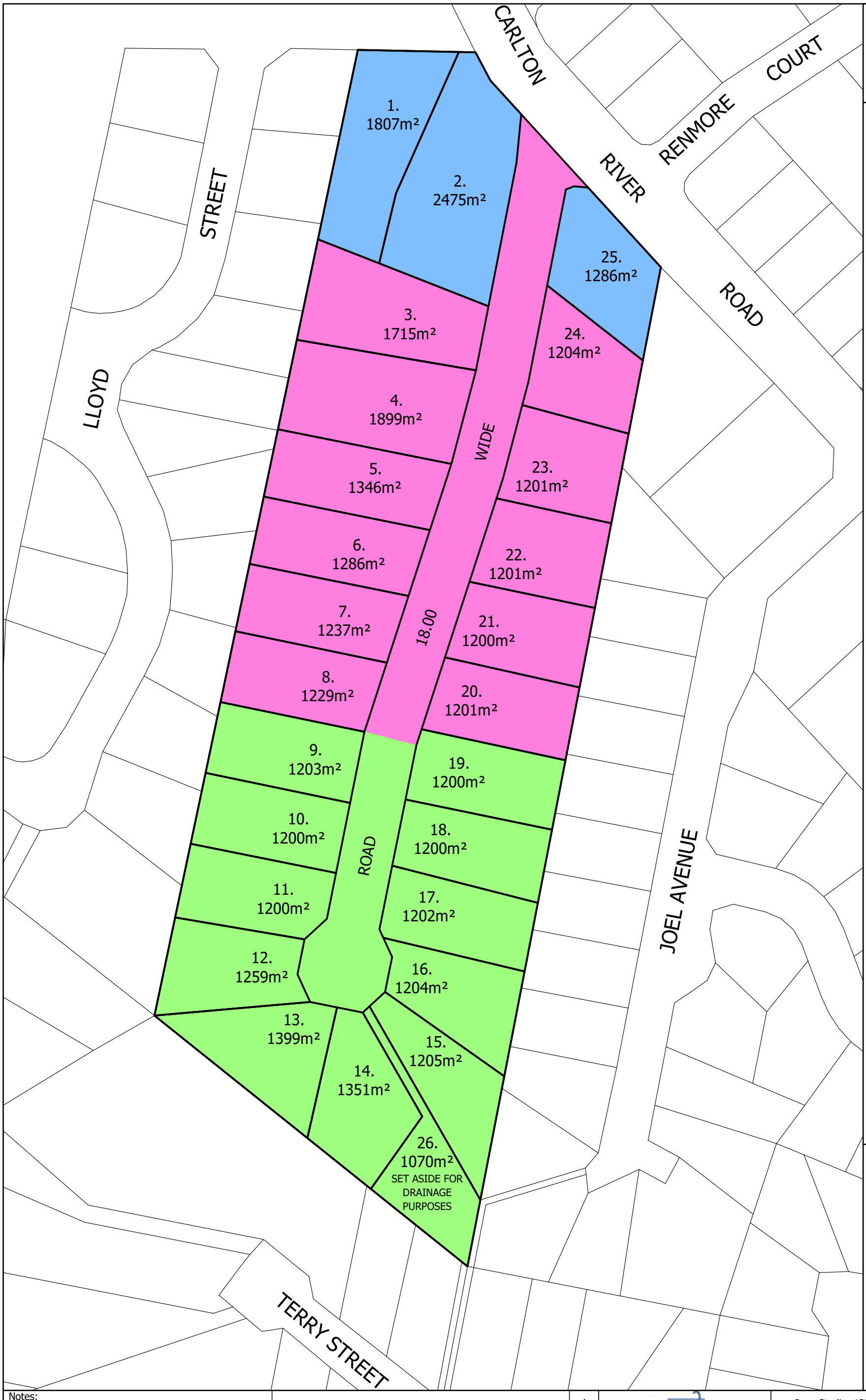
N

WOOLCOTT SURVEYS
Rear Studio, 132 Davey Street
Hobart TAS 7000
Phone (03) 6227 7968
Email: admin@woolcottsurveys.com.au

Job Number L210420

Drawn	File Name	Date	Scale	Edition	Sheet
BMW	L210420_PROPOSALPLAN.DWG	08/01/24	1:1250 @ A3	V.03	1/2

THIS PLAN HAS BEEN PREPARED TO ACCOMPANY A PLANNING APPLICATION TO COUNCIL AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.



LEGEND:

- LOT BOUNDARY
- STAGE 1
- STAGE 2
- STAGE 3

Notes:

1. All dimensions and areas are approximate only and subject to survey.
2. Horizontal datum is plane based on MGA'2020.
3. Vertical datum is AHD'83.
4. Contour interval is 0.5m, index is 2.0m.
5. Not all services have been measured by this survey and some are shown for diagrammatic purposes only.

PROPOSED SUBDIVISION
STAGING PLAN
223 CARLTON RIVER ROAD, CARLTON
C.T.126930/1, C.T.126929/1 & C.T.126929/2

N

WOOLCOTT SURVEYS
Rear Studio, 132 Davey Street
Hobart TAS 7000
Phone (03) 6227 7968
Email: admin@woolcottsurveys.com.au

Job Number L210420

Drawn	File Name	Date	Scale	Edition	Sheet
BMW	L210420_PROPOSALPLAN.DWG	08/01/24	1:1250 @ A3	V.03	2/2

Annexure 3 – Planning Certificate

BUSHFIRE-PRONE AREAS CODE

CERTIFICATE[1] UNDER S51(2)(d) *LAND USE PLANNING AND APPROVALS ACT 1993*

1. Land to which certificate applies

The subject site includes property that is proposed for use and development and includes all properties upon which works are proposed for bushfire protection purposes.

Street address:	223 Carlton River Road, Carlton
Certificate of Title / PID:	**CT126930/1 CT126929/1, CTCT126929/2. PID5914397**

2. Proposed Use or Development

Description of proposed Use and Development:	25 lot subdivisoin
Applicable Planning Scheme:	Tasmanian Planning Scheme – Sorell

3. Documents relied upon

This certificate relates to the following documents:

Title	Author	Date	Version
Bushfire Hazard Report	Woolcott Surveys	07/12/2023	2
Proposed 25 Lot Subdivision	Woolcott Surveys	08/01/2024	3
Bushfire Hazard Management Plan	Woolcott Surveys	08/01/2023	1

[1] This document is the approved form of certification for this purpose and must not be altered from its original form.

4. Nature of Certificate

The following requirements are applicable to the proposed use and development:

☐	**E1.4 / C13.4 – Use or development exempt from this Code**	
	Compliance test	**Compliance Requirement**
☐	E1.4(a) / C13.4.1(a)	Insufficient increase in risk.

☐	**E1.5.1 / C13.5.1 – Vulnerable Uses**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.5.1 P1 / C13.5.1 P1	***Planning authority discretion required. A proposal cannot be certified as compliant with P1.***
☐	E1.5.1 A2 / C13.5.1 A2	Emergency management strategy
☐	E1.5.1 A3 / C13.5.1 A2	Bushfire hazard management plan

☐	**E1.5.2 / C13.5.2 – Hazardous Uses**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.5.2 P1 / C13.5.2 P1	***Planning authority discretion required. A proposal cannot be certified as compliant with P1.***
☐	E1.5.2 A2 / C13.5.2 A2	Emergency management strategy
☐	E1.5.2 A3 / C13.5.2 A3	Bushfire hazard management plan

☒	**E1.6.1 / C13.6.1 Subdivision: Provision of hazard management areas**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.6.1 P1 / C13.6.1 P1	***Planning authority discretion required. A proposal cannot be certified as compliant with P1.***
☒	E1.6.1 A1 (a) / C13.6.1 A1(a)	Insufficient increase in risk. Lots 12-23
☒	E1.6.1 A1 (b) / C13.6.1 A1(b)	Provides BAL-19 for all lots
☐	E1.6.1 A1(c) / C13.6.1 A1(c)	Consent for Part 5 Agreement

☒	**E1.6.2 / C13.6.2 Subdivision: Public and fire fighting access**	
	Acceptable Solution	**Compliance Requirement**
☒	E1.6.2 P1 / C13.6.2 P1	***Planning authority discretion required. A proposal cannot be certified as compliant with P1.***
☒	E1.6.2 A1 (a) / C13.6.2 A1 (a)	Insufficient increase in risk. Lots 12-23
☐	E1.6.2 A1 (b) / C13.6.2 A1 (b)	Access complies with relevant Tables

☒	**E1.6.3 / C13.1.6.3 Subdivision: Provision of water supply for fire fighting purposes**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.6.3 A1 (a) / C13.6.3 A1 (a)	Insufficient increase in risk.
☐	E1.6.3 A1 (b) / C13.6.3 A1 (b)	Reticulated water supply complies with relevant Table
☐	E1.6.3 A1 (c) / C13.6.3 A1 (c)	Water supply consistent with the objective
☒	E1.6.3 A2 (a) / C13.6.3 A2 (a)	Insufficient increase in risk. Lots 12-23
☒	E1.6.3 A2 (b) / C13.6.3 A2 (b)	Static water supply complies with relevant Table
☐	E1.6.3 A2 (c) / C13.6.3 A2 (c)	Static water supply consistent with the objective

5. Bushfire Hazard Practitioner

Name:	James Stewart	**Phone No:**	0467 676 721
Postal Address:	PO BOX 593, Mowbray, Tas, 7248	**Email Address:**	james@woolcottsurveys.com.au
Accreditation No:	BFP – 157	**Scope:**	1, 2, 3B, 3C

6. Certification

I certify that in accordance with the authority given under Part 4A of the *Fire Service Act 1979* that the proposed use and development:

☐ Is exempt from the requirement Bushfire-Prone Areas Code because, having regard to the objective of all applicable standards in the Code, there is considered to be an insufficient increase in risk to the use or development from bushfire to warrant any specific bushfire protection measures, or

☒ The Bushfire Hazard Management Plan/s identified in Section 3 of this certificate is/are in accordance with the Chief Officer's requirements and compliant with the relevant **Acceptable Solutions** identified in Section 4 of this Certificate.

Signed:
certifier

Name: James Stewart **Date:** 08/01/2023

Certificate Number: WS-129

(for Practitioner Use only)

Annexure 4 – TFS Advice

Hi James,

I write in relation to your assessment of your client's proposed 25-lot subdivision at 223 Carlton River Road, Carlton (CT126930/1, CT126929/2, CT126929/1).

As detailed in your report (Woolcott Surveys, Job no. L210420, December 2023), a variation is sought to the cul-de-sac radius standard applicable under clause C13.6.2 A1. I can confirm TFS supports the justification provided under C13.6.2 P1.

Regards

Chris Moore
Planning & Assessment Officer
Bushfire Risk Unit

Tasmania Fire Service
Service | Professionalism | Integrity | Consideration
Northern Region Office | 339 Hobart Road Youngtown Tasmania 7249
Mobile 0418 356 448
bfp@fire.tas.gov.au | www.fire.tas.gov.au

Land Surveying | Town Planning | Project Management
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East Coast office
48 Cecilia Street
St Helens 7216
p (03) 6376 1972

Hobart
South office
Rear studio, 132 Davey Street
Hobart 7000
p (03) 6227 7968

Devonport
North west office
2 Piping Lane
East Devonport 7310
p (03) 6332 3760

MIDSON traffic pty ltd

Woolcott Surveys

223 Carlton River Road, Carlton
Traffic Impact Assessment

November 2023

ENGINEERS AUSTRALIA

PROFESSIONAL ENGINEER OF THE YEAR
INDIVIDUAL AWARDS
TASMANIA
WINNER 2016

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Table Index

1. Introduction

1.1 Background

Midson Traffic were engaged by Woolcott Surveys to prepare a traffic impact assessment for a proposed 25-lot residential subdivision at 223 Carlton River Road, Carlton.

1.2 Traffic Impact Assessment (TIA)

A traffic impact assessment (TIA) is a process of compiling and analysing information on the impacts that a specific development proposal is likely to have on the operation of roads and transport networks. A TIA should not only include general impacts relating to traffic management, but should also consider specific impacts on all road users, including on-road public transport, pedestrians, cyclists and heavy vehicles.

This TIA has been prepared in accordance with the Department of State Growth (DSG) publication, *Traffic Impact Assessment Guidelines*, August 2020. This TIA has also been prepared with reference to the Austroads publication, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2019.

Land use developments generate traffic movements as people move to, from and within a development. Without a clear understanding of the type of traffic movements (including cars, pedestrians, trucks, etc), the scale of their movements, timing, duration and location, there is a risk that this traffic movement may contribute to safety issues, unforeseen congestion or other problems where the development connects to the road system or elsewhere on the road network. A TIA attempts to forecast these movements and their impact on the surrounding transport network.

A TIA is not a promotional exercise undertaken on behalf of a developer; a TIA must provide an impartial and objective description of the impacts and traffic effects of a proposed development. A full and detailed assessment of how vehicle and person movements to and from a development site might affect existing road and pedestrian networks is required. An objective consideration of the traffic impact of a proposal is vital to enable planning decisions to be based upon the principles of sustainable development.

This TIA also addresses the relevant clauses in C2.0, *Parking and Sustainable Transport Code*, and C3.0, *Road and Railway Assets Code*, of the Tasmanian Planning Scheme – Sorell, 2021.

1.3 Statement of Qualification and Experience

This TIA has been prepared by an experienced and qualified traffic engineer in accordance with the requirements of Council's Planning Scheme and The Department of State Growth's, *Traffic Impact Assessment Guidelines*, August 2020, as well as Council's requirements.

The TIA was prepared by Keith Midson. Keith's experience and qualifications are briefly outlined as follows:

- 27 years professional experience in traffic engineering and transport planning.
- Master of Transport, Monash University, 2006
- Master of Traffic, Monash University, 2004

- Bachelor of Civil Engineering, University of Tasmania, 1995
- Engineers Australia: Fellow (FIEAust); Chartered Professional Engineer (CPEng); Engineering Executive (EngExec); National Engineers Register (NER)

1.4 Project Scope

The project scope of this TIA is outlined as follows:

- Review of the existing road environment in the vicinity of the site and the traffic conditions on the road network.
- Provision of information on the proposed development with regards to traffic movements and activity.
- Identification of the traffic generation potential of the proposal with respect to the surrounding road network in terms of road network capacity.
- Traffic implications of the proposal with respect to the external road network in terms of traffic efficiency and road safety.

1.5 Subject Site

The subject site is located at 223 Carlton River Road, Carlton. The site consists of three titles. The three lots currently consist of an old thrift shop (now closed), a dwelling, and a Salvation Army hall.

The subject site and surrounding road network is shown in Figure 1.

Figure 1 Subject Site & Surrounding Road Network

Image Source: LIST Map, DPIPWE

1.6 Reference Resources

The following references were used in the preparation of this TIA:

- Tasmanian Planning Scheme - Sorell, 2021 (Planning Scheme)
- Austroads, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2019
- Austroads, Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections, 2021
- Department of State Growth, *Traffic Impact Assessment Guidelines*, 2020
- Roads and Maritime Services NSW, *Guide to Traffic Generating Developments*, 2002 (RMS Guide)
- Roads and Maritime Services NSW, *Updated Traffic Surveys,* 2013 (Updated RMS Guide)
- Australian Standards, AS2890.1, *Off-Street Parking*, 2004 (AS2890.1)

2. Existing Conditions

2.1 Transport Network

For the purposes of this report, the transport network consists of Carlton River Road, Convoy Road and Lloyd Street.

Carlton River Road is a minor residential collector road connecting between Old Forcett Road/ Carlton Beach Road intersection in Dodges Ferry through Carlton to Sugarloaf Road in Carlton River. Carlton River Road has a posted speed limit of 60-km/h and carries approximately 2,000 vehicles per day with approximately 250 vehicles per hour during the afternoon peak.

Carlton River Road adjacent to the subject site is shown in Figure 2.

Figure 2 Carlton River Road

Convoy Road is a short residential street that provides connectivity to Lloyd Street. Lloyd Street connects to Convoy Road as a continuous road corridor. The extension of Convoy Road to the west of the Lloyd Street junction has an unsealed pavement.

Lloyd Street is a local access cul-de-sac servicing a small number of residential dwellings.

2.2 Road Safety Performance

Crash data can provide valuable information on the road safety performance of a road network. Existing road safety deficiencies can be highlighted through the examination of crash data, which can assist in determining whether traffic generation from the proposed development may exacerbate any identified issues.

Crash data was obtained from the Department of State Growth for a 5+ year period between 1st January 2018 and 30th June 2023 for Lloyd Street, Convoy Road, and Carlton River Road between Carlton Beach Road to Dodges Hill Road.

The findings of the crash data is summarised as follows:

- No crashes were reported in Lloyd Street or Convoy Road.
- 3 crashes were reported in Carlton River Road:
  - → 9:05am, Saturday 3rd November 2018 – 'other-off-path' single vehicle crash resulting in property damage only.
  - → 2:05pm, Sunday 6th October 2019 – 'other-curve' single vehicle crash resulting in first aid at the scene at the intersection of Moomere Street.
  - → 7:55pm, Thursday 2nd July 2020 – "other-curve' single vehicle crash resulting in property damage only.

The crash data does not indicate that there are any pre-existing road safety deficiencies in the transport network that may be exacerbated by traffic generated by the propose development.

3. Proposed Development

3.1 Development Proposal

The proposed development involves the construction of a 25-lot residential subdivision. A new central access road will be constructed to service the majority of the lots. One lot will have direct road frontage to Convoy Road (an existing dwelling with existing access).

The proposed subdivision layout plan is shown in Figure 3.

Figure 3 Proposed Subdivision Layout Plan

4. Traffic Impacts

4.1 Trip Generation

Traffic generation rates were sourced from the RMS Guide. The RMS Guide (and RMS updated surveys) states the following traffic generation rates for residential developments:

- Daily vehicle trips 7.4 per dwelling
- Weekday peak hour vehicle trips 0.78 per dwelling

Based on these rates, the traffic generation from the subdivision when fully developed (with all dwellings occupied within the subdivision) is likely to be in the order of 163 vehicles per day, with a peak of 17 vehicles per hour.

Note that the existing dwellings and Salvation Army hall will continue to generate the same amount of traffic independent of the proposed subdivision. The traffic generation of the proposed new lots associated with the subdivision have been considered in this TIA.

4.2 Trip Assignment

All new traffic generated by the subdivision will utilise the central subdivision road. The majority of turning movements at the junction with Carlton River Road will be right-in/ left-out based on the connectivity of the site with key areas in the surrounding road network.

4.3 Traffic Capacity Analysis

The new T-junction will operate at a high level of service, noting that the peak traffic generation will be 17 vehicles per hour with an opposing flow on Carlton River Road of approximately 250 vehicles per hour.

4.4 Access Impacts

Two existing dwellings associated with the subject site will remain unchanged. The property access is not proposed to be altered for these dwellings (lot 25 has an access on Carlton River Road and lot 1 on Convoy Street). These two dwellings (lots 1 and 25) will therefore have no access impacts on the surrounding road network.

The subdivision for lots 2-24 will utilise and upgrade an existing access at Carlton River Road. The Acceptable Solution A1.4 of Clause C3.5.1 of the Planning Scheme states "*Vehicular traffic to and from the site, using an existing vehicle crossing or private level crossing, will not increase by more than the amounts in Table C3.1*".

Table C3.1 specifies a maximum increase of 20% of 40 vehicles per day, whichever is greater. In this case the development generates an increase of approximately 163 vehicles per day and therefore does not comply with the requirements of Acceptable Solution A1.4 of Clause C3.5.1 of the Planning Scheme.

The Performance Criteria P1 of Clause C3.5.1 of the Planning Scheme states:

> *"Vehicular traffic to and from the site must minimise any adverse effects on the safety of a junction, vehicle crossing or level crossing or safety or efficiency of the road or rail network, having regard to:*
>
> *(a) any increase in traffic caused by the use;*
>
> *(b) the nature of the traffic generated by the use;*
>
> *(c) the nature of the road;*
>
> *(d) the speed limit and traffic flow of the road;*
>
> *(e) any alternative access to a road;*
>
> *(f) the need for the use;*
>
> *(g) any traffic impact assessment; and*
>
> *(h) any advice received from the rail or road authority".*

The following is relevant with respect of the proposed subdivision:

a. Increase in traffic. The daily increase in traffic will be 163 vehicles per day. The peak increase is likely to be 17 vehicles per hour.

b. Nature of traffic generation. The traffic generation will be residential in nature, which is consistent with traffic generation from the surrounding area.

c. Nature of road. Carlton River Road is a residential collector road. It provides direct property access to residential properties along its length.

d. Speed limit and traffic flow. The posted speed limit of Carlton River Road is 60-km/h. The traffic volume is estimated to be 2,000 vehicles per day. The speed limit and traffic flow are compatible with the traffic generation associated with the proposed subdivision.

e. Alternative access. No alternative access is considered necessary.

f. Need for use. The access is required to service the lots within the subdivision.

g. Traffic impact assessment. This report documents the findings of a traffic impact assessment.

h. Road authority advice. Council, as road authority, require a TIA to be prepared for the proposed subdivision.

Based on the above assessment, the proposed subdivision meets the requirements of Performance Criteria P1 of Clause C3.5.1 of the Planning Scheme.

The design of the access junction should be in accordance with LGAT requirements.

4.5 Subdivision Road Design

Council relies on the design criteria of LGAT Tasmanian Standard Drawings and Subdivision Guidelines, 2013. The requirements for rural sealed roads are reproduced in Table 1. The following standards are applicable for the internal road network:

- Road design should be in accordance with Austroads Guidelines.
- LGAT Standard Drawings and Tasmanian Subdivision Guidelines.

Table 1 LGAT Standard Drawings – Road Requirements, Rural Roads

TABLE 2		EXISTING INFRASTRUCTURE	NEW DEVELOPMENT				
CODE*	A.A.D.T.	(w) SEALED TRAFFIC WIDTH	(w) SEALED TRAFFIC WIDTH	SEALED SHOULDER	GRAVEL SHOULDER	VERGE	CARRIAGEWAY WIDTH
S1	< 30	4000 (S)	–	–	500	NO	5000
S2	30 – 100	4000 (S)	–	–	1000	NO	6000
S3	100 – 300	5500 (D)	5500 (D)	400 Refer Note 7.	500	500	6500
S4	300 – 2000	6000 (D)	6000 (D)	400 Refer Note 7.	500	500	7000
S5	> 2000	7000 (D)	7000 (D)	500	500	500	9000

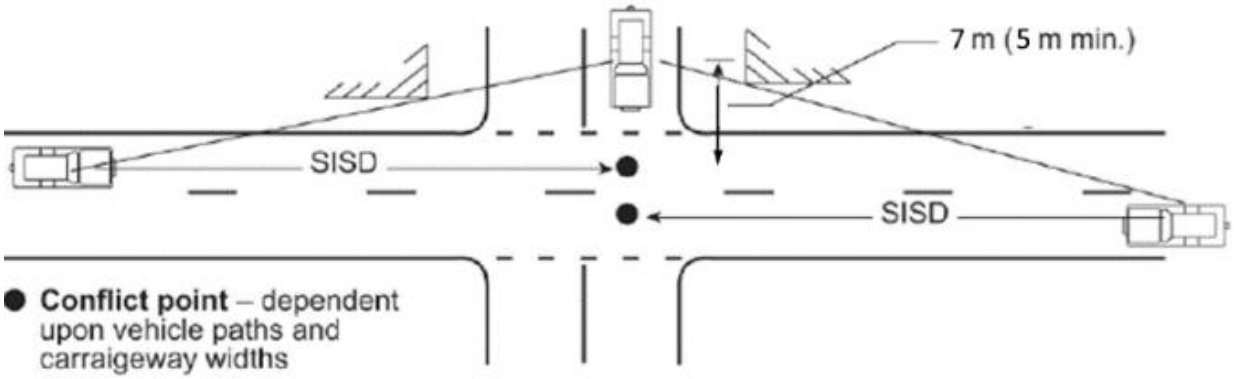
The appropriate road design for the internal road within the subdivision is an S2 design a carriageway width of 6.5 metres and a sealed road width of 5.5 metres.

4.6 Sight Distance

Austroads Part 4A provides the sight distance requirements for road junctions.

Safe Intersection Sight Distance (SISD) is the minimum sight distance which should be provided on the major road at any intersection. SISD is measured along the carriageway from the approaching vehicle to the conflict point; the line of sight having to be clear to a point 7.0 metres (5.0 metres minimum) back along the side road from the conflict point as shown in Figure 4.

Figure 4 Austroads SISD Requirements



Assuming that the 85th percentile speed of vehicles using Carlton River Road is equal to the posted speed limit of 60-km/h, then the required SISD is 123 metres.

The available sight distance exceeds 150 metres in both directions from the access location and therefore complies with Austroads SISD requirements.

4.7 Pedestrian Impacts

The proposed development is likely to attract a relatively small amount of pedestrian movements in the surrounding network. It is noted that there are few pedestrian generating land uses in the nearby surrounding network.

The existing footpath infrastructure in the surrounding road network is considered adequate for the likely pedestrian movements generated by the subdivision.

4.8 Road Safety Impacts

The proposed development generates a relatively small amount of additional traffic on the surrounding road network (in the order of 17 vehicles per hour during peak times, which is an average of approximately 1 vehicle movement every 3.5 minutes).

No significant adverse road safety impacts are therefore foreseen for the following reasons:

- The existing crash history of Carlton River Road near the subject site network does not indicate that there are any road safety deficiencies that would be exacerbated by the proposed development.

- The traffic generation of the proposed development is considered to be low (in the order of 17 vehicles per hour during peak periods as noted above), and therefore will not alter the level of service of any part of the transport network. No significant road safety impacts are likely to result without a corresponding deterioration in the network's level of service.
- The site access is located in a residential low speed environment. All traffic movements into and out of the site are clear and obvious for other road users.

5. Conclusions

This traffic impact assessment (TIA) investigated the traffic and parking impacts of a proposed 25-lot residential subdivision development at 223 Carlton River Road, Carlton.

The key findings of the TIA are summarised as follows:

- The traffic generation of the development is likely to be 163 vehicles per day with a peak generation of 17 vehicles per hour.
- The development's access on Carlton River Road meets the requirements of Performance Criteria P1 of Clause C3.5.1 of the Planning Scheme. The junction should be designed in accordance with LGAT requirements.

Based on the findings of this report the proposed development is supported on traffic grounds.

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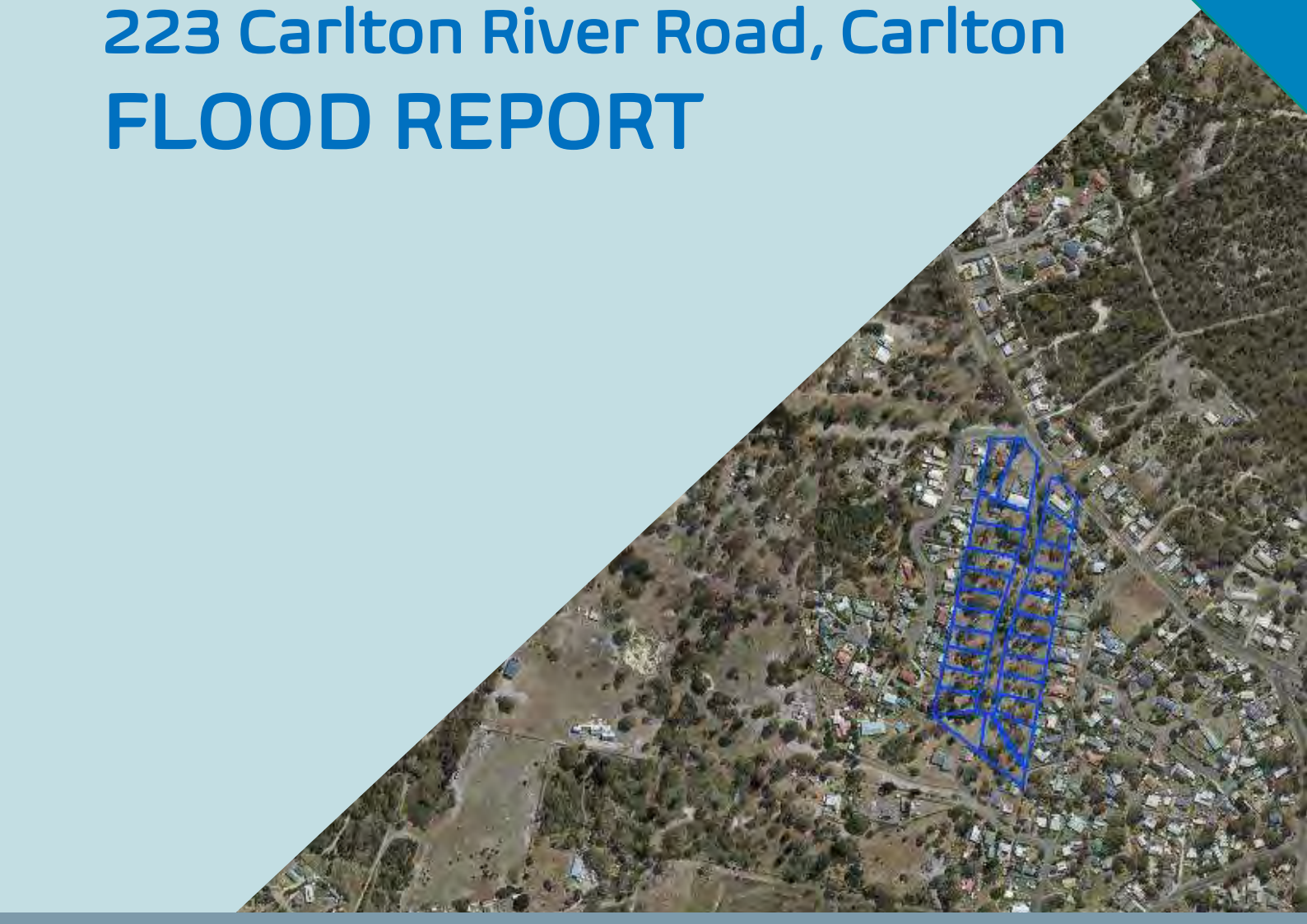
223 Carlton River Road, Carlton
FLOOD REPORT



Prepared for: Stagar Pty Ltd

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Title	Client	Document Number	Project Manager
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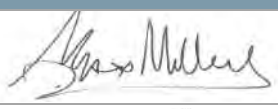
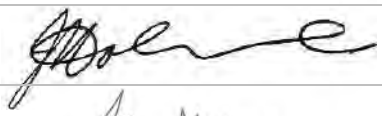
Document Initial Revision

REVISION 00	Staff Name	Signature	Date
Prepared by	Max W. Moller *Principal Hydraulic Engineer*		16/05/2023
Prepared by	Ash Perera *Hydraulic Engineer*		16/05/2023
GIS Mapping	Damon Heather *GIS Specialist*		19/05/2023
Reviewed by	Christine Keane *Senior Water Resources Analyst*		22/05/2023
Reviewed by	John Holmes *Senior Engineer*		25/05/2023
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Rev No.	Description	Prepared by	Authorised by	Date
01	Design change	Max W. Moller	Max W. Moller	21/12/2023

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Acronyms

AEP: Annual Exceedance Probability
ARR: Australian Rainfall and Runoff
CC: Climate Change
TPS: Tasmanian Planning Scheme
DEM: Digital Elevation Model

1. Introduction

Flüssig Engineers has been engaged by **Stagar Pty Ltd** to undertake a site-specific flood hazard report for the site at 223 Carlton River Road, Carlton in the **Sorell Council** municipality. The purpose of this report is to determine the hydraulic characteristics on the existing and post-development scenarios and the flood hazard for the 1% AEP plus climate change (CC).

1.1 Development

The proposed site location is at 223 Carlton River Road, Carlton, located in the municipality of the **Sorell Council.** The site is an approximately 4.1 ha lot with a proposed staged 25 residential lot subdivision development. This development triggers the inundation code as the development falls within Sorell Council, flood prone area.

1.2 Objectives and Scope

This flood analysis has been written to meet the standards of the Tasmanian Planning Scheme - Sorell (TPS), with the intent of understanding the development risk with respect to riverine inundation. The objectives of this study are:

- Provide an assessment of the site's flood characteristics under the combined 1% AEP + CC scenario.
- Provide comparison of flooding for post-development against acceptable solution and performance criteria.
- Provide flood mitigation recommendations for a potential future development, where appropriate.

1.3 Limitations

This study is limited to the objectives of the engagement by the client, the availability and reliability of data, and including the following:

- The flood model is limited to a 1% AEP + CC worst case temporal design storm.
- All parameters have been derived from best practice manuals and available relevant studies (if applicable) in the area.
- All provided data by the client or government bodies for the purpose of this study is deemed fit for purpose.
- The study is to determine the effects of the new development on flooding behaviour and should not be used as a full flood study into the area without further assessment.

1.4 Relevant Planning Scheme Requirements

Table 1. TPS Planning Scheme Requirements

Planning Scheme Code	Objective	Document Reference
C12.7.1 Subdivision within a flood-prone hazard area	That subdivision within a flood-prone hazard area does not create an opportunity for use or development that cannot achieve a tolerable risk from flood.	Refer Section 4

2. Model Build

2.1 Overview of Catchment

The contributing catchment for the site at 223 Carlton River Road, Carlton is approximately 61 ha. The land use of the catchment is zoned predominantly Rural Living and Low Density residential with the immediate areas surrounding the specific site being proposed Low Density Residential.

Figure 1 below outlines the approximate contributing catchment for the site at 223 Carlton River Road, Carlton.

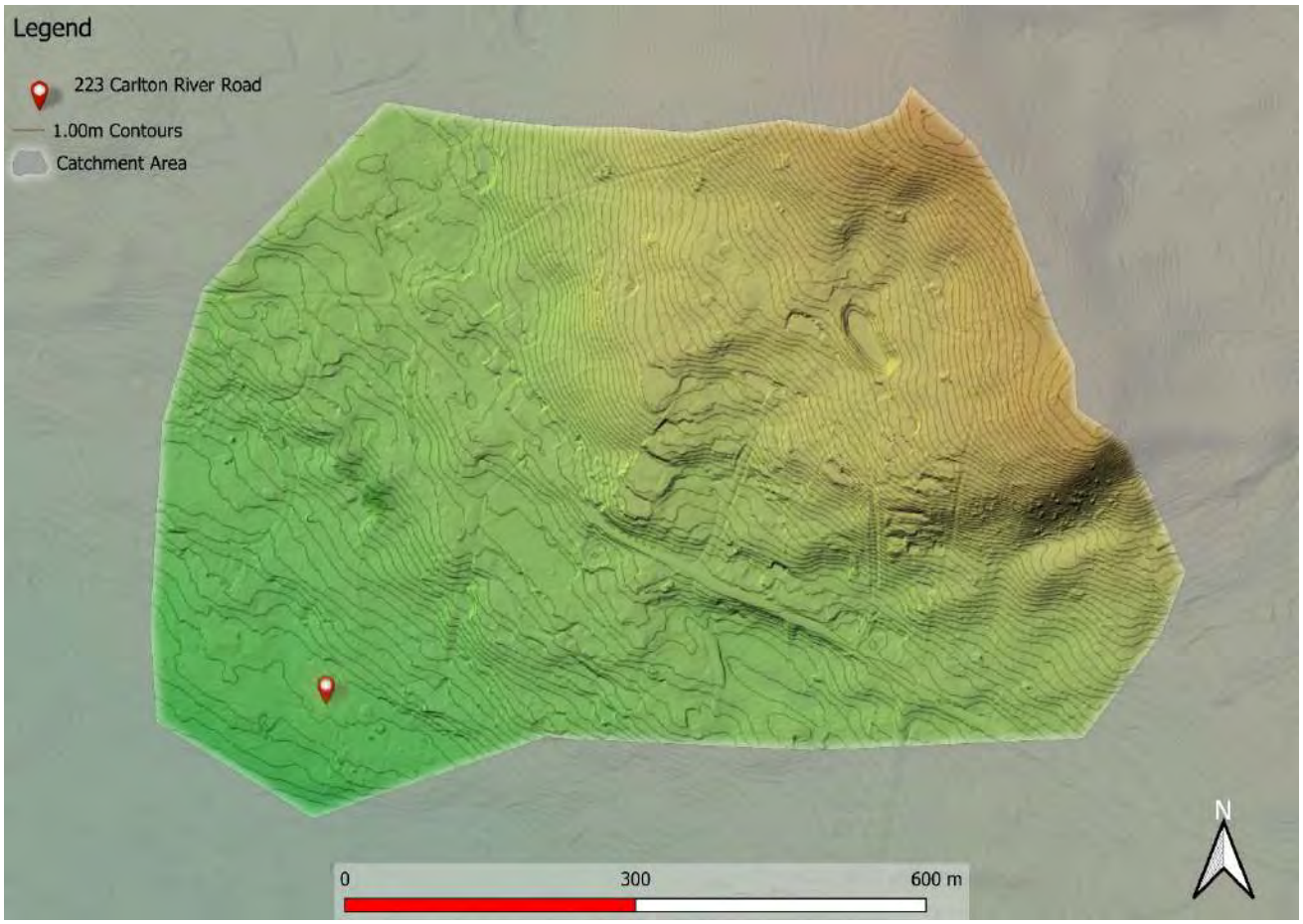

Figure 1. Contributing Catchment for the site at 223 Carlton River Road, Carlton

2.2 Hydrology

The following Table 2 states the adopted hydrological parameters for the RAFTS catchment, derived from best practice documents.

Table 2. Parameters for RAFTS catchment

Catchment Area (ha)	Initial Loss Perv/imp (mm)	Continuing Loss Perv/imp (mm/hr)	Manning's N pervious	Manning's N impervious	Non-linearity factor
61	29/1	3.7/0.0	0.045	0.02	-0.285

2.2.1 Design Rainfall Events

Figure 2 shows the box and whisker output for the 1% model run. The model shows that the 1% AEP 10-minute storm temporal pattern 8 was the worst-case storm. Therefore, this storm event was used within the hydraulic model.

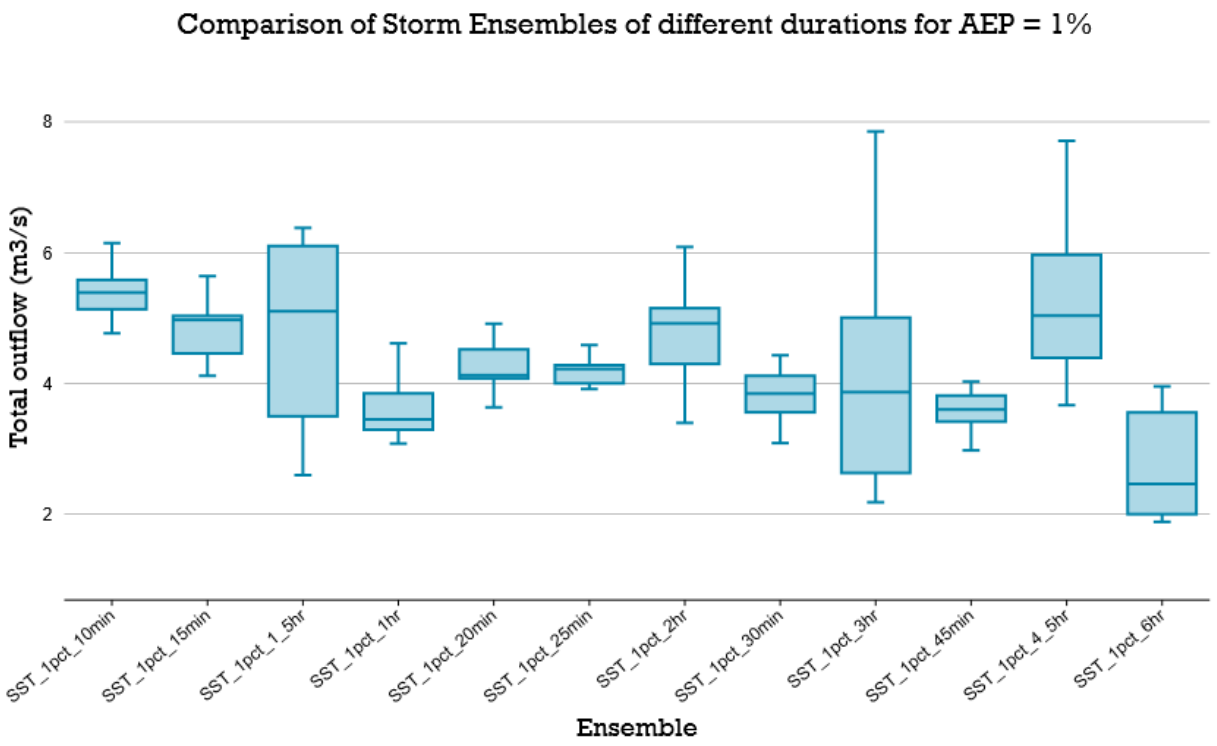

Figure 2. 1% AEP Box and Whisker Plot

2.2.2 Climate Change

As per ARR 2019 Guidelines, for an increase in rainfall due to climate change at 2100, it is recommended the use of RCP 8.5. Table 3 shows the ARR 8.5 increase compared to the revised increase of 14.6%. Therefore, the ARR 8.5 increase of 16.3% was adopted in the model.

Table 3. Climate Change Increases

Climate Zone	CFT increase @ 2100	ARR 8.5 increase @ 2100
South-East Tasmania	14.6 %	16.3 %

2.2.3 Calibration/Validation

This catchment has no stream gauge to calibrate the model against a real-world storm event. Similarly, there is little historical information available, and limited available past flood analysis undertaken to validate against the flows obtained in the model.

2.3 Hydraulics

A 1D-2D hydraulic model was created to determine the flood level through the target area.

2.3.1 Extents and topography

The development site is situated in the south-west of the catchment. The catchment originates approximately 400 m north of Renmore Court, approximately 65 mAHD higher than the site location and the mainstream with an average gradient of approximately 8.7 %.

2.3.2 Survey

The 2D surface model was taken from a combination of LiDAR 2019 to create a 1m and cell size DEM. For the purposes of this report, 1m cells are enough to capture accurate flow paths. The DEM with hill shading can be seen below (Figure 3).

Figure 3. 1m DEM (hillshade) of 223 Carlton River Road, Carlton.

2.3.3 Roughness (Manning's n)

Table 4 shows Manning's values used in the model. Values for this layer were derived from the ARR 2019 Guidelines.

Table 4. Manning's Coefficients (ARR 2019)

Land Use	Roads	Open Channel	Rural	Residential	Parks	Buildings	Piped Infrastructure
Manning's n	0.018	0.035	0.04	0.045	0.05	0.3	0.013

2.3.4 Walls

All significant fences and retaining structures were included as 2D linear wall structures within the 2D model. Fences were modelled 300 mm above the ground level.

2.3.5 Buildings

Buildings were represented as mesh polygons with a high Manning's n value within the model. Buildings with unknown floor levels were set with a minimum 300 mm above ground. This method allows for flow through the building if the flood levels/pressure become great enough. The aim is to mimic flow through passageways such as doors, windows, hallways etc.

2.3.6 Stormwater Infrastructure

All upstream stormwater infrastructure was included within the model to provide insight into the upstream capacity of the stormwater system. The pit/pipes were sourced through Sorell Council data, 'Before you Dig Australia' and site visits including infrastructure location, size, type, and invert levels

(where applicable). Where data was missing, this was inferred from surrounding data and where invert levels were missing, a 600mm cover was applied.

2.3.7 Pit Inlets

As this is a 1D/2D model, user defined inlet equation was adopted for varying pit sizes.

$$Q = ay^b$$

Where:

Q = flow

a = constant defined in User Equation A value field

y = depth of flow at inlet

b = constant defined in User Equation B value field

2.4 Development Runoff

Stormwater runoff from the development site has been assessed under pre- and post-development models to determine the potential impact the development at 223 Carlton River Road has on the immediate local flows. As per planning guidelines it is a requirement that this does not have a negative impact from pre to post development.

Site characteristics for the pre- and post-development model are summarised in Table 5.

Table 5. Site characteristics

Land Use	Pre-Development		Post-Development	
	Area (ha)	% Total	Area (ha)	% Total
Total Pervious	0.42	10	0.55	13
Total Impervious	3.65	90	3.52	87

3. Model Results

The result of 1% AEP + CC were run through the pre-development scenario to analyse the changes to flooding onsite and to surrounding properties.

3.1 Flood depth and extent

It can be seen from the pre-development model runs Figure 4, that the overland flow path runs from Carlton River Road and flows through the proposed 25-lot subdivision site. Figure 4 shows the existing lot with existing dwellings along with the pre-development flood extents.

Flooding with depths between 80-100 mm mostly affects proposed lots 4 and 5. There is also some minor flooding which occurs in proposed lots 12,13, 15, 22 and 23.

The post-development run (Figure 5) shows the influence the proposed development has on the flood extents within the site. The proposed road contains open Vee drains on the sides with 0.6 m depth and 3.6 m top width which helps channel the overland flow. Stormwater from the open Vee drains gets collected via a table drain/Footpath that out falls onto Terry Street.

The recommended table drain/footpath is 3m wide with 0.3m height. This allows stormwater to be collected from the road and be channelled towards Terry Street without negatively affecting any lots or neighbouring properties.

Please refer “FE_23049_223 Carlton River Rd SWMP REV01” and Civil drawings titled “231220_23049_223 Carlton River Rd_REV P2” for detailed drawings of the footpath/table drain, road drains and the detention basin.

Flood extents and depths have reduced significantly within the lots due to the inclusion of the open drain on the sides of the proposed road and the footpath/table Drain through to Terry Street

In the post development scenario, only lots 4 and 5 are affected significantly with maximum depths between 70-80 mm.

Figure 4. Pre-Development 1%+CC Flood Depths and extents

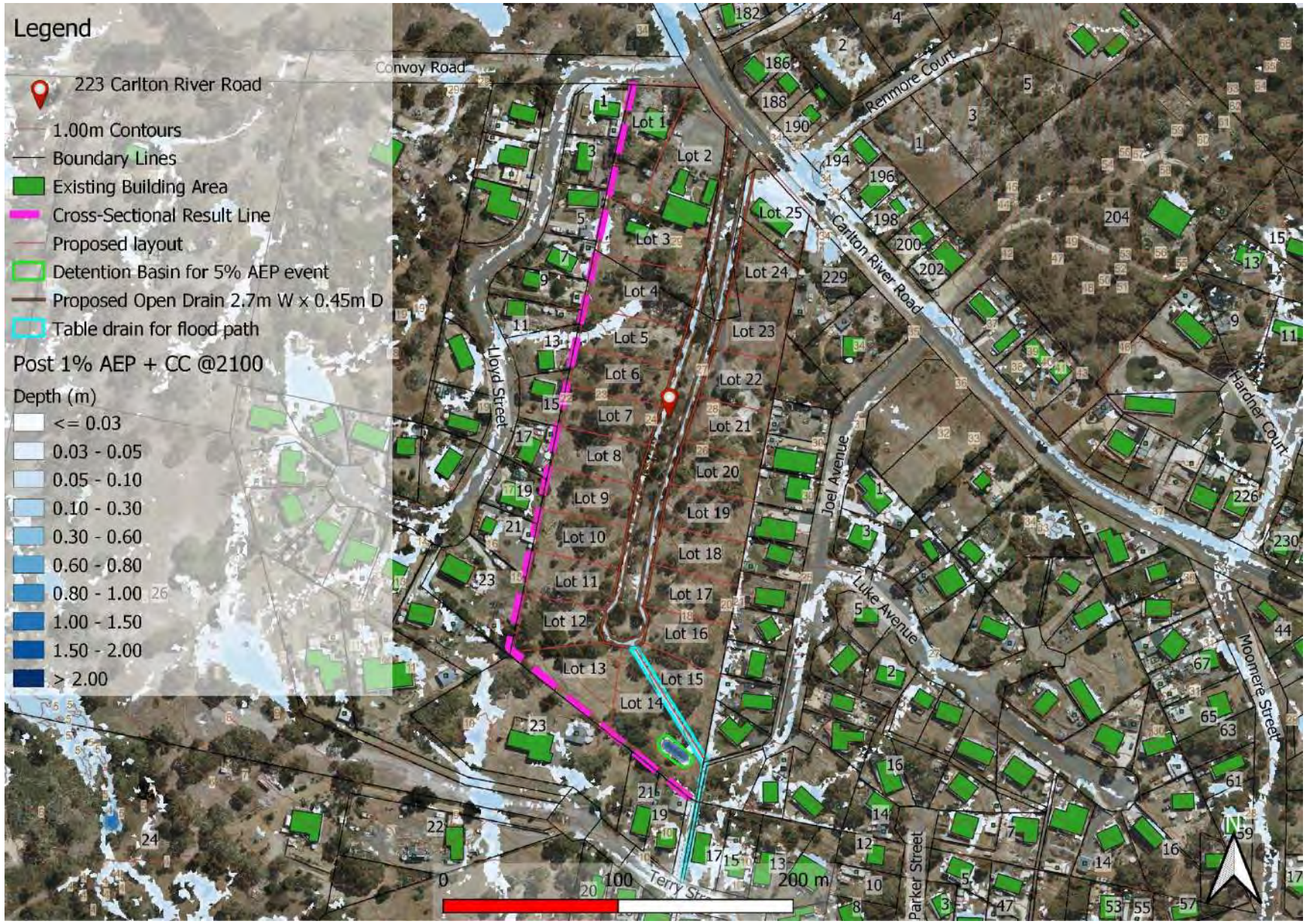

Figure 5. Post Development 1%+CC Flood Depth and extents

3.2 Displacement of Overland Flow on Third Party Property

Post-development flows in Figure 5 show that when compared against pre-development in Figure 4, there is no observed increase in flood depths and extents on neighbouring lots. Furthermore, the hazard rating (H1) shows no increase on neighbouring infrastructure between the pre and post development scenarios.

Therefore, the post-development model is assessed to have no overland flow displacement and has no negative impact on flood flow through nearby properties and the likelihood of any increased risk of detrimental impact resulting from future residential development is low.

3.3 Development Effects on Stormwater Discharge

Figure 6 below shows the discharge hydrograph at the cross sectional result line on the property boundary for the overland flow through the development area. The graph was captured in the model for both pre- and post-development runs and combined in graph format to demonstrate the change in net discharge and velocity.

It demonstrates an increase in velocity of 0.72 m/s from 0.43 m/s to 1.15 m/s. The relatively high increase in velocity is due to the flow being channelled through the recommended table drain. If the table drain is excluded in the post development scenario, the maximum post development velocity is 0.69 m/s indicating a 0.19 m/s increase.

Net discharge is showing a minor increase of 0.03 m^3/s in the post development scenario.

The changes discharge is minimal and could be attributed to model sensitivity. The change in velocity can be explained by the presence of the table drain along the cross-sectional results line.

It is therefore deemed that the post development model **does not increase net discharge**.

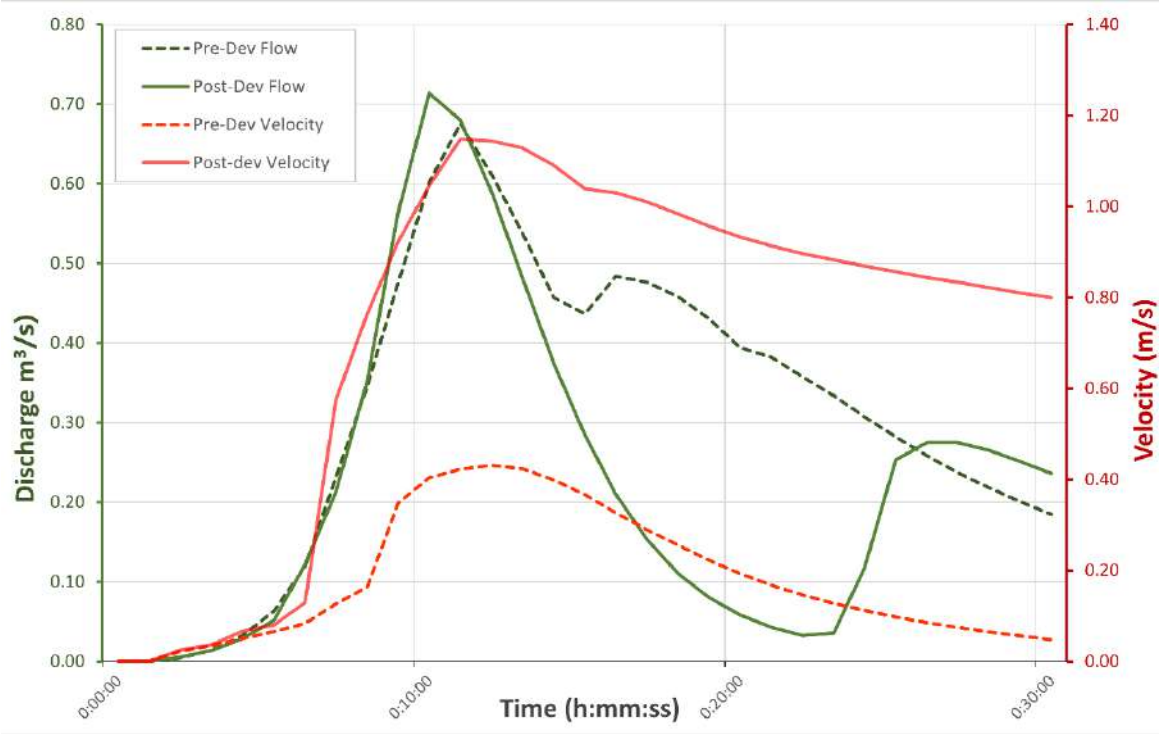

Figure 6. Pre and Post development net discharge and velocity 1% AEP + CC at 223 Carlton River Road

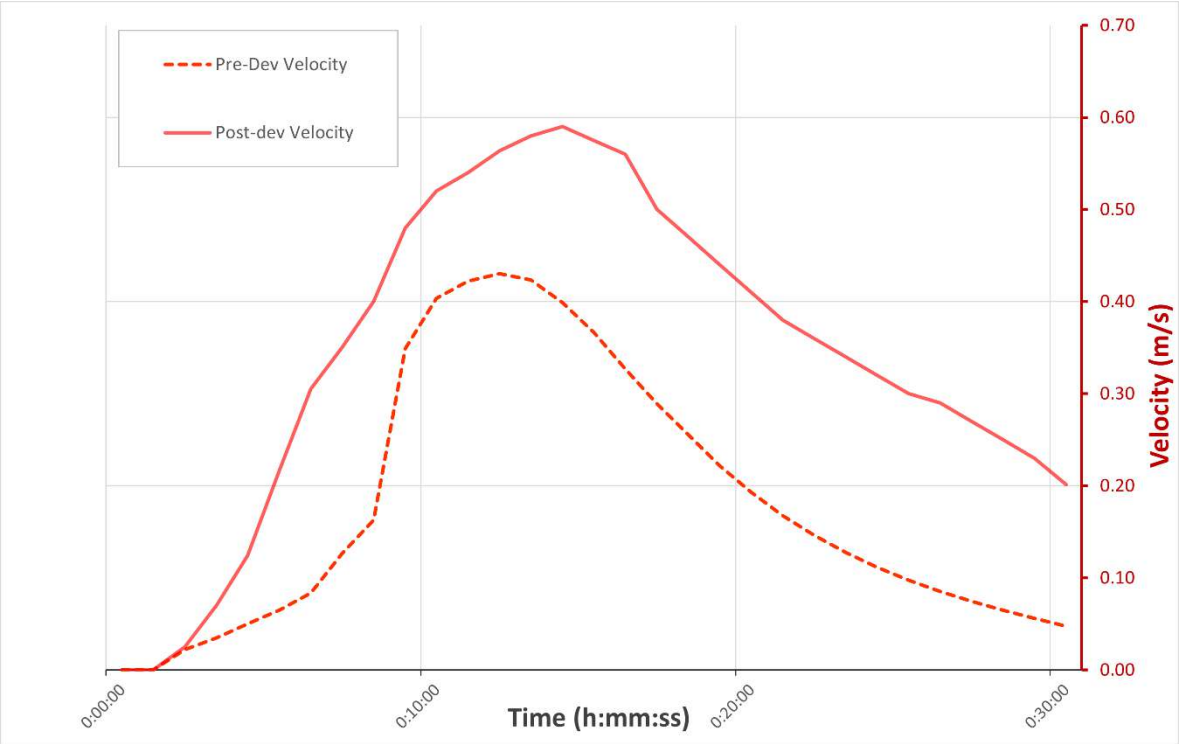

Figure 7. Pre and Post development velocity 1% AEP + CC at 223 Carlton River Road excluding the recommended table drain.

3.4 Model Summary

Table 6. Pre-development and post-development at the cross-sectional line within the lot

	Pre-development	Post-development	Net Change
Depth (m)	0.14	0.18	0.04
Velocity (m/s)	0.43	1.15	0.72
Discharge (m^3/s)	0.68	0.71	0.03

4. Flood Hazard

Under existing conditions prior to development, the proposed location of the subdivision is subject to be inundated to < 0.14 m flood depth and < 0.43 m/s velocity the cross-sectional result line. This places the hazard rating as adopted by Australian Flood Resilience and Design Handbook as a maximum H1 – *Generally safe for people, vehicles and buildings* as shown in Appendix A – Hazard maps.

The post-development scenario only sees the depth at the cross section increase by 0.04 m and the velocity showing an increase of 0.72 m/s.

Hazard extents in the post-development scenario is only limited to the proposed lots 4,5 and the proposed road extents with a maximum hazard rating of H1.

The drains within the road and the recommended table drain out falling to Terry Street experiences flood depths between 300-350mm in a few localised areas due to the depth of the drains. The H3-H4 hazard rating observed in the detention basin is restricted to the extents of the basin and will not pose any risk to buildings and people. With the above points in consideration, the hazard ratings seen within drains and the detention basin is deemed to negligible as they have no potential to increase the risk to human life and buildings.

Therefore, it can be concluded that the proposed development **does not increase the level of risk within the site and surrounding infrastructure.** This report would advise that residents and visitors remain inside in the event of a flood unless instructed by emergency services.

A summary of the hazard ratings is shown in Figure 8.

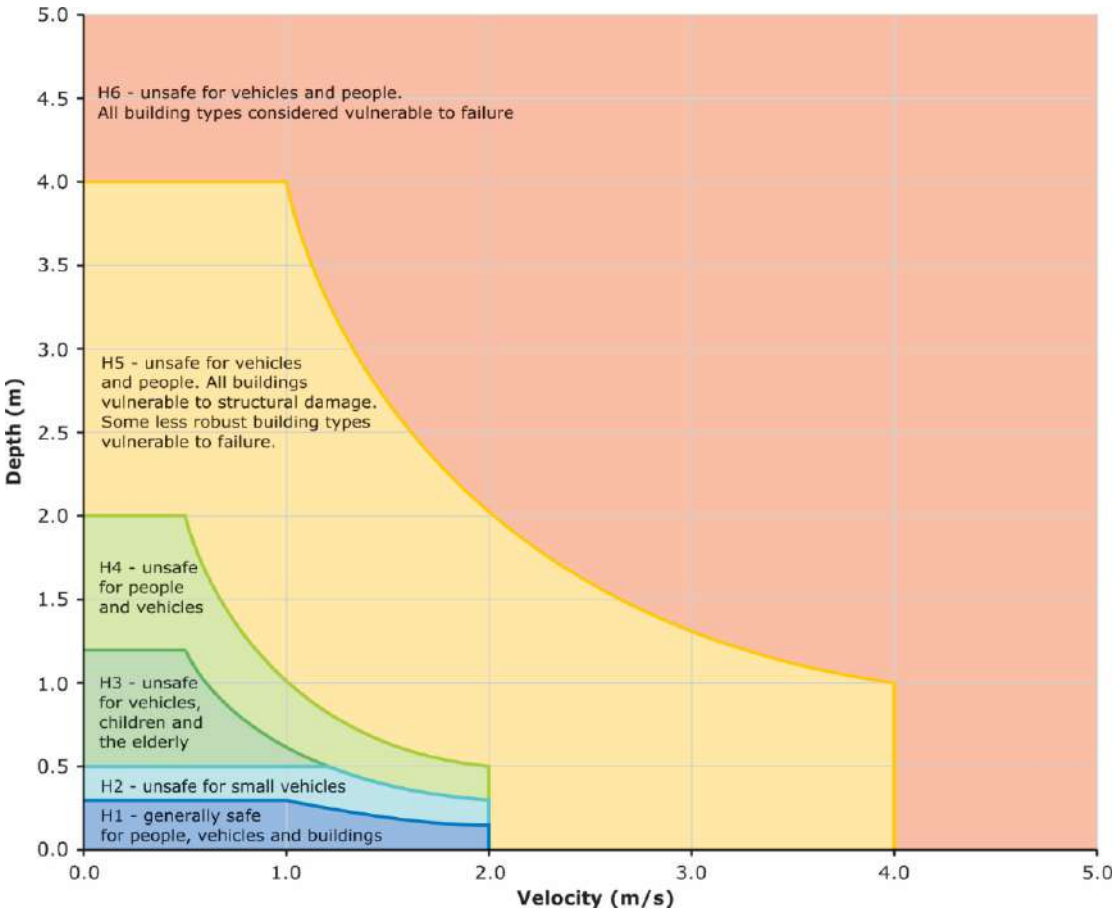

Figure 8. Hazard Categories Australian Disaster and Resilience Handbook

Specific hazard categories and flood characteristics for the affected lots are shown below in Table 7

Table 7. Lot characteristics within lots 4 and 5.

Lot	1% AEP +CC flood Velocity (m/s)	1% AEP +CC flood Depth (m)	Hazard Classification
4	0.7	0.05	H1
5	0.8	0.08	H1

4.1 Tolerable Risk

The lot at 223 Carlton River Road, Carlton is susceptible to a relatively shallow, slow-moving flood plain flow, with the majority of the immediate surrounding region classified as (H1) hazard rating in the 1% AEP + climate change event. Following the development, hazard rating extents have remained at the maximum hazard rating of H1. Therefore, it is deemed that the proposed subdivision does not provide an opportunity for development that cannot achieve a tolerable risk to flooding if recommendations in this report are followed.

Velocities and depths, although relatively small, still present some risks from erosion and debris movement. It is recommended that all future structures undertake a hydrostatic/ hydrodynamic analysis to ensure suitability.

Table 8. TPS C12.7.1 Subdivision within a flood-prone hazard area

C12.7.1 Subdivision within a flood-prone hazard area			
Objectives: That subdivision within a flood-prone hazard area does not create an opportunity for use or development that cannot achieve a tolerable risk from flood.			
Performance Criteria			
A1		**P1**	
Each lot, or a lot proposed in a plan of subdivision, within a flood-prone hazard area, must not create an opportunity for use or development that cannot achieve a tolerable risk from flood, having regard to:		Response from flood report	
(a)	any increase in risk from flood for adjacent land;	(a)	Increase in flood risk on adjacent land following any residential development would be negligible.
(b)	the level of risk to use or development arising from an increased reliance on public infrastructure;	(b)	Development on proposed lots would not increase the risk of additional reliance on public infrastructure.
(c)	the need to minimise future remediation works;	(c)	Future use of proposed lots could be developed for residential purposes without the need of significant remediation works as building envelopes are only partially inundated by riverine flooding < 0.1 m depth and < 1.0 m/s velocity.
(d)	any loss or substantial compromise by flood of access to the lot, on or off site;	(d)	Access to all proposed lots except lot 4 from the public road is outside flood inundation area. Lot 4 access is at a maximum hazard rating of H1 which makes it safe for access.
(e)	the need to locate building areas outside the flood-prone hazard area;	(e)	The risk to future buildings being partially located within the H1 hazard band in lots 4 and 5 is acceptable.
(f)	any advice from a state authority, regulated entity or a council; and	(f)	N/A
(g)	the advice contained in a flood hazard report.	(g)	Refer to this report and recommendations.

5. Conclusion

The Flood Hazard Report for the 223 Carlton River Road, Carlton development site has reviewed the potential development flood scenario.

The following conclusions were derived in this report:

1. A comparison of the post-development peak flows for the 1% AEP and storm surge event at 2100 were undertaken to address C12.7.1 of the TPS – Sorell.
2. Minor increase of 0.04 m of flood depth at the property boundary from pre-development to post-development scenario.
3. Peak discharge sees a small increase of 0.03 m^3/s from pre- to post-development, riverine flood scenarios.
4. Velocity shows an increase of 0.72 m/s change between pre- and post-development, riverine flood scenarios as the flow channels through the recommended table drain.
5. Hazard from flooding within the lot remain at the majority category of H1 for both pre and post development scenarios.

6. Recommendations

Flüssig Engineers therefore recommends the following engineering design be adopted for the development and future use to ensure the works meets the Inundation Code:

1. The new subdivision to provide an unobstructed overland flow path corridors toward the existing watercourses to accommodate the 1% AEP flood scenario. DN450 pipes have been provided under lot driveways to provide this unobstructed flow path.
2. The proposed road to have 0.6m deep, 3.6 m top width open Vee drains on the sides according to Flüssig Engineers' civil concept drawings.
3. The proposed road to be connected to a to a 0.3 m deep, 3 m table drain/footpath out falling to Terry Street. It is recommended to protect this drain by a drainage easement.
4. All future proposed structures within the flood extent not shown within this report will require a separate design and report addressing their impacts.
5. The new road and services infrastructure to be designed to resist flood forces including debris.
6. Future use of lot areas to be limited to areas deemed safe under the ARR Disaster Manual categories.
7. Road and access use be limited to use deemed safe under the ARR Disaster manual categories.
8. An emergency evacuation plan be implemented as a precaution to flooding.

Under the requirements of this Flood Hazard Report, the proposed development will meet current acceptable solutions and performance criteria under the Tasmanian Planning Scheme – Sorell.

7. Limitations

Flüssig Engineers were engaged by **Stagar Pty Ltd** for the purpose of a site-specific Flood Hazard Report for the site at 223 Carlton River Road, Carlton as per C12.7.1 of the Tasmanian Planning Scheme - Sorell 2021. This study is deemed suitable for purpose at the time of undertaking the study. If the conditions of the development should change, the plan will need to be reviewed against all changes.

This report is to be used in full and may not be used in part to support any other objective other than what has been outlined within, unless specific written approval to do otherwise is granted by Flüssig Engineers.

Flüssig Engineers accepts no responsibility for the accuracy of third-party documents supplied for the purpose of this flood report.

8. References

- Australian Disaster Resilience Guideline 7-3: Technical flood risk management guideline: Flood hazard, 2014, Australian Institute for Disaster Resilience CC BY-NC
- Austroads 2013, Guide to Road Design Part 5: Drainage-General and Hydrology Considerations
- Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors), 2019, Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia
- Grose, M. R., Barnes-Keoghan, I., Corney, S. P., White, C. J., Holz, G. K., Bennett, J., & Bindoff, N. L. (2010). Climate Futures for Tasmania: General Climate Impacts Technical Report.
- T.A. Remenyi, N. Earl, P.T. Love, D.A. Rollins, R.M.B. Harris, 2020, Climate Change Information for Decision Making –Climate Futures Programme, Discipline of Geography & Spatial Sciences, University of Tasmania.

9. Appendices

Appendix A Flood Maps

PRE 1% AEP + CC @2100

Legend

223 Carlton River Road

1.00m Contours

Boundary Lines

Pre 1% AEP + CC @2100

Depth (m)

- <= 0.03
- 0.03 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.60
- 0.60 - 0.80
- 0.80 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 60 120 m

meters

N

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- 12-12-2023 - Flussig Engineers

Map CRS: GDA94 / MGA zone 55 EPSG:28355

PRE 1% AEP + CC @2100

Legend

223 Carlton River Road

1.00m Contours

Boundary Lines

Pre 1% AEP + CC @2100

Velocity (m/s)

- <= 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 60 120 m

meters

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PRE 1% AEP + CC @2100

Legend

223 Carlton River Road

1.00m Contours

Boundary Lines

Pre 1% AEP + CC @2100

Hazard

- H1
- H2
- H3
- H4
- H5
- H6

0 60 120 m

meters

N

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Map CRS: GDA94 / MGA zone 55 EPSG:28355

POST 1% AEP + CC @2100

Legend

223 Carlton River Road
1.00m Contours
Boundary Lines
Proposed layout
Detention Basin for 5% AEP event
Table drain for flood path
Proposed Open Drain
2.7m W x 0.45m D

Post 1% AEP + CC @2100

Depth (m)
- <= 0.03
- 0.03 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.60
- 0.60 - 0.80
- 0.80 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 60 120 m

meters

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POST 1% AEP + CC @2100

Legend

223 Carlton River Road

Boundary Lines

Proposed layout

Detention Basin for 5% AEP event

Table drain for flood path

Proposed Open Drain

2.7m W x 0.45m D

Post 1% AEP + CC @2100

Velocity (m/s)

- <= 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 60 120 m

meters

N

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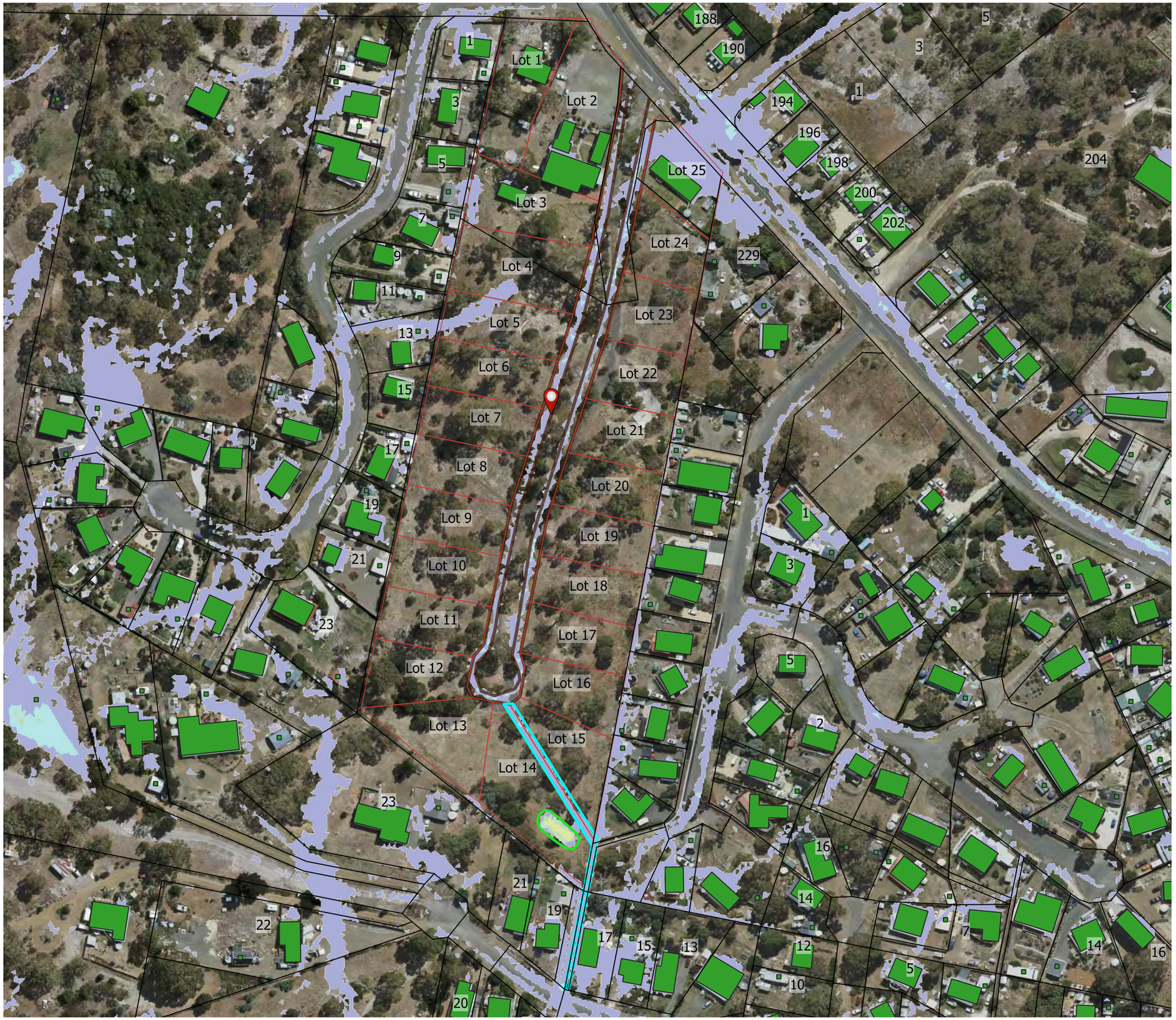
Map CRS: GDA94 / MGA zone 55 EPSG:28355

POST 1% AEP + CC @2100



Legend

223 Carlton River Road

Boundary Lines

Proposed layout

Detention Basin for 5% AEP event

Table drain for flood path

Proposed Open Drain

2.7m W x 0.45m D

Post 1% AEP + CC @2100

Hazard

- H1
- H2
- H3
- H4
- H5
- H6

0 60 120 m

meters

N

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- 12-12-2023 - Flussig Engineers

Map CRS: GDA94 / MGA zone 55 EPSG:28355

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GES

GEO-ENVIRONMENTAL

SOLUTIONS

ON-SITE WASTEWATER ASSESSMENT

223 Carlton River Road, Carlton

Updated November 2023

Geo-Environmental Solutions P/L 29 Kirksway Place, Battery Point.

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Contents

1. Introduction

The proposed subdivision site is located at 223 Carlton River Road in the locality of Carlton, Tasmania. The total current land area of the existing lot (PID: 5914397) is approximately 4.1ha, of which it is proposed to create twenty five (25) residential lots. The proposed new lots will vary in size from 1200m^2 to 2496m^2 (see Figure 2 – subdivision proposal). The site is not serviced with mains sewer, therefore onsite wastewater disposal would be required on the lots (see Figure 1 for study area). The land area in question is undulating to approx. 10% to the Southwest.

It is the scope of this report to consider the capability of said land to support sustainable residential use including on site wastewater disposal without sustaining environmental harm.

Figure 1 – Whole Site Location (subdivision site outlined black)

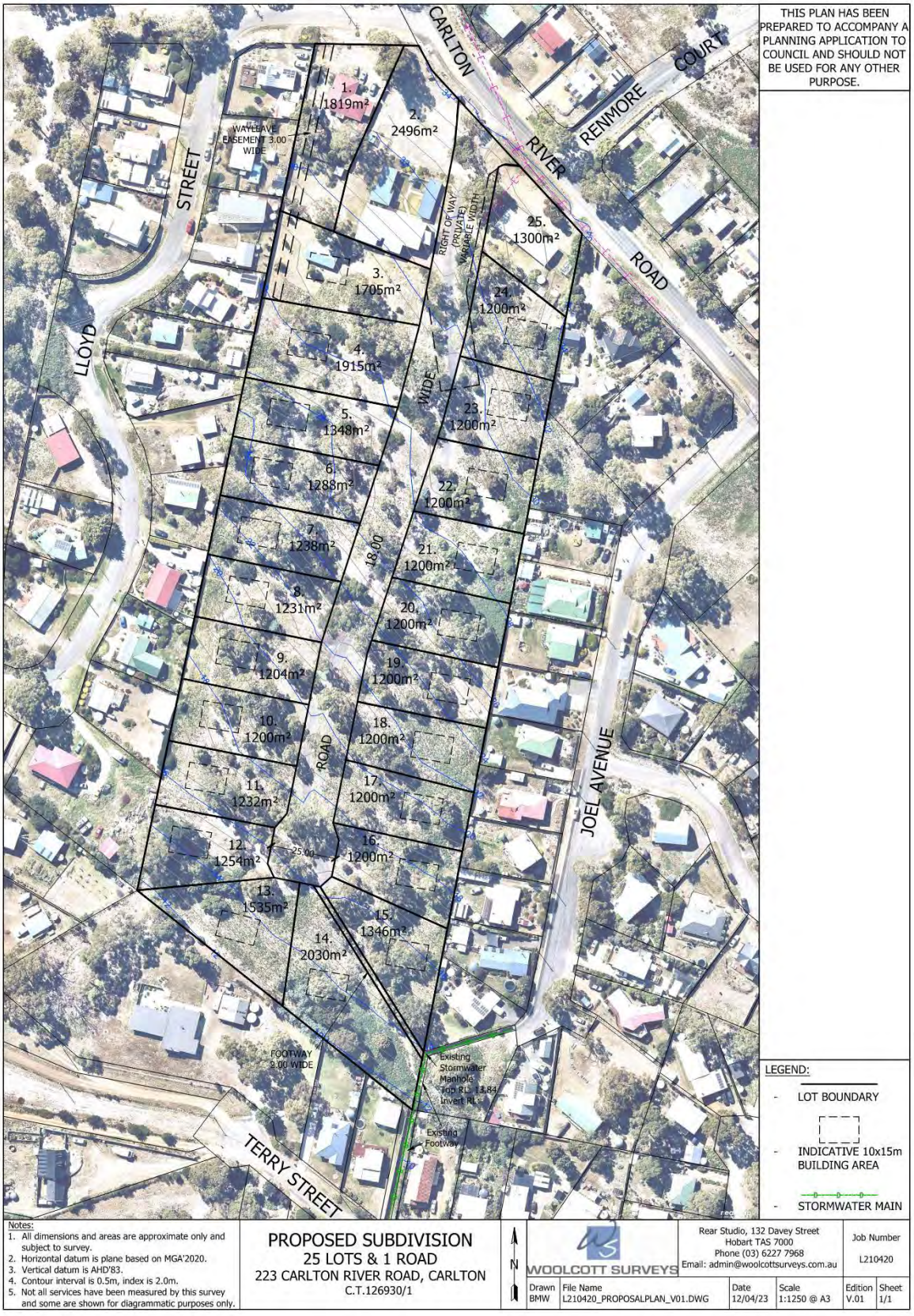


Figure 2 – Subdivision Proposal

2. Planning Context

The land area proposed for subdivision falls within the Low Density Residential Zone as defined by the Tasmanian Planning Scheme (see Figure 3). Therefore, the subdivision must comply with the requirements for this zoning as set out in Section 10.0 of the Tasmanian Planning Scheme – State Planning Provisions. Section 10.6.1 Lot Design stipulates a minimum lot size of 1500m^2 under the Acceptable Solutions or 1200m^2 under Performance. All lots with an area of less than 1500m^2 are also subject to the provisions of SOR-S2.0 Southern Beaches On-site Waste Water and Stormwater Management Specific Area Plan in addition to the provisions of the Low Density Residential Zone. This specific area plan does not stipulate any development standards for subdivision.

The proposed lots will comply with the majority of criteria outlined under A1 of SOR-S2.7.1 On-site Waste Water and will achieve the clause objective under compliance with P1 where the Acceptable Solution is not achievable (see Appendix 5).

As there is no instrument within the Scheme to assess site capability for on-site wastewater adequate for the future use and development of the land, this is best demonstrated by examination against the Guidelines for on-site wastewater within the Building Act framework. Provided that the requirements are met regarding the provision of infrastructure, and the land is suitable for residential construction/on-site wastewater management the application to develop the land should proceed.

Figure 3 – Planning Zones – Tasmanian Planning Scheme (subdivision site outlined black)

3. Site Information

Site information pertaining to the capability of the land to sustain residential development without causing environmental harm was collected from desktop and field survey. Field survey was undertaken utilising an AMS PowerProbe auger system, with soil samples assessed according to AS1547-2012 for suitability for on-site wastewater management.

3.1 Geology

The study area falls within the Mineral Resources Tasmania, 1:250 000 sheet which indicates the area is formed by Quaternary aged sediments. Site inspection confirmed aeolian sediments is the predominant parent material for the relatively uniform soils forming across the site with a possible underlying basement of sandstone bedrock. These areas were examined as deep uniform sandy soils to depths of generally over 2.00m with some variation in soil depth and horizon development expected across the site.

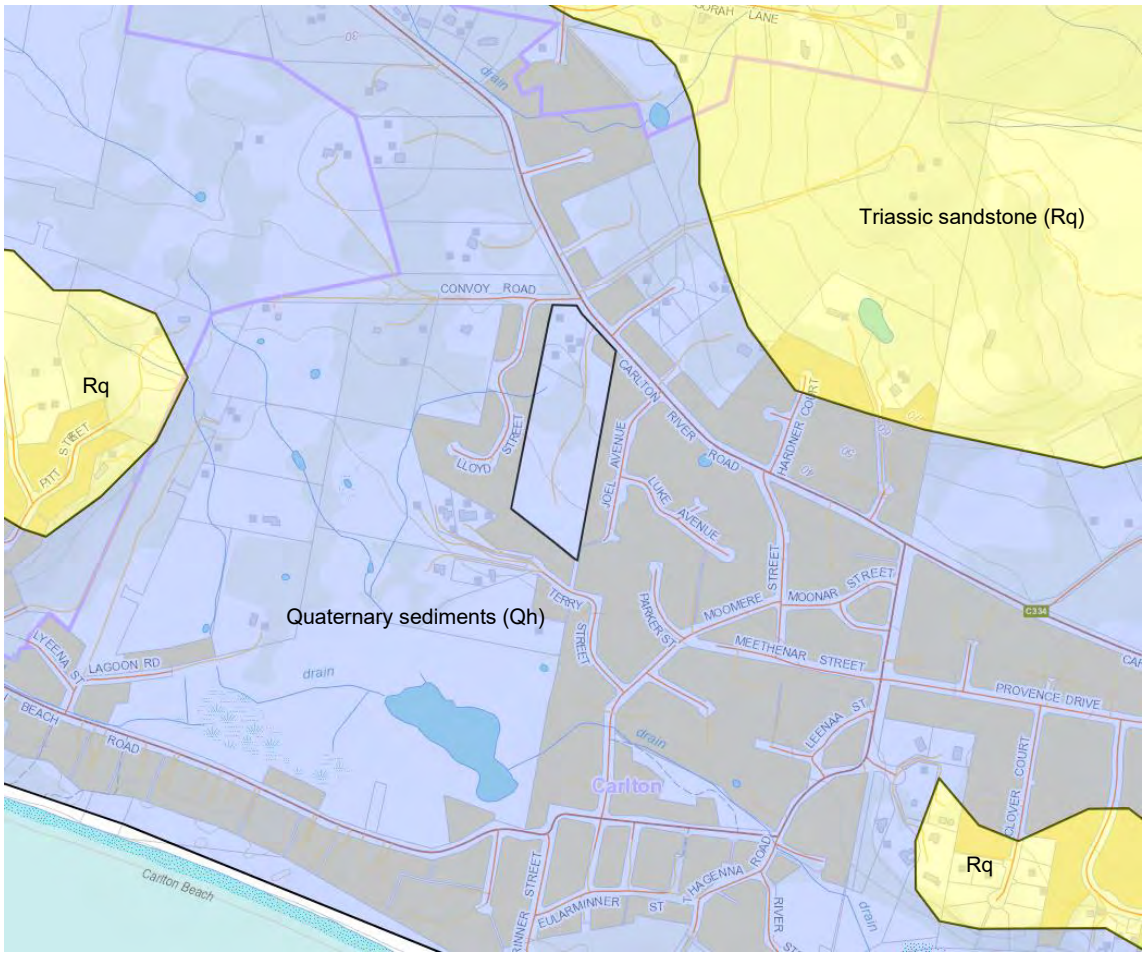


Figure 5 - MRT 1:250 000 Sheet Geological Survey (subdivision site outlined black)

3.1 Soil Distribution

The soil found on the property shows a close correlation with the Quaternary aeolian deposits typical of the area. Soil distribution within the proposed subdivision area was relatively uniform.

Soils on these aeolian deposits are characterised by moderately deep sandy profiles. The anticipated subsoil permeability under saturated conditions from samples across the site is expected to be in the order of >3m/day.

Soils of this type developing on aeolian deposits are generally unreactive or stable (AS2870-2011 Class A). These soils may also be prone to surface erosion when denuded of cover, and or subject to abnormal drainage conditions.

4. Site Suitability for Onsite Wastewater Disposal

The soils across the subdivision site were compared and classified according to AS/NZS1547-2012 (on-site wastewater management). Bore logs for each profile based upon onsite geotechnical drilling is presented in Appendix 2 whilst site and soil factors pertinent to wastewater disposal under AS1547-2012 are presented in Table 1 and Table 2 overleaf.

The soils across the site area classified according to AS1547-2012 as **Category 1 (SAND)** with high Long Term Acceptance Rates (LTAR's). These highly permeable soils coupled with the spatial constraints of the site make the proposed lots unsuited to a primary treatment system and each lot would require secondary treatment of effluent via a packaged treatment system. The proposed lots are best suited to in-ground disposal of secondary treated wastewater to minimise wastewater area requirements.

Modelling utilising a typical three-bedroom house on tank water with standard plumbing fixtures indicates that a disposal area of up to 36m^2 (18m^2 installed and 18m^2 reserve) should be set aside wastewater disposal on each lot (see Trench summary reports attached). Based upon allowances for adequate down slope boundary setbacks and sufficient construction, access, and recreational space, then I recommend that a minimum area available for wastewater disposal of flow from any future dwelling to be 100m^2 would be adequate for subdivision design. It should be noted that this area is based upon the installation of an AWTS or similar packaged system on each lot.

The site contains several buildings that are serviced by existing onsite wastewater systems. These buildings are within proposed lots 1, 2 and 25. On lot 1 the existing system currently has failing septic tank. The land application area location could not be verified however no evidence of absorption trenches were found across proposed lot boundaries. It is proposed that this system be decommissioned and replaced with a new secondary treated system.

On lot 2 the septic system was verified on site to be located South of the building. Because this is located on a new lot It is proposed that this system be decommissioned and replaced with a new secondary treated system.

The septic tank on lot 25 is also just South of the building. The disposal area was confirmed to be located on the proposed boundary with lot 24. As such, it would be prudent to disconnect and decommission this system with a new secondary treatment system installed.

All parts of the redundant systems should be emptied by a licensed liquid waste contractor. The septic tanks should be disinfected with ag lime or hydrated lime. Where possible, the old system should be removed from the site. Alternatively, the lid and base of the septic tank are to be broken up to below ground level and the tank filled with compacted clean fill and the surface relevelled. If settling occurs over time then additional fill may be required. The inlet and outlet pipes on the tank must be permanently sealed or plugged.

The exact use and respective wastewater output of each of the buildings would need to be confirmed. For the purpose of subdivision assessment, they have been modelled on the requirements for a typical three-bedroom dwelling as the remaining lots.

On each lot, the suitability and design of the application area will depend on the relative position of the dwelling, driveway, and other infrastructure to an area viable for wastewater disposal.

Nutrient balance and sustainable wastewater application

The soils across the entire site are developed from aeolian deposits with a low cation exchange complex. These soils have no significant clay fraction and are therefore not at risk of soil dispersion. The soils examined are fine to medium grained sands that are expected to have low nutrient adsorption capacity. Therefore, the soils have a poor ability to retain applied nutrients in wastewater and the risk of nutrient attenuation associated with wastewater application is high. Planting of deep rooted appropriate species is recommended to aid nutrient uptake. Furthermore, it is recommended that detailed soil classification is undertaken in proposed disposal areas on each lot to ensure the predicted soil behaviour and effluent disposal standards are met.

Table 1.0 Summary of Site Factors Affecting Onsite Wastewater Disposal

Soil Depth to Auger Refusal (m)	2.00+
Slope Type, Magnitude and Aspect (%)	Simple 10% SW
Soil Classification according to AS1547-2012	Category 1 – SAND
Potential Dispersion Risk	Low
Sensitive Environmental Receptors	Waterbody >300m*
Suitability for AWTS/septic	AWTS with suitable setbacks

**Note: a minor tributary is mapped as draining through Lot 5. Further investigations are required to determine the exact location of this watercourse and identify any potential impact this may have on site design. Lots 2 – 5, 23 – 25 and some of the proposed road have a flood-prone areas overlay (TPS) mapped over variably sized areas (see Appendix 4). Further investigations and site specific design may be required to address these constraints.*

There are many established groundwater bores mapped throughout the Carlton area, with three mapped within the subdivision site and several mapped within 50m of the site on the Groundwater Information Access Portal (see Appendix 4). Those mapped within the site are listed with an operational status as either abandoned, capped or unknown. Those mapped outside of the site are all listed as functioning with the most recent operating status date being 2005.

Table 2.0 Groundwater Bores in Vicinity of Proposed Subdivision

Bore #	***Comments***	***Status***
2922	Within proposed Lot 21	Abandoned
3023	Within proposed Lot 5	Capped
3335	Within proposed Lot 5	Unknown
16492	>50m from site	-
17392	Approx. 10m from Eastern boundary of proposed Lot 22 cross-slope	Functioning
17393	>50m from site	-
31043	Approx. 45m from Southwestern boundary of proposed Lot 9 down-slope	Functioning
40547	Approx. 42m from Western boundary of proposed Lot 12 cross-slope	Functioning

Coordinate accuracy of the mapped bore locations is 25-50m. It is unknown if any of the bores are still utilised and what service they currently provide, if any. Given the proposed use of secondary treatment there is low risk of groundwater contamination and it appears at this stage that sufficient setback distances can be achieved from any remaining bores in the vicinity of the proposed subdivision.

Hydrological balance and wastewater disposal

Modelling of wastewater application on each lot was undertaken utilising the Trench program, long term weather average for Carlton, and estimated flows from an average three-bedroom home. This yielded a minimum AWTS application area of approximately 18m^2, which is further amended to 36m^2 to fulfil the requirements for a 100% reserve area. Based upon the modelling undertaken in Trench, the required areas are more than adequate to sustain long term wastewater application on each lot. It should however be noted that the modelling is based upon the installation of packaged treatment systems (e.g., AWTS) with in-ground absorption for a single dwelling on each lot. Recommendations can be made about the suitability and design requirements of the system and the final decision of wastewater system approval rests with the permit authority at the time of site specific design to ensure the most compatible environmental and economic outcomes.

Setbacks distances to boundaries and sensitive features

The proposed lots have gentle slopes and the average slope of approximately 10% or 6° has been utilised to represent the indicative required setbacks. The minimum acceptable boundary setbacks modelled according to the acceptable solutions stipulated in Building Act 2016 for on-site wastewater management for the development are:

Table 2.0 – Building Act 2016 setback requirements

	10% (6 degrees)
Upslope or level boundary	1.5m
Downslope boundary	7.5m
Upslope or level building	3m
Downslope building	3.5m
Downslope surface water	27m
Groundwater	0.6m
Limiting layer	0.5m

**Note: See Appendix 6 for Building Act compliance.*

A subdivision proposal with lots of a minimum area of approximately 1200m^2 should allow for significant space on each lot for wastewater disposal with adequate setbacks in regards boundaries and sensitive features. Therefore, it is concluded that current subdivision plan results in lots compliant with the onsite wastewater guidelines and the Tasmanian Planning Scheme.

Site specific setbacks applied to each lot will require fine tuning at the special plumbing permit stage as access, parking, and building footprints are finalised in conjunction with wastewater disposal areas. Modelling at this planning stage does however suggest that sufficient room would be available on each lot to accommodate the required setbacks.

5. Conclusions

In conclusion, I feel that the land area examined is capable of supporting residential development provided that the identified landscape constraints are addressed with appropriate site specific management strategies.

- The land surveyed is suitable for on site wastewater disposal utilising a packaged treatment plant with absorption. Application area design will vary for each site depending upon the soil characteristics, final lot layout and construction type.
- Based upon the modelling undertaken a minimum lot size of 1200m^2 would be adequate to accommodate residential development and on-site wastewater disposal.
- Appropriate setbacks from wastewater application areas must be assessed in the site specific building and wastewater design phase.

- The presence of sensitive environmental receptors and flood-prone areas must be considered in system design.
- All earthworks on site must comply with AS3798-2007 and consideration should be given to drainage and sediment control on site during and after construction.
- The final approval for construction and wastewater disposal rests with the permit authority at the building approvals stage, and the recommendations in this report should not be viewed as blanket approval for any scale or type of residential development on each lot. Sites must be revisited for individual onsite wastewater assessments.
- The scale and type of residential development on each lot should therefore be appropriate to the environmental constraints of each Lot – therefore I recommend that geotechnical information be provided to prospective purchasers to allow informed decisions.

It is my professional opinion that the land surveyed is suitable to support residential development and on-site wastewater without sustaining environmental harm.

Dr John Paul Cumming B.Agr.Sc (hons) PhD CPSS GAICD
Environmental and Engineering Soil Scientist

Appendix 1 –Trench Summary Reports

GES P/L

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Assessment Report

Site assessment for on-site waste water disposal

Assessment for	Carlton Dixon	Assess. Date	2-Aug-23
		Ref. No.	
Assessed site(s)	223 Carlton River Road, Carlton	Site(s) inspected	30-Jun-23
Local authority	Sorell	Assessed by	John Paul Cumming

This report summarises wastewater volumes, climatic inputs for the site, soil characteristics and sustem sizing and design issues. Site Capability and Environmental sensitivity issues are reported separately, where 'Alert' columns flag factors with high (A) or very high (AA) limitations which probably require special consideration for system design(s). Blank spaces on this page indicate data have not been entered into TRENCH.

Wastewater Characteristics

Wastewater volume (L/day) used for this assessment = 600 (using the 'No. of bedrooms in a dwelling' method)
Septic tank wastewater volume (L/day) = 200
Sullage volume (L/day) = 400
Total nitrogen (kg/year) generated by wastewater = 5.4
Total phosphorus (kg/year) generated by wastewater = 2.3

Climatic assumptions for site (Evapotranspiration calculated using the crop factor method)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean rainfall (mm)	39	32	45	35	42	53	33	49	46	44	43	43
Adopted rainfall (R, mm)	39	32	45	35	42	53	33	49	46	44	43	43
Retained rain (Rr, mm)	33	27	39	30	36	45	28	42	39	37	36	36
Max. daily temp. (deg. C)												
Evapotrans (ET, mm)	130	110	91	63	42	29	32	42	63	84	105	126
Evapotr. less rain (mm)	**97**	**83**	**52**	**33**	**6**	**-16**	**3**	**0**	**24**	**47**	**69**	**90**

Annual evapotranspiration less retained rain (mm) = 489

Soil characterisitics

Texture = Sandy LOAM Category = 2 Thick. (m) = 3
Adopted permeability (m/day) = 3 Adopted LTAR (L/sq m/day) = 40 Min depth (m) to water = 2

Proposed disposal and treatment methods

Proportion of wastewater to be retained on site:	All wastewater will be disposed of on the site
The preferred method of on-site primary treatment:	In a package treatment plant
The preferred method of on-site secondary treatment:	In-ground
The preferred type of in-ground secondary treatment:	Evapotranspiration bed(s)
The preferred type of above-ground secondary treatment:	None
Site modifications or specific designs:	Not needed

Suggested dimensions for on-site secondary treatment system

Total length (m) =	6
Width (m) =	3
Depth (m) =	0.6
Total disposal area (sq m) required =	36
comprising a Primary Area (sq m) of:	18
and a Secondary (backup) Area (sq m) of:	18

Sufficient area is available on site

Comments
The assigned LTAR for the Category 2 soil present is 40L/m^2/day with an absorption area of 18m^2 required for a typical three-bedroom dwelling with a tank water supply.

GES P/L

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Site Capability Report

Site assessment for on-site waste water disposal

Assessment for	Carlton Dixon	Assess. Date	2-Aug-23
		Ref. No.	
Assessed site(s)	223 Carlton River Road, Carlton	Site(s) inspected	30-Jun-23
Local authority	Sorell	Assessed by	John Paul Cumming

This report summarises data relating to the physical capability of the assessed site(s) to accept wastewater. Environmental sensitivity and system design issues are reported separately. The 'Alert' column flags factors with high (A) or very high (AA) site limitations which probably require special consideration in site acceptability or for system design(s). Blank spaces indicate data have not been entered into TRENCH.

Alert	Factor	Units	Value	Confid level	Limitation Trench	Limitation Amended	Remarks
	Expected design area	sq m	1,200	V. high	Low		
	Density of disposal systems	/sq km	20	Mod.	Moderate		
	Slope angle	degrees	6	High	Low		
	Slope form	Convex spreading		High	Very low		
	Surface drainage	Good		High	Very low		
	Flood potential	Site floods 1 in 75-100 yrs		High	Low		
	Heavy rain events	Infrequent		High	Moderate		
A	Aspect (Southern hemi.)	Faces SE or SW		V. high	High		
	Frequency of strong winds	Common		High	Low		
	Wastewater volume	L/day	600	High	Moderate		
	SAR of septic tank effluent		1.4	High	Low		
	SAR of sullage		2.5	High	Moderate		
	Soil thickness	m	3.0	V. high	Very low		
	Depth to bedrock	m	3.0	V. high	Very low		
	Surface rock outcrop	%	0	V. high	Very low		
	Cobbles in soil	%	0	V. high	Very low		
	Soil pH		6.5	High	Very low		
	Soil bulk density	gm/cub. cm	1.5	High	Low		
	Soil dispersion	Emerson No.	8	V. high	Very low		
AA	Adopted permeability	m/day	3	Mod.	Very high		
AA	Long Term Accept. Rate	L/day/sq m	40	High	Very high		

Comments

The soils on site have good capacity to accept wastewater provided that secondary treatment of effluent is applied.

GES P/L

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Environmental Sensitivity Report

Site assessment for on-site waste water disposal

Assessment for	Carlton Dixon	Assess. Date	2-Aug-23
		Ref. No.	
Assessed site(s)	223 Carlton River Road, Carlton	Site(s) inspected	30-Jun-23
Local authority	Sorell	Assessed by	John Paul Cumming

This report summarises data relating to the environmental sensitivity of the assessed site(s) in relation to applied wastewater. Physical capability and system design issues are reported separately. The 'Alert' column flags factors with high (A) or very high (AA) limitations which probably require special consideration in site acceptability or for system design(s). Blank spaces indicate data have not been entered into TRENCH.

Alert	Factor	Units	Value	Confid level	Limitation Trench	Limitation Amended	Remarks
A	Cation exchange capacity	mmol/100g	30	High	High		
A	Phos. adsorp. capacity	kg/cub m	0.3	High	High		
	Annual rainfall excess	mm	-489	High	Very low		
	Min. depth to water table	m	2	High	Low		
	Annual nutrient load	kg	7.7	High	Low		
	G'water environ. value	Agric sensit/dom irrig		V. high	Moderate		
	Min. separation dist. required	m	2	High	Very low		
	Risk to adjacent bores						Factor not assessed
	Surf. water env. value	Agric sensit/dom drink		V. high	Moderate		
	Dist. to nearest surface water	m	300	V. high	Low		
AA	Dist. to nearest other feature	m	10	V. high	Very high		
	Risk of slope instability	Very low		V. high	Very low		
	Distance to landslip	m	1000	V. high	Very low		

Comments

There is low risk of environmental degredation associated with the disposal of wastewater on this site if secondary treatment is applied and setbacks are observed.

Appendix 2 – Bore Logs

Hole 1 Depth (m)	Hole 2 Depth (m)	Horizon	Description
0.00 – 0.20	0.00 – 0.20	A1	Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.20 – 1.30	0.20 – 0.80	A2	Pale Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
1.30 – 1.50	0.80 – 1.00	Pan	Dark Brown **SAND (SW)**, trace of clay, single grain structure, slightly moist dense consistency, variable boundary to
1.50 – 2.0+	1.00 – 2.0+	A3	Pale Grey, Pale Yellow **SAND (SP),** single grain structure, slightly moist medium dense consistency, no refusal

Hole 3 Depth (m)	Hole 4 Depth (m)	Horizon	Description
0.00 – 0.20	0.00 – 0.30	A1	Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.20 – 0.90	0.30 – 1.00	A2	Pale Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.90 – 2.0+	1.00 – 2.0+	Pan	Dark Brown **SAND (SW)**, trace of clay, single grain structure, slightly moist dense consistency, no refusal

Hole 5 Depth (m)	Hole 6 Depth (m)	Horizon	Description
0.00 – 0.20	0.00 – 0.30	A1	Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.20 – 1.00	0.30 – 1.00	A2	Pale Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
1.00 – 2.0+	1.00 – 2.0+	A3	Pale Brown **SAND (SP),** single grain structure, slightly moist medium dense consistency, no refusal

Hole 7 Depth (m)	Hole 8 Depth (m)	Horizon	Description
0.00 – 0.30	0.00 – 0.30	A1	Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.30 – 1.00	0.30 – 1.40	A2	Pale Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
	1.40 – 1.50	Pan	Dark Brown **SAND (SW)**, trace of clay, single grain structure, slightly moist dense consistency, variable boundary to
1.00 – 2.0+		A3	Pale Grey, Pale Yellow **SAND (SP),** single grain structure, slightly moist medium dense consistency, no refusal
	1.50 – 2.0+	B1	Pale Brown, Greenish Grey, **Clayey SAND (SC)**, ~5% clay, weak polyhedral structure, moist, dense consistency, no refusal

Hole 9 Depth (m)	Hole 10 Depth (m)	Horizon	Description
0.00 – 0.30	0.00 – 0.50	A1	Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.30 – 2.0+	0.50 – 2.0+	A2	Pale Grey **SAND (SP),** single grain structure, slightly moist loose consistency, no refusal

Hole 11 Depth (m)	Hole 12 Depth (m)	Horizon	Description
0.00 – 0.40	0.00 – 0.20	A1	Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.40 – 2.0+	0.20 – 0.70	A2	Pale Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
	0.70 – 1.20	Pan	Dark Brown **SAND (SW)**, trace of clay, single grain structure, slightly moist dense consistency, variable boundary to
	1.20 – 2.0+	A3	Pale Grey, Pale Yellow **SAND (SP),** single grain structure, slightly moist medium dense consistency, no refusal

Hole 13 Depth (m)	Hole 14 Depth (m)	Horizon	Description
0.00 – 0.20	0.00 – 0.50	A1	Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.20 – 1.00	0.50 – 1.10	A2	Pale Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
1.00 – 2.0+	1.10 – 2.0+	B1	Pale Brown, Greenish Grey, **Clayey SAND (SC)**, ~5% clay, weak polyhedral structure, moist, dense consistency, no refusal

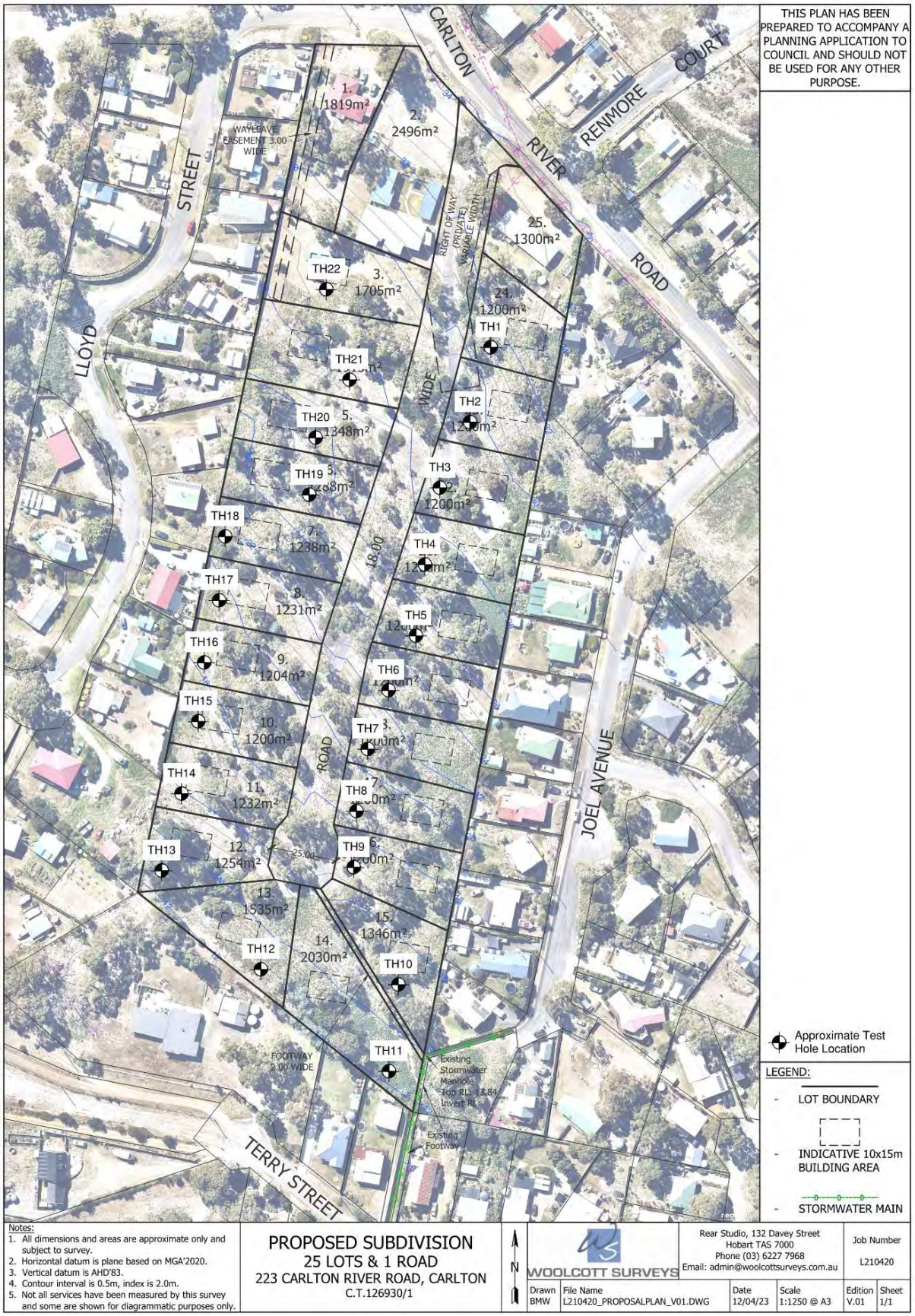
Hole 15 Depth (m)	Hole 16 Depth (m)	Horizon	Description
0.00 – 0.30	0.00 – 0.30	A1	Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.30 – 1.00	0.30 – 1.00	A2	Pale Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
1.00 – 1.50	1.00 – 1.30	B1	Pale Brown, Greenish Grey, **Clayey SAND (SC)**, ~5% clay, weak polyhedral structure, moist, dense consistency, variable boundary to,
1.50 – 2.0+	1.30 – 2.0+	B2	Brownish Yellow **CLAY (CI)**, moderate polyhedral structure, slightly moist, firm consistency, medium plasticity, no refusal

Hole 17 Depth (m)	Hole 18 Depth (m)	Horizon	Description
0.00 – 0.30	0.00 – 0.20	A1	Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.30 – 1.30	0.20 – 2.0+	A2	Pale Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
1.30 – 2.0+		A3	Pale Grey, Pale Yellow **SAND (SP),** single grain structure, slightly moist medium dense consistency, no refusal

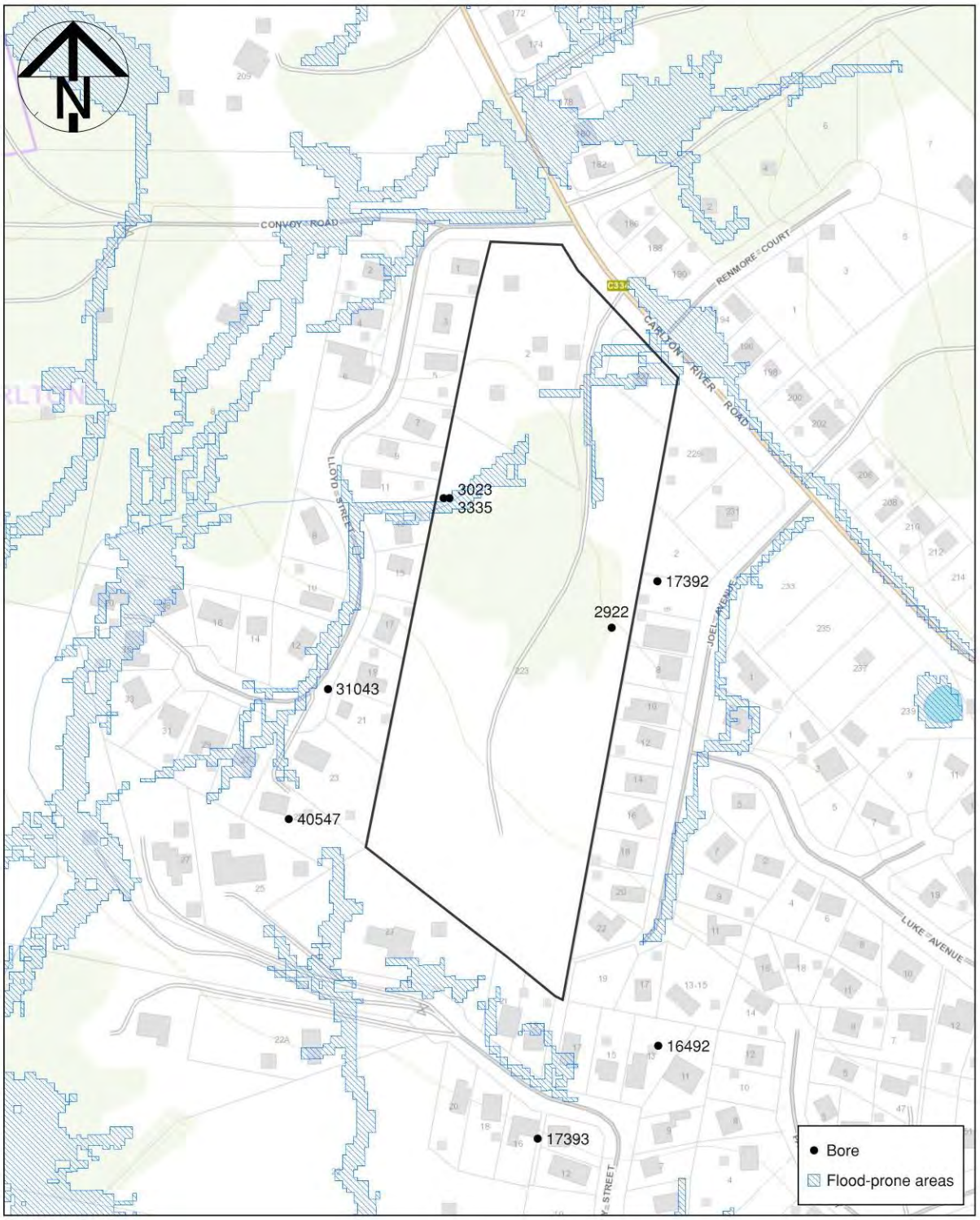
Hole 19 Depth (m)	Hole 20 Depth (m)	Horizon	Description
0.00 – 0.20	0.00 – 0.20	A1	Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.20 – 1.20	0.20 – 0.70	A2	Pale Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
1.20 – 2.0+	0.70 – 2.0+	A3	Pale Grey, Pale Yellow **SAND (SP),** single grain structure, slightly moist medium dense consistency, no refusal

Hole 21 Depth (m)	Hole 22 Depth (m)	Horizon	Description
0.00 – 0.20	0.00 – 0.20	A1	Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.20 – 0.50	0.20 – 1.00	A2	Pale Grey **SAND (SP),** single grain structure, slightly moist loose consistency, variable boundary to
0.50 – 2.0+	1.00 – 2.0+	A3	Pale Grey, Pale Yellow **SAND (SP),** single grain structure, slightly moist medium dense consistency, no refusal

Appendix 3 – Test Hole Locations



Appendix 4 – Hydrology



Appendix 5 – Sorell Local Provisions Schedule Excerpt

SOR–S2.0 Southern Beaches On-site Waste Water and Stormwater Management Specific Area Plan

SOR–S2.1 Plan Purpose

The purpose of the Southern Beaches On-site Waste Water and Stormwater Management Specific Area Plan is:

SOR-S2.1.1 That development requiring on-site waste water management on lots with an area of less than 1,500m^2 has sufficient land available for on-site waste water management.

SOR-S2.1.2 That stormwater quality and quantity is managed to protect natural assets, infrastructure and property.

SOR–S2.2 Application of this Plan

SOR-S2.2.1 This specific area plan applies to the area of land designated as the Southern Beaches On-site Waste Water and Stormwater Management Specific Area Plan on the overlay maps.

SOR-S2.2.2 In the area of land to which this plan applies, the provisions of the specific area plan are in addition to the provisions of:

(a) Low Density Residential Zone;

(b) Village Zone;

(c) Local Business Zone; and

(d) Rural Living Zone,

as specified in the relevant provision.

SOR–S2.3 Local Area Objectives

This sub-clause is not used in the specific area plan.

SOR–S2.4 Definition of Terms

SOR-S2.4.1 In this Specific Area Plan, unless the contrary intention appears:

Term	Definition
intensification	means a substantial and continuing increase in the number of persons occupying or capable of occupying, a dwelling or the number of persons visiting or working at a business premises.
land application area	means an area of land used to apply effluent from a waste water treatment unit and reserved for future waste water application.
suitably qualified person (onsite waste water management)	means a person who can adequately demonstrate relevant tertiary qualifications (or equivalent) and experience, knowledge, expertise or practice in undertaking onsite waste water management system design in accordance with AS/NZS 1547.

SOR–S2.5 Use Table

This sub-clause is not used in this specific area plan.

SOR–S2.6 Use Standards

SOR-S2.6.1 Uses within the Southern Beaches On-site Waste Water Management Specific Area Plan

This clause is in addition to Low Density Residential Zone – clause 10.3 Use Standards, Rural Living Zone – clause 11.3 Use Standards, Village Zone – clause 12.3 Use Standards, and Local Business Zone – clause 14.3 Use Standards.

Objective:	That on-site waste water management for residential or business use does not cause any adverse environmental impact or impact on public health.

Acceptable Solutions	**Performance Criteria**
A1 No change, expansion or intensification of residential or business use on the site.	**P1** The change, expansion or intensification of a residential or business use on the site does not cause any adverse environmental impact or impact on public health, having regard to: (a) the extent and nature of the land available on the property to accommodate an on-site waste water management system (including the land application area) for the proposed development; and (b) the land application area is setback a sufficient distance from watercourses, property boundaries and groundwater.

SOR – S2.7 Development Standards for Buildings and Works

SOR-S2.7.1 On-site waste water

This clause is in addition to the Low Density Residential Zone – clause 10.4 Development Standards for Dwellings and 10.5 Development Standards for Non-Dwellings, Rural Living Zone – clause 11.4 Development Standards for Building and Works, Village Zone – clause 12.4 Development Standards for Buildings and Works, and Local Business Zone – clause 14.4 Development Standards for Buildings and Works.

Objective:	That the site has a sufficient and suitable area of land available for on-site waste water management.

Acceptable Solutions	**Performance Criteria**
A1 Development must: (a) not cover more than 20% of the site; (b) not be located on land shown on an overlay map, as within: (i) a flood-prone hazard area; (ii) a landslip hazard area; (iii) a coastal erosion hazard area; (iv) a waterway and coastal protection area; or (v) a coastal inundation hazard area; (c) be located on a site with a soil depth of at least 1.5m; (d) be located on a site where the average gradient of the land does not exceed 10%; and (e) in the case of a dwelling, provide 65m^2 of land for wastewater land application area per bedroom which is located at least 1.5m from an upslope or side slope boundary and 5m from a downslope boundary.	**P1** The site must provide sufficient area for management of on-site waste water, having regard to: (a) the topography of the site; (b) the capacity of the site to absorb wastewater; (c) the size and shape of the site; (d) the existing buildings and any constraints imposed by existing development; (e) the area of the site to be covered by the proposed development; (f) the provision for landscaping, vehicle parking, driveways and private open space; (g) any adverse impacts on the quality of ground, surface and coastal waters; (h) any adverse environmental impact on surrounding properties and the locality; and (i) any written advice from a suitably qualified person (onsite waste water management) about the adequacy of the on-site waste water management system.
A2 An outbuilding, driveway or parking area or addition or alteration to a building must not encroach onto an existing land application area.	**P2** An outbuilding, driveway or parking area or addition or alteration to a building must demonstrate that there is sufficient suitable area of land available for a new on- site waste water management system.

SOR-S2.7.2 Stormwater management

This clause is in addition to the Low Density Residential Zone – clause 10.4 Development Standards for Dwellings and clause 10.5 Development Standards for Non-Dwellings, Village Zone – clause 12.4 Development Standards for Buildings and Works, and Local Business Zone – clause 14.4 Development Standards for Buildings and Works.

Objective:	That development provides for adequate on-site stormwater management.
Acceptable Solutions	**Performance Criteria**
A1 Development must be capable of connecting by gravity to a public stormwater system.	**P1** Development must be capable of accommodating an on-site stormwater management system adequate for the development, having regard to: (a) topography of the site; (b) the size and shape of the site; (c) soil conditions; (d) any existing buildings and any constraints imposed by existing development on the site; (e) any area of the site covered by impervious surfaces; (f) any watercourses on the land; (g) stormwater quality and quantity management targets identified in the *State Stormwater Strategy 2010*; and (h) any advice from a suitably qualified person on the seasonal water table at the site, risks of inundation, land instability or coastal erosion.

SOR – S2.8 Development Standards for Subdivision

This sub-clause is not used in this specific area plan.

SOR – S2.9 Tables

This sub-clause is not used in this specific area plan.

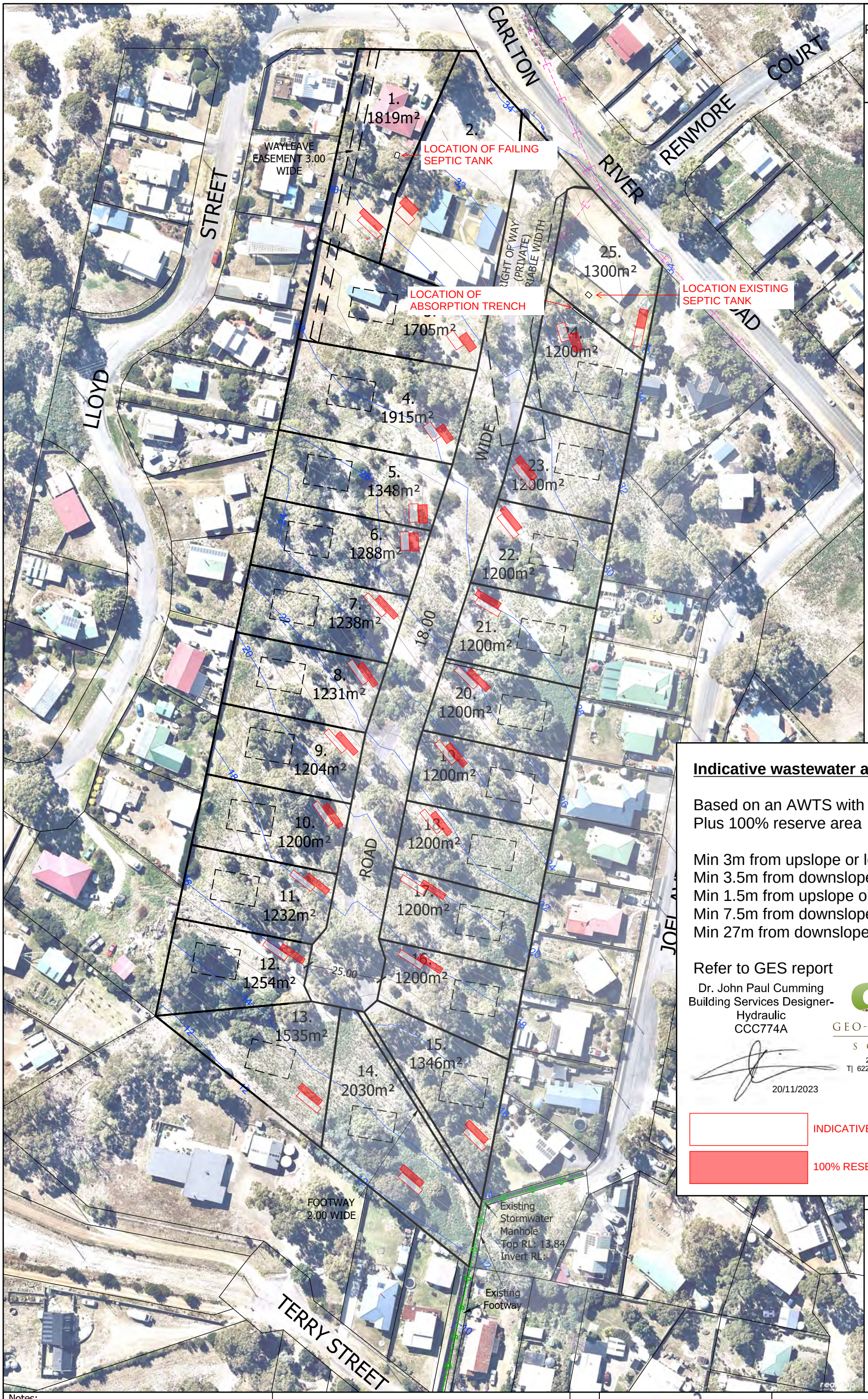
Appendix 6 – Building Act 2016 Compliance

Acceptable Solutions	Performance Criteria	Compliance
A1 Horizontal separation distance from a building to a land application area must comply with one of the following: a) be no less than 6m; or b) be no less than: (i) 3m from an upslope building or level building; (ii) If primary treated effluent to be no less than 4m plus 1m for every degree of average gradient from a downslope building; (iii) If secondary treated effluent and subsurface application, no less than 2m plus 0.25m for every degree of average gradient from a downslope building.	P1 a) The land application area is located so that (i) the risk of wastewater reducing the bearing capacity of a building's foundations is acceptably low.; and (ii) is setback a sufficient distance from a downslope excavation around or under a building to prevent inadequately treated wastewater seeping out of that excavation	Complies with A1 (b) (i) Land application area will be located with a minimum separation distance of 3m from an upslope or level building. Complies with A1 (b) (iii) Land application area will be located with a minimum separation distance of 3.5m of downslope building.
A2 Horizontal separation distance from downslope surface water to a land application area must comply with (a) or (b) (a) be no less than 100m; or (b) be no less than the following: (i) if primary treated effluent 15m plus 7m for every degree of average gradient to downslope surface water; or (ii) if secondary treated effluent and subsurface application, 15m plus 2m for every degree of average gradient to down slope surface water.	P2 Horizontal separation distance from downslope surface water to a land application area must comply with all of the following: a) Setbacks must be consistent with AS/NZS 1547 Appendix R; b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	Complies with A2 (b) (ii) Land application area will be located with a minimum separation distance of 27m of downslope surface water.

A3 Horizontal separation distance from a property boundary to a land application area must comply with either of the following: (a) be no less than 40m from a property boundary; or (b) be no less than: (i) 1.5m from an upslope or level property boundary; and (ii) If primary treated effluent 2m for every degree of average gradient from a downslope property boundary; or (iii) If secondary treated effluent and subsurface application, 1.5m plus 1m for every degree of average gradient from a downslope property boundary.	P3 Horizontal separation distance from a property boundary to a land application area must comply with all of the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	Complies with A3 (b) (i) Land application area will be located with a minimum separation distance of 1.5m from an upslope or level property boundary. Complies with A3 (b) (iii) Land application area will be located with a minimum separation distance of 7.5m of downslope property boundary.
A4 Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must be no less than 50m and not be within the zone of influence of the bore whether up or down gradient.	P4 Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must comply with all of the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 demonstrates that the risk is acceptable	See Page 7 for details.

A5 Vertical separation distance between groundwater and a land application area must be no less than: (a) 1.5m if primary treated effluent; or (b) 0.6m if secondary treated effluent	P5 Vertical separation distance between groundwater and a land application area must comply with the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 that demonstrates that the risk is acceptable	No groundwater encountered.
A6 Vertical separation distance between a limiting layer and a land application area must be no less than: (a) 1.5m if primary treated effluent; or (b) 0.5m if secondary treated effluent	P6 Vertical setback must be consistent with AS/NZS1547 Appendix R.	No limiting layer identified.
A7 nil	P7 A wastewater treatment unit must be located a sufficient distance from buildings or neighbouring properties so that emissions (odour, noise or aerosols) from the unit do not create an environmental nuisance to the residents of those properties	Complies

THIS PLAN HAS BEEN PREPARED TO ACCOMPANY A PLANNING APPLICATION TO COUNCIL AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.



Indicative wastewater application areas

Based on an AWTS with absorption (18m²)
Plus 100% reserve area

Min 3m from upslope or level buildings
Min 3.5m from downslope buildings
Min 1.5m from upslope or level boundaries
Min 7.5m from downslope boundary
Min 27m from downslope surface water

Refer to GES report

Dr. John Paul Cumming
Building Services Designer-Hydraulic
CCC774A

20/11/2023

GES
GEO-ENVIRONMENTAL SOLUTIONS
29 Kirksway Place Battery Point
T| 62231839 E| office@geosolutions.net.au

INDICATIVE APPLICATION AREA (18m²)

100% RESERVE AREA (18m²)

LEGEND:

- LOT BOUNDARY
- INDICATIVE 10x15m BUILDING AREA
- STORMWATER MAIN

Notes:
1. All dimensions and areas are approximate only and subject to survey.
2. Horizontal datum is plane based on MGA'2020.
3. Vertical datum is AHD'83.
4. Contour interval is 0.5m, index is 2.0m.
5. Not all services have been measured by this survey and some are shown for diagrammatic purposes only.

PROPOSED SUBDIVISION
25 LOTS & 1 ROAD
223 CARLTON RIVER ROAD, CARLTON
C.T.126930/1

N

WOOLCOTT SURVEYS
Rear Studio, 132 Davey Street
Hobart TAS 7000
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Job Number L210420

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6th June 2023

FE_23049

223 Carlton River Road, Carlton River Subdivision
STORMWATER MANAGEMENT PLAN

Prepared for: Stagar Pty Ltd

flüssig ENGINEERS

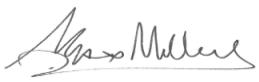
Level 4 - 116 Bathurst Street
HOBART TASMANIA 7000

ABN 16 639 276 181

Document Information

Title	Client	Document Number	Project Manager
223 Carlton River Road, Carlton River Subdivision Stormwater Management Plan	**Stagar Pty Ltd**	FE_23049	**Max W. Möller** *BEng, FIEAust, EngExec, CPEng, NER, APEC Engineer, IntPE(Aus)* *Managing Director / Principal Hydraulic Engineer*

Document Initial Revision

REVISION 00	Staff Name	Signature	Date
Prepared by	Max W. Moller *Principal Hydraulic Engineer*		31/05/2023
Prepared by	Ash Perera *Hydraulic Engineer*		31/05/2023
Prepared by	Manuri Alwis *Graduate Civil Engineer*		31/05/2023
GIS Mapping	Damon Heather *GIS Specialist*		31/05/2023
Reviewed by	Rafael Upcroft Civil/Urban Design Specialist		31/05/2023
Reviewed by	Christine Keane *Senior Water Resources Analyst*		31/05/2023
Authorised by	Max W. Möller *Principal Hydraulic Engineer*		31/05/2023

Document Revision History

Rev No.	Description	Reviewed by	Authorised by	Date
02	Detention volume change	Max W. Möller	Max W. Möller	15/03/2024
01	Above ground detention	Max W. Möller	Max W. Möller	21/12/2023

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1. Introduction

Flüssig Engineers have been engaged by Stagar Pty Ltd to undertake a site-specific Stormwater Management Plan (SWMP) for the development of the 223 Carlton River Road, Carlton River including, but not limited to flow discharge analysis, including stormwater drainage and MUSIC modelling to stated stormwater quality standards. The purpose of this report is to determine the hydraulic characteristics and stormwater infrastructure capacity of a 5% AEP storm event and treatment on the existing and post-development scenarios.

1.1 Scope

This engagement includes:

- Pre-construction drainage capacity at 5% AEP of existing design.
- Pre-construction overland flow behaviour of existing stormwater design.
- Post-construction drainage capacity at 5% AEP of new road and driveways design.
- Post-construction overland flow behaviour of new road and driveways stormwater design.

2. Site Characteristics

2.1 Site Location

The proposed site location is at 223 Carlton River Road, Carlton River Tasmania, in the municipality of the Sorell Council. The site is approximately 4.07 ha with a proposed development of a road and driveways which will increase the total impervious area to approximately 0.55 ha, accounting for approximately 13.5% of the site.

The development site and its immediate areas are zoned Low Density Residential as is the remainder of the catchment.

2.2 Topography

The proposed subdivision is approximately 40,695 m² in area, draining from approximately 34m AHD to 12m AHD towards the southern corner of the lot.

As can be seen by the topography in Figure 1, the area slopes down in a southern direction towards Terry Street (southern boundary of lot).

Figure 1. DEM Area

3. Proposal

3.1 Proposed Development

The proposed development consists of twenty-five lots within the boundary while lot 1, 2, 3 and 25 are already existing. The subdivision includes an internal access road from the northern side of the lot. Design of the subdivision was undertaken by Woolcott Surveys as shown in Figure 2.

Figure 2. Planning Design of subdivision

4. Survey Data

All survey data was supplied by the client as a processed AutoCAD file. The provided data has been incorporated into various software to undertake the analysis.

5. Stormwater Quantity

5.1 Catchment Analysis

The catchment was modelled using RAFTS Hydrology software within InfoWorks ICM. RAFTS software uses the Laurenson runoff-routing method to calculate runoff using the catchment properties including size, slope and % impervious. This method is accepted within ARR2019 for areas larger than single dwelling lots.

5.2 Catchment Conditions

The development site at 223 Carlton River Road, Carlton has an overall catchment area of approximately 61 ha. The catchment area extends from the north-eastern side to the eastern side of the of the development site. The soils onsite are predominately podzols (sandy soils with organic matter) overlain on dolerite, sandstone, and mudstone. This allows for drainage directly to a stream or piped infrastructure.

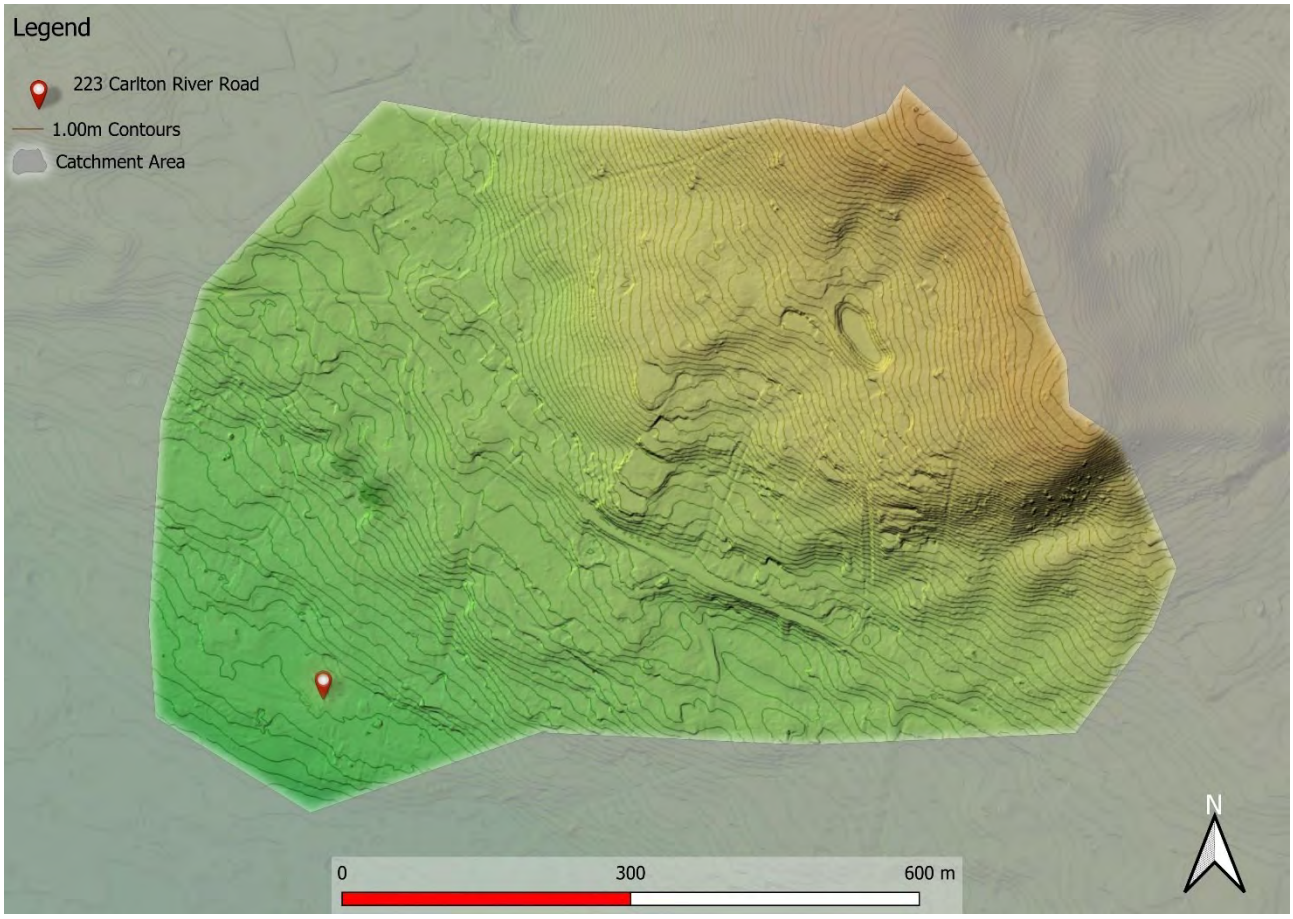


Figure 3. Catchment Boundary (approximate boundary only)

5.3 Design Intensity Storms

Design storm durations and temporal patterns were calculated using Australian Rainfall and Runoff 2019 (ARR19) guidelines, running ten temporal pattern events through each duration to determine the worst-case duration using the median temporal pattern. Figure 4 below shows the worst-case 5%

AEP rainfall event as the 15-minute storm, pattern number 8. Therefore, this storm event was used within the hydraulic model.

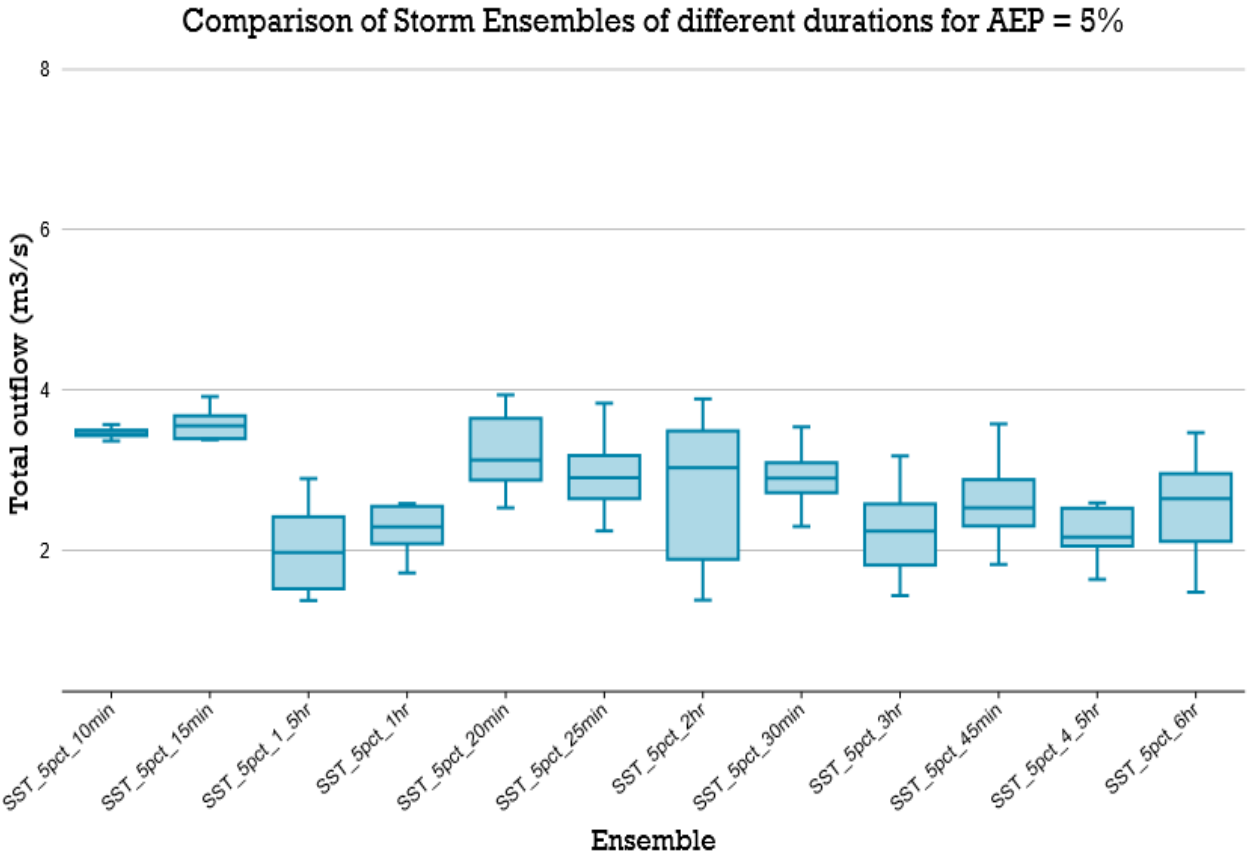


Figure 4. 5% AEP Flood Event Model, Box and Whisker Plot

5.4 Land use

Land use for the site, both pre- and post-development, were derived from plans and aerial imagery. Land use values are as follows in Table 1.

Table 1. Land Use Area

	Pre-Development		Post-Development	
Land Use	**Area (ha)**	**% Total land**	**Area (ha)**	**% Total land**
Total Impervious	0.423	10.39	0.551	13.54
Total Pervious	3.647	89.61	3.519	86.46

5.5 Manning's n and losses

Losses for this catchment were derived from ARR19 data hub. As per ARR19, losses were taken at 60% of prescribed value to account for effective impervious area. See Table 2 for loss values. Manning's n values were taken directly from best practice manuals as shown in Table 3.

Table 2. Runoff Coefficients

Surface	Initial losses (IL) mm	Continuing Losses (CL) mm/ hr
Pervious	29	3.7
Impervious	1	0

Table 3. Manning's N coefficients

Land Use	Manning's n
Roads	0.018
Open Channel	0.035
Rural	0.04
Residential	0.045
Parks	0.05
Buildings	0.3
Piped Infrastructure	0.013

5.6 Development Runoff

Stormwater runoff from the development site has been assessed under pre- and post-development models to determine the potential impact the proposed subdivision has on the immediate local flows. As per planning guidelines, it is a requirement that this does not deteriorate from pre to post development.

Using the above parameters, the proposed impervious and pervious areas were calculated using Infoworks ICM software and ARR19 best practice manuals. Site characteristics for the pre- and post-development models are summarised in Table 4.

Table 4. Site Characteristics

Catchment	Area (ha)	Maximum Slope (%)	Total Land use pervious/ impervious (ha)	Storm duration and storm pattern
Pre-Development	4.07	6.2	3.65 / 0.42	5% 15-min pattern 8
Post-Development	4.07	6.2	3.52 / 0.55	5% 15-min pattern 8

6. Model Results

The residential pre- and post-development scenarios were calculated using Infoworks ICM software against the 5% AEP storm events. The storm durations were derived from the worst-case median temporal pattern for the event, which was 01-hour duration.

The pre and post conditions can be seen in Figure 5 below, showing the peak discharge and increase in peak discharge from pre to post development.

Figure 5 below shows the pre- and post-development discharge curves which indicates the 5% AEP overland flow behaviour.

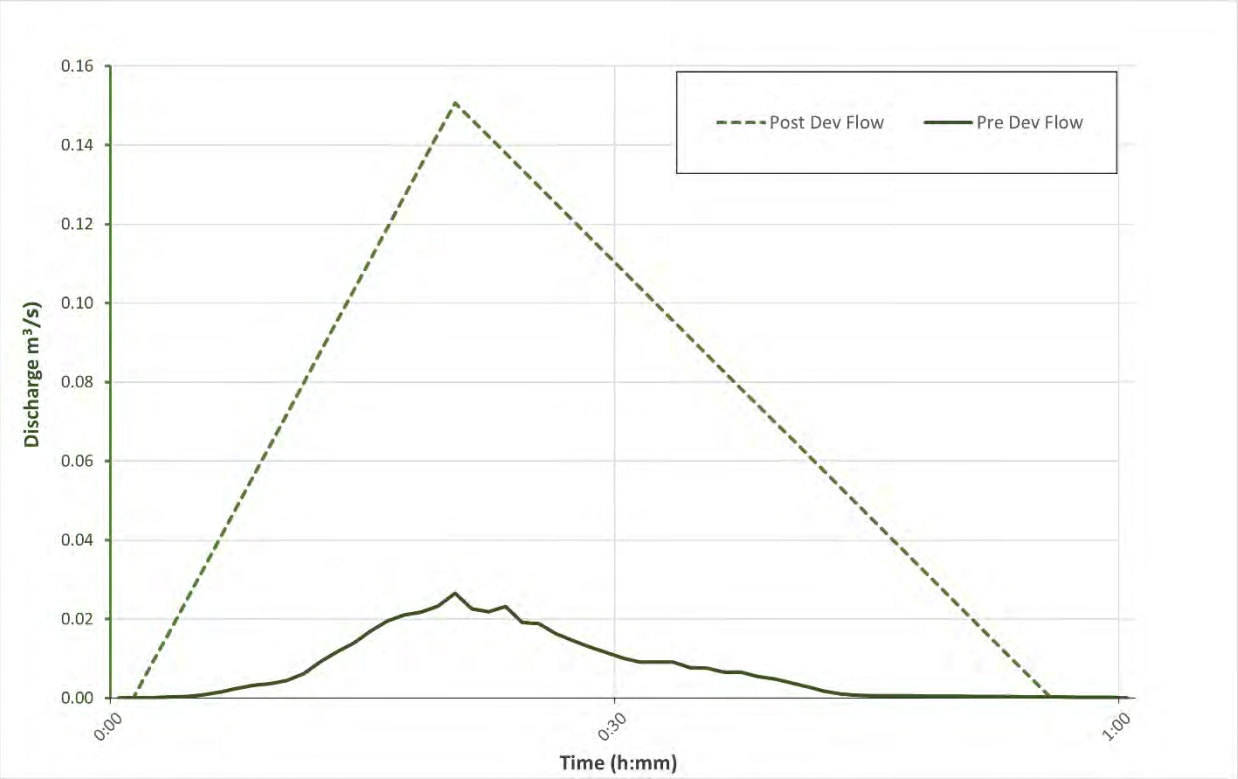


Figure 5. Site Discharge Curves Pre vs post-Development

As per best practices for the stormwater runoff, the post-development allowable site discharge must not exceed the pre-development site discharge. As can be seen from Table 5, this is exceeded by a permissible site discharge of 194.09 L/s for proposed impervious area including Renmore Court. Therefore, the site must detain the difference using an onsite stormwater detention (OSD) system. The permissible site discharge of the proposed subdivision is calculated using rational method.

As per council guidance, the above ground storage is calculated for the 1% AEP storm event but the PSD is for the 5% AEP event.

Table 5.Discharge volume rates and required detention of pre-post scenarios in 5% storm.

		Design Event (AEP)	Permissible Site Discharge (L/s)	Required Development Detention (L)
Existing lot 1,2,3 & 25	Undetained	5%	17.18	-
Existing Renmore Subdivision excluding asphalt road	Undetained	5%	150.43	-
Proposed lot 4 - 24, proposed asphalt road and existing Renmore Court asphalt Road	Detained	1%	26.48	111,070 L
Total	-	-	**194.09**	-

Areas used for subdivision's bioretention basin calculations are summarized in Table 6.

Table 6. Areas used for bioretention pond sizing.

	Area (m^2)
Proposed asphalt road	2654
Existing Renmore Court asphalt road	1120
Proposed internal driveway of lot 4 – 24, 10% per lot as per council guidance	2860
Total impervious area	**6634**

6.1 On-Site Detention Sizing and Configuration

As shown in Table 5, the permissible site discharge is exceeded from the proposed development and needs to be detained or otherwise agreed. The sections below outline the storage requirements for this exceedance.

6.2 Development Detention

As seen from Table 5, after allowance has been made to detain impervious areas, the total volume discharged in the storm event still exceeds pre-development flows. Therefore, the proposed development will require minimum detention of 111,070L the impervious area. Refer to "APPENDIX A Calculations".

Lots on the eastern side of the subdivision will drain via property connections to the proposed roadside table drain. Lots on the western and southern sides of the subdivision will drain to new stormwater infrastructure located in the proposed boundary drainage easement. Stormwater from the road areas is serviced by a network of table drains, drainage pipes and several stormwater pits. All stormwater drainage from road will be directed to an onsite stormwater detention (OSD) system consisting of an above ground bioretention pond with a minimum of 111,070 L capacity, located in the southeastern corner of the proposed subdivision. Stormwater will drain from the bioretention pond to a new public main which will connect to the existing DN375 public main at the southeast corner of the lot. More detailed information regarding maintenance is provided in Section 7.6.

Council has stated that the stormwater infrastructure in Renmore Court is under capacity and that they would like to re-route the stormwater run-off through the new subdivision. It was agreed on 30/05/23 that the culvert would discharge the existing Renmore Court stormwater runoff into the proposed subdivision roadside table drain. This table drain will then drain into the proposed above ground detention system within the proposed subdivision.

6.3 1% AEP Overland Flow Path (OFP)

As per Sorell Council requirements, runoff for the 1% AEP is not required to be captured by infrastructure nor detained onsite in an OSD. However, the 1% AEP storm must be able to drain through the site and not cause additional impedance on the neighbouring lots or future residents. Figure 6 below shows the pre-development overland flow path for the site in the event of a 1% AEP storm. Post development flow paths can be seen in Figure 7. The introduction of the new road and driveways show no significant increase in flood depths within the lot boundary from the existing 1% AEP overland flow path. The slight increase in depth will be contained within the proposed 0.6 m deep, 3.6m top width open roadside table drains and will then discharge to Terry Street via an open drain along the proposed footpath. The images below demonstrate that the development has no impact on third-party property except 13 Lloyd Street. Refer to Flussig Engineers Flood Report for further information.

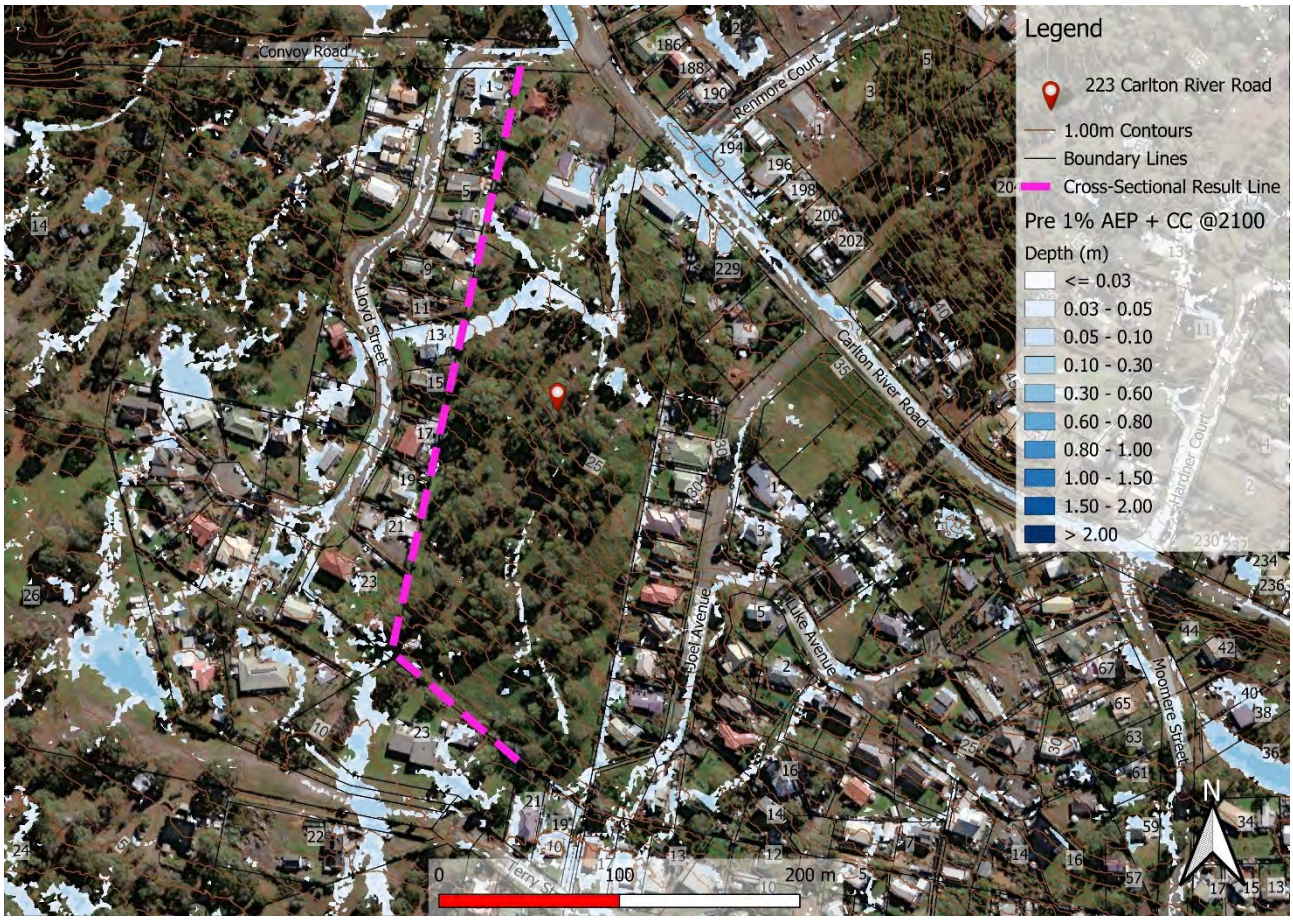


Figure 6. 1% AEP OFP Pre-Development

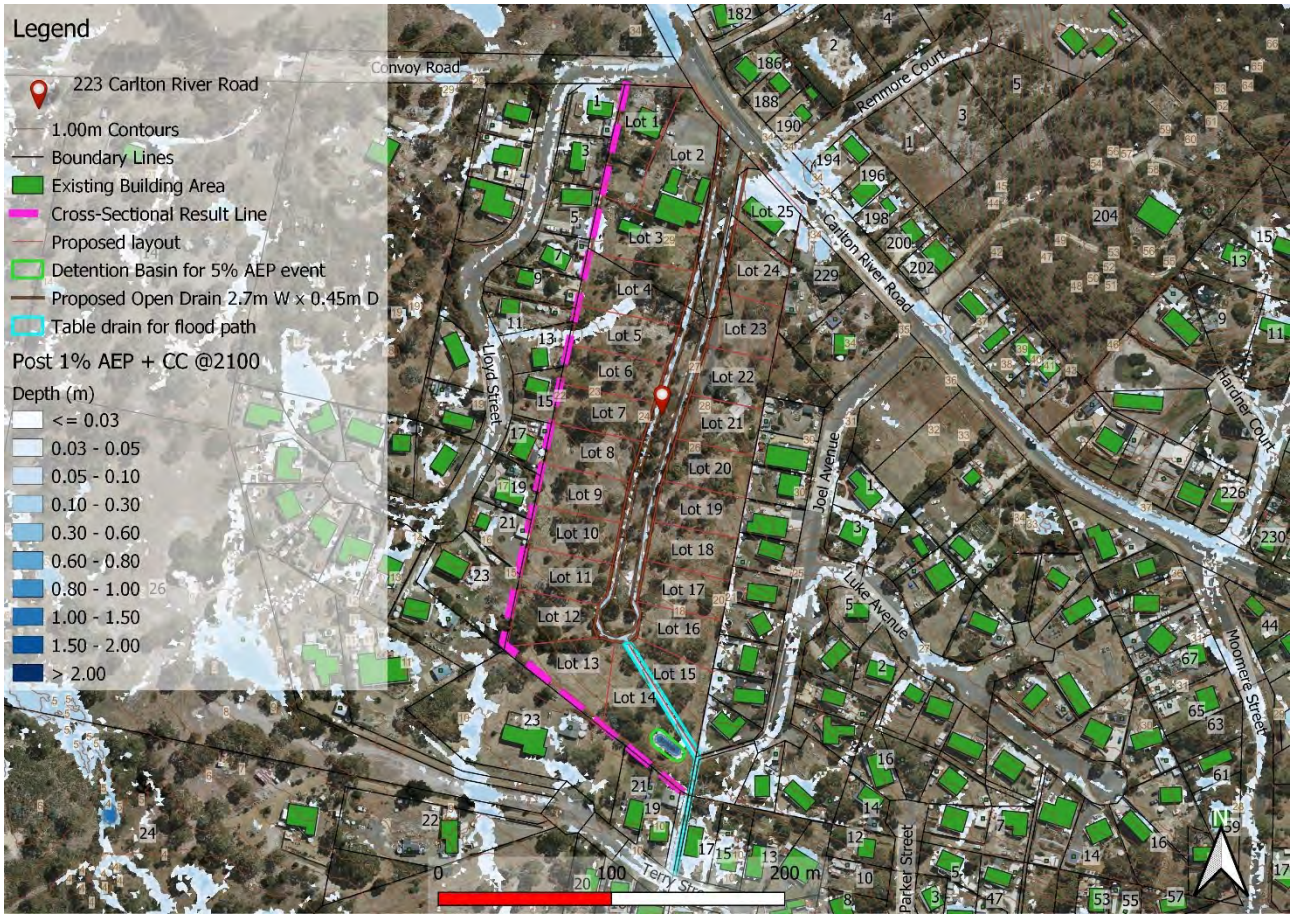


Figure 7. 1% AEP OFP Post-Development

6.4 Quantity Summary

The SWMP quantity report has been designed from best practice design and guidelines. The following is a summary of the requirements for stormwater management for the proposed subdivision in 223 Carlton River Road Subdivision.

1. The additional runoff from the new asphalt road and lot driveways is required to be detained to maintain pre-development discharge quantities, as per Sorell Council requirements.
2. New houses will be required to detain the roof area within the lot prior to discharging to the stormwater system.
3. Storage requirements from the proposed development would require minimum111,070 L total above ground detention volume for proposed impervious area including Renmore Court. A bioretention pond will be used as the above ground detention basin to be situated in between lot 14 and lot 15 to the southern boundary of the subdivision.
4. The 1% AEP runoff overland flow paths can be directed from the development site via roadside table drains and an open drain along the footpath to Terry Street.

7. Water Quality

Water quality modelling for the site has been undertaken with the urban stormwater improvement conceptualisation software MUSIC. The modelling conducted in MUSIC has been done in accordance with MUSIC Modelling Guidelines and the Tasmanian State Stormwater Strategy. This document provides a guide to water quality modelling methodology and outlines the assumptions that should be made when selecting input parameters.

Recommendations for the improvement of the water quality on site would include the diversion of stormwater flows from the subdivision to primary treatment system (treatment train). This would reduce the pollutants in the receiving waters further and be a safe design option if future usage of this sub catchment provides higher pollutant storm water runoff.

7.1 Stormwater Quality Treatment (construction phase)

During construction, many pollutants are generated from various sources. These pollutants can easily be captured in stormwater runoff and introduced into the downstream receiving environment polluting the waterways. Listed below are some of the main construction phase pollutants:

- Litter from construction – material packaging, paper, plastic, food packaging, off cuts etc.
- Sediment erosion and transports from excavated material and fresh surfaces.
- Hydrocarbons – equipment and machinery
- Toxic material – cement, solvents, paints, cleaning agents etc.
- pH altering substances – cement, cleaning agents etc.

Construction phase pollutants should be planned and mitigated for by a designed site-specific SWMP as part of the drawing set. This should detail controls including but not limited to:

- Diversion of upslope water (where applicable)
- Stabilised exit/ entry points
- Minimise site disturbance where possible
- Implement sediment control along downslope boundaries
- Appropriate location and protection for stockpiles
- Capture on-site runoff that may contain pollutants

- Maintain control measures
- Stabilise site after disturbance (revegetate etc.)

7.2 Stormwater Quality Modelling

Stormwater pollutant modelling for the 223 Carlton River Road Subdivision development was undertaken using Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software, version 6.3.0, under the guidelines of the State Stormwater Strategy and Interim Planning Scheme.

This model splits the catchment into the following typical areas:

- Residential Catchment
- Road Catchment (including bank runoff)

The following fraction impervious land areas has been adopted in the modelling as per the concept design measurements. See Table 7 below for fraction imperviousness (fi).

Table 7. Adopted Fraction Impervious

Catchment Area (ha)	Road		Existing roof/concrete		Garden/ Lots	
	Area (ha)	fi	Area (ha)	fi	Area (ha)	fi
4.07	0.55	0.9	0.23	1	3.29	0.03

7.3 Council Planning Quality Removal Standards

The Sorell Council has adopted the pollutant removal targets and best practice from the State Stormwater Strategy 2010. See Table 8 for target removal rates.

Table 8. State Stormwater Strategy Pollutant Removal Targets

Parameter	Result Pollutant Retention on Developed Site
Total Suspended Solids (TSS)	80%
Total Phosphorous (TP)	45%
Total Nitrogen (TN)	45%
Gross Pollutants	90%

7.4 Treatment Train

To achieve stormwater pollutant removal targets outlined above and considering site constraints, this model utilised an open vee drain beside the road (3.6 m top width, 0.6 m depth), 3 x ATLAN Stormsacks (or similar) and a bioretention pond.

The treatment train consists of roads and lot driveways draining through the open vee drain via stormwater infrastructure to the bioretention Pond within the site boundary.

Properties of bioretention pond can be seen in Table 9. Should an alternative similar measure be selected it needs to have equal or greater removal properties.

Table 9. Bioretention Pond Properties

Properties	
Are the proposed pollutant reduction efficiencies independently verified using a method suited to local conditions?	Y
Does the data provided include performance results under dry weather flows (to account for potential pollutant leeching?)	Y
It the assumed high-flow bypass rate consistent with manufacturer specifications?	Y
High Flow by-pass (m^3/s)	100
Low Flow (m^3/s)	26.48
Suspended Solids (TSS) Input (mg/L) Suspended Solids (TSS) Output (mg/L)	100.00 0.20
Phosphorous (TP) Input (mg/L) Phosphorous (TP) Output (mg/L)	100.00 2.60
Nitrogen (TN) Input (mg/L) Nitrogen (TN) Output (mg/L)	100.00 5.40
Gross Pollutants (GP) Input (mg/L) Gross Pollutants (TP) Output (mg/L)	15.00 0.00

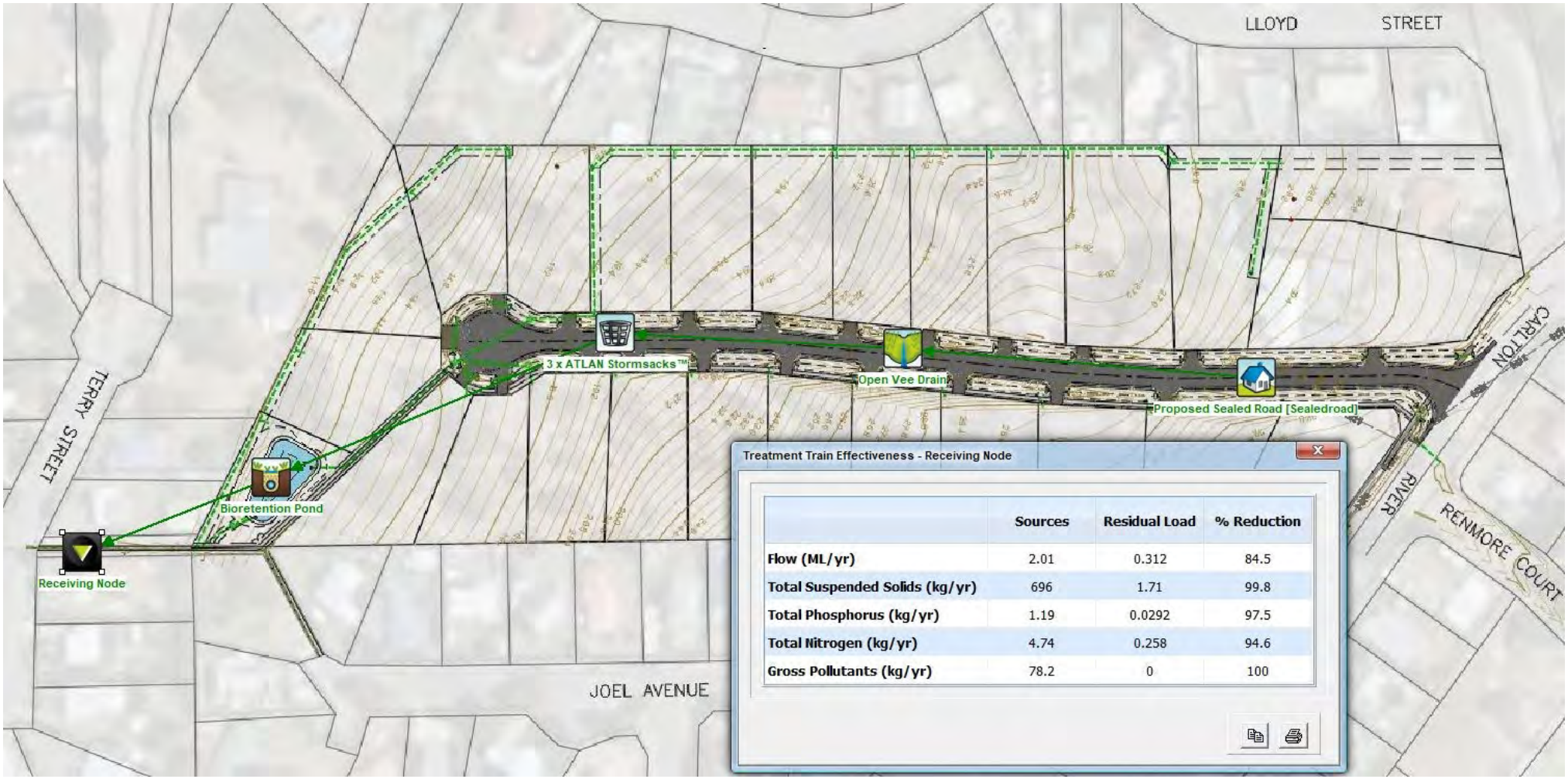


Figure 8. MUSIC Treatment Train Effectiveness Result

7.5 Quality Results

The MUSIC pollutant load reductions are detailed in Table 10 below. As can be seen when comparing the MUSIC results to the required state stormwater strategy target load reductions, the specified treatment train outlined above and as seen in Figure 8 show that all targets either meet or exceed state reduction targets.

Table 10. Pollutant Removal Achieved vs Targets.

Parameter (kg/year)	Target Load Reduction (%)	MUSIC Results	SW Targets Achieved (Y/N)
Total Suspended Solids (TSS)	80.0	99.8	Y
Total Phosphorous (TP)	45.0	97.5	Y
Total Nitrogen (TN)	45.0	94.6	Y
Total Pollutants (GP)	90.0	100.0	Y

Based on the water quality assessment using the MUSIC software, it is found that the pollutant reduction improvement can be achieved by adopting the Stormwater Quality Improvement Devices (SQIDs) specified in Table 11.

Table 11. Required SQIDS

Stormwater Quality Improvement Device	
ATLAN Stormsacks or Similar	3 units
Bioretention Pond	1 x 115kL
Open 'V' drain (3.6 m top width, 0.6m depth)	Y

7.6 SQID Maintenance

To ensure ongoing operation of all treatment systems, the Council would be required to perform regular maintenance on all treatment devices to ensure they remain in good working order. This would include, but not be limited to, the information described in Table 12.

Table 12. Concept Maintenance Plan

Task	Action	Frequency
General Cleaning	Clear all pollutants from storage and device filters, ensure operational	Every 3 months
Specialised cleaning and inspection	Inspect all storage, inflow, and outflow – clean and flush if required. Visually inspect bioretention pond for defects and blockage.	Yearly
Maintenance	Perform detailed inspection and maintenance of pond and associated infrastructure by a qualified person.	Every 5 years

The above maintenance plan is generic and based on removal rates and best practice advice. Specific maintenance plans should be created for each specific device upon purchasing or confirmation of design.

7.7 Quality Summary

Flüssig Engineers recommends the following to be undertaken to ensure the ongoing stormwater quality from the developed site:

1. Construction quality control should be implemented to prevent pollution during construction.
2. Installation of treatment devices in the order specified in this document (Figure 8), not including individual lot devices.
3. Maintenance plans need to be created and adhered to ensure the ongoing operation of the systems.

Flüssig Engineers note that some of the specified treatment products are proprietary products and although suitable in this instance, does not limit the developer to this product. However, any product selected by the developer should meet removal properties of these products for the MUSIC model to be valid.

Flüssig Engineers notes that if the installation of SQIDs may not be feasible due to site restrictions. Should this be the case, Flüssig Engineers recommends a contribution to Council for improvements to public stormwater treatment systems downstream be made in lieu of the installation of SQIDs.

8. Conclusion

The post-development quantity and quality scenarios for the Stormwater Management Plan for 223 Carlton River Road Subdivision have been investigated. Post-development quantity and quality have been assessed against the stormwater management best practices, and the State Stormwater Strategy to ensure the post-development flows meet specified standards.

The following conclusions were derived in this report:

1. A comparison of the post-development peak flows for the 5% AEP storm event were undertaken against the pre-development flows, resulting in an increase in site discharge.
2. Above ground bioretention pond totalling a minimum of 111,070 L is required for the 1% AEP storm runoff for the proposed subdivision road, internal driveways and existing Renmore Court asphalt road.
3. The 1% AEP runoff overland flow paths can be directed from the development site via roadside table drains and an open drain along the footpath to Terry Street.
4. SQIDS designed and sized using MUSIC can achieve required pollutant removal through the installation of treatment devices.

Under the Stormwater Management Plan, the development site will meet current specified standards for both quantity and quality control.

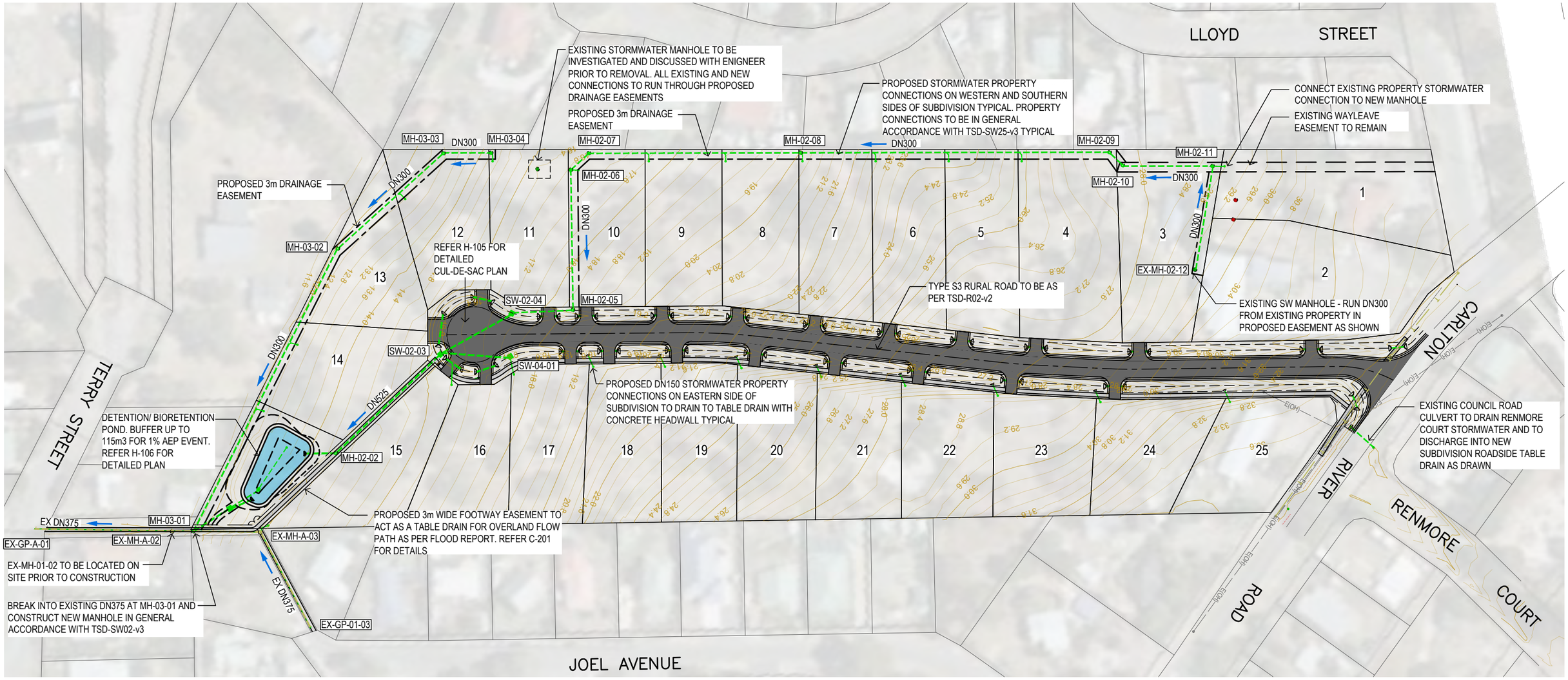
10. Limitations

Flüssig Engineers were engaged by **Stagar Pty Ltd** in representation of the developer of 223 Carlton River Road Subdivision, Carlton River for the purpose of a site-specific stormwater management plan as per stormwater management best practices. This study is deemed suitable for purpose at the time of undertaking the study. If conditions of the subdivision change, the plan will need to be reviewed against all changes.

This report is to be used in full and may not be used in part to support any other objective other than what has been outlined within, unless specific written approval to do otherwise is granted by Flüssig Engineers.

Flüssig Engineers accepts no responsibility for the accuracy of third-party documents supplied for the purpose of this stormwater management plan.

APPENDIX A – On-site Detention Concept Design



STORMWATER GENERAL ARRANGEMENT PLAN

SCALE 1:1250

NOTE:
1. REFER H-105 FOR LEGEND

STORMWATER SERVICES NOTES:

1. ALL SITE SAFETY & MANAGEMENT PROCEDURES SHALL BE IN ACCORDANCE WITH THE DEPARTMENT OF STATE GROWTH SPECIFICATIONS: SECTION 168 OCCUPATIONAL HEALTH AND SAFETY & SECTION 176 ENVIRONMENTAL MANAGEMENT.
2. ALL PIPES UNDER TRAFFIC ABLE AREAS ARE TO BE BACK FILLED FULL DEPTH WITH 20 F.C.R. AND FULLY COMPACTED.
3. ALL STORM WATER PIPES LESS THAN DN225 TO BE PVC-U-SWJ CLASS "SN8" TO AS 1254 UNO.
4. ALL STORMWATER PIPES DN225 & LARGER TO BE POLYPROPYLENE TO AS5065 RRJ 'STORMPRO' UNO.
5. PROVIDE ANCHOR BLOCKS IN ACCORDANCE WITH TSD-SW01 WHERE PIPE GRADES EXCEED 10%.
6. CONNECTIONS TO LIVE COUNCIL MAINS TO BE CARRIED OUT BY COUNCIL OR APPROVED CONTRACTOR AT DEVELOPERS COST.
7. ALL SW LOT CONNECTIONS SHALL BE 150 DIAMETER EX DN150 PVC PIPE WITH DN150 RISER AND SCREW CAP TO SURFACE AND COVERED WITH INSPECTION BOXES IN ACCORDANCE WITH IPWE STD DRG TSD-SW25-V1.
8. SW LOT CONNECTIONS DIRECTLY TO MAINS SHALL BE FORMED JUNCTIONS.
9. ALL DRAIN AND TRENCH CONSTRUCTION SHALL COMPLY WITH THE LGAT STANDARD DRG TSD G01.
10. ALL MANHOLE LIDS IN TRAFFICABLE AREAS SHALL COMPLY WITH CLASS "B" LOAD RATING TO AUSTRALIAN STANDARD AS 3996 AND TSD-SW02.
11. ANY EXCAVATED TRENCHES IN EXCESS OF 1.5M IN DEPTH ARE TO BE ADEQUATELY SHORED TO PREVENT COLLAPSE DURING WORKS.
12. SUBSOIL DRAINS UNDER INFILTRATION SWALES SHALL BE SLOTTED UPVC CLASS "SN4"TO AS 1254 & INSTALLED IN ACCORDANCE WITH AS3500.
13. SUBSOIL DRAINS ARE TO BE CONNECTED TO STORMWATER PITS.

P4

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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CLIENT: STAGAR PTY LTD

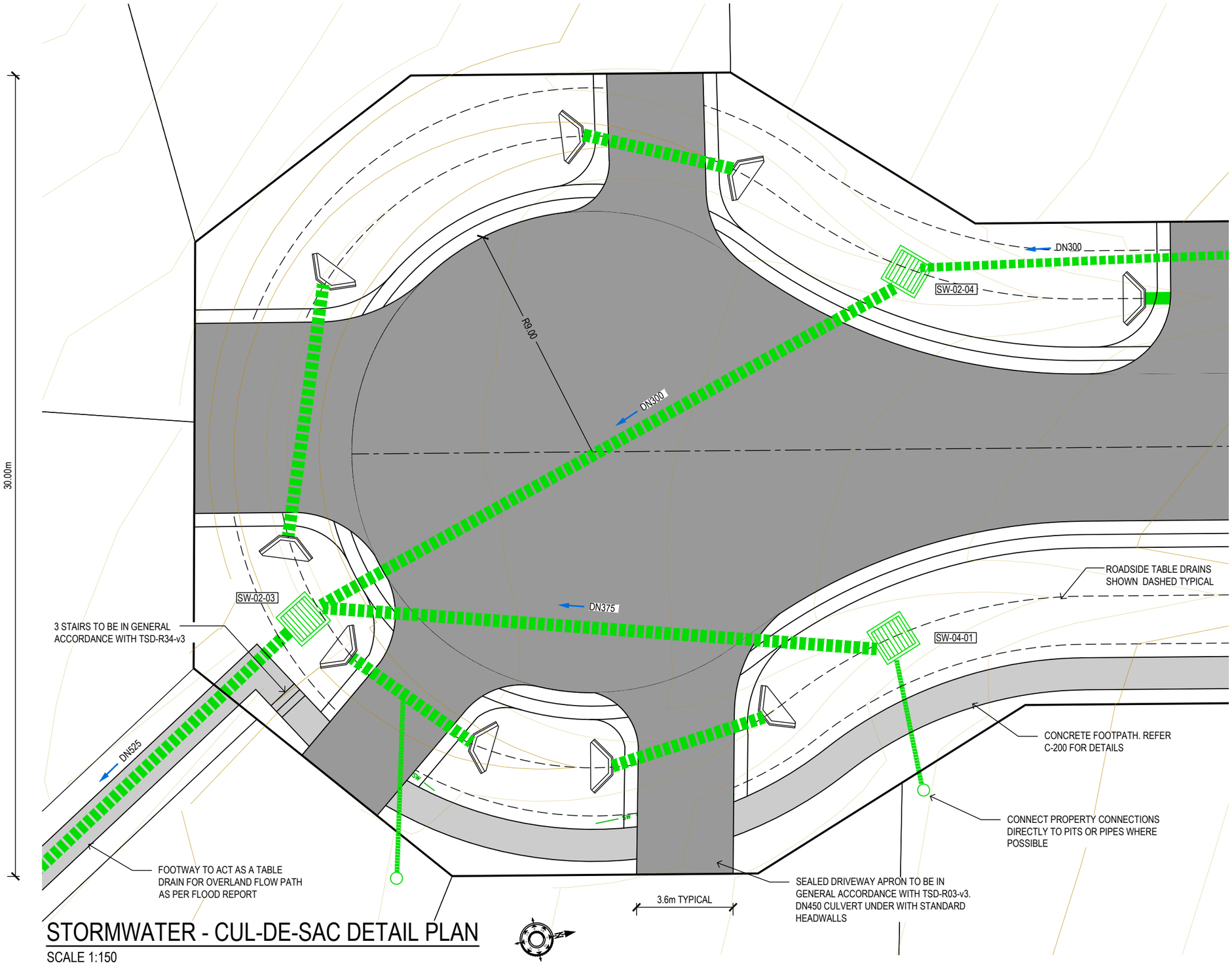
SITE: 223 CARLTON RIVER ROAD

TITLE: STORMWATER PLAN

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
1:1250	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	H-100	P4



NOTE:
1. REFER H-100 FOR STANDARD STORMWATER NOTES

NEW SERVICES

STORMWATER DRAIN. REFER LONG SECTIONS FOR SIZES AND TYPES

SW SW — DN300 RCP DRIVEWAY CULVERT

NEW STORMWATER SERVICES

STORMWATER FLOW DIRECTION

EX-SWMH-XX-XX - EXISTING STORMWATER MANHOLE

SWMH-XX-XX - NEW STORMWATER MANHOLE TO BE IN GENERAL ACCORDANCE WITH TSD-SW02-v3

EX-SW-XX-XX - EXISTING GRATED STORMWATER PIT

SW-XX-XX - GRATED STORMWATER PIT TO BE 1200X1200 UNLESS NOTED OTHERWISE AND TO BE IN GENERAL ACCORDANCE WITH TSD-SW15-v3

SW-04-01, SW-02-02 AND SW-02-03 TO BE FITTED WITH STORMSACKS

HW-XX-XX - HEADWALL. TO BE AS PER TSD-SW17-v3

STORMWATER PROPERTY CONNECTION HEADWALL TO BE HUDSON CIVIL SUBSOIL END WALL
CODE: CP6105 150mm SUBSOIL ENDWALL

STORMWATER - CUL-DE-SAC DETAIL PLAN

SCALE 1:150

P4

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REV:	DESCRIPTION:	BY:	DATE:
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STATUS: PLANNING

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a: 116 Bathurst St, Level 4 Hobart, 7000, TASMANIA

CLIENT: STAGAR PTY LTD

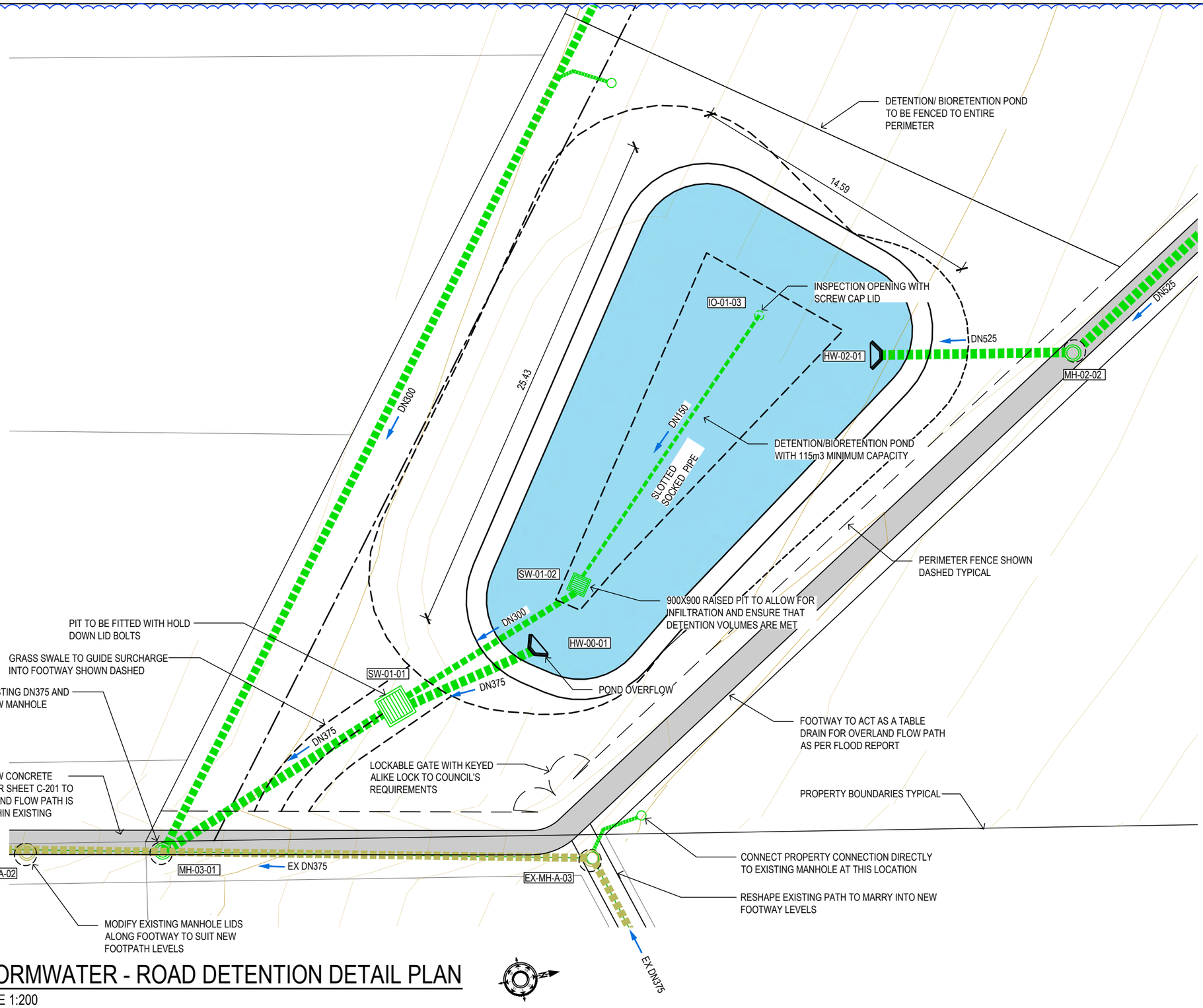
SITE: 223 CARLTON RIVER ROAD

TITLE: CUL-DE-SAC DETAIL PLAN

PROJECT: 223 CARLTON RIVER ROAD
SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
1:150	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	H-105	P4



NOTE:
1. REFER H-100 FOR STANDARD STORMWATER NOTES

NEW SERVICES

STORMWATER DRAIN. REFER LONG SECTIONS FOR SIZES AND TYPES

SW SW — DN300 RCP DRIVEWAY CULVERT

NEW STORMWATER SERVICES

STORMWATER FLOW DIRECTION

EX-SWMH-XX-XX - EXISTING STORMWATER MANHOLE

SWMH-XX-XX - NEW STORMWATER MANHOLE TO BE IN GENERAL ACCORDANCE WITH TSD-SW02-v3

EX-SW-XX-XX - EXISTING GRATED STORMWATER PIT

SW-XX-XX - GRATED STORMWATER PIT TO BE 1200X1200 UNLESS NOTED OTHERWISE AND TO BE IN GENERAL ACCORDANCE WITH TSD-SW15-v3

SW-04-01 AND SW-02-03 TO BE FITTED WITH STORMSACKS

HW-XX-XX - HEADWALL. TO BE AS PER TSD-SW17-v3

STORMWATER PROPERTY CONNECTION HEADWALL TO BE HUDSON CIVIL SUBSOIL END WALL
CODE: CP6105 150mm SUBSOIL ENDWALL

STORMWATER - ROAD DETENTION DETAIL PLAN

SCALE 1:200

P4

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CLIENT: STAGAR PTY LTD

SITE: 223 CARLTON RIVER ROAD

TITLE: DETENTION POND PLAN

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
1:150	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	H-106	P4

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APPENDIX B – On-site Detention Calculations

223 Carton River Road Carton - New Impervious with Renmore 1%

STORMWATER DETENTION V5.05

Flussig Engineers

Location: **Carlton TAS**
Site: **6634m² with tc = 20 and tcs = 14 mins.**
PSD: **AEP of 5%, Above ground PSD = 26.48L/s**
Storage: **AEP of 1%, Above ground volume = 111.07m³**

Design Criteria

(Custom AEP IFD data used)

Location =	Carlton TAS	
Method =	E	(A)RI 2001,A(E)P 2019
PSD annual exceedance probabiliy (APE) =	5	%
Storage annual exceedance probabiliy (APE) =	1	%
Storage method =	A	(A)bove,(P)ipe,(U)nderground,(C)ustom

Site Geometry

Site area (As) =	6634	m²	=	0.6634 Ha
Pre-development coefficient (Cp) =	0.30			
Post development coefficient (Cw) =	0.90			
Total catchment (tc) =	20	minutes		
Upstream catchment to site (tcs) =	14	minutes		

Coefficient Calculations

Pre-development

Zone	Area (m²)	C	Area * C
Concrete	0	0.90	0
Roof	0	1.00	0
Gravel	0	0.50	0
Garden	6634	0.30	1990
Total	6634 m²		1990

Cp = ΣArea*C/Total = 0.300

Post development

Zone	Area (m²)	C	Area * C
Concrete	6634	0.90	5971
Roof	0	1.00	0
Gravel	0	0.50	0
Garden	0	0.30	0
Total	6634 m²		5971

Cw = ΣArea*C/Total = 0.900

Permissible Site Discharge (PSD) (AEP of 5%)

PSD Intensity (I) =	45.4	mm/hr	For catchment tc = 20 mins.	
Pre-development (Qp = Cp*I*As/0.36) =	25.11	L/s		
Peak post development (Qa = 2*Cw*I*As/0.36) =	150.67	L/s	=(3.317 x I)	Eq. 2.24
Storage method =	A	(A)bove,(P)ipe,(U)nderground,(C)ustom		
Permissible site discharge (Qu = PSD) =	26.480	L/s		

Above ground - Eq 3.8

$0 = PSD^2 - 2*Qa/tc*(0.667*tc*Qp/Qa + 0.75*tc+0.25*tcs)*PSD + 2*Qa*Qp$

Taking x as = PSD and solving

a = 1.0 b = -312.2 c = 7566.8

$PSD = -b \pm \sqrt{(b^2-4ac)}/(2a)$

PSD = 26.480 L/s

Below ground pipe - Eq 3.3

$Qp = PSD*[1.6*tcs/\{tc*(1-2*PSD/(3*Qa))\}-0.6*tcs^{2.67}/\{tc*(1-2*PSDp/(3*Qa))\}^{2.67}]$

= 25.11

PSD = 26.548 L/s

Below ground rectangular tank - Eq 3.4

t =tcs/(tc*(1-2*PSD/(3*Qa))) = 0.790

$Qp = PSD*[0.005-0.455*t+5.228*t^2-1.045*t^3-7.199*t^4+4.519*t^5]$

= 25.11

PSD = 25.639 L/s

223 Carton River Road Carton - New Impervious with Renmore 1%

STORMWATER DETENTION V5.05 Flussig Engineers

Design Storage Capacity (AEP of 1%)

Above ground (Vs) = [0.5*Qa*td-[(0.875*PSD*td)(1-0.917*PSD/Qa)+(0.427*td*PSD²/Qa)]]*60/10³ m³ Eq 4.23
Below ground pipe (Vs) = [(0.5*Qa-0.637*PSD+0.089*PSD²/Qa)*td]*60/10³ m³ Eq 4.8
Below ground rect. tank (Vs) = [(0.5*Qa-0.572*PSD+0.048*PSD²/Qa)*td]*60/10³ m³ Eq 4.13

td (mins)	I (mm/hr)	Qa (L/s)	Above Vs (m³)	Pipe Vs (m³)	B/G Vs (m³)
5	118.7	393.7	52.30		
13	82.0	271.9	88.71		
16	73.3	243.1	95.46		
20	64.3	213.3	101.65		
24	57.4	190.5	105.75		
28	52.0	172.5	108.50		
32	47.6	157.9	110.31		
35	44.8	148.7	111.23		
39	41.7	138.3	112.03		
43	39.0	129.4	112.44		

Table 1 - Storage as function of time for AEP of 1%

Type	td (mins)	I (mm/hr)	Qa (L/s)	Vs (m³)
Above	34.4	45.4	150.5	**111.07**
Pipe				
B/ground				

Table 2 - Storage requirements for AEP of 1%

Frequency of operation of Above Ground storage

Qop2 = 0.75 Cl 2.4.5.1
Qp2 =Qop2*Qp1 (where Qp1=PSD) = 19.86 L/s at which time above ground storage occurs
I = 360*Qp2/(2*Cw*As*10³) = 6.0 mm/h Eq 4.24

Period of Storage

Time to Fill:

Above ground (tf) = td*(1-0.92*PSD/Qa) Eq 4.27
Below ground pipe (tf) = td*(1-2*PSD/(3*Qa)) Eq 3.2
Below ground rect. tank (tf) = td*(1-2*PSD/(3*Qa)) Eq 3.2

Time to empty:

Above ground (te) = (Vs+0.33*PSD²*td/Qa*60/10³)*(1.14/PSD)*(10³/60) Eq 4.28
Below ground pipe (te) = 1.464/PSD*(Vs+0.333*PSD²*td/Qa*60/10³)*(10³/60) Eq 4.32
Below ground rect. tank (te) = 2.653/PSD*(Vs+0.333*PSD²*td/Qa*60/10³)*(10³/60) Eq 4.36

Storage period (Ps = tf + te) Eq 4.26

Type	td (mins)	Qa (L/s)	Vs (L/s)	tf (mins)	te (mins)	Ps (mins)
Above	34.4	150.5	111.1	28.8	82.0	110.8
Pipe						
B/ground						

Table 3 - Period of Storage requirements for AEP of 1%

Orifice

Permissible site discharge (Qu=PSD) = 26.48 L/s (Above ground storage)
Orifice coefficient (CD) = 0.61 For sharp circular orifice
Gravitational acceration (g) = 9.81 m/s²
Maximum storage depth above orifice (H) = 750 mm
Orifice flow (Q) = CD*Ao*√(2*g*H)

Therefore:
Orifice area (Ao) = 11317 mm²
Orifice diameter (D = √(4*Ao/π)) = 120.0 mm

APPENDIX C – Flood Maps

PRE 1% AEP + CC @2100

Legend

223 Carlton River Road

Boundary Lines

1.00m Contours

Pre 1% AEP + CC @2100

Depth (m)

- <= 0.03
- 0.03 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.60
- 0.60 - 0.80
- 0.80 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 60 120 m

meters

N

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Map CRS: GDA94 / MGA zone 55 EPSG:28355

POST 1% AEP + CC @2100

Legend

- 223 Carlton River Road
- 1.00m Contours
- Boundary Lines
- Proposed layout
- Detention Basin for 5% AEP event
- Table drain for flood path
- Proposed Open Drain
  2.7m W x 0.45m D

Post 1% AEP + CC @2100

Depth (m)

- <= 0.03
- 0.03 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.60
- 0.60 - 0.80
- 0.80 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 60 120 m

meters

N

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Map CRS: GDA94 / MGA zone 55 EPSG:28355

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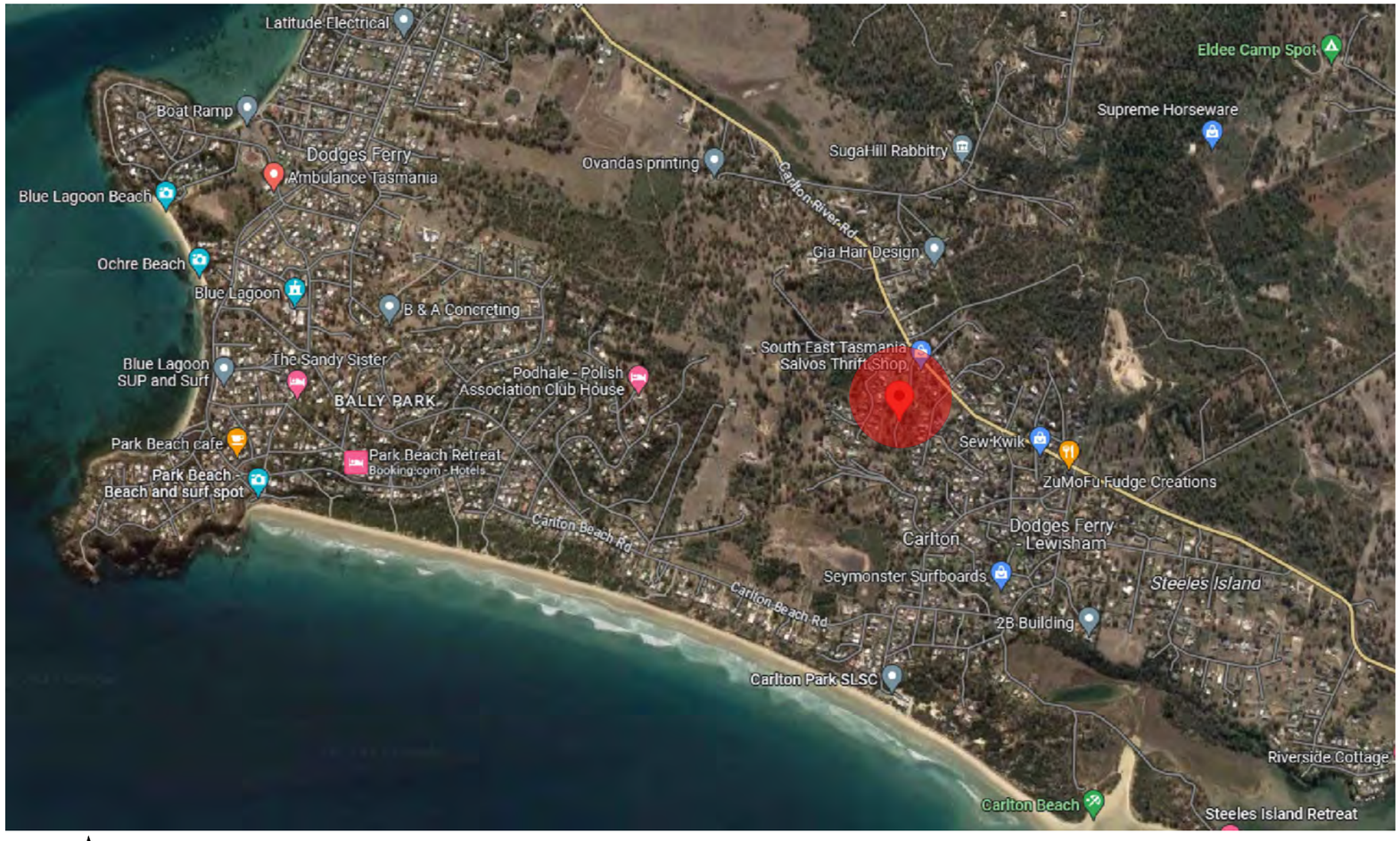
223 CARLTON RIVER ROAD
SUBDIVISION STORMWATER DESIGN

SHEET LIST TABLE		
SHEET NUMBER	SHEET TITLE	DRAWING REVISION NUMBER
G-000	COVER SHEET	P4
C-100	SITE PLAN	P4
C-110	ROAD LONG SECTION	P4
C-120	ROAD CROSS SECTIONS	P4
C-121	ROAD CROSS SECTIONS	P4
C-122	ROAD CROSS SECTIONS	P4
C-123	ROAD CROSS SECTIONS	P4
C-200	TYPICAL DETAILS	P4
C-201	TYPICAL DETAILS	P4
H-100	STORMWATER PLAN	P4
H-105	CUL-DE-SAC DETAIL PLAN	P4
H-106	DETENTION POND PLAN	P4
H-110	STORMWATER LONG SECTION	P4
H-111	STORMWATER LONG SECTION	P4
H-112	STORMWATER LONG SECTION	P4
H-113	STORMWATER LONG SECTION	P4
H-114	STORMWATER LONG SECTION	P4
H-115	STORMWATER LONG SECTION	P4
H-116	STORMWATER LONG SECTION	P4
H-117	STORMWATER LONG SECTION	P4



N

PROPOSED SUBDIVISION AREA

SCALE: NTS

Sorell Council

Development Application: Response to Request for Information - 223-227 Carlton River Road, Carlton River.pdf
Plans Reference: P5
Date Received: 15/03/2024

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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CLIENT: STAGAR PTY LTD

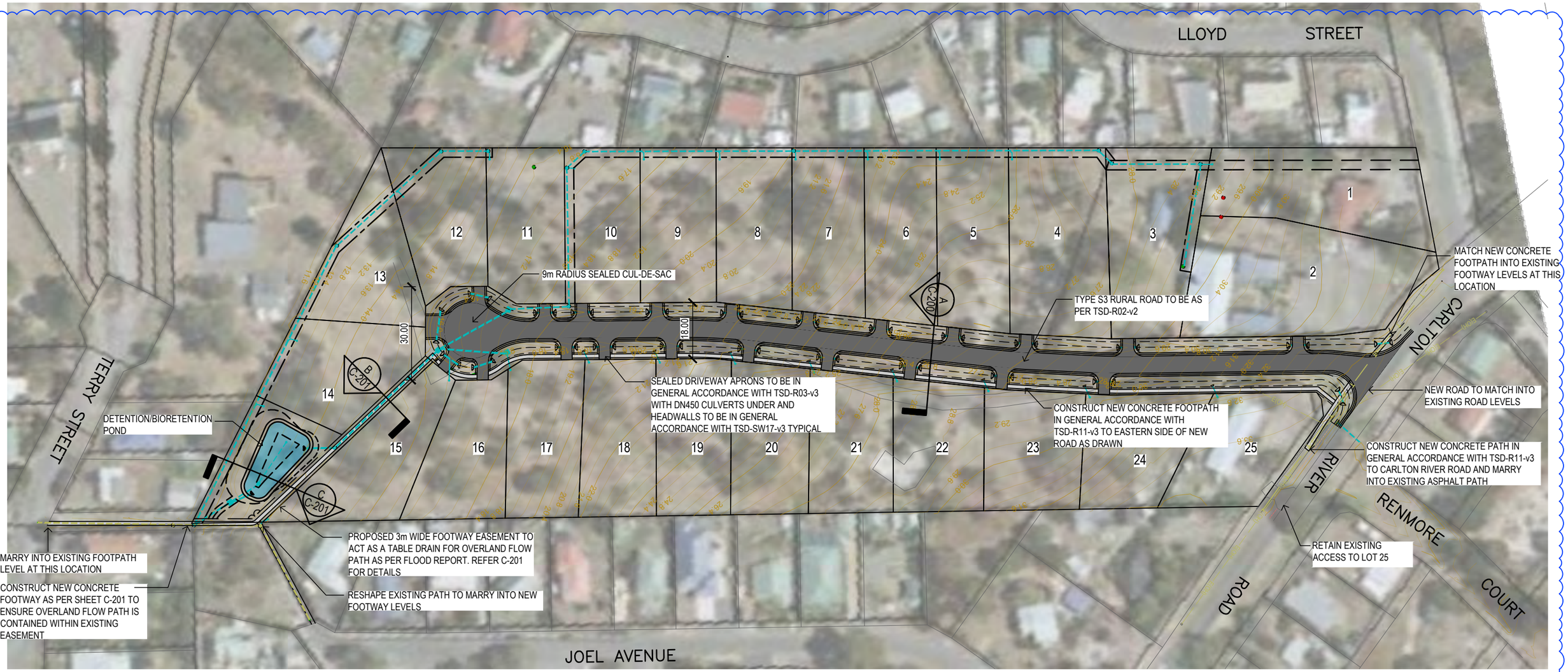
SITE: 223 CARLTON RIVER ROAD

TITLE: COVER SHEET

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	G-000	P4



SITE PLAN

SCALE 1:1250

P4

LEGEND

ASPHALT DRIVEWAY - REFER C-200 FOR DETAILS

NEW SERVICES

- STORMWATER DRAIN
- WATER SUPPLY LINE
- SEWERAGE DRAIN

EXISTING SERVICES

- STORM WATER DRAIN
- WATER SUPPLY LINE
- SEWERAGE DRAIN
- SEWERAGE DRAIN
- ELECTRICAL OVERHEAD
- SERVICE TO BE ABANDONED

Sorell Council

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P4	RFI REVISIONS	RU	13/03/24
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P1	PLANNING ISSUE	RU	31/05/23

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CLIENT: STAGAR PTY LTD

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SITE: 223 CARLTON RIVER ROAD

TITLE: SITE PLAN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
1:1250	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	C-100	P4

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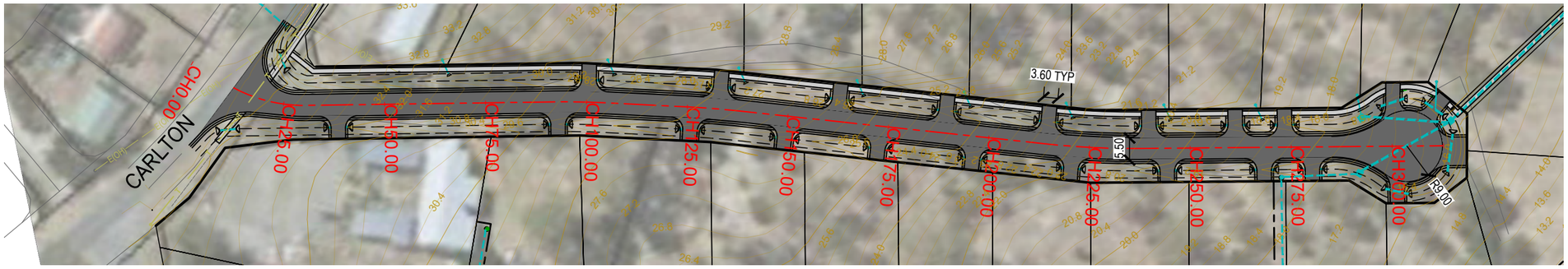

ROAD 01

SCALE 1:1250

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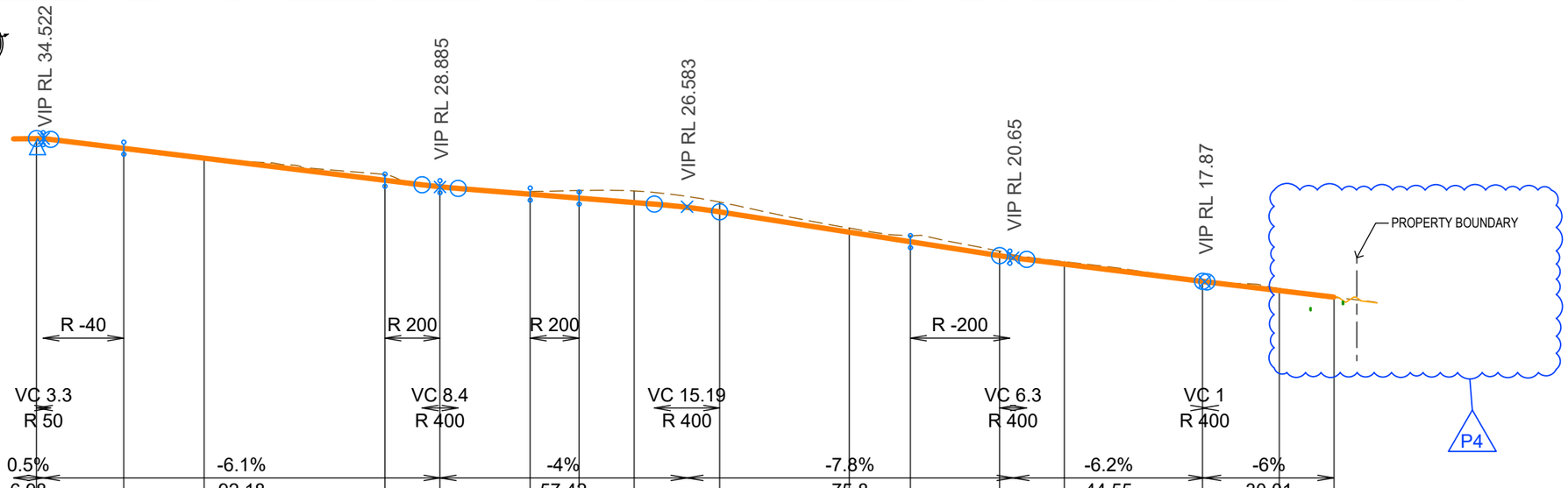
Plans Reference: P5
Date Received: 15/03/2024



HORIZONTAL CURVE DATA		R -40				R 200		R 200				R -200						
VERTICAL CURVE LENGTH (m)		VC 3.3				VC 8.4			VC 15.19				VC 6.3			VC 1		
VERTICAL CURVE RADIUS (m)		R 50				R 400			R 400				R 400			R 400		
VERTICAL GEOMETRY GRADE (%)		0.5%		-6.1%				-4%				-7.8%			-6.2%		-6%	
VERTICAL GEOMETRY LENGTH (m)		6.98		92.18				57.42				75.8			44.55		30.01	
DATUM RL = -13.700																		
FINISHED SURFACE LEVEL		34.514	33.382	32.240	29.669	28.909	28.046	27.590	27.076	25.989	23.631	22.520	20.897	19.907	17.902	16.831		
EXISTING SURFACE LEVEL		34.574	33.171	32.109	30.340	28.875	28.353	28.476	28.424	27.124	24.109	23.216	21.406	20.193	17.945	17.086	16.065	
CUT / FILL DEPTH		-0.060	0.211	0.131	-0.670	0.034	-0.307	-0.887	-1.349	-1.134	-0.478	-0.696	-0.509	-0.286	-0.044	-0.255		
CONTROL LINE CHAINAGE	0	11.038	31.329	50	92.034	104.826	125.803	137.177	150	169.874	200	214.197	234.94	250	282.137	300	312.709	

A1 SCALE: H 1:1250, V 1:625

LONGITUDINAL SECTION ROAD 01

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P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
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CLIENT: STAGAR PTY LTD

SITE: 223 CARLTON RIVER ROAD

TITLE: LONG SECTION-ROAD 01

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
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FE-23049	C-110	P4

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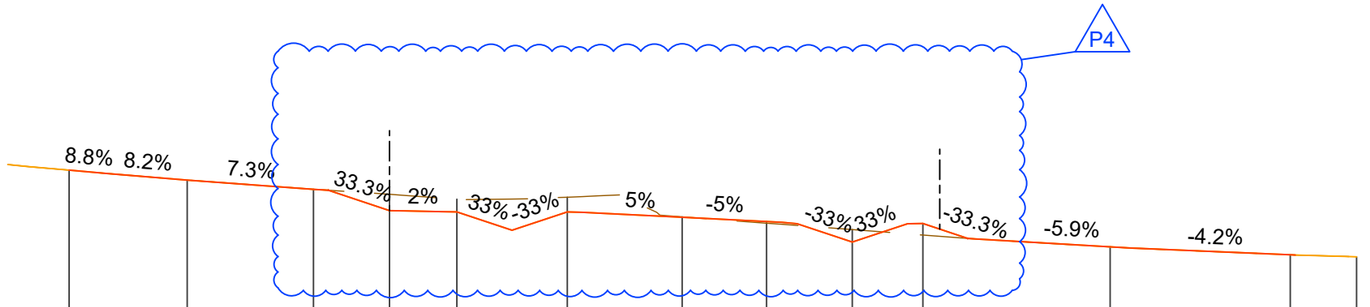
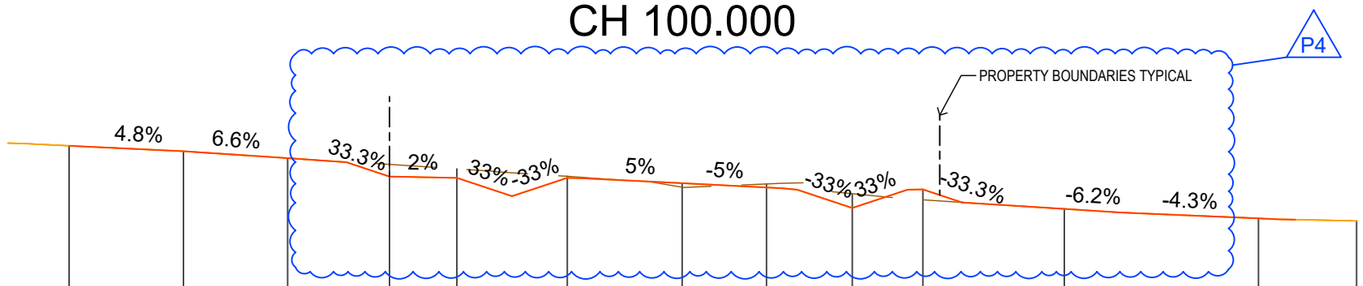


DATUM RL 23.800

FINISHED SURFACE LEVEL	30.719	30.396	30.095	29.399	29.355	29.355	29.182	29.045	28.376	28.980	28.216	27.958	
EXISTING SURFACE LEVEL	30.719	30.396	30.095	29.932	29.773	29.837	29.195	28.990	28.781	28.602	28.216	27.958	27.892
OFFSET	-20.000	-16.146	-12.028	-9.550	-7.350	-3.750	0.000	2.750	5.550	7.850	13.961	19.838	22.000

CH 100.000



DATUM RL 27.000

FINISHED SURFACE LEVEL	33.461	33.281	33.056	32.457	32.413	32.413	32.240	32.103	31.434	32.038	31.401	31.093	
EXISTING SURFACE LEVEL	33.461	33.281	33.056	32.855	32.708	32.464	32.109	32.215	31.898	31.699	31.401	31.093	31.013
OFFSET	-20.000	-16.270	-12.873	-9.550	-7.350	-3.750	0.000	2.750	5.550	7.850	12.465	18.800	22.000

CH 50.000

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P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

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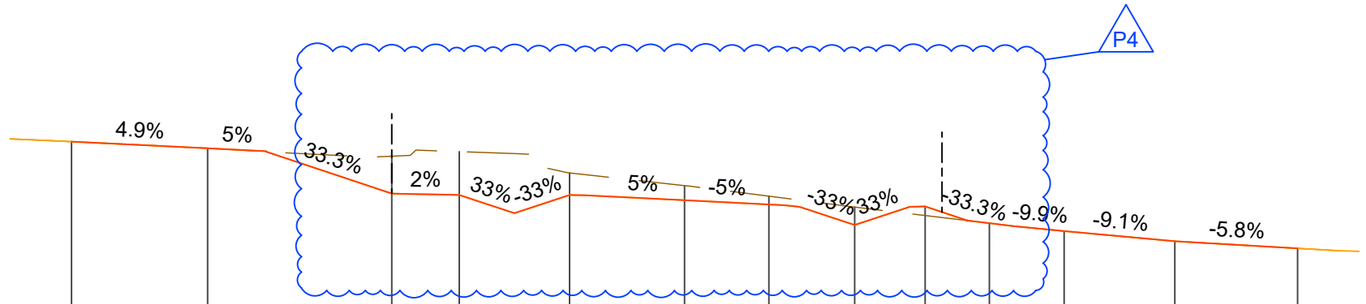
SITE: 223 CARLTON RIVER ROAD

TITLE: ROAD 01 CROSS SECTIONS

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
H-1:200 V-1:200	13/03/24	RU/DH	MM

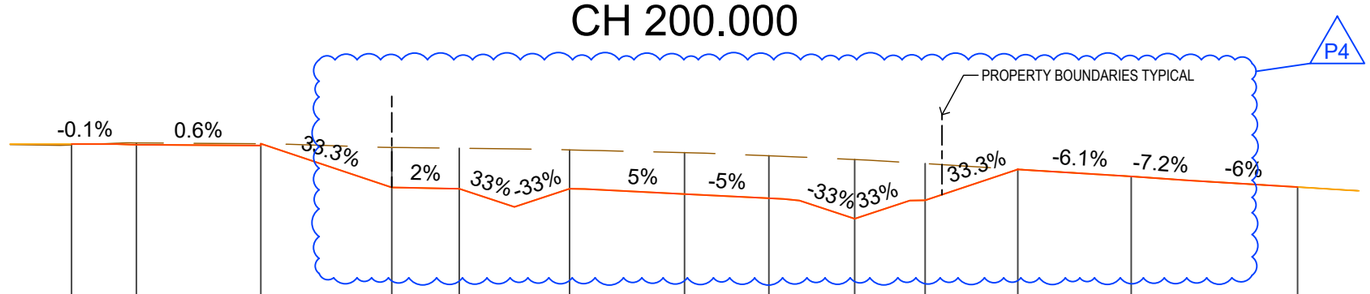
PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	C-120	P4



DATUM RL 17.900

FINISHED SURFACE LEVEL	25.543	25.327	23.848	23.804	23.804	23.631	23.494	22.825	23.429	22.884	22.624	22.296	22.064	
EXISTING SURFACE LEVEL	25.543	25.327	25.069	25.217	24.521	24.109	23.766	23.407	23.133	22.884	22.624	22.296	22.064	
OFFSET	-20.000	-15.557	-9.550	-7.350	-3.750	0.000	2.750	5.550	7.850	9.945	12.384	15.995	20.000	

CH 200.000



DATUM RL 22.200

FINISHED SURFACE LEVEL	28.706	28.682	28.656	27.292	27.248	27.248	27.076	26.938	26.269	26.873	27.880	27.652	27.303	
EXISTING SURFACE LEVEL	28.676	28.742	28.716	28.594	28.568	28.514	28.424	28.323	28.200	28.067	27.880	27.652	27.303	
OFFSET	-20.000	-17.883	-13.822	-9.550	-7.350	-3.750	0.000	2.750	5.550	7.850	10.869	14.570	20.000	

CH 150.000

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
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CLIENT: STAGAR PTY LTD

PROJECT: 223 CARLTON RIVER ROAD
SUBDIVISION STORMWATER DESIGN

SITE: 223 CARLTON RIVER ROAD

TITLE: ROAD 01 CROSS SECTIONS

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
H-1:200 V-1:200	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	C-121	P4

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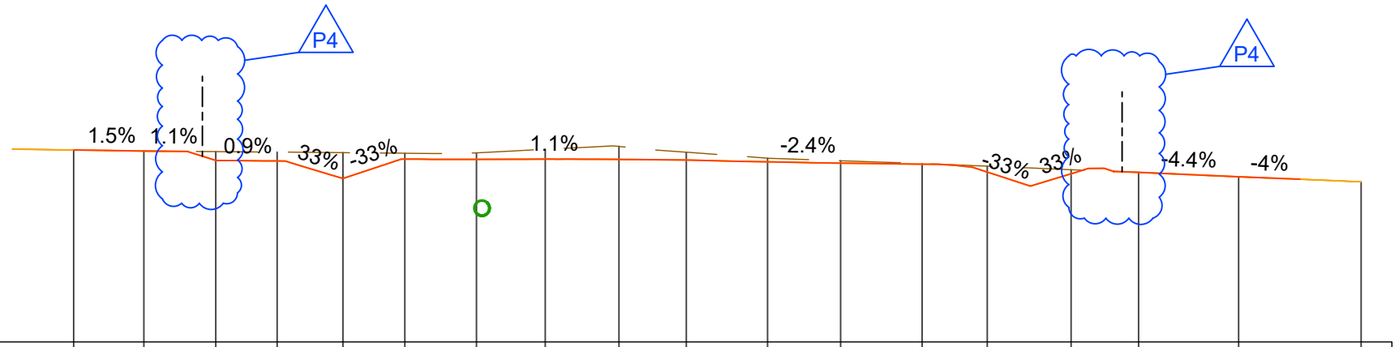
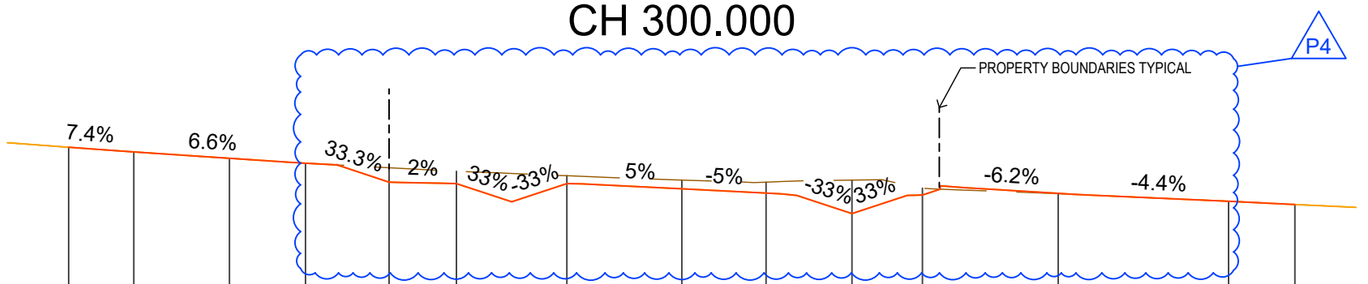


DATUM RL 10.900

FINISHED SURFACE LEVEL	17.159	17.124	16.818	16.800	16.231	16.861	16.853	16.863	16.851	16.831	16.774	16.730	16.698	16.439	16.385	16.428	16.284	
EXISTING SURFACE LEVEL	17.159	17.124	17.106	17.091	17.072	17.053	17.066	17.181	17.274	17.087	16.892	16.808	16.717	16.631	16.515	16.428	16.284	16.119
OFFSET	-20.000	-17.710	-15.367	-13.363	-11.218	-9.198	-6.861	-4.616	-2.214	-0.015	2.633	5.017	7.677	9.801	12.535	14.737	18.001	22.000

CH 300.000



DATUM RL 15.100

FINISHED SURFACE LEVEL	21.265	21.109	20.902	20.744	20.123	20.079	20.079	19.907	19.769	19.100	19.704	19.759	19.504	19.398
EXISTING SURFACE LEVEL	21.265	21.109	20.902	20.744	20.595	20.480	20.335	20.193	20.125	20.191	19.929	19.749	19.504	19.398
OFFSET	-20.000	-17.875	-14.757	-12.274	-9.550	-7.350	-3.750	0.000	2.750	5.550	7.850	12.277	17.837	20.000

CH 250.000

Sorell Council

Development Application: Response to Request for Information - 223-227 Carlton River Road, Carlton River.pdf
Plans Reference: P5
Date Received: 15/03/2024

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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a: 116 Bathurst St, Level 4 Hobart, 7000, TASMANIA

CLIENT: STAGAR PTY LTD

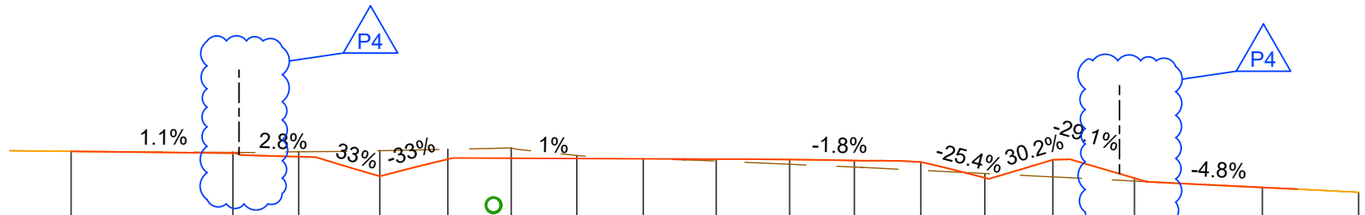
SITE: 223 CARLTON RIVER ROAD

TITLE: ROAD 01 CROSS SECTIONS

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
H-1:200 V-1:200	13/03/24	RU/DH	MM

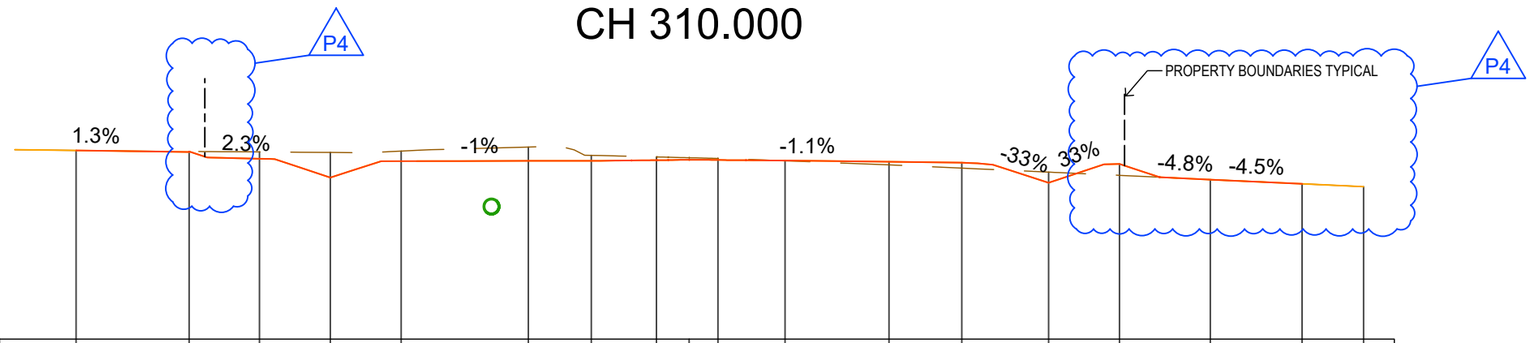
PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	C-122	P4



DATUM RL 10.500

FINISHED SURFACE LEVEL	16.534	16.474	16.360	15.722	16.276	16.212	16.228	16.272	16.279	16.270	16.236	16.189	15.674	16.260	15.664	15.360		
EXISTING SURFACE LEVEL	16.534	16.500	16.521	16.557	16.601	16.646	16.400	16.294	16.220	16.114	16.022	15.916	15.812	15.702	15.565	15.360	15.201	
OFFSET	-20.000	-14.722	-12.578	-9.930	-7.713	-5.641	-3.503	-1.339	1.042	3.436	5.550	7.717	9.804	12.025	14.686	18.862	22.000	

CH 310.000



DATUM RL 10.700

FINISHED SURFACE LEVEL	16.850	16.800	16.581	15.965	16.532	16.510	16.513	16.531	16.540	16.520	16.482	16.453	15.797	16.409	15.897	15.763		
EXISTING SURFACE LEVEL	16.850	16.817	16.802	16.786	16.829	16.961	16.690	16.638	16.589	16.511	16.380	16.274	16.143	16.039	15.897	15.763	15.668	
OFFSET	-20.000	-16.316	-14.022	-11.710	-9.397	-5.248	-3.195	-1.072	0.938	3.124	6.515	8.892	11.721	14.033	16.997	19.991	22.000	

CH 305.000

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P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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PROJECT: 223 CARLTON RIVER ROAD
SUBDIVISION STORMWATER DESIGN

SITE: 223 CARLTON RIVER ROAD

TITLE: ROAD 01 CROSS SECTIONS

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
H-1:200 V-1:200	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	C-123	P4

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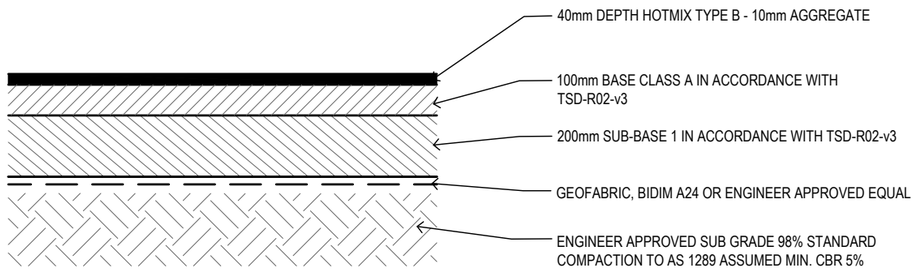
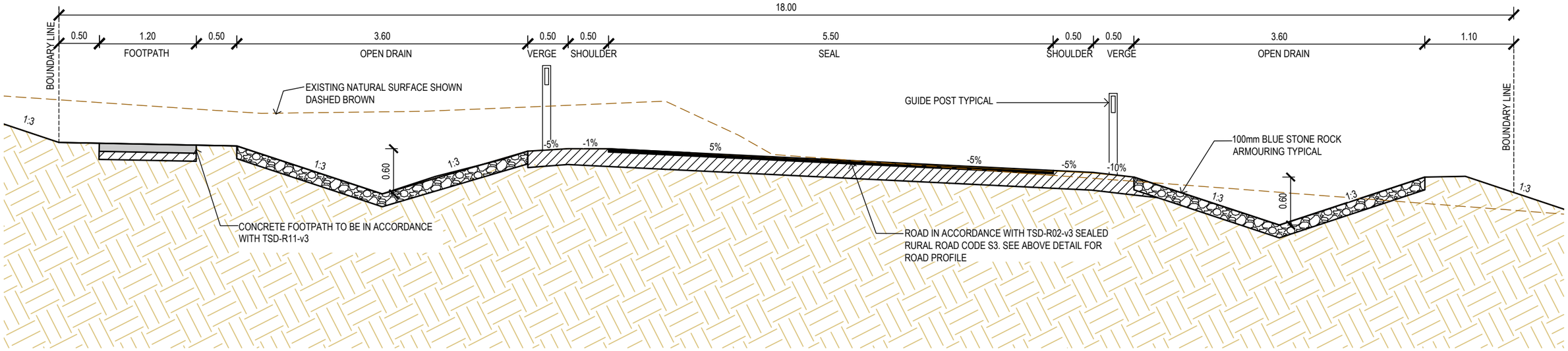


TYPICAL ASPHALT ROAD COMPOSITION

SCALE 1:20



A C-100 TYPICAL DRIVEWAY PROFILE

SCALE 1:50

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P1	PLANNING ISSUE	RU	31/05/23

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a: 116 Bathurst St, Level 4 Hobart, 7000, TASMANIA

CLIENT: STAGAR PTY LTD

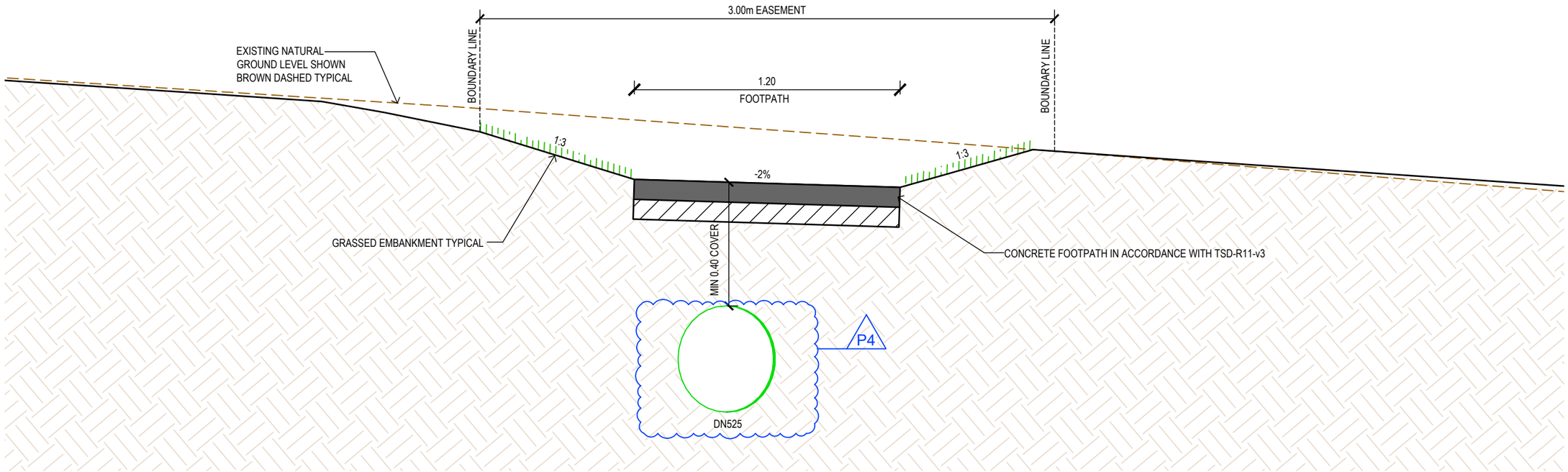
SITE: 223 CARLTON RIVER ROAD

TITLE: TYPICAL DETAILS

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
AS SHOWN	13/03/24	RU/DH	MM

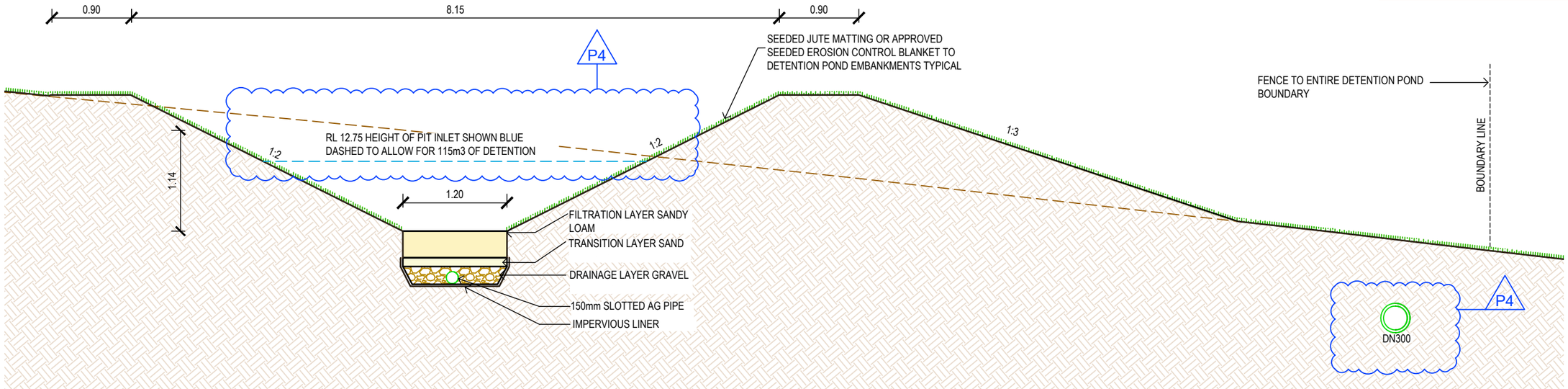
PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	C-200	P4



B
C-100

TYPICAL WALKWAY PROFILE

SCALE 1:20



C
C-100

DETENTION/BIORETENTION POND TYPICAL DETAIL

SCALE 1:50

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P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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CLIENT: STAGAR PTY LTD

SITE: 223 CARLTON RIVER ROAD

TITLE: TYPICAL DETAILS

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
AS SHOWN	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	C-201	P4

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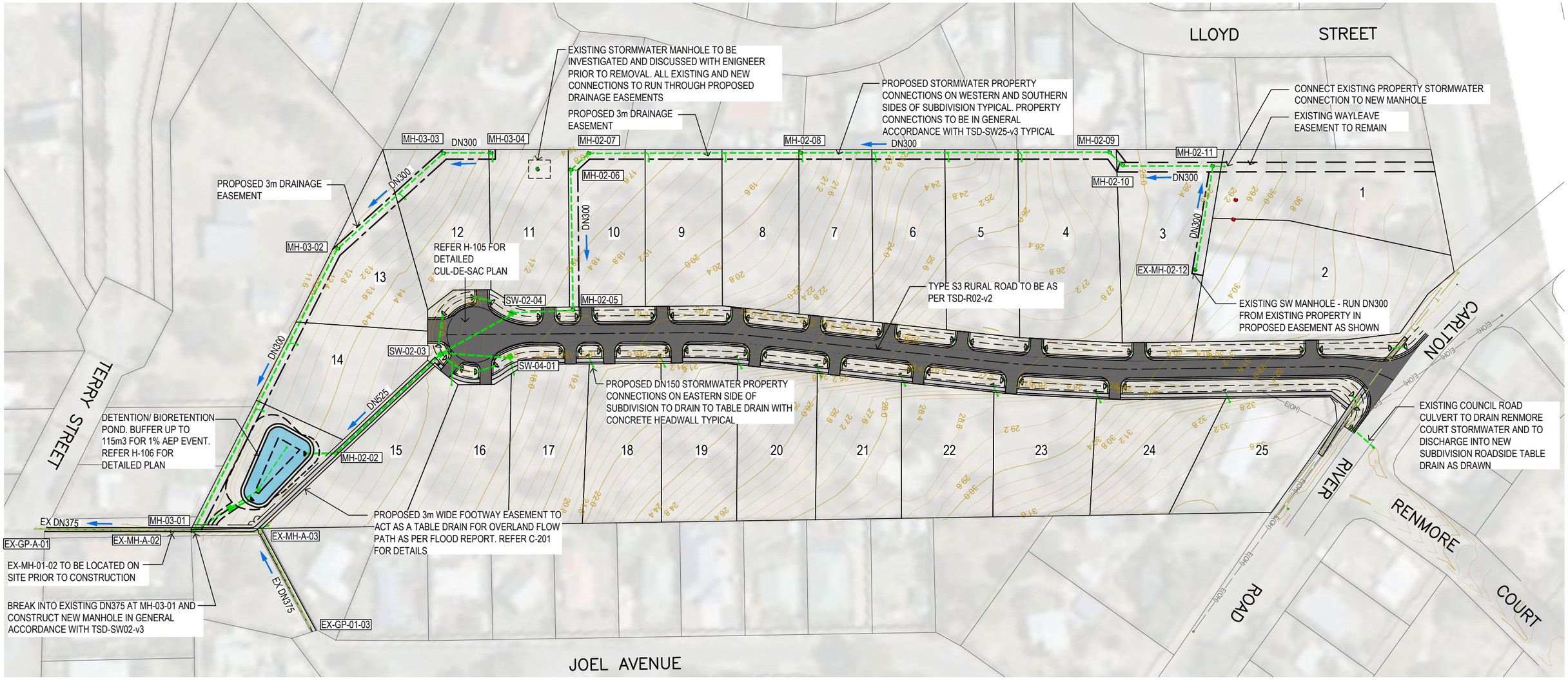

STORMWATER GENERAL ARRANGEMENT PLAN

SCALE 1:1250

NOTE:
1. REFER H-105 FOR LEGEND

STORMWATER SERVICES NOTES:

1. ALL SITE SAFETY & MANAGEMENT PROCEDURES SHALL BE IN ACCORDANCE WITH THE DEPARTMENT OF STATE GROWTH SPECIFICATIONS: SECTION 168 OCCUPATIONAL HEALTH AND SAFETY & SECTION 176 ENVIRONMENTAL MANAGEMENT.
2. ALL PIPES UNDER TRAFFIC ABLE AREAS ARE TO BE BACK FILLED FULL DEPTH WITH 20 F.C.R. AND FULLY COMPACTED.
3. ALL STORM WATER PIPES LESS THAN DN225 TO BE PVC-U-SWJ CLASS "SN8" TO AS 1254 UNO.
4. ALL STORMWATER PIPES DN225 & LARGER TO BE POLYPROPYLENE TO AS5065 RRJ 'STORMPRO' UNO.
5. PROVIDE ANCHOR BLOCKS IN ACCORDANCE WITH TSD-SW01 WHERE PIPE GRADES EXCEED 10%.
6. CONNECTIONS TO LIVE COUNCIL MAINS TO BE CARRIED OUT BY COUNCIL OR APPROVED CONTRACTOR AT DEVELOPERS COST.
7. ALL SW LOT CONNECTIONS SHALL BE 150 DIAMETER EX DN150 PVC PIPE WITH DN150 RISER AND SCREW CAP TO SURFACE AND COVERED WITH INSPECTION BOXES IN ACCORDANCE WITH IPWE STD DRG TSD-SW25-V1.
8. SW LOT CONNECTIONS DIRECTLY TO MAINS SHALL BE FORMED JUNCTIONS.
9. ALL DRAIN AND TRENCH CONSTRUCTION SHALL COMPLY WITH THE LGAT STANDARD DRG TSD G01.
10. ALL MANHOLE LIDS IN TRAFFICABLE AREAS SHALL COMPLY WITH CLASS "B" LOAD RATING TO AUSTRALIAN STANDARD AS 3996 AND TSD-SW02.
11. ANY EXCAVATED TRENCHES IN EXCESS OF 1.5M IN DEPTH ARE TO BE ADEQUATELY SHORED TO PREVENT COLLAPSE DURING WORKS.
12. SUBSOIL DRAINS UNDER INFILTRATION SWALES SHALL BE SLOTTED UPVC CLASS "SN4"TO AS 1254 & INSTALLED IN ACCORDANCE WITH AS3500.
13. SUBSOIL DRAINS ARE TO BE CONNECTED TO STORMWATER PITS.

Sorell Council
Development Application: Response to Request for Information - 223-227 Carlton River Road, Carlton River.pdf
Plans Reference: P5
Date Received: 15/03/2024

P4

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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CLIENT: STAGAR PTY LTD

SITE: 223 CARLTON RIVER ROAD

TITLE: STORMWATER PLAN

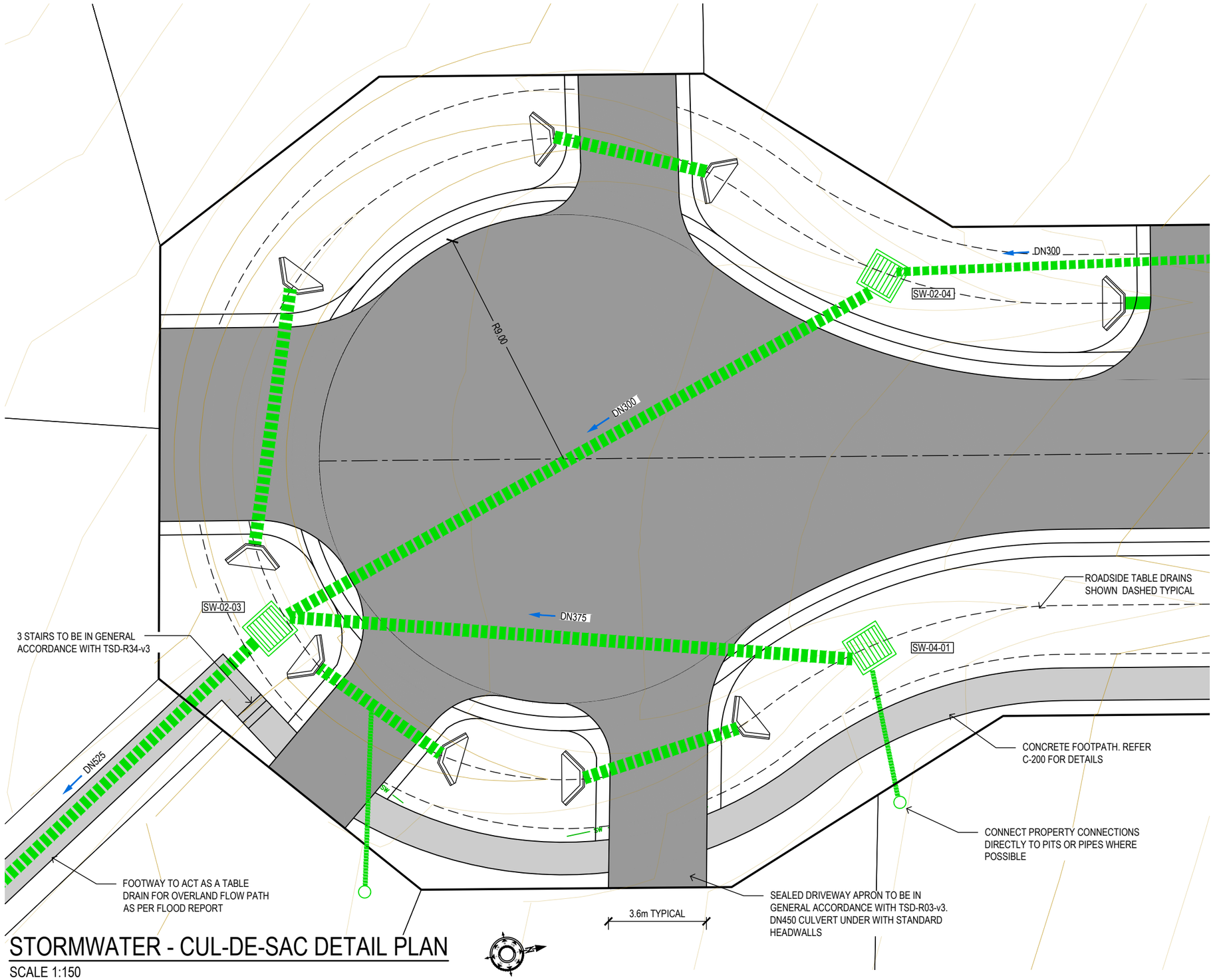
PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
1:1250	13/03/24	RU/DH	MM

PROJECT NO: FE-23049

DRAWING NO: H-100

REVISION: P4



STORMWATER - CUL-DE-SAC DETAIL PLAN

SCALE 1:150

NOTE:
1. REFER H-100 FOR STANDARD STORMWATER NOTES

NEW SERVICES

STORMWATER DRAIN. REFER LONG SECTIONS FOR SIZES AND TYPES

SW SW — DN300 RCP DRIVEWAY CULVERT

NEW STORMWATER SERVICES

STORMWATER FLOW DIRECTION

EX-SWMH-XX-XX - EXISTING STORMWATER MANHOLE

SWMH-XX-XX - NEW STORMWATER MANHOLE TO BE IN GENERAL ACCORDANCE WITH TSD-SW02-v3

EX-SW-XX-XX - EXISTING GRATED STORMWATER PIT

SW-XX-XX - GRATED STORMWATER PIT TO BE 1200X1200 UNLESS NOTED OTHERWISE AND TO BE IN GENERAL ACCORDANCE WITH TSD-SW15-v3

SW-04-01, SW-02-02 AND SW-02-03 TO BE FITTED WITH STORMSACKS

HW-XX-XX - HEADWALL. TO BE AS PER TSD-SW17-v3

STORMWATER PROPERTY CONNECTION HEADWALL TO BE HUDSON CIVIL SUBSOIL END WALL
CODE: CP6105 150mm SUBSOIL ENDWALL

Sorell Council

Development Application: Response to Request for Information - 223-227 Carlton River Road, Carlton River.pdf
Plans Reference: P5
Date Received: 15/03/2024

P4

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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CLIENT: STAGAR PTY LTD

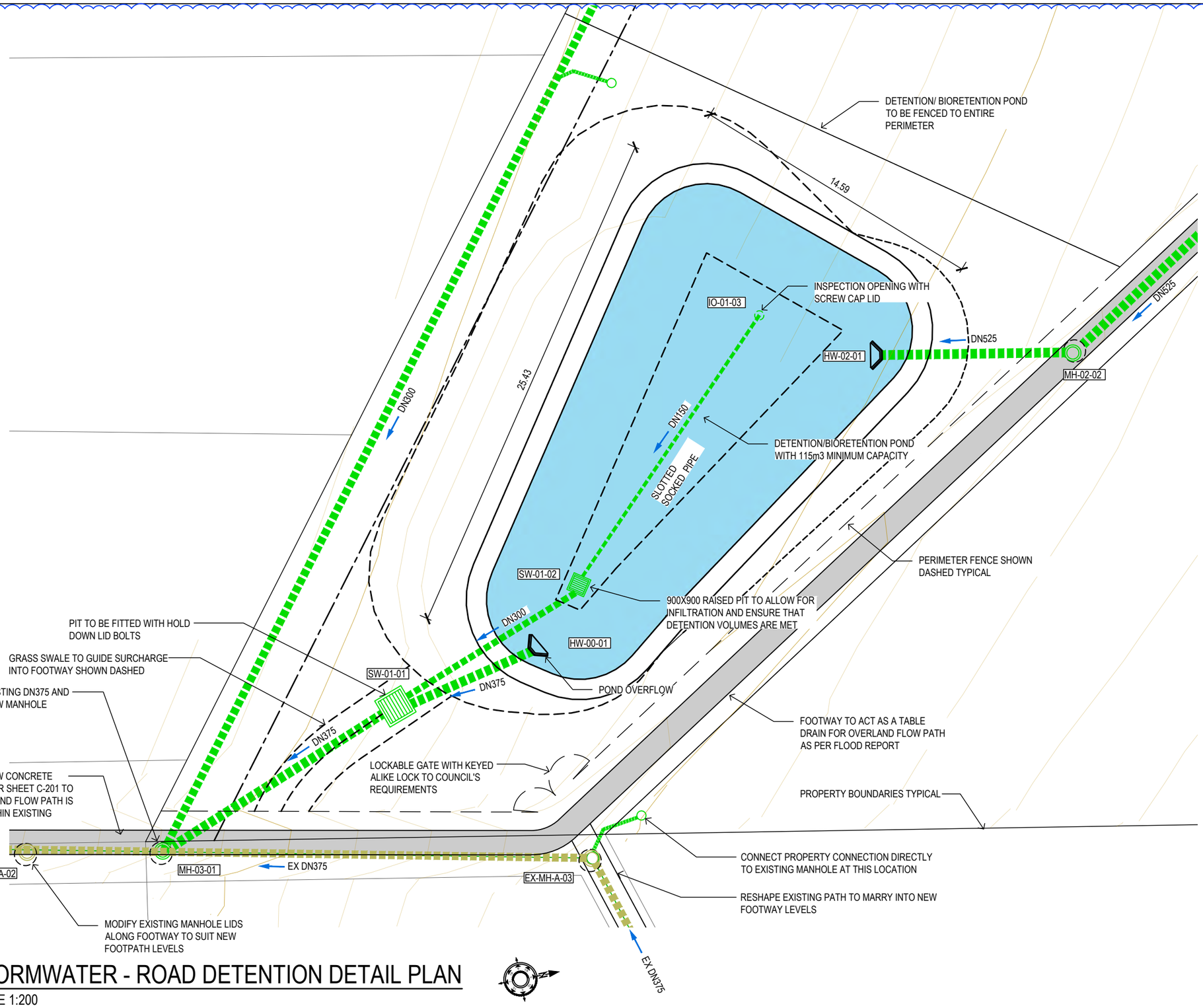
SITE: 223 CARLTON RIVER ROAD

TITLE: CUL-DE-SAC DETAIL PLAN

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
1:150	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	H-105	P4



STORMWATER - ROAD DETENTION DETAIL PLAN

SCALE 1:200

NOTE:
1. REFER H-100 FOR STANDARD STORMWATER NOTES

NEW SERVICES

STORMWATER DRAIN. REFER LONG SECTIONS FOR SIZES AND TYPES

SW SW — DN300 RCP DRIVEWAY CULVERT

NEW STORMWATER SERVICES

STORMWATER FLOW DIRECTION

EX-SWMH-XX-XX - EXISTING STORMWATER MANHOLE

SWMH-XX-XX - NEW STORMWATER MANHOLE TO BE IN GENERAL ACCORDANCE WITH TSD-SW02-v3

EX-SW-XX-XX - EXISTING GRATED STORMWATER PIT

SW-XX-XX - GRATED STORMWATER PIT TO BE 1200X1200 UNLESS NOTED OTHERWISE AND TO BE IN GENERAL ACCORDANCE WITH TSD-SW15-v3

SW-04-01 AND SW-02-03 TO BE FITTED WITH STORMSACKS

HW-XX-XX - HEADWALL. TO BE AS PER TSD-SW17-v3

STORMWATER PROPERTY CONNECTION HEADWALL TO BE HUDSON CIVIL SUBSOIL END WALL
CODE: CP6105 150mm SUBSOIL ENDWALL

P4

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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CLIENT: STAGAR PTY LTD

SITE: 223 CARLTON RIVER ROAD

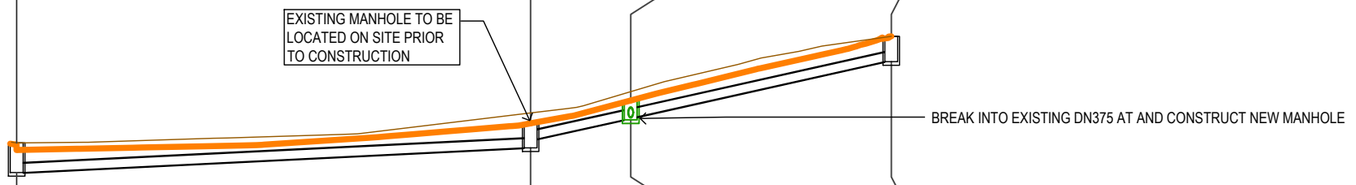
TITLE: DETENTION POND PLAN

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
1:150	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	H-106	P4

STRUCTURE NAME	EX-GP-A-01	EX-MH-A-02	MH-03-01	EX-MH-A-03
STRUCTURE DESCRIPTION	ROAD PIT	MANHOLE	MANHOLE	MANHOLE



PIPE SIZE (mm)		375	375	375
PIPE CLASS & TYPE		EXISTING	EXISTING	EXISTING
PIPE GRADE (%)		2.40%	9.60%	10.60%
PIPE SLOPE (1 in X)		41.7	10.4	9.4
DATUM RL		-18.000		
HGL IN PIPE & WSE IN STRUCTURE	0.000	0.000	0.000	0.000
FINISHED (& EXISTING) SURFACE LEVEL	9.206	(9.497)	(10.715)	(11.584)
DEPTH OF INVERT BELOW FSL	0.916	0.916	0.639	0.669
INVERT LEVEL	8.290	8.290	9.656	10.558
CHAINAGE	0.000	41.913	50.078	71.328
		41.913m	8.165m	21.250m

UNABLE TO CALCULATE HGL AS WE DO NOT HAVE DATA FROM JOEL AVENUE

LINE EXISTING LINE

Sorell Council
Development Application: Response to Request for Information - 223-227 Carlton River Road, Carlton River.pdf
Plans Reference: P5
Date Received: 15/03/2024

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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a: 116 Bathurst St, Level 4 Hobart, 7000, TASMANIA

CLIENT: STAGAR PTY LTD

SITE: 223 CARLTON RIVER ROAD

TITLE: STORMWATER LONG SECTIONS

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

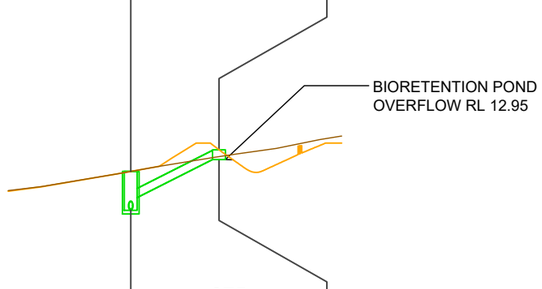
SCALE AT A3:	DATE:	DRAWN:	CHECKED:
H 1:500 V 1:250	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	H-110	P4

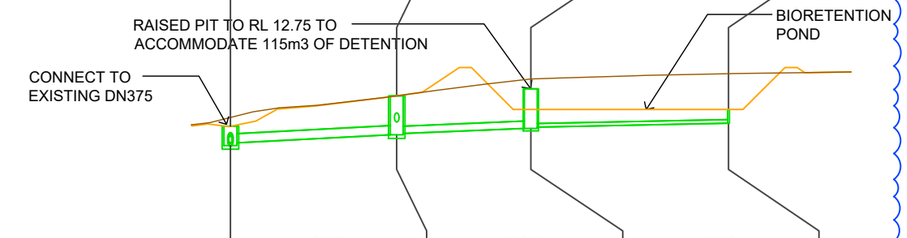
P4

Sorell Council
Development Application: Response to Request for Information - 223-227 Carlton River Road, Carlton River.pdf
Plans Reference: P5
Date Received: 15/03/2024

LINE SW LINE 00

STRUCTURE NAME	SW-01-01	HW-00-01	
			
		BIORETENTION POND OVERFLOW RL 12.95	
PIPE SIZE (mm)		375	
PIPE CLASS & TYPE		STORMPRO SN8	
PIPE GRADE (%)		-23.50%	
PIPE SLOPE (1 in X)		-4.3	
FULL PIPE VELOCITY (m/s)			
NORMAL DEPTH VELOCITY (m/s)			
PIPE FLOW (cumecs)			
CAPACITY FLOW (cumecs)		0.850	
DATUM RL		-16.000	
HGL IN PIPE & WSE IN STRUCTURE 20 MINUTE 5% AEP STORM EVENT	0.000	0.000	0.000
FINISHED (& EXISTING) SURFACE LEVEL	12.464	13.346	(13.069)
DEPTH OF INVERT BELOW FSL	1.066	0.396	0.396
INVERT LEVEL	11.398	12.950	12.950
CHAINAGE	0.000	7.197	
		6.391m	

LINE SW LINE 01

STRUCTURE NAME	MH-03-01	SW-01-01	SW-01-02	IO-01-03	
					
			RAISED PIT TO RL 12.75 TO ACCOMMODATE 115m3 OF DETENTION	BIORETENTION POND	
			CONNECT TO EXISTING DN375		
PIPE SIZE (mm)		375	300	150	
PIPE CLASS & TYPE		STORMPRO SN8	STORMPRO SN8	SLOTTED PVC	
PIPE GRADE (%)		-2.15%	-1.91%	-1.00%	
PIPE SLOPE (1 in X)		-46.4	-52.4	-100.0	
FULL PIPE VELOCITY (m/s)					
NORMAL DEPTH VELOCITY (m/s)					
PIPE FLOW (cumecs)					
CAPACITY FLOW (cumecs)		0.257	0.134		
DATUM RL		-17.000			
HGL IN PIPE & WSE IN STRUCTURE 20 MINUTE 5% AEP STORM EVENT	0.000	0.000	0.000	0.000	0.000
FINISHED (& EXISTING) SURFACE LEVEL	11.226	(11.584)	12.464	11.910	(13.155)	11.910	(13.369)
DEPTH OF INVERT BELOW FSL	0.676	1.584	1.534	0.771	0.721	0.560	0.560
INVERT LEVEL	10.550	10.880	10.930	11.139	11.189	11.350	11.350
CHAINAGE	0.000	13.563	24.499	40.618		
		15.342m	10.936m	16.120m	

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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a: 116 Bathurst St, Level 4 Hobart, 7000, TASMANIA

CLIENT: STAGAR PTY LTD
SITE: 223 CARLTON RIVER ROAD
TITLE: STORMWATER LONG SECTIONS
PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN
SCALE AT A3: H 1:500 V 1:250
DATE: 13/03/24
DRAWN: RU/DH
CHECKED: MM
PROJECT NO: FE-23049
DRAWING NO: H-111
REVISION: P4

P4

STRUCTURE NAME	HW-02-01	MH-02-02		SW-02-03		SW-02-04		MH-02-05	
PIPE SIZE (mm)		525		525		300		300	
PIPE CLASS & TYPE		STORMPRO SN8		STORMPRO SN8		RCP CLASS 4 (RRJ)		STORMPRO SN8	
PIPE GRADE (%)		2.03%		1.88%		1.99%		1.91%	
PIPE SLOPE (1 in X)		49.3		53.2		50.2		52.3	
FULL PIPE VELOCITY (m/s)		1.91		1.91		1.69		1.06	
NORMAL DEPTH VELOCITY (m/s)		3.04		2.95		2.18		1.95	
PIPE FLOW (cumecs)		0.413		0.413		0.120		0.075	
CAPACITY FLOW (cumecs)		0.613		0.590		0.136		0.134	
DATUM RL		-13.000							
HGL IN PIPE & WSE IN STRUCTURE 20 MINUTE 5% AEP STORM EVENT	13.064		13.306	13.781 13.694	14.436	14.829 14.779	15.162	15.409 15.383	15.505 15.637
FINISHED (& EXISTING) SURFACE LEVEL	13.172	(13.800)	14.012	(14.290)	15.480	(16.298)	16.332	(17.186)	18.259 (18.632)
DEPTH OF INVERT BELOW FSL	0.424	0.424	1.138	1.101	1.477	1.427	1.781	1.731	3.272
INVERT LEVEL	12.748	12.748	12.874	12.911	14.003	14.053	14.551	14.601	14.988
CHAINAGE	-68.241		-62.054		-3.962		21.049		41.251
		6.187m		58.092m		25.011m		20.202m	

LINE SW LINE 02

Sorell Council

Development Application: Response to Request for Information - 223-227 Carlton River Road, Carlton River.pdf
Plans Reference: P5
Date Received: 15/03/2024

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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a: 116 Bathurst St, Level 4 Hobart, 7000, TASMANIA

CLIENT: STAGAR PTY LTD

SITE: 223 CARLTON RIVER ROAD

TITLE: STORMWATER LONG SECTIONS

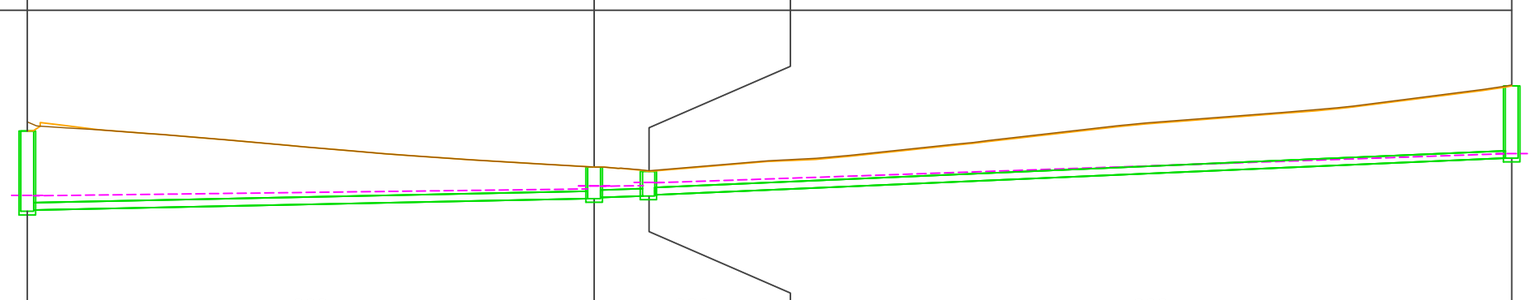
PROJECT: 223 CARLTON RIVER ROAD
SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
H 1:500 V 1:250	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	H-112	P4

P4

STRUCTURE NAME	MH-02-05		MH-02-06		MH-02-07		MH-02-08	
PIPE SIZE (mm)			300		300		300	
PIPE CLASS & TYPE			STORMPRO SN8		STORMPRO SN8		STORMPRO SN8	
PIPE GRADE (%)			1.01%		1.25%		2.12%	
PIPE SLOPE (1 in X)			99.4		80.0		47.1	
FULL PIPE VELOCITY (m/s)			1.06		1.06		0.77	
NORMAL DEPTH VELOCITY (m/s)			1.52		1.65		1.87	
PIPE FLOW (cumecs)			0.075		0.075		0.055	
CAPACITY FLOW (cumecs)			0.097		0.108		0.141	
DATUM RL			-10.000					
HGL IN PIPE & WSE IN STRUCTURE 20 MINUTE 5% AEP STORM EVENT	15.505	15.637 15.618		15.898	16.021 16.007	16.034	16.166 16.148	17.334 17.341
FINISHED (& EXISTING) SURFACE LEVEL	18.259	(18.632)		16.788		16.617	(16.641)	20.097 (20.139)
DEPTH OF INVERT BELOW FSL	3.272	3.222		1.286	1.236	1.008	0.958	2.945
INVERT LEVEL	14.988	15.038		15.503	15.553	15.609	15.659	17.152
CHAINAGE	41.251			87.481		91.964		162.315
			46.230m		4.483m		70.351m	



Sorell Council

Development Application: Response to Request for Information - 223-227 Carlton River Road, Carlton River.pdf
Plans Reference: P5
Date Received: 15/03/2024

LINE SW LINE 02

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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CLIENT: STAGAR PTY LTD

PROJECT: 223 CARLTON RIVER ROAD
SUBDIVISION STORMWATER DESIGN

SITE: 223 CARLTON RIVER ROAD

TITLE: STORMWATER LONG SECTIONS

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
H 1:750 V 1:325	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	H-113	P4

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P4

STRUCTURE NAME	MH-02-08	SW-02-09
PIPE SIZE (mm)	300	
PIPE CLASS & TYPE	STORMPRO SN8	
PIPE GRADE (%)	8.00%	
PIPE SLOPE (1 in X)	12.5	
FULL PIPE VELOCITY (m/s)	0.77	
NORMAL DEPTH VELOCITY (m/s)	3.02	
PIPE FLOW (cumecs)	0.055	
CAPACITY FLOW (cumecs)	0.274	
DATUM RL	-6.000	
HGL IN PIPE & WSE IN STRUCTURE 20 MINUTE 5% AEP STORM EVENT	17.334 / 17.341	25.390 / 25.584
FINISHED (& EXISTING) SURFACE LEVEL	20.097 / (20.139)	27.866 / (27.922)
DEPTH OF INVERT BELOW FSL	2.945 / 2.913	2.658
INVERT LEVEL	17.152 / 17.183	25.208
CHAINAGE	162.315	262.623

100.308m

LINE SW LINE 02

Sorell Council
Development Application: Response to Request for Information - 223-227 Carlton River Road, Carlton River.pdf
Plans Reference: P5
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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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CLIENT: STAGAR PTY LTD

PROJECT: 223 CARLTON RIVER ROAD
SUBDIVISION STORMWATER DESIGN

SITE: 223 CARLTON RIVER ROAD

TITLE: STORMWATER LONG SECTIONS

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
H 1:750 V 1:325	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	H-114	P4

P4

STRUCTURE NAME	MH-03-01	MH-03-02
PIPE SIZE (mm)	300	
PIPE CLASS & TYPE	STORMPRO SN8	
PIPE GRADE (%)	0.57%	
PIPE SLOPE (1 in X)	174.3	
FULL PIPE VELOCITY (m/s)	0.19	
NORMAL DEPTH VELOCITY (m/s)	0.87	
PIPE FLOW (cumecs)	0.020	
CAPACITY FLOW (cumecs)	0.133	
DATUM RL	-17.000	
HGL IN PIPE & WSE IN STRUCTURE 20 MINUTE 5% AEP STORM EVENT	10.649	11.227
FINISHED (& EXISTING) SURFACE LEVEL	11.226	(11.584) 12.058
DEPTH OF INVERT BELOW FSL	0.676	0.676 0.933
INVERT LEVEL	10.550	10.550 11.125
CHAINAGE	0.000	100.230

11.233

100.230m

LINE SW LINE 03

Sorell Council
Development Application: Response to Request for Information - 223-227 Carlton River Road, Carlton River.pdf
Plans Reference: P5
Date Received: 15/03/2024

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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CLIENT: STAGAR PTY LTD

PROJECT: 223 CARLTON RIVER ROAD
SUBDIVISION STORMWATER DESIGN

SITE: 223 CARLTON RIVER ROAD

TITLE: STORMWATER LONG SECTIONS

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
H 1:750 V 1:325	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	H-115	P4

P4

STRUCTURE NAME	MH-03-02		MH-03-03		MH-03-04	
PIPE SIZE (mm)		300		300		
PIPE CLASS & TYPE		STORMPRO SN8		STORMPRO SN8		
PIPE GRADE (%)		0.50%		6.75%		
PIPE SLOPE (1 in X)		200.0		14.8		
FULL PIPE VELOCITY (m/s)		0.08		0.07		
NORMAL DEPTH VELOCITY (m/s)		0.65		1.24		
PIPE FLOW (cumecs)		0.009		0.003		
CAPACITY FLOW (cumecs)		0.124		0.117		
DATUM RL		-16.000				
HGL IN PIPE & WSE IN STRUCTURE 20 MINUTE 5% AEP STORM EVENT	11.227	11.233 11.241	11.468	11.470 11.670	12.585	12.587
FINISHED (& EXISTING) SURFACE LEVEL	12.058		12.740		14.147	
DEPTH OF INVERT BELOW FSL	0.933	0.883	1.340	1.095	1.605	
INVERT LEVEL	11.125	11.175	11.401	11.645	12.542	
CHAINAGE	100.230		145.340		158.636	
		45.110m		13.296m		

LINE SW LINE 03

Sorell Council
Development Application: Response to Request for Information - 223-227 Carlton River Road, Carlton River.pdf
Plans Reference: P5
Date Received: 15/03/2024

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REV:	DESCRIPTION:	BY:	DATE:
P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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a: 116 Bathurst St, Level 4 Hobart, 7000, TASMANIA

CLIENT: STAGAR PTY LTD

SITE: 223 CARLTON RIVER ROAD

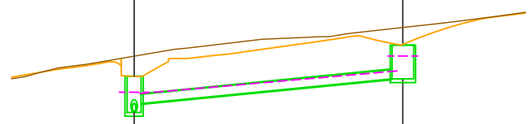
TITLE: STORMWATER LONG SECTIONS

PROJECT: 223 CARLTON RIVER ROAD SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
H 1:750 V 1:325	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	H-116	P4

P4

STRUCTURE NAME	SW-02-03	SW-04-01		
				
PIPE SIZE (mm)		375		
PIPE CLASS & TYPE		RCP CLASS 4 (RRJ)		
PIPE GRADE (%)		4.58%		
PIPE SLOPE (1 in X)		21.8		
FULL PIPE VELOCITY (m/s)		1.82		
NORMAL DEPTH VELOCITY (m/s)		3.46		
PIPE FLOW (cumecs)		0.201		
CAPACITY FLOW (cumecs)		0.375		
DATUM RL		-13.000		
HGL IN PIPE & WSE IN STRUCTURE 20 MINUTE 5% AEP STORM EVENT	14.436	14.829 14.779	15.699	16.308
FINISHED (& EXISTING) SURFACE LEVEL	15.480	(16.298)	16.781	(17.470)
DEPTH OF INVERT BELOW FSL	1.477	1.110	1.407	
INVERT LEVEL	14.003	14.370	15.374	
CHAINAGE	-10.319		11.598	

21.917m

LINE SW LINE 04

Sorell Council
Development Application: Response to Request for Information - 223-227 Carlton River Road, Carlton River.pdf
Plans Reference: P5
Date Received: 15/03/2024

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P4	RFI REVISIONS	RU	13/03/24
P3	BOUNDARY ADJUSTMENT	RU	09/01/24
P2	DETENTION AND ROAD DESIGN	RU	20/12/23
P1	PLANNING ISSUE	RU	31/05/23

STATUS: PLANNING

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CLIENT: STAGAR PTY LTD

SITE: 223 CARLTON RIVER ROAD

TITLE: STORMWATER LONG SECTIONS

PROJECT: 223 CARLTON RIVER ROAD
SUBDIVISION STORMWATER DESIGN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
H 1:750 V 1:325	13/03/24	RU/DH	MM

PROJECT NO:	DRAWING NO:	REVISION:
FE-23049	H-117	P4

Attachment to item number 5.3 -

Planning Submission;

Waterway Impact Statement; and

Bushfire Assessment Report

22 February 2024

Sorell Council
By email: sorell.council@sorell.tas.gov.au

Dear Sir/madam,

2217 ARTHUR HIGHWAY – PROPOSED SUBDIVISION 7.2023.25.1
DRIVEWAYS

BACKGROUND

A subdivision and boundary adjustment is proposed at 2217 Arthur Highway Copping to create 3 lots from 2.

In the RFI dated 12 January 2024 Council has requested:

- Please demonstrate an existing approved access has been constructed in accordance with the prescribed standard 12.5.1 & C3.5.1. *Alternatively please amend the proposed plan of subdivision to denote a proposed access to lot a. It has been noted by council that land owner consent (from the crown) has been granted.*

Poortenaar Consulting was asked to address the driveways.

DRIVEWAYS

The situation is somewhat unique as a parking area is sealed to the boundary so no works are required within the road reserve.

The driveway for lot 1 was previously a gravel/grass parking area off the sealed parking area. The owner has recently upgraded the driveway with gravel contained by a edging. There is no space to turn around within the property so a vehicle must back out onto the parking area. The parking area is 7.2m from the edge of the running lane so there is plenty of clearance.

Similarly the shared driveway to lot 2 and 3 is existing. It is sealed to the boundary. The gate is set back 6m from the boundary. There is space for two vehicles to exit and enter the driveway clear of the road.

A shared driveway for lot 2 and 3 is preferable for reducing traffic conflicts.

All driveways have sight lines in excess of 110m in both directions. The posted speed limit is 60km/hr requiring a sight distance of 105m.

There is potential for conflict between users of the informal sealed parking area and users of the driveways but no more than any informal pull off area. The speed environment is low and the parking area is only busy when there is an event on. Some sort of delineation was considered but it would just create confusion.

Yours Faithfully

Hein Poortenaar
Poortenaar Consulting Pty Ltd

Attachments
Photos
Drawing

Lot1 driveway

Lot 2&3 driveway

Sight distance west

Sight distance east

BRIDGE

RAVENSCROFT RIVULET

DRAIN

POND

POND

POND

PREBBLES ROAD

3
7,036m²±

300Ø

#9

1
3095m²±

2
5,168m²±

POND

2,500

2,537

Existing Building

Existing Building

2,500

Existing Access for Lot 2 & Lot 3

Existing Lot Access

ARTHUR HIGHWAY

300Ø

EXISTING DRIVEWAY

GATE

BOUNDARY

EXISTING SEALED SHOULDER

Building

2.500

EXISTING DRIVEWAY RECENTLY UPGRADED

EXISTING SEALED SHOULDER

BOUNDARY

AY

Rev No	Revision note	Date	Approved
A	FOR APPROVAL	FEB24	HJP

POORTENAAR CONSULTING
ABN 40 672 032 737
PH 62664708
hein@poortenaarconsulting.com

Client	Mark Whitehead
Project	2218 ARTHUR HIGHWAY, COPPING
Title	GENERAL ARRANGEMENT
Scale	1:2000 A3
Designed By	H.POORTENAAR
Date	FEB24
	A1
Drawing No.	24396-01
Rev.	A

19 February 2024

Sorell Council
By email: sorell.council@sorell.tas.gov.au

Dear Sir/madam,

2217 ARTHUR HIGHWAY – PROPOSED SUBDIVISION 7.2023.25.1
WATERWAY IMPACT STATEMENT

BACKGROUND

A subdivision and boundary adjustment is proposed at 2217 Arthur Highway Copping to create 3 lots from 2. The site has a watercourse passing through it.

In the RFI dated 12 January 2024 Council has requested:

Provide a Natural values report prepared by a suitably qualified and experienced ecologist or equivalent that is:

- Prepared in accordance with the Guidelines for natural values surveys (wwww.nre.tas.gov.au) and has regard to clause C7.7.1 subdivision within a waterway and coastal protection area.

Poortenaar Consulting was asked to address the provisions of the Waterways Protection overlay.

SUITABLE QUALIFICATIONS

The subdivision has a very low risk of impacting the ecological values of the watercourse as:

- the watercourse is a class 4 watercourse,
- it is normally dry, heavily modified by damming and diversions
- the area is not covered by a Biodiversity Overlay
- the development satisfies A1 of C7.7.1 that any foreseeable development is outside the waterways protection zone

I believe I as an environmental engineer with 35 years experience including many watercourse impact assessments am suitably qualified and experienced to assess the natural values of the watercourse. I am assisted with species identification Ben Poortenaar, final year undergraduate environmental scientist.

THE SITE

Property details are summarised as follows:

Owner	Mark Whitehead
Address	2217 Arthur Highway, Copping

Property ID	3533689
Title reference	244710/2,172538/1
Zoning	Village
Overlays	Waterways protection area Bushfire prone area

THE WATERCOUSRE

The watercourse has a catchment of 33Ha south of the highway comprising rural residential, farmland and some bush on the top of a hill. The upper parts of the catchment at two steep hills. There are two dams used for irrigation that intercept most of the catchment's flow. There are a number of small ponds too. The catchment is piped under the highway with a 300mm culvert which is very undersized for the size of the catchment. Approximately 130m of highway drain to a side entry pit connected to the 300mm pipe. The area is dry with an annual rainfall of 495mm and a water deficit where 100% of reuse water is used up.

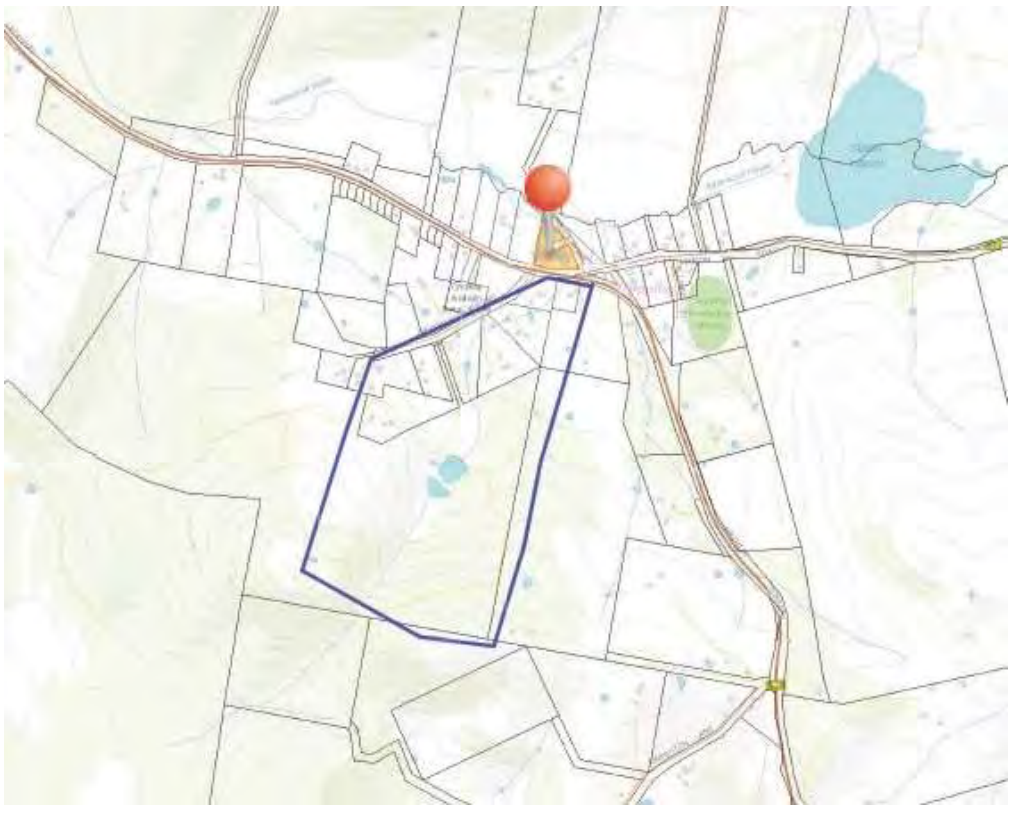

Figure 1. Catchment. (↑N) (Source: annotated map from the LISTmap[Error! Bookmark not defined.]).

Within the property the watercourse is 200m long. The mapped location of the watercourse on the List is inaccurate as shown below:

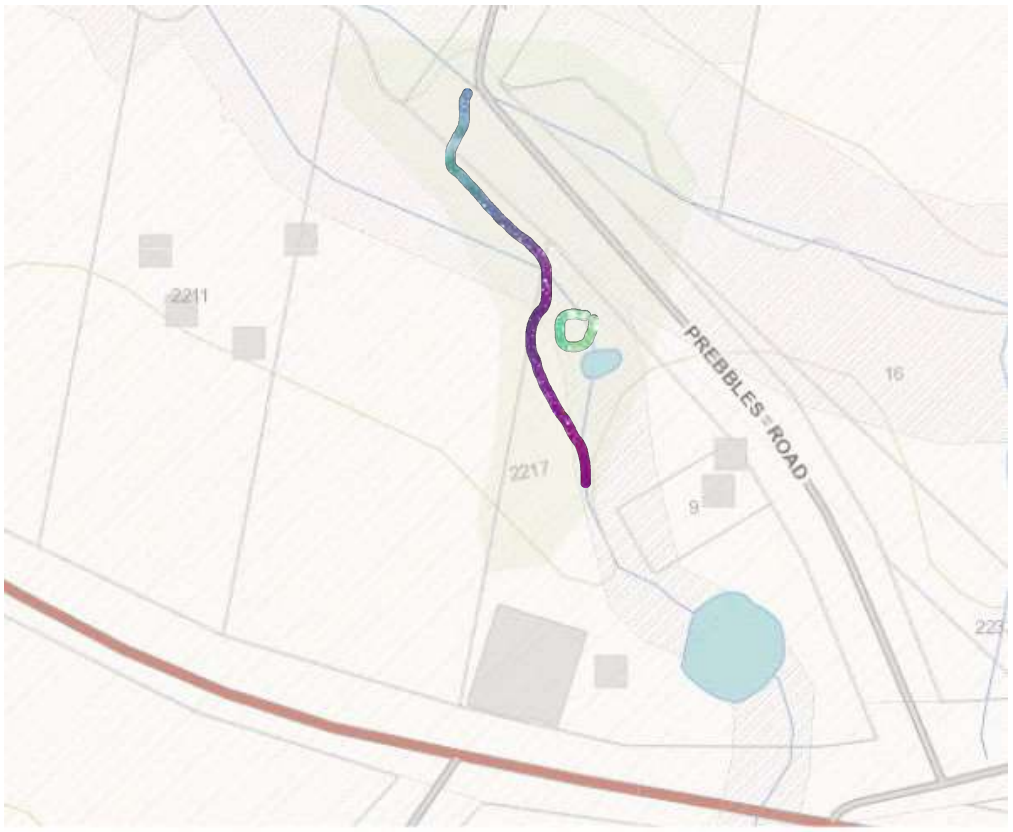

Figure 2. Alignment of watercourse (purple) compared with mapped location. (↑N) (Source: annotated map from the LISTmap[Error! Bookmark not defined.]).

The 300mm diameter pipe under the highway discharges to a short section of grassed drain and then to a large pond. The pond is choked with bulrushes (Typha orientalis). The pond has an outlet through a low dam wall into a grassed swale that runs along the back fence of the house at #9 Prebbles Road. The drain then passes through a culvert where a farm track crosses the watercourse. Downstream of the culvert is a small pond/scout hole with standing water and surrounded by dense reeds and sedges. From here a shallow (0.5m deep x 1m wide) ditch bypasses two treatment ponds before following the boundary and joining Ravenscroft Rivulet

at the Prebbles Street bridge outside the property. This ditch is dry, grassed with occasional rushes.

The only aquatic habitat is in large pond which is choked with bulrushes which suppresses any other aquatic flora and the small scour hole below the farm culvert which appears healthy. Riparian vegetation comprises rushes and sedges. Weeds observed include Typha orieltalis, crack willow (*Salix Fragilis*), Flax (*Phormium tenax*) and Gorse (*Ulex europaeus*). Through the proposed lot 3 the drain is entirely artificial and appears to be on the boundary or in the road reserve as the fence is not on the boundary.

Photos of the watercourse are attached.

Although highly modified, dammed and diverted the watercourse performs its purpose adequately. There is no nuisance flooding or erosion evident and the watercourse filters sediment, nutrients and contaminants from the catchment and highway before it joins Ravenscroft Rivulet.

IMPACTS ON THE WATERCOURSE

The subdivision will not result in any direct impacts on the watercourse protection zone:

- Lot 1 already has a dwelling and there would be no additional development anticipated
- Lot 2 already has a large commercial building and it would be unlikely there would be any dwelling constructed and there is adequate space clear of the waterways protection area
- Lot 3 is likely to be developed as a rural residential property. It is a large 7038m2 paddock and any dwelling would be in the middle. Lot 3 is already a separate title so could be built upon without the boundary adjustment. The watercourse is along the northern boundary or appears to be outside the boundary in the road reserve.

The only potential impact of the subdivision is stormwater discharge to the watercourse. However roof water for any new dwelling is captured for reuse and as the lots are large and flat there is adequate soakage potential from impervious surfaces such as driveways. (refer Stormwater Management Plan)

COMPLIANCE WITH THE PLANNING SCHEME

The Waterways protection area falls under C7.0 Natural Assets Code/ C7.7 Development Standards for subdivision. The code covers works for the subdivision (of which there are none) or future development likely to be facilitated by the subdivision.

Acceptable solution A1 is satisfied as the future development of any of the lots including building, services, bushfire hazard management or vehicle access will be outside the waterways protection area.

CONCLUSION

The watercourse is a class 4 highly modified, dammed, diverted, ephemeral watercourse. It is normally dry as irrigation dams upstream use most of the flow.

The subdivision and boundary adjustment does not necessarily facilitate any additional development as the only vacant lot already is on a separate title.

Regardless due to the large size of the lots and the watercourse following the northern edge any development including dwelling, services, and access will be well clear of the watercourse protection area so satisfy C7.7.1 of the natural values Code for subdivision in a waterways protection zone.

Yours Faithfully

Hein Poortenaar
Poortenaar Consulting Pty Ltd

Attachments
Photos
Drawing

Culvert under highway

Large pond

Large pond overflow

Swale behind #9

Track crossing

Pond/scout hole below culvert

Off line treatment pond 1

Offline treatment pond 2

Drain in lot 3

Prebbles road looking towards lot 3

Drain through lot 3

COVER

RAVENSCROFT RIVULET

DRAIN

45.92

5.71

5.78

POND

POND

POND

67.71

PREBBLES ROAD

158.92

3

7,036m²±

84.25

10m x 15m Min.
Compliance Area

Existing Boundary
to be adjusted

POND

33.53

300Ø

#9

18.29

33.53

19.19

2

5,168m²±

27.35

Proposed Right of
Way 6.00 Wide

20.23

32.08

2.500

2.537

24.25

POND

36.45

Existing
Building

Existing
Building

23.87

1

3095m²±

28.67

26.68

2.500

16.44

48.76

15.13

9.63

Existing
Access for
Lot 2 & Lot 3

ARTHUR HIGHWAY

Existing Lot
1 Access

300Ø

Rev No	Revision note	Date	Approved
A	FOR APPROVAL	FEB24	HJP

POORTENAAR CONSULTING
ABN 40 672 032 737
PH 62884708
hein@poortenaarconsulting.com

Client: Mark Whitehead
Project: 2218 ARTHUR HIGHWAY, COPPING
Title: WATERWAY

Scale	Designed By	Date		Drawing No.	Rev.
1:2000 A3	H.POORTENAAR	FEB24	A1	24396-01	A

GEOTECH 23-170

7/12/2023

ROCK SOLID GEOTECHNICS PTY LTD
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Craig@rbsurveyors.com

ONSITE WASTEWATER ASSESSMENT / SYSTEM DESIGN – 2217 Arthur Highway, Copping

Below find the assessment to determine of the type and size of wastewater treatment system, and the allocation of a Land Application Area (LAA) for the current cottage at 2217 Arthur Highway, Copping. This assessment should be read in conjunction with Site & Soil Evaluation Report (GEOTECH 23-170) - enclosed.

It is proposed to subdivide the property, removing the current cottage and southeastern portion of the land (Proposed Lot 1). The cottage has a joint wastewater system (with the existing building on proposed Lot 2). The system's Land Application Area is located on proposed Lot 2. This report designs a system for the cottage that is wholly contained on proposed Lot 1.

A site investigation was completed on Friday 1 December, 2023, in the presence of Mr Mark Whitehead (property owner). This assessment included the augering of two test holes to assess the site for onsite wastewater disposal suitability (4WD mounted SAMPLA25 mechanical auger with 100mm solid flight augers). The locations of the test holes are marked on Figure 1.

Proposed Lot 1 is a 3095m^2 +/- block on the southwestern corner of Arthur Highway and Prebbles Road, with direct access from Arthur Highway (Figure 1). The 2-bedroom cottage lies on the western side of the land (Plate 1), with a natural drainage line containing a large dam running south to northwest through the centre of the block (Figures 2 & 3).

The large dam and defined natural drainage line occupies a significant portion of the site. The land immediately to the north and east/southeast of the residence and drainage line is best suited for an onsite wastewater LAA. These areas are on the highest and driest portions of the block. Both areas are covered in grass, with mature trees on the southern side of the site adjacent to Arthur Highway. The land slopes very shallowly towards the dam (1-2 degrees) (Plate 1).

The profile encountered in Test Hole #1 (Plate 2) consisted of:

0.00 – 0.20m	SAND: fine grained, dark greyish brown, rootlets – TOPSOIL
0.20 – 0.80m	SAND: fine grained, very light grey, dry to slightly moist
0.80 – 2.10m	sandy CLAY: medium to high plasticity, olive brown, 25% fine to medium grained, brown, moist
2.10m+	Hole terminated at required depth – 2.10m.

The profile encountered in Test Hole #2 (Plate 3) consisted of:

0.00 – 0.20m	SAND: fine grained, dark greyish brown, rootlets – TOPSOIL
0.20 – 0.45m	SAND: fine grained, brownish grey, dry to slightly moist
0.45 – 2.10m	sandy CLAY: medium plasticity, olive & greyish brown, 25-30% fine to medium grained, brown, moist
2.10m+	Hole terminated at required depth – 2.10m.

Groundwater was not encountered in either test hole.

The site is classified as a Class 2 (sandy LOAM) over Class 5 (light CLAY) with an Indicative Permeability of 0.12-0.5 m/day.

A conservative Design Irrigation Rate (DIR) of 3mm/day is appropriate for secondary treated effluent form an Aerated Wastewater Treatment System (AWTS), due to the close proximity to the dam and natural drainage line.

It is proposed to install an Aerated Wastewater Treatment System (AWTS) and to dispose of the effluent into the abovementioned LAAs sited to the northeast and east of the residence.

Plate 1 – Looking to the northwest at the cottage (main building - ex museum, in the background).

Plate 2 – Test Hole #1 – Proposed LAA – Looking to the southwest. Cottage in the background, dam on LHS.

Plate 3 – Test Hole #2 – Proposed LAA – Looking to the west. Cottage in the background, dam in centre.

COMPLIANCE WITH THE 2016 DIRECTOR'S GUIDELINES FOR ONSITE WASTEWATER

Compliance Table Directors Guidelines for OSWM		
Acceptable Solutions	Performance Criteria	Compliance achieved by
7. Standards for Wastewater Land Application Areas		
A1 Horizontal separation distance from a building to a LAA must comply with one of the following: a) be no less than 6m; b) be no less than: (i) 3m from an upslope boundary or level building; (ii) If primary treated effluent to be no less than 4m plus 1m for every degree of average gradient from a downslope building; (iii) If secondary treated effluent and subsurface application, no less than 2m plus 0.25m for every degree of average gradient from a downslope building.	P1 The LAA is located so that the risk of wastewater reducing the bearing capacity of a building's foundations is acceptably low.	Complies with A1 LAA >6m from any building.
A2 Horizontal separation distance from downslope surface water to a LAA must comply with (a) or (b) (a) be no less than 100m; or (b) be no less than the following: (i) if primary treated effluent 15m plus 7m for every degree of average gradient to downslope surface water; or (ii) if secondary treated effluent and subsurface application, 15m plus 2m for every degree of average gradient to down slope surface water.	P2 Horizontal separation distance from downslope surface water to a LAA must comply with all of the following: a) Setbacks must be consistent with AS/NZS 1547 Appendix R; b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	Complies with P2 See Risk Assessment
A3 Horizontal separation distance from a property boundary to a LAA must comply with either of the following: (a) be no less than 40m from a property boundary; or (b) be no less than: (i) 1.5m from an upslope or level property boundary; & (ii) If primary treated effluent 2m for every degree of average gradient from a downslope property boundary; or (iii) If secondary treated effluent and subsurface application, 1.5m plus 1m for every degree of average gradient from a downslope property boundary.	P3 Horizontal separation distance from a property boundary to a LAA must comply with all of the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	Complies with A3 Minimum 1.5m setback from upper and side-slope boundaries. Minimum 10m setback from lower-slope boundary.
A4 Horizontal separation distance from a downslope bore, well or similar water supply to a LAA must be no less than 50m and not be within the zone of influence of the bore whether up or down gradient.	P4 Horizontal separation distance from a downslope bore, well or similar water supply to a LAA must comply with all of the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 demonstrates that the risk is acceptable.	Complies with A4 No known potable bores in the area.

A5 Vertical separation distance between groundwater & a LAA must be no less than: (a) 1.5m if primary treated effluent; or (b) 0.6m if secondary treated effluent	P5 Vertical separation distance between groundwater and a LAA must comply with the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 that demonstrates that the risk is acceptable.	Complies with A5 Groundwater not encountered.
A6 Vertical separation distance between a limiting layer & a LAA must be no less than: (a) 1.5m if primary treated effluent; or (b) 0.5m if secondary treated effluent.	P6 Vertical setback must be consistent with AS/NZS1547 Appendix R.	Complies with A6 Limiting layer >0.5m.
A7 Nil	P7 A wastewater treatment unit must be located a sufficient distance from buildings or neighbouring properties so that emissions (odour, noise or aerosols) from the unit do not create an environmental nuisance to the residents of those properties.	Complies with P7

RISK ASSESSMENT

Each identified environmental aspect is subject to a qualitative risk analysis based on likelihood and consequences of environmental impact. The risk analysis matrix is as follows:

LIKELIHOOD	***CONSEQUENCES***				
	Catastrophic 1	Major 2	Moderate 3	Minor 4	Insignificant 5
A (almost certain)	Extreme	Extreme	High	High	Medium
B (likely)	Extreme	Extreme	High	High	Medium
C (possible)	Extreme	Extreme	High	Medium	Low
D (unlikely)	Extreme	High	Medium	Low	Low
E (rare)	High	Medium	Low	Low	Low

Criteria for the five categories of likelihood:

Almost certain: An environmental health impact is expected to occur in most circumstances.

Likely: An environmental health impact will probably occur in most circumstances

Possible: An environmental health impact could occur.

Unlikely: An environmental health impact could occur but is not expected.

Rare: An environmental health impact would occur only in exceptional circumstances.

Criteria for determining consequence to environmental health from an on-site wastewater management issue:

Catastrophic: Widespread, irreparable environmental damage; loss of human life or long-term human health effects; serious litigation; over $1 million to manage consequences.

Major: Widespread, medium to long term impact; moderate human health impacts requiring medical treatment; major breach of legal requirements (prosecution); $50,000 to $1 million to manage consequences.

Moderate: Localised medium to long term impact; minor and reversible human health impacts treatable with first aid; moderate breach of legal requirements with fine (EIN/prosecution); $5,000 to $50,000 to manage consequences.

Minor: Localised short to medium term impact; no injury to people; minor breach of legal requirements (eg. legal notice, EIN); $1000 to $5,000 to manage consequences.

Insignificant: Limited impact to a local area but no long-term effects; concern or complaints from neighbours; no injury to people; minor technical nonconformity but no legal nonconformity; less than $1000 cost to manage consequences.

Conducting a risk analysis results in the allocating of a risk level of *extreme*, *high*, *moderate* or *low* for each environmental aspect. Environmental health aspects with an *extreme* or *high* risk are considered to be *significant*, that is, they have or can have a significant environmental impact.

Defined risks are:

- Setback distance to surface water.

The defined site constraint items of specific concern (as defined in Table R1 of AS/NZS 1547:2021) FOR THE ABOVE DEFINED RISKS are: A, B, D, E, F, G, J

A Microbial quality of effluent.

- Effluent to be secondary treated in an AWTS – low risk level.

B Surface Water.

- Profile sandy topsoils over sandy clay subsoils. Subsurface application – low risk of off-site effluent movement. Dam and creek not high resource value. Low application rate by utilising two LAAs intermittently dosed using an indexing valve.

D Slope.

- Natural slope 1-2° to the W. Subsurface application – low risk of off-site effluent movement.

E Position of land application area in landscape.

Profile sandy topsoils over sandy clay subsoils. Subsurface application – low risk of off-site effluent movement. Dam and creek not high resource value. Low application rate by utilising two LAAs intermittently dosed using an indexing valve.

F Drainage.

Profile sandy topsoils over sandy clay subsoils. Subsurface application – low risk of off-site effluent movement. Dam and creek not high resource value. Low application rate by utilising two LAAs intermittently dosed using an indexing valve.

G Flood Potential.

- See comments for F – low risk level. Dam level artificially controlled with spillway (dam will spill well before any chance of LAAs being inundated).

J Application method.

- Secondary treated effluent into subsurface irrigation – low risk level for this site.

The risk assessment identifies several, linked risks for wastewater application on this site.

- These issues will be mitigated / reduced to an acceptable level by secondary treating the wastewater effluent, and applying the effluent into the ground via shallow subsurface irrigation in two LAAs – at a low Design Irrigation Rate.

WASTEWATER SYSTEM DESIGN:

It is proposed to install an Aerated Wastewater Treatment System (AWTS) and to dispose of the effluent into two LAAs consisting of subsurface irrigation lines.

The size of the total LAAs is conditional on the wastewater load entering the system and the permeability of the site. The site is classified as a Class 1 (SAND) over Class 5 (light CLAY) with an Indicative Permeability of 0.12-0.5 m/day, and a very conservative Design Irrigation Rate (DIR) of 3mm/day.

2-bedroom residence	4 persons occupancy	
Tank water	120 litres/person/day	
Wastewater Load	4 x 120 litres/person/day	480 litres/day
Design Irrigation Rate (DIR)	3mm/day	Secondary treated effluent
Irrigation Area	480 / 3 = 160m^2	

Total size of calculated Land Application Area (LAA) is 160m^2.

It is proposed to intermittently dose the two x 80m^2 LAAs utilising an indexing valve.

LAND APPLICATION AREAS

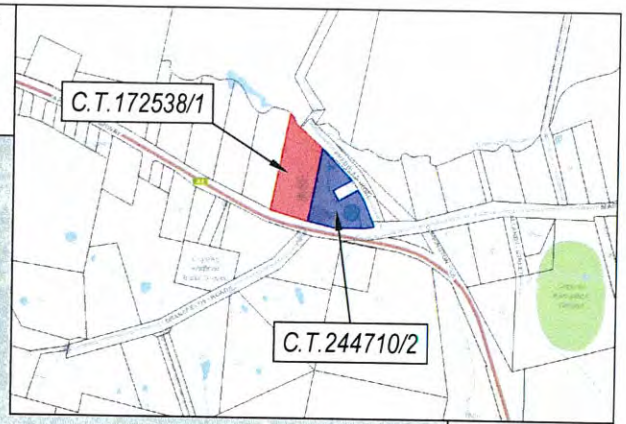
The new Land Application Area should be constructed as per the following specifications:

- Establishment and maintenance of 160m^2 of irrigation areas in two x 80m^2 zones, utilising an indexing valve.
- The areas are to consist of sub-surface irrigation under designated lawns.
- Landscaping of the irrigation area is to be maintained in good order at all times. Such maintenance includes the mowing of the lawns.
- The current topsoil should be scoured / ripped to a minimum depth of 200mm, and any rocks removed.
- The drip lines must be rated for use with wastewater (pressure compensated), and organized to cover the entire two x 80m^2 zones @ 0.7m spacings.
- Vacuum Breaker Valves should be provided at the high points of the LAAs, and placed in valve boxes to enable inspection.
- Flush Valves should be provided for the LAAs, with piping returning the flush water to the treatment plant. The Flush Valves are to be installed in valve boxes to allow inspection and servicing.
- An inline strainer (150-200 mesh) is to be installed to prevent solids from entering the irrigation system.
- Cutoff drains upslope from the LAAs will not be required.
- The areas should not be driven on, as compaction of the subsurface driplines could render the system unserviceable.

This plan has been prepared only for the purpose of obtaining preliminary subdivsional approval from the local authority and is subject to that approval.

All measurements and areas are subject to the final survey.

Base image by TASMAP (www.tasmap.tas.gov.au), © State of Tasmania
Base data from the LIST (www.thelist.tas.gov.au), © State of Tasmania



LOCATION PLAN

3
7,036m²±

2
5,168m²±

1
3095m²±

10m x 15m Min. Compliance Area

Existing Boundary to be adjusted

Proposed Right of Way 6.00 Wide

Existing Building

Existing Building

Existing Access for Lot 2 & Lot 3

Existing Lot 1 Access

ARTHUR HIGHWAY

45.92
5.78
61.71
158.92
84.25
33.53
18.29
33.53
19.19
27.35
20.23
32.08
28.67
2.500
2.531
24.25
23.87
2.500
26.68
16.44
48.76
15.13
9.63
36.45

Site Drainage

Lot 1: Existing On-site Water, Stormwater & Wastewater

Lot 2: Existing On-site Water, Stormwater & Wastewater

Lot 3: Proposed On-site Water, Stormwater & Wastewater

Development Standards for Subdivision
Sorell
12.0 Village Zone

P1 - All lots comply with requirements

A2 - All lots comply - Min. 10m frontage

A3 - All lots comply - vehicular access directly from road

12.5.2 Roads
A4 - All lots comply - no new roads

8.6.3 Services
A1 - All lots comply - On-site Water Management
A2 - All lots comply - On-site Waste-water Management
A3 - All lots comply - On-site Stormwater Management

REV	AMENDMENTS	DRAWN	DATE	APPR.
E				
D				
C				
B				
A				

ROGERSON & BIRCH SURVEYORS
UNIT 1, 2 KENNEDY DRIVE
CAMBRIDGE 7170
PHONE: (03)6248 5898
EMAIL: admin@rbsurveyors.com
WEB: www.rbsurveyors.com

OWNER: MARK D. WHITEHEAD
TITLE REFERENCE: C.T.172538/1 & C.T.244710/2
LOCATION: 2217 ARTHUR HIGHWAY, **COPPING**

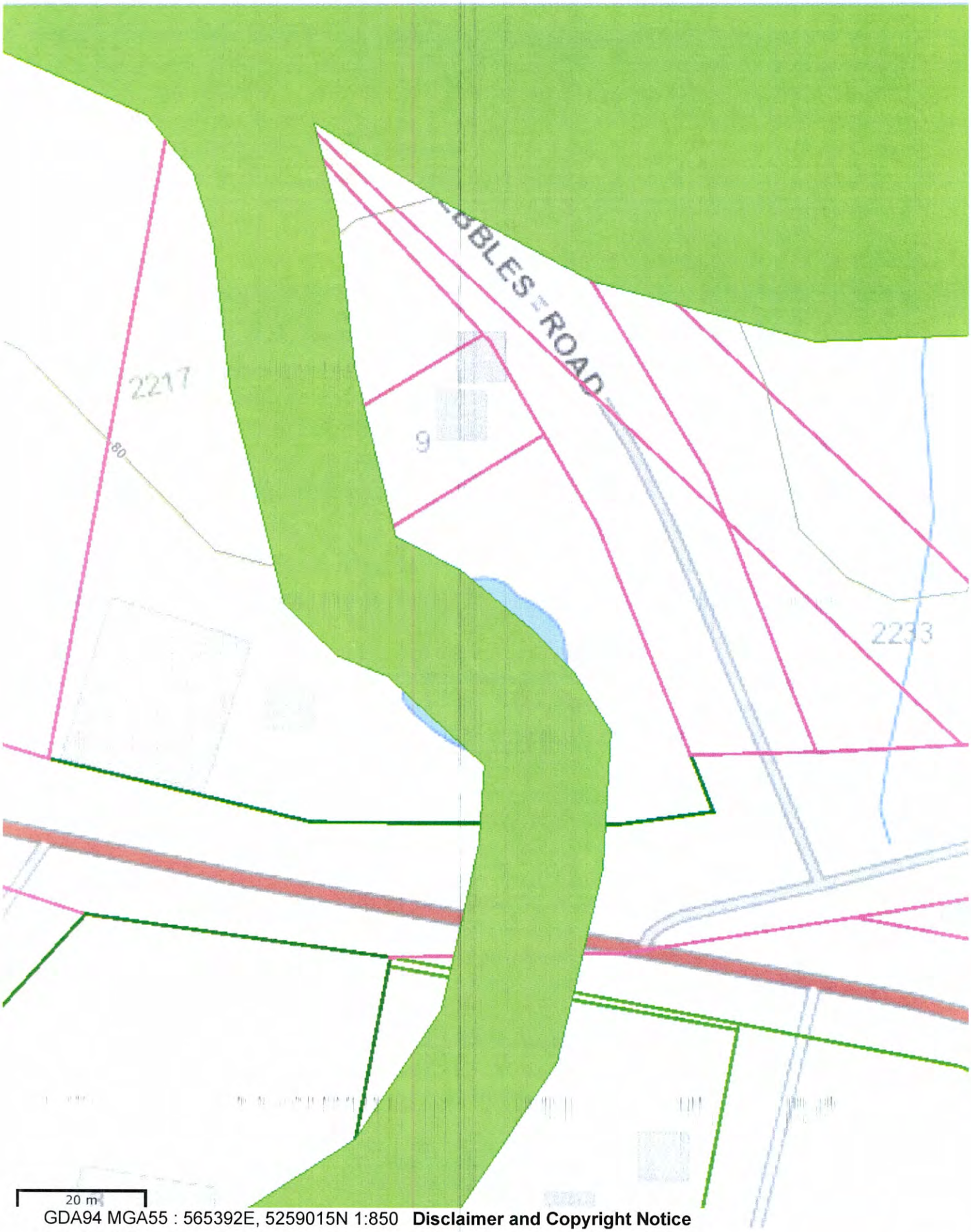
Proposed Subdivision

Date: 21/08/2023
Reference: WHITE01 15104-00
Scale: 1:800 (A3)
Municipality: SORELL

FIGURE 1

GDA94 MGA55 : 565458E, 5258951N 1:425 **Disclaimer and Copyright Notice**

FIGURE 2



GDA94 MGA55 : 565392E, 5259015N 1:850 **Disclaimer and Copyright Notice**

FIGURE 3

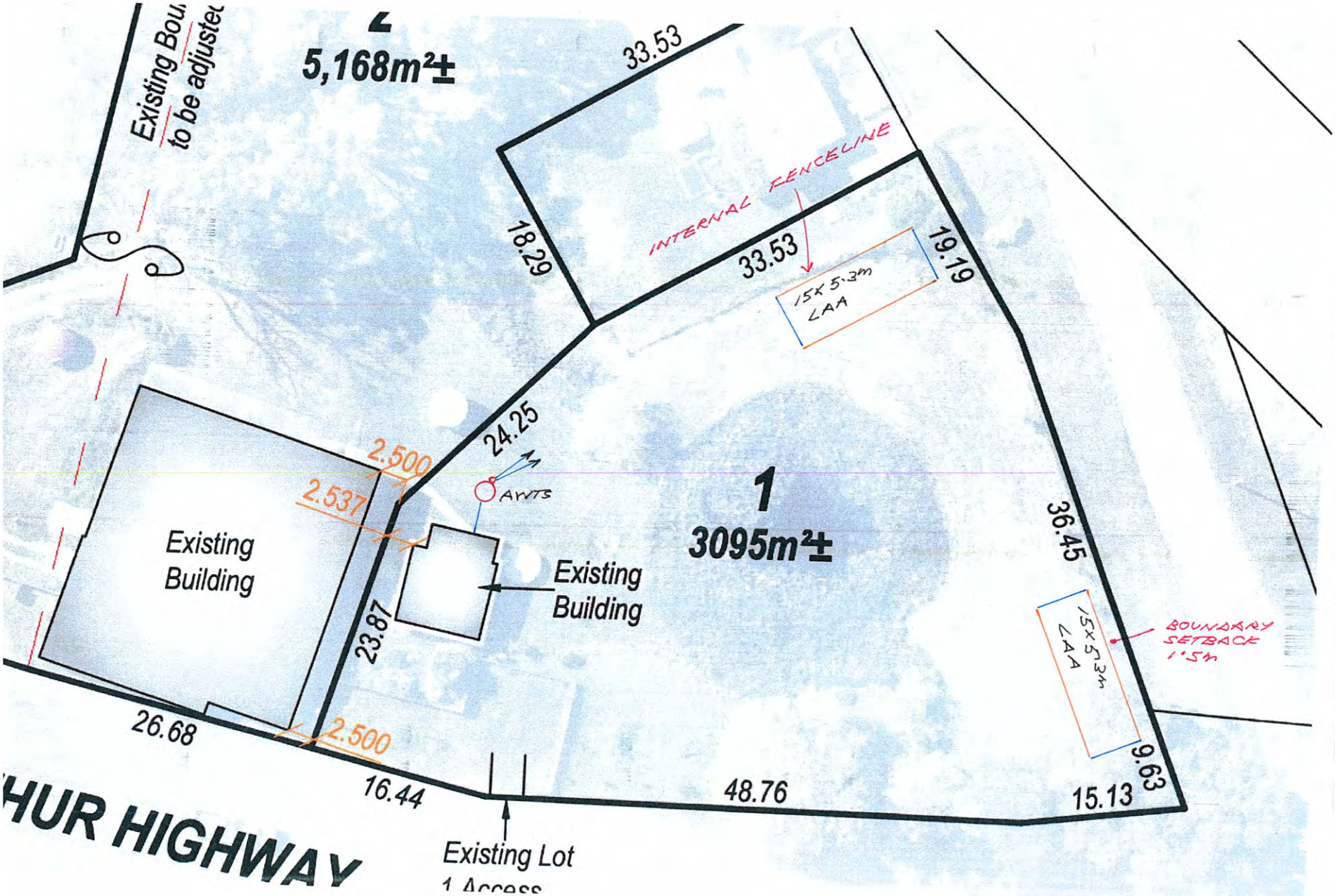
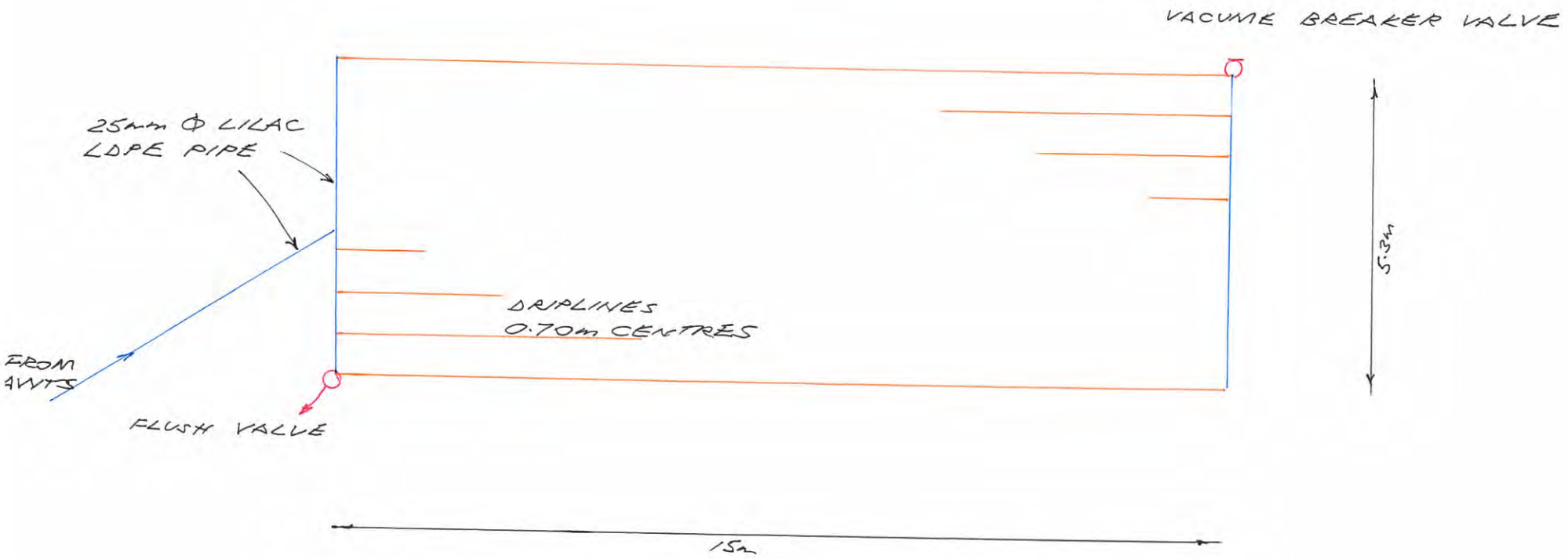

Existing Bou
to be adjuste
5,168m²±
33.53
INTERNAL FENCELINE
18.29
33.53
19.19
15x 5.3m
LAA
24.25
2.500
2.537
AWTS
1
3095m²±
Existing
Building
Existing
Building
36.45
23.87
BOUNDARY
SETBACK
1.5m
15x 5.3m
LAA
26.68
2.500
16.44
48.76
15.13
9.63
HUR HIGHWAY
Existing Lot
1 Access

FIGURE 4

PLAN
IRRIGATION AREAS
(BOTH AREAS
SAME LAYOUT)



1:100

SITE AND SOIL EVALUATION REPORT

Soil Category:

	Modified Emerson Test Required	No
1,...2,...3,...4,...5,...6	If Yes, Emerson Class No.	
Measured or Estimated Soil Permeability (m/d):	1.0m/d	
Design Irrigation Rate (DIR)	0.12-0.5 m/day	
Geology:	Quaternary sediments	

Slope:	1-2 degrees
Drainage lines / water courses:	As marked
Vegetation:	Grass
Site History: (land use)	Museum
Aspect:	West
Pre-dominant wind direction:	Northwest to southwest
Site Stability: Will on-site wastewater disposal affect site stability?	No
Is geological advice required?	No
Drainage/Groundwater:	Not Encountered
Depth to seasonal groundwater (m):	Not Encountered
Are surface or sub-surface drains required upslope of the land application area?	No
Date of Site Evaluation:	1/12/2023
Weather Conditions:	Fine

ROCK SOLID GEOTECHNICS PTY LTD
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0417960769
peter@rocksolidgeotechnics.com.au

Mark Whitehead
mwhitehead1979@yahoo.com.au

7/12/2023

Loading Certificate for Onsite Wastewater System

2217 Arthur Highway, Copping

1 System Capacity:

- (medium/long term) 2-bedroom residence - 4 persons, 480 litres/day

2 Design Criteria Summary:

Secondary Treated Effluent	Aerated Wastewater Treatment System (AWTS)
Soil Category	Class 1 SAND over Class 5 light CLAY
Land Application System	160m^2 of subsurface irrigation

3 Reserve Area:

- Reserve LAA available if required.

4 Variation from design flows etc:

- The system should successfully assimilate additional peak loadings which may result from occasional social gatherings provided that this does not exceed use by more than 8 persons in a 24-hour period or more than 2 temporary resident visitors (ie. up to 6 persons total) for a period not exceeding 4 days. Visitors should be advised of the requirement to minimise time spent in showers, not running taps whilst cleaning teeth, and other common sense water conservation measures.

5 Consequences of overloading the system:

- Long term use by more than 4 residents or equivalent may result in overloading of the system, surfacing of effluent, public and environmental health nuisances, pollution of surface water etc.

6 Consequences of under-loading the system:

- Nil.

7 Consequences of lack of operation, maintenance and monitoring attention:

- The septic tank should be pumped at least every 3 years.

Peter Hofto
Rock Solid Geotechnics Pty Ltd

CERTIFICATE OF THE RESPONSIBLE DESIGNER

Section 94
Section 106
Section 129
Section 155

Form 35

To: Mark Whitehead 0449089504 *Owner name*

mwhitehead1979@yahoo.com.au *Address*

Suburb/postcode

Designer details:

Name: Peter Hofto

Category: Building Services Designer Hydraulic - Restricted

Business name: Rock Solid Geotechnics P/L

Phone No: 0417960769

Business address: 163 Orielton Road

Orielton 7172

Fax No:

Licence No: CC6159I

Email address: peter@rocksolidgeotechnics.com.au

Details of the proposed work:

Owner/Applicant Mark Whitehead

Designer's project reference No. GEOTECH 23-170

Address: 2217 Arthur Highway, Copping

Lot No:

Type of work: Building work ☐ Plumbing work ☒ *(X all applicable)*

Description of work:

ONSITE WASTEWATER MANAGEMENT SYSTEM

(new building / alteration / addition / repair / removal / re-erection water / sewerage / stormwater / on-site wastewater management system / backflow prevention / other)

Description of the Design Work (Scope, limitations or exclusions): *(X all applicable certificates)*

Certificate Type:	Certificate	Responsible Practitioner
	☐ Building design	Architect or Building Designer
	☐ Structural design	Engineer or Civil Designer
	☐ Fire Safety design	Fire Engineer
	☐ Civil design	Civil Engineer or Civil Designer
	X Hydraulic design	Building Services Designer
	☐ Fire service design	Building Services Designer
	☐ Electrical design	Building Services Designer
	☐ Mechanical design	Building Service Designer
	Plumbing design	Plumber-Certifier; Architect, Building Designer or Engineer
	☐ Other (specify)	

Deemed-to-Satisfy: X Performance Solution: *(X the appropriate box)*

Other details:

Design documents provided:

The following documents are provided with this Certificate –

Document description:

Drawing numbers:	Prepared by: ROCK SOLID GEOTECHNICS	Date: 7/12/2023
Schedules:	Prepared by:	Date:
Specifications:	Prepared by: ROCK SOLID GEOTECHNICS	Date: 7/12/2023
Computations:	Prepared by: ROCK SOLID GEOTECHNICS	Date: 7/12/2023
Performance solution proposals:	Prepared by:	Date:
Test reports:	Prepared by:	Date:

Standards, codes or guidelines relied on in design process:

AS 1547:2021 On-site domestic wastewater management

Director's Guidelines for Onsite Wastewater Management

Any other relevant documentation:

Site & Soil Evaluation and design report, for 11257 Tasman Highway, Pontypool, dated 27/11/2023

Attribution as designer:

I Peter Hofto – ROCK SOLID GEOTECHNICS P/L ..... am responsible for the design of that part of the work as described in this certificate;

The documentation relating to the design includes sufficient information for the assessment of the work in accordance with the *Building Act 2016* and sufficient detail for the builder or plumber to carry out the work in accordance with the documents and the Act;

This certificate confirms compliance and is evidence of suitability of this design with the requirements of the National Construction Code.

	Name: (print)	*Signed*	*Date*
Designer:	Peter Hofto		7/12/2023
Licence No:	CC6159I		

Assessment of Certifiable Works: (TasWater)

Note: single residential dwellings and outbuildings on a lot with an existing sewer connection are not considered to increase demand and are not certifiable.

If you cannot check ALL of these boxes, LEAVE THIS SECTION BLANK.

TasWater must then be contacted to determine if the proposed works are Certifiable Works.

I confirm that the proposed works are not Certifiable Works, in accordance with the Guidelines for TasWater CCW Assessments, by virtue that all of the following are satisfied:

- [x] The works will not increase the demand for water supplied by TasWater
- [x] The works will not increase or decrease the amount of sewage or toxins that is to be removed by, or discharged into, TasWater's sewerage infrastructure
- [x] The works will not require a new connection, or a modification to an existing connection, to be made to TasWater's infrastructure
- [x] The works will not damage or interfere with TasWater's works
- [x] The works will not adversely affect TasWater's operations
- [x] The work are not within 2m of TasWater's infrastructure and are outside any TasWater easement
- [x] I have checked the LISTMap to confirm the location of TasWater infrastructure
- [x] If the property is connected to TasWater's water system, a water meter is in place, or has been applied for to TasWater.

Certification:

I .....Peter Hofto – ROCK SOLID GEOTECHNICS P/L..... being responsible for the proposed work, am satisfied that the works described above are not Certifiable Works, as defined within the *Water and Sewerage Industry Act 2008,* that I have answered the above questions with all due diligence and have read and understood the Guidelines for TasWater CCW Assessments.

Note: the Guidelines for TasWater Certification of Certifiable Works Assessments are available at: www.taswater.com.au

	Name: (print)	*Signed*	*Date*
Designer:	Peter Hofto	PHO	7/12/2023

CONDITIONS OF INVESTIGATION

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This report should not be used for submission for Building or Development Application until RSG has been paid in full for its production. RSG accepts no liability for the contents of this report until full payment has been received.

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This report contains observations & interpretations based often on limited subsurface evaluation. Where interpretative information or evaluation has been reported, this information has been identified accordingly & is presented based on professional judgement. RSG does not accept responsibility for variations between interpreted conditions & those that may be subsequently revealed by whatever means. Due to the possibility of variation in subsurface conditions & materials, the characteristics of materials can vary between sample & observation sites. RSG takes no responsibility for changed or unexpected variations in ground conditions that may affect any aspect of the project. The classifications in this report are based on samples taken from specific sites. The information is not transferable to different sites, no matter how close (ie. if the development site is moved from the original assessment site an additional assessment will be required).

It is recommended to notify the author should it be revealed that the sub-surface conditions differ from those presented in this report, so additional assessment & advice may be provided.

- AS1547-2012: Onsite Domestic Wastewater Management

Any assessment that has included an onsite wastewater system design will require a further site visit / inspection once the system has been installed. It is the responsibility of the client / plumber to inform the author as to when the wastewater system is being installed, and to arrange the final inspection. After the inspection to verify that the system has been installed as per RSG's design a statement will be provided. An additional fee applies for the site visit & issuing the certificate.

RSG is not responsible for the correct installation of wastewater systems. Any wastewater installation is the sole responsibility of the owner/agent and certified plumber. Any variation to the wastewater design must be approved by RSG, and an amended Special Plumbing Permit obtained from the relevant council. The registered plumber must obtain a copy and carefully follow the details in the council issued Special Plumbing Permit. A "Certificate of Completion" will be based on surface visual inspection only, to verify the location of the system. All underground plumbing works are the responsibility of the certified plumber.

PETER HOFTO

ROCK SOLID GEOTECHNICS PTY LTD

BUSHFIRE ASSESSMENT REPORT

Proposed Three Lot Subdivision

Address: 2217 Arthur Highway, Copping TAS 7174

Title Reference: C.T.172538/1 & C.T.244710/2

Prepared by James Rogerson, Bushfire Hazard Practitioner (BFP-161)
VERSION – 1.0
Date: 28/11/2023

Contents

Disclaimer: The information contained within this report is based on the instructions of AS 3959-2018 the standard states that *"Although this Standard is designed to improve the performance of building when subjected to bushfire attach in a designated bushfire-prone area there can be no guarantee that a building will survive a bushfire event of every occasion. This is substantially due to the degree of vegetation management, the unpredictable nature and behaviour of fire and extreme weather conditions." (Standards Australia Limited, 2011)*

INTRODUCTION

1.1 Background

This Bushfire Assessment Report and associated Bushfire Hazard Management Plan (BHMP) has been prepared by James Rogerson of Rogerson and Birch Surveyors on behalf of the proponent to form part of supporting documentation for the proposed three lot subdivision of 2217 Arthur Highway, Copping. Under the Tasmanian Planning Scheme – Sorell (TPS) and C13.0 Bushfire-Prone Areas Code it is a requirement that a subdivision application within a bushfire-prone area must accomplish a minimum Bushfire Attack Level (BAL) rating of BAL-19 for all future dwellings on newly formed allotments. This report also includes an associated BHMP which is also a requirement under C13.0.

The proposed development is within a Bushfire-Prone Area overlay and there is bushfire-prone vegetation within 100m from the site. Therefore, this site is within a bushfire-prone area.

1.2 Scope

This Bushfire Report offers an investigation and assessment of the bushfire risk to establish the level of bushfire threat and vulnerability on the land for the purpose of subdivision. This report includes the following:

- A description of the land and adjacent land, and description of the use or development that may be at threat by a bushfire on the subject site;
- Calculates the level of a bushfire threat and offers opinions for bushfire mitigation measures that are consistent with AS3959:2018 and C13.0.
- Subdivision Proposal Plan (Appendix B)
- Bushfire Hazard Management Plan (Appendix C)
- Planning Certificate (Appendix D)

1.3 Scope of BFP Accreditation

I, James Rogerson am an accredited Bushfire Practitioner (BFP-161) to assess bushfire hazards and endorse BHMP's under the the *Chief Officers Scheme for the Accreditation of Bushfire Hazard Practitioners.* I have successfully completed the *Planning for Bushfire Prone Areas Short Course* at University of Technology Sydney.

1.4 Limitations

The site assessment has been conducted and report written on the understanding that:

- The report only deals with the potential bushfire risk, all other statutory assessments are outside the scope of this report;
- The report only classifies the size, volume and status of the vegetation at the time the site assessment was conducted;
- Impacts on future development and vegetation growth have not been considered in this report. No action or reliance is to be placed on this report, other than which it was commissioned.

1.5 Proposal

The proposal is for the subdivision of current titles C.T.172538/1 & C.T.244710/2 into 3 resultant titles. See proposal plan (Appendix B).

2 PRE-FIELD ASSESSMENT

2.1 Site Details

Table 1

Owner Name(s)	Mark David Whitehead
Location	2217 Arthur Highway, Copping TAS 7174
Title Reference	C.T.172538/1 & C.T.244710/2
Property ID	3533689
Municipality	Sorell
Zoning	Village
Planning Overlays	7 – Natural Assets Code & 13 – Bushfire-prone Areas Code
Water Supply for Firefighting	The property is not serviced by reticulated water. Static water supply tanks will be required.
Public Access	Access to the development is off the Arthur Highway.
Fire History	Record fires approximately 270m west of the site from 2012-2023.
Existing Development	All-weather gravel private driveways.

Figure 1 - Location of subject site. Source: The LIST, © State of Tasmania

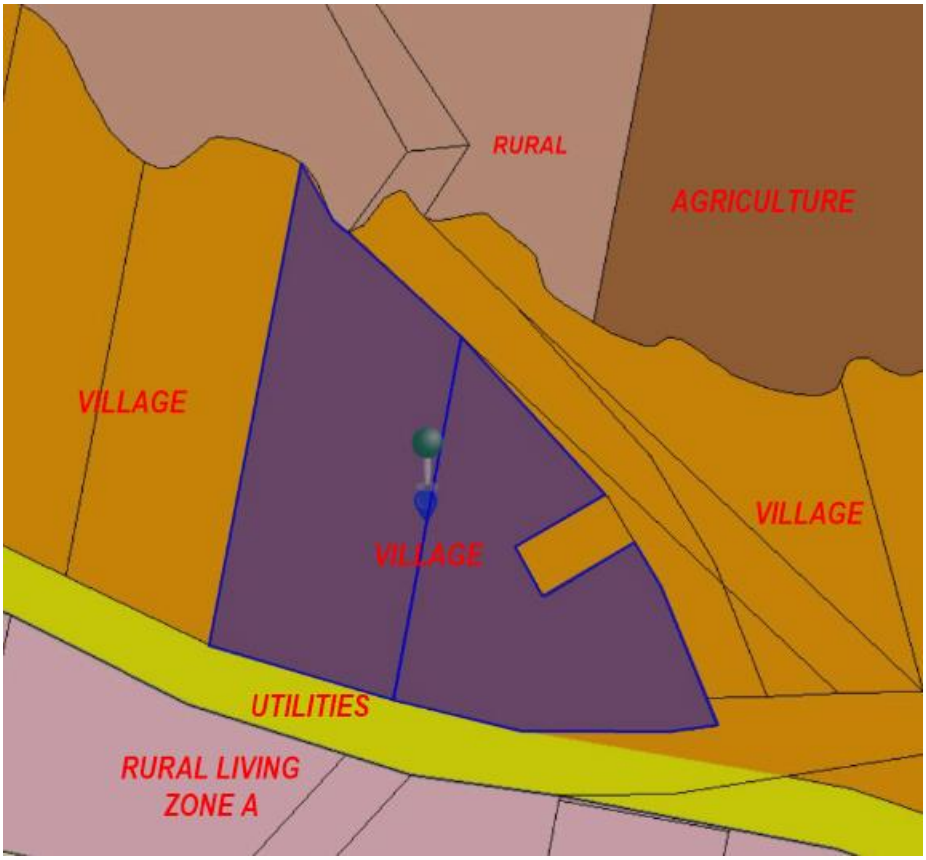


Figure 2 - Planning Scheme Zoning of site and surrounding properties. Source: The LIST, © State of Tasmania

2.2 TasVeg 4.0

There are 2 classified vegetation communities on the subject site, and the same communities on the surrounding land and parcels. Figure 3 below shows the classified vegetation from TASVEG4.0(Source: The LIST).

Please note that TASVEG4.0 classification does not necessarily reflect ground conditions.

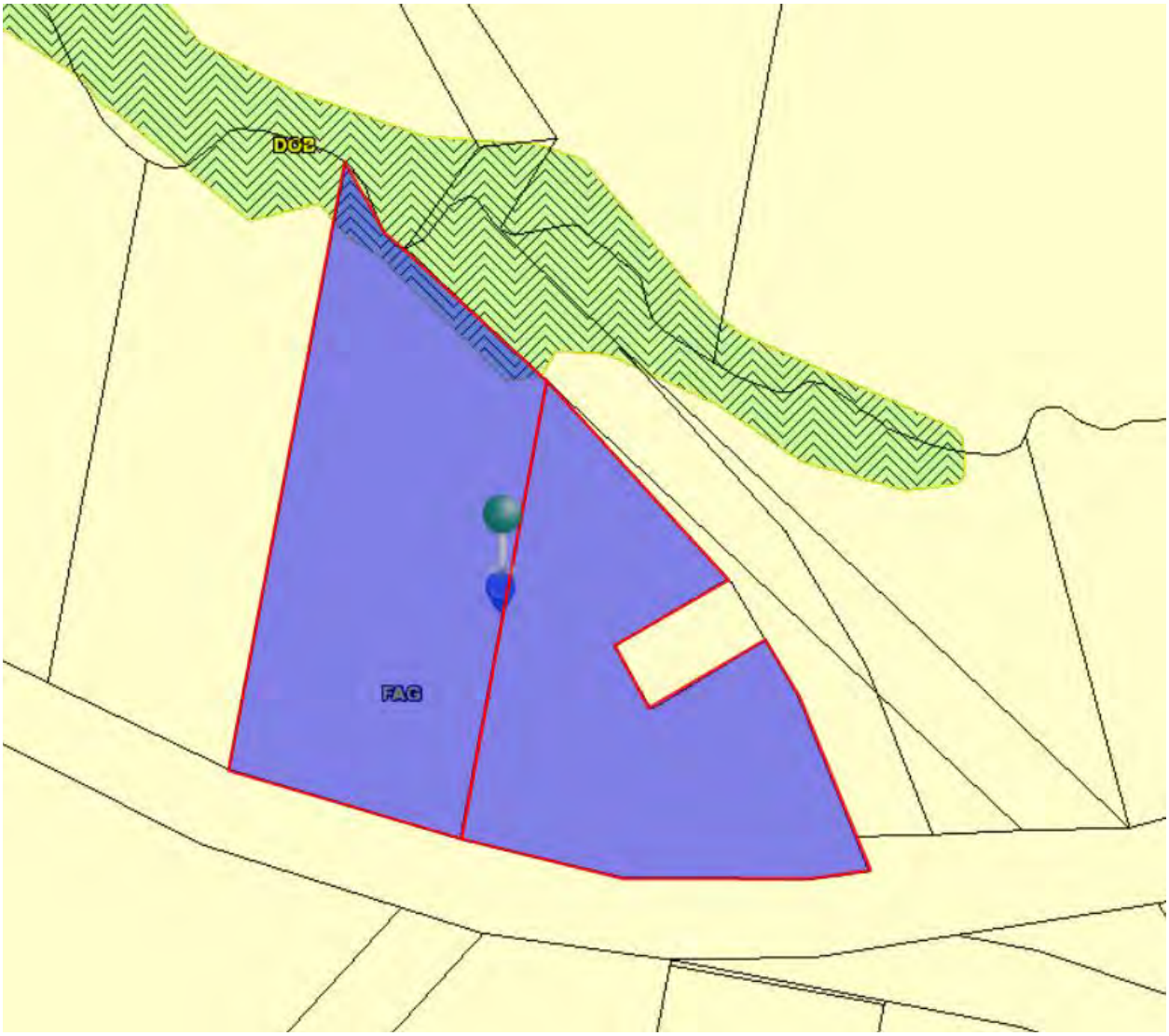


Figure 3 - TASVEG4.0 communities on subject site and surrounding land. FUR – Urban areas, FAG – Agricultural land & DOB – Eucalyptus obliqua dry forest. Source: The LIST, © State of Tasmania

3 SITE ASSESSMENT

The site assessment was conducted by James Rogerson (BFP-161) on the 10th of October 2023.

3.1 Bushfire Hazard Assessment

C13.0 Bushfire Prone Areas Code defines Bushfire-prone areas as follows;

> *a) Land that is within the boundary of a bushfire-prone area shown on an overlay on a planning scheme map; or*
>
> *b) Where there is no overlay on a planning scheme map, or where the land is outside the boundary of a bushfire-prone area shown on such map, land that is within 100m of an area of bushfire –prone vegetation equal or greater than 1ha.*

The subject site is within a bushfire-prone areas overlay for the TPS, and the subject site is within 100m of an area of bushfire-prone vegetation equal or greater than 1ha. Therefore, this proposed subdivision is within a bushfire-prone area as per the TPS.

For the purposes of the BAL Assessment, vegetation within 100m of the proposed subdivision site was assessed and classified in accordance with AS3959:2018 Simplified Procedure (Method 1) (relevant fire danger index: 50-which applies across Tasmania).

BUSHFIRE THREAT DIRECTION

Bushfire threat to this development is from the **GRASSLAND FUEL** within, north and south of the property. An additional threat is from the small patch of **WOODLAND FUEL** within the property.

Prevailing Winds: The prevailing winds for this site are primarily westerly, north westerly.

3.2 Vegetation and Effective Slope

Vegetation and relevant effective slopes within 100m of the proposed subdivision have been inspected and classified in accordance with AS 3959:2018. Effective Slope refers to the slope of the land underneath the classified bushfire-prone vegetation relative to the building site and not the slope between the vegetation and the building site. The effective slope affects a fires rate of spread and flame length and is an acute aspect of bushfire behaviour.

WITHIN THE TITLE BOUNDARY (BDY) & PROPERTY DESCRIPTION

The property is a medium sized, developed, Village zoned property that is in the central part of the small, rural township of Copping. The property is located at the intersection of Arthur Highway and Marion Bay Road. The property is two existing titles. The developed property is the old antiques store (now closed) and a coffee shop (temporarily closed). The property is orientated in a north-south aspect. The terrain within the property is gentle, sloping slightly in a northerly aspect. The property consists of two Class 1a dwellings, in addition to various Class 10a sheds (including the old stores), cultivated lawns and gardens and all-weather driveways. (See Figure 4 for slopes).

The land directly surrounding the dwellings and sheds is used as private open space and is therefore classed as MANAGED LAND or LOW THREAT VEGETATION per Clause 2.2.3.2 (e)(f) of AS3959:2018. The entire of the existing vacant property and small portions of the existing developed property are grassed, appearing in an unmanaged condition, due to minimal land use and is therefore classed as GROUP G GRASSLAND per Table 2.3 of AS3959:2018. There is a patch of Eucalyptus trees that are <10m high, have a foliage cover of <30% with an understory of grass and smaller isolated shrubs, that would be classed as woodland fuel, however, the area of this vegetation is only ~1700m² and is not classed as woodland as grassland is the far greater predominant fuel in this area.

NORTH OF THE TITLE BDY

To the north of the property (upslope) are various developed, vacant, large sized, Rural and Agricultural Zoned properties.

The developed properties (21 and 23 Prebbles Road) are also the Rural Zoned properties. These two properties consist of Class 1a dwellings, in addition to various Class 10a sheds, cultivated lawns, gardens and all-weather driveways. The land directly surrounding the dwellings and sheds is used as private open space (POS) and is therefore classed as MANAGED LAND or LOW THREAT VEGETATION per Clause 2.2.3.2 (e)(f) of AS3959:2018. External to the POS the land is grassed, appearing in an unmanaged condition due to minimal land use and is therefore classed as GROUP G GRASSLAND per Table 2.3 of AS3959:2018. The remainder of these two properties are vegetation with Eucalyptus trees, that are <10m high, with a foliage cover of <30% and an understory of grass and is therefore classed as GROUP B WOODLAND per Table 2.3 of AS3959:2018.

The vacant two properties (51 Breem Creek Road) are the Agricultural zoned properties and are predominately covered with unmanaged pasture grass, that is appearing unmanaged due to minimal land use and is therefore classed as GROUP G GRASSLAND per Table 2.3 of AS3959:2018. The remainder of the larger of the two vacant properties is vegetated with Eucalyptus trees, that are <10m high, with a foliage cover of <30% and an understory of grass and is therefore classed as GROUP B WOODLAND per Table 2.3 of AS3959:2018.

EAST OF THE TITLE BDY

To the east of the property (across slope) are various medium sized, developed, Village Zone properties. The land directly surrounding the dwellings and sheds is used as POS and is therefore classed as MANAGED LAND or LOW THREAT VEGETATION per Clause 2.2.3.2 (e)(f) of AS3959:2018. External the POS the land within these properties is predominately grassed, that appeared in a managed condition, due to the sizes of the properties, regular use and mowing and is therefore classed as LOW THREAT VEGETSTION per Clause 2.2.3.2 (f) of AS3959:2018.

SOUTH OF THE TITLE BDY

To the south of the property (across slope and upslope) are various medium sized, developed, vacant, Rural Living Zone A and Community Purpose zoned properties.

2224 Arthur Highway and 3 Dransfield Lane are small, developed Rural Living Zone A zoned properties consisting of Class 1a dwellings, in addition to various Class 10a sheds, cultivated lawns, gardens and all-weather gravel driveways. The land directly surrounding the dwellings and sheds is used as POS and is therefore classed as MANAGED LAND or LOW THREAT VEGETATION per Clause 2.2.3.2 (e)(f) of AS3959:2018. External the POS the land within these properties is predominately grassed, that appeared in a managed condition, due to the sizes of the properties, regular use and mowing and is therefore classed as LOW THREAT VEGETSTION per Clause 2.2.3.2 (f) of AS3959:2018.

2226 Arther Highway is a larger, developed, Rural Living Zone A zoned property consisting of Class 1a dwellings, in addition to various Class 10a sheds, cultivated lawns, gardens and all-weather gravel driveways. consisting of Class 1a dwellings, in addition to various Class 10a sheds, cultivated lawns, gardens and all-weather gravel driveways. External the POS and the remainder of the property is vegetated with Eucalyptus trees, that are <10m high, with a foliage cover of <30% and an understory of grass and is therefore classed as GROUP B WOODLAND per Table 2.3 of AS3959:2018.

The vacant (unaddressed property) is zoned Rural Living Zone A. The property is grassed, appearing in an unmanaged condition due to minimal land use and is therefore classed as GROUP G GRASSLAND per Table 2.3 of AS3959:2018.

2204 Arthur Highway is the 'Copping Anglican Burial Ground' and is zoned Community Purpose. The site is a graveyard and the whole site is managed and is therefore classed as MANAGED LAND or LOW THREAT VEGETATION per Clause 2.2.3.2 (e)(f) of AS3959:2018.

WEST OF THE TITLE BDY

To the west of the property boundary (across slope) is three titles all addressed 2201 Arthur Highway and owned by the same person. These properties are all zoned Village. The middle of the three properties is developed, consisting of a Class 1a dwelling, in addition to various Class 10a sheds, cultivated lawns, gardens and an all-weather gravel driveway. The land directly surrounding the dwelling and sheds is used as POS and is therefore classed as MANAGED LAND or LOW THREAT VEGETATION per Clause 2.2.3.2 (e)(f) of AS3959:2018. External the POS on the property directly to the west of the subject property is vacant and is grassed, that appeared partly mowed (assuming as part of the Sorell Fire Abatement Policy) These mowed parts are classed as LOW THREAT VEGETATION per Clause 2.2.3.2 (f). The remainder of this property and the remaining property of this address is grassed, appearing unmanaged due to minimal land use and is therefore classed as GROUP G GRASSLAND per Table 2.3 of AS3959:2017.

Figure 4 below shows the relationship between the subject site and the surrounding vegetation.

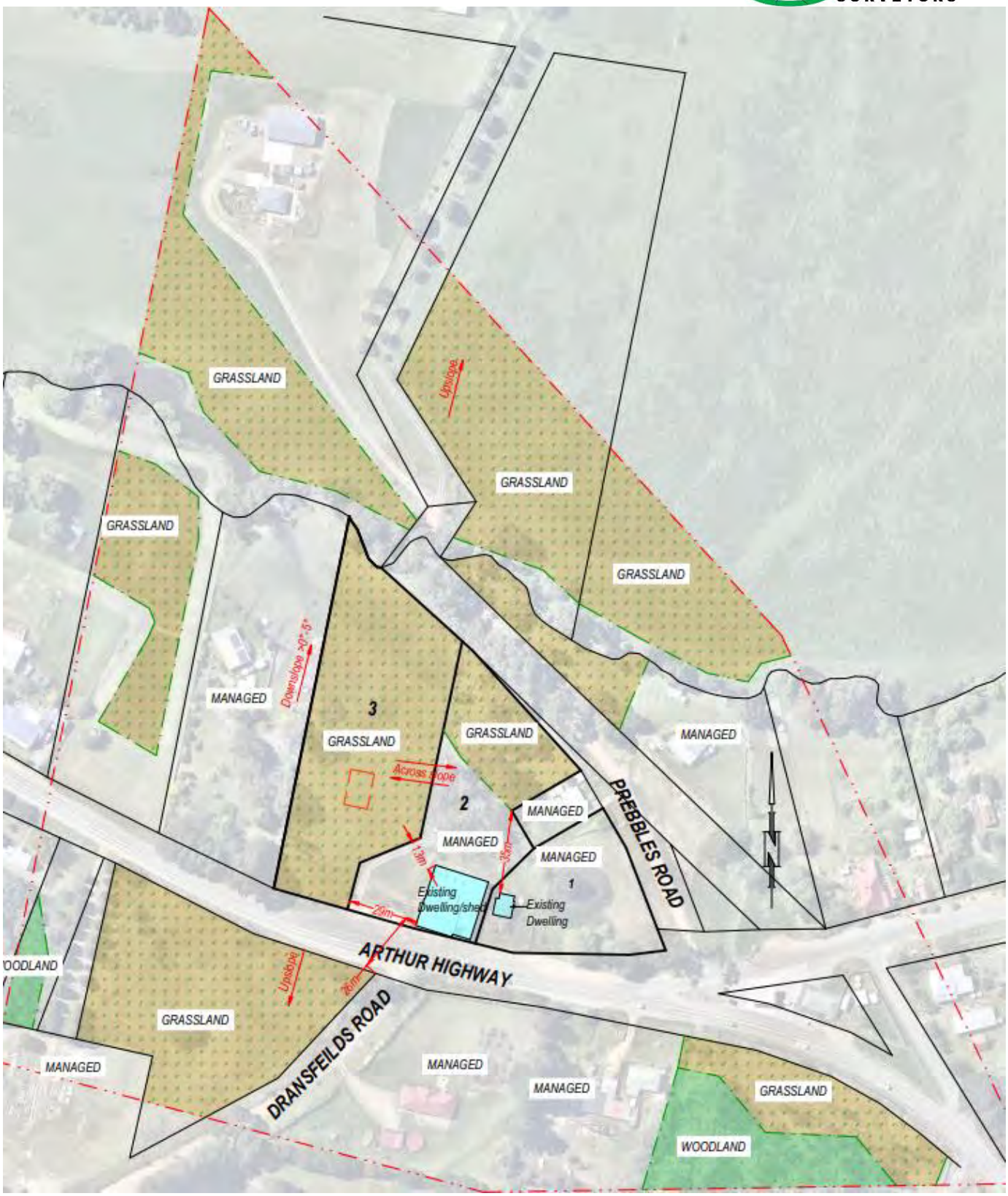


Figure 4 classified vegetation (within 100m of site) and existing separation from bushfire-prone vegetation (not to scale)

3.3 Bushfire Attack Level (BAL)

Table 2 - BAL rating for each lot and required separation distances

LOT 1 – Existing Dwelling (Existing separation)				
DIRECTION OF SLOPE	**N**	**E**	**S**	**W**
Vegetation Classification	MANAGED GRASSLAND	MANAGED	MANAGED	MANAGED GRASSLAND
Existing Horizontal distance to classified vegetation	35m-73m (G)	N/A	N/A	59m-92m (G)
Effective Slope under vegetation	Downslope >0°-5° Upslope	Across slope	Across slope & upslope	Across slope
Exemption				>50 to (G)
Current BAL value for each side of the site	BAL-12.5	BAL-LOW	BAL-LOW	BAL-LOW
Separation distances to achieve BAL-19	11m	N/A	N/A	N/A
Separation distances to achieve BAL-12.5	16m	N/A	N/A	N/A

LOT 2 – Existing Dwelling (Existing separation)				
DIRECTION OF SLOPE	**N, NE**	**E, SE**	**SW**	**NW**
Vegetation Classification	MANAGED GRASSLAND	MANAGED	MANAGED GRASSLAND	MANAGED GRASSLAND
Existing Horizontal distance to classified vegetation	38m-76m (G)	N/A	26m-88m (B)	13m-97m (G)
Effective Slope under vegetation	Downslope >0°-5° Upslope	Across slope	Upslope	Downslope >0°-5°
Exemption				
Current BAL value for each side of the site	BAL-12.5	BAL-LOW	BAL-12.2	BAL-19
Separation distances to achieve BAL-19	11m	N/A	10m	11m
Separation distances to achieve BAL-12.5	16m	N/A	14m	16m

LOT 3 – Vacant (Indicative Building Area)				
DIRECTION OF SLOPE	**N, NE**	**E, SE**	**S, SW**	**W, NW**
Vegetation Classification	GRASSLAND MANAGED	GRASSLAND MANAGED	GRASSLAND MANAGED	GRASSLAND MANAGED
Existing Horizontal distance to classified vegetation	m-78m (G)	0m-24 (G)	0m-43m & 63m-100m (G)	0m-22m & 80m-100m (G)
Effective Slope under vegetation	Downslope >0°-5° Upslope	Across slope	Upslope	Across slope
Exemption				
Current BAL value for each side of the site	BAL-FZ	BAL-FZ	BAL-FZ	BAL-FZ
Separation distances to achieve BAL-19	11m	10m	10m	10m
Separation distances to achieve BAL-12.5	16m	14m	14m	14m

3.4 Definition of BAL-LOW

Bushfire Attack Level shall be classified BAL-LOW per Section 2.2.3.2 of AS3959:2018 where the vegetation is one or a combination of any of the following Exemptions:

a) Vegetation of any type that is more than 100m from the site.
b) Single areas of vegetation less than 1 hectare in area and not within 100m of other areas of vegetation being classified.
c) Multiple areas of vegetation less than 0.25 ha in area and not within 20m of the site, or each other.
d) Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site or each other, or other areas of vegetation being classified.
e) Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops.
f) Low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks.

NOTE: Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100mm).

The BAL level will also be classified as BAL-LOW if Grassland fuel is >50m from the site for any effective slope per Table 2.6 of AS3959:2018.

Due to some existing developed and managed land, some separations distances are already achieved.

Where there were multiple fuel classifications and effective slopes, the predominant fuel and slope have been used in the BAL table above.

BAL ratings are as stated below:

BAL LOW	BAL 12.5	BAL 19	BAL 29	BAL 40	BAL FZ
There is insufficient risk to warrant any specific construction requirements, but there is still some risk	Ember attack and radiant heat below 12.5 kW/m²	Increasing ember attack and windborne debris, radiant heat between 12.5 kW/m² and 19 kW/m2	Increasing ember attack and windborne debris, radiant heat between 19kW/m² and 29 kW/m2	Increasing ember attack and windborne debris, radiant heat between 29 kW/m² and 40 kW/m². Exposure to flames from fire front likely	Direct Exposure to flames, radiant heat and embers from the fire front

4 BUSHFIRE PROTECTION MEASURES

4.1 Hazard Management Areas (HMA)

Hazard Management Area as described in the Code "*maintained in a minimal fuel condition and in which there are no other hazards present which will significantly contribute to the spread of a bushfire".* Also as described from Note 1 of AS3959:2018 Clause 2.2.3.2 "*Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100 mm)".*

Compliance to C13.6.1

The building areas within all lots require a Hazard Management Area (HMA) to be established and maintained between the bushfire vegetation and the area at a distance equal to, or greater than specified for the Bushfire Attack Level in Table 2.6 of AS3959:2018.

Due to the sizes of the lots, only the building areas are to be maintained as an HMA for Lots 2 and 3. And the entire of Lot 1 to be an HMA. The building areas within Lots 1 and 2 are already kept in a HMA condition and must continue to do so in perpetuity.

Requisite fuel removal is required for Lot 3 to achieve BAL-19 compliance.

Minimum separation distances for each lot are stated below.

LOT 1 – Separation Distances (Existing Dwelling)				
Aspect	N	E	S	W
BAL-19	11m	N/A	N/A	N/A
BAL-12.5	16m	N/A	N/A	N/A

LOT 2 – Separation Distances (Existing Dwelling)				
Aspect	N, NE	E, SE	S, SW	W, NW
BAL-19	11m	N/A	10m	11m
BAL-12.5	16m	N/A	14m	16m

LOT 3 – Separation Distances (Indicative Building Area)				
Aspect	N, NE	E, SE	S, SW	W, NW
BAL-19	11m	10m	10m	10m
BAL-12.5	16m	14m	14m	14m

The Tasmanian Fire Service provides the following advice regarding the implementation and maintenance of Hazard management areas:

- Removing of fallen limbs, sticks, leaf and bark litter
- Maintaining grass at less than a 100mm height
- Removing pine bark and other flammable mulch (especially from against buildings)
- Thinning out understory vegetation to provide horizontal separation between fuels
- Pruning low-hanging tree branches (<2m from the ground) to provide vertical separation between fuel layers
- Pruning larger trees to maintain horizontal separation between canopies
- Minimize the storage of flammable materials such as firewood
- Maintaining vegetation clearance around vehicular access and water supply points
- Use of low-flammability species for landscaping purposes where appropriate
- Clearing out any accumulated leaf and other debris from roof gutters.

Additional site-specific fuel reduction or management may be required. An effective hazard management area does not require removal of all vegetation. Rather, vegetation must be designed and maintained in a way that limits opportunity for vertical and horizontal fire spread in the vicinity of the building being protected. Retaining some established trees can even be beneficial in terms of protecting the building from wind and ember attack

4.2 Public and Fire Fighting Access

Public Access

The proposed development fronts Arthur Highway and Marion Bay Road. Arthur Highway and Marion Bay Road are bitumen sealed roads. Arthur Highway is maintained by State Growth and Marion Bay Road is maintained by the Sorell Council. Arthur Highway has a nominal carriageway width of 8m, and Marion Bay Road has a nominal carriageway width of 7m.

No upgrades are required to the public roads and the public roads comply with public access road requirements.

Property Access

Current Conditions:

Lot 1

The existing private access to the existing dwelling within Lot 1 is an all-weather gravel material driveway, which runs perpendicular off Arthur Highway, and terminates adjacent to the front fence. The length of the access is approximately 11m.

Lot 2

The existing access to the existing dwelling within Lot 2 is an all-weather gravel material driveway, which runs perpendicular off Arthur Highway, and curves around behind the dwelling and terminates at a parking area behind the dwelling. The approximate length of the access is 65m for a nominal width of 3.5m.

Lot 3

The existing access to Lot 3 is using the same access as Lot 2 for a distance of approximately 20m only.

Figure 5 – Existing access to Lot 1

Figure 6 – Existing access to Lots 2 & 3

Compliance to C13.6.2

Lot 1

Access to the existing dwelling within Lot 1 is <30m and the access is not required for a fire appliance, therefore, there are no specified design or construction requirements, and the existing access complies to the Acceptable Solution A1 and Table 13.2 (B) of C13.6.2.

Lot 2

Access to the existing dwelling within the Lot 2 is >30m, but <200m, access is required for a fire appliance. The existing access has a nominal width of 3.5m, therefore minor upgrades to widen the access to 4m are required. There is existing compliant turning head space for a fire appliance. Upon upgrades to the existing access the proposal will comply with the Acceptable Solution A1 and Table C13.2 (B) of C13.0 demonstrated in Table 3 below.

Lot 3

Access to the building area within Lot 1 will be >30m but <200m, access is required for a fire appliance. Therefore, the access must comply with the relevant standards of Acceptable Solution A1 and Table C13.2 (B) of C13.0 demonstrated in Table 3 below.

Upgrades to existing access, hardstand and turning head for Lot 2 to be constructed prior to sealing of titles. New access, turning and hardstand for Lot 3 to be constructed prior to occupancy of a future habitable dwelling.

Table 3 - Requirements for access length greater than 30m and less than 200m per Table C13.2 (B)

Access Standards: (access length >30m, <200m)

a) All-weather construction;
b) Load capacity of at least 20 t, including bridges and culverts;
c) Minimum carriageway width of 4m;
d) Minimum vertical clearance of 4m;
e) Minimum horizontal clearance of 0.5m from the edge of the carriageway;
f) Cross falls less than 3 degrees (1:20 or 5%)
g) Dips less than 7 degrees (1:8 or 12.5%);
h) Curves with a minimum inner radius of 10m;
i) Maximum gradient of 15 degrees (1:3.5 or 28%) for sealed roads, and 10 degrees (1:5.5 or 18%) for unsealed road; and
j) Terminate with a turning area for fire appliances provided by one of the following
    i. A turning circle with a minimum outer radius of 10m; or
    ii. A property access encircling the building; or
    iii. A hammerhead 'T' or 'y' turning head 4m wide and 8m long.

4.3 Water Supply for Fire Fighting

Current Conditions:

Site assessment confirmed the property is not serviced by reticulated water. Existing tanks for domestic use only exist.

Compliance to C13.6.3

Lot 2

Lot 2 has an existing unused concrete tank (min. 10,000L) which can be used as a static water supply for fire fighting once the appropriate fitting is installed.

Upon installation of the new fitting, prior to sealing of titles Lot 2 will comply with Acceptable Solution A2 of C13.6.3 and Table C13.5.

Lots 1 and 3

Both lots 1 and 3 **must** be provided with a firefighting water supply that meets the requirements for Acceptable Solution A2 of section C13.6.3 and Table C13.5.

Firefighting water supply requirements for Lot 1 **must** be provided prior to sealing of titles and prior to occupancy of a future habitable dwellings for Lot 3.

Static water supply requirements are outlined in Table 4 below which is per C13.6.3 and Table C13.5

Table 4 – Requirements for Static Water Supply per C13.6.3 and Table C13.5

A. Distance between building area to be protected and water supply

a) the building area to be protected must be located within 90m of the fire fighting water point of a static water supply; and

b) the distance must be measured as a hose lay, between the fire fighting water point and the furthest part of the building area

B. Static Water supplies

a) may have a remotely located offtake connected to the static water supply;

b) may be a supply for combined use (fire fighting and other uses) but the specified minimum quantity of fire fighting water must be available at all times;

c) must be a minimum of 10,000L per building area to be protected. This volume of water must not be used for any other purpose including fire fighting sprinkler or spray systems;

d) must be metal, concrete or lagged by non-combustible materials if above ground; and

e) if a tank can be located so it is shielded in all directions in compliance with section 3.5 of Australian Standard AS 3959-2009 Construction of buildings in bushfire-prone areas, the tank may be constructed of any material provided that the lowest 400mm of the tank exterior is protected by:

(i) metal;

(ii) non-combustible material; or

(iii) fibre-cement a minimum of 6mm thickness.

C. Fittings, pipework and accessories (including stands and tank supports)

Fittings and pipework associated with a fire fighting water point for a static water supply must:

(a) have a minimum nominal internal diameter of 50mm;

(b) be fitted with a valve with a minimum nominal internal diameter of 50mm;

(c) be metal or lagged by non-combustible materials if above ground;

(d) if buried, have a minimum depth of 300mm [S1];

(e) provide a DIN or NEN standard forged Storz 65mm coupling fitted with a suction washer for connection to fire fighting equipment;

(f) ensure the coupling is accessible and available for connection at all times;

(g) ensure the coupling is fitted with a blank cap and securing chain (minimum 220mm length);

(h) ensure underground tanks have either an opening at the top of not less than 250mm diameter or a coupling compliant with this Table; and

(i) if a remote offtake is installed, ensure the offtake is in a position that is:

(i) visible;

(ii) accessible to allow connection by fire fighting equipment;

(iii) at a working height of 450 – 600mm above ground level; and

(iv) protected from possible damage, including damage by vehicles.

D. Signage for static water connections

The fire fighting water point for a static water supply must be identified by a sign permanently fixed to the exterior of the assembly in a visible location. The sign must:

a) comply with water tank signage requirements within Australian Standard AS 2304-2011 Water storage tanks for fire protection systems; or

b) comply with the Tasmania Fire Service Water Supply Guideline published by the Tasmania Fire Service.

E. Hardstand

A hardstand area for fire appliances must be:

a) no more than 3m from the fire fighting water point, measured as a hose lay (including the minimum water level in dams, swimming pools and the like);
b) no closer than 6m from the building area to be protected;
c) a minimum width of 3m constructed to the same standard as the carriageway; and
d) connected to the property access by a carriageway equivalent to the standard of the property access.

4.4 Construction Standards

Existing and future habitable dwellings within the specified building areas on each lot must be designed and constructed to the minimum BAL ratings specified in the BHMP (Appendix C) and to BAL construction standards in accordance with AS3959:2018 or subsequent edition as applicable at the time of building approval.

The BAL-19 building setback lines on the BHMP define the minimum setbacks for habitable buildings.

Future Class 10a buildings within 6m of a Class 1a dwelling must be constructed to the same BAL as the dwelling or provide fire separation in accordance with Clause 3.2.3 of AS3959:2018.

5 STATUTORY COMPLIANCE

The applicable bushfire requirements are specified in State Planning Provisions C13.0 – Bushfire-Prone Areas Code.

Clause	Compliance
C13.4 Use or development exempt from this code	N/A
C13.5 Use Standards	
C13.5.1 Vulnerable Uses	N/A
C13.5.2 Hazardous Uses	N/A
C13.6 Development Standards for Subdivision	
C13.6.1 Provision of Hazard Management Areas.	To comply with the Acceptable Solution A1, the proposed plan of subdivision must; • Show building areas for each lot; and • Show hazard management areas between these building areas and that of the bushfire vegetation with the separation distances required for BAL 19 in Table 2.6 of *Australian Standard AS 3959:2018 Construction of buildings in bushfire-prone areas.* The BHMP demonstrates that all lots can accommodate a BAL rating of BAL-19 with on-site vegetation managing and clearing for Lot 3. The HMA for Lots 1 and 2 to be implemented prior to sealing of titles and prior to occupancy of future habitable dwellings for Lot 3. Subject to the compliance with the BHMP the proposal will satisfy the Acceptable Solution C13.6.1(A1)
C13.6.2 Public and firefighting access; A1	The BHMP (through reference to section 4 of this report) specifies requirements for private accesses are consistent with Table C13.2. Existing access to Lot 2 requires minor upgrades to meet the min. 4m width. The new or upgrades to accesses, turning heads and hardstands to be constructed prior to sealing to sealing of titles for Lot 2 and prior to occupancy of a future habitable dwelling for Lot 3. Subject to the compliance with the BHMP the proposal satisfies the Acceptable Solution C13.6.2(A1).
C13.6.3 A2 Provision of water supply for firefighting purposes.	Static water supply is required for all lots per C13.6.3 A2. Lot 2 has an existing tank to be used as the static water supply. A new fitting is required for the existing tank to be fitted prior to dealing of titles. Firefighting water supply requirements for Lot 1 **must** be provided prior to sealing of titles and prior to occupancy of a future habitable dwellings for Lot 3. Subject to the compliance with the BHMP the proposal satisfies the Acceptable Solution C13.6.3

6 CONCLUSION & RECOMMENDATIONS

The proposed subdivision is endorsed that each lot can meet the requirements of Tasmanian Planning Scheme – Sorell and C13.0 Bushfire-prone Areas Code for a maximum BAL rating of BAL-19. Providing compliance with measures outlined in the BHMP (Appendix C) and sections 4 & 5 of this report.

Recommendations:

- The HMA's within the subdivision be applied in accordance with section 4.1 of this report and the BHMP (Appendix C).
- Bushfire protection measures for Lots 1 and 2 outlined in Sections 4.1, 4.2 and 4.3 to be implemented/construction/installed prior to sealing of titles.
- Sorell Council condition the planning approval on the compliance with the BHMP (as per Appendix C).

7 REFERENCES

Department of Primary Industries and Water, The LIST, viewed November/December 2023, www.thelist.tas.gov.au

Standards Australia, 2018, *AS 3959:2018 – Construction of buildings in bushfire-prone areas*, Standards Australia, Sydney.

Tasmanian Planning Commission, 2015, *Tasmanian Planning Scheme – Sorell* viewed November/December 2023, www.iplan.tas.gov.au

Building Act 2016. The State of Tasmania Department of Premier and Cabinet. https://www.legislation.tas.gov.au/view/html/inforce/current/act-2016-025

Building Regulations 2016. The State of Tasmania Department of Premier and Cabinet. https://www.legislation.tas.gov.au/view/html/inforce/current/sr-2016-110

8 APPENDIX A – SITE PHOTOS

Figure 7 – Grassland fuel within the property (Lot 3), view facing NW

Figure 8 – Grassland fuel within the property (Lot 2), view facing north

Figure 9 – Grassland fuel north of the property, view facing north

Figure 10 – Grassland fuel south of the property, view facing SW

Figure 11 – Existing managed land and dwellings within the property (Lots 1 & 2), view facing south

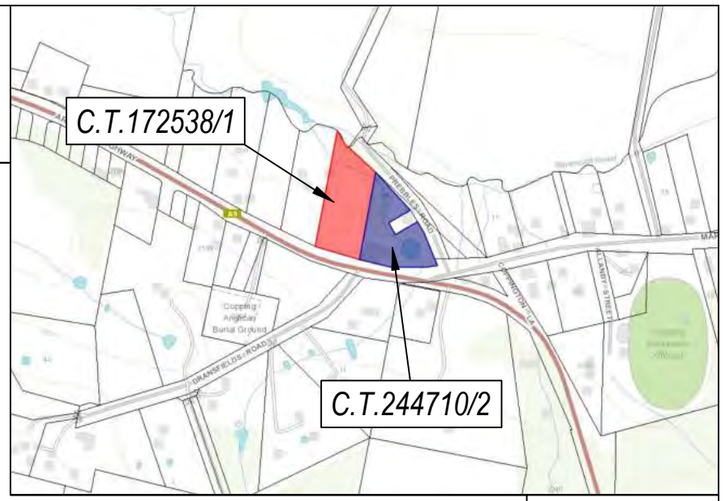
Figure 12 – Existing managed land and dwellings within the property (Lots 1 & 2), view facing west

9 APPENDIX B – SUBDIVISION PROPOSAL PLAN

This plan has been prepared only for the purpose of obtaining preliminary subdivsional approval from the local authority and is subject to that approval.

All measurements and areas are subject to the final survey.

Base image by TASMAP (www.tasmap.tas.gov.au), © State of Tasmania
Base data from the LIST (www.thelist.tas.gov.au), © State of Tasmania



LOCATION PLAN

2
8,296m²

158.92

51.70

67.71

1
7,002m²

118.89

33.53

18.29

33.53

19.19

36.45

9.63

15.13

48.76

43.11

60.75

Existing Building

Existing Building

Existing Access

Existing Lot 1 Access

ARTHUR HIGHWAY

REV	AMENDMENTS	DRAWN	DATE	APPR.
E				
D				
C				
B				
A				

ROGERSON & BIRCH SURVEYORS
UNIT 1, 2 KENNEDY DRIVE
CAMBRIDGE 7170
PHONE: (03)6248 5898
EMAIL: admin@rbsurveyors.com
WEB: www.rbsurveyors.com

OWNER: MARK D. WHITEHEAD
TITLE REFERENCE: C.T.172538/1 & C.T.244710/2
LOCATION: 2217 ARTHUR HIGHWAY, **COPPING**

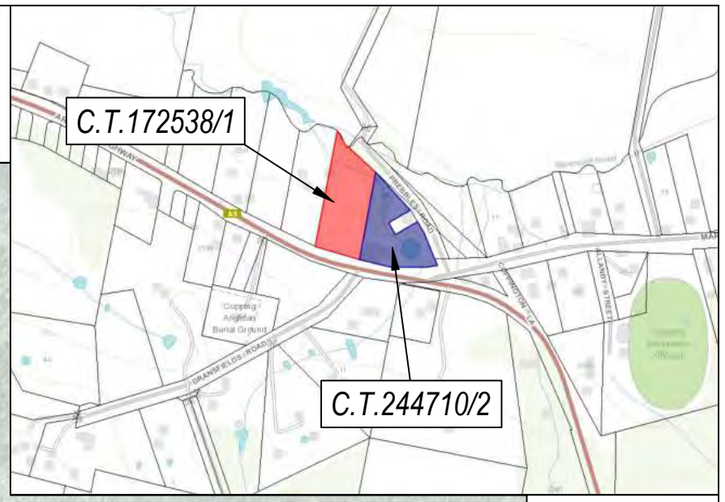
Existing Site Plan

Date: 21/08/2023
Reference: **WHITE01** 15104-00
Scale: 1:800 (A3)
Municipality: SORELL

This plan has been prepared only for the purpose of obtaining preliminary subdivsional approval from the local authority and is subject to that approval.

All measurements and areas are subject to the final survey.

Base image by TASMAP (www.tasmap.tas.gov.au), © State of Tasmania
Base data from the LIST (www.thelist.tas.gov.au), © State of Tasmania



LOCATION PLAN

3
7,036m²±

2
5,168m²±

1
3095m²±

10m x 15m Min.
Compliance Area

45.92
5.78
67.71
158.92
84.25
Existing Boundary to be adjusted
33.53
18.29
33.53
19.19
24.25
36.45
27.35
Proposed Right of Way 6.00 Wide
20.23
32.08
28.67
2.500
2.537
Existing Building
Existing Building
23.87
26.68
2.500
16.44
48.76
15.13
9.63
Existing Access for Lot 2 & Lot 3
Existing Lot 1 Access
ARTHUR HIGHWAY

Site Drainage

Lot 1: Existing On-site Water, Stormwater & Wastewater

Lot 2: Existing On-site Water, Stormwater & Wastewater

Lot 3: Proposed On-site Water, Stormwater & Wastewater

Development Standards for Subdivision
Sorell
12.0 Village Zone

P1 - All lots comply with requirements

A2 - All lots comply - Min. 10m frontage

A3 - All lots comply - vehicular access directly from road

12.5.2 Roads
A4 - All lots comply - no new roads

8.6.3 Services
A1 - All lots comply - On-site Water Management
A2 - All lots comply - On-site Waste-water Management
A3 - All lots comply - On-site Stormwater Management

REV	AMENDMENTS	DRAWN	DATE	APPR.
E				
D				
C				
B				
A				

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UNIT 1, 2 KENNEDY DRIVE
CAMBRIDGE 7170
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OWNER: *MARK D. WHITEHEAD*
TITLE REFERENCE: *C.T.172538/1 & C.T.244710/2*
LOCATION: *2217 ARTHUR HIGHWAY,* ***COPPING***

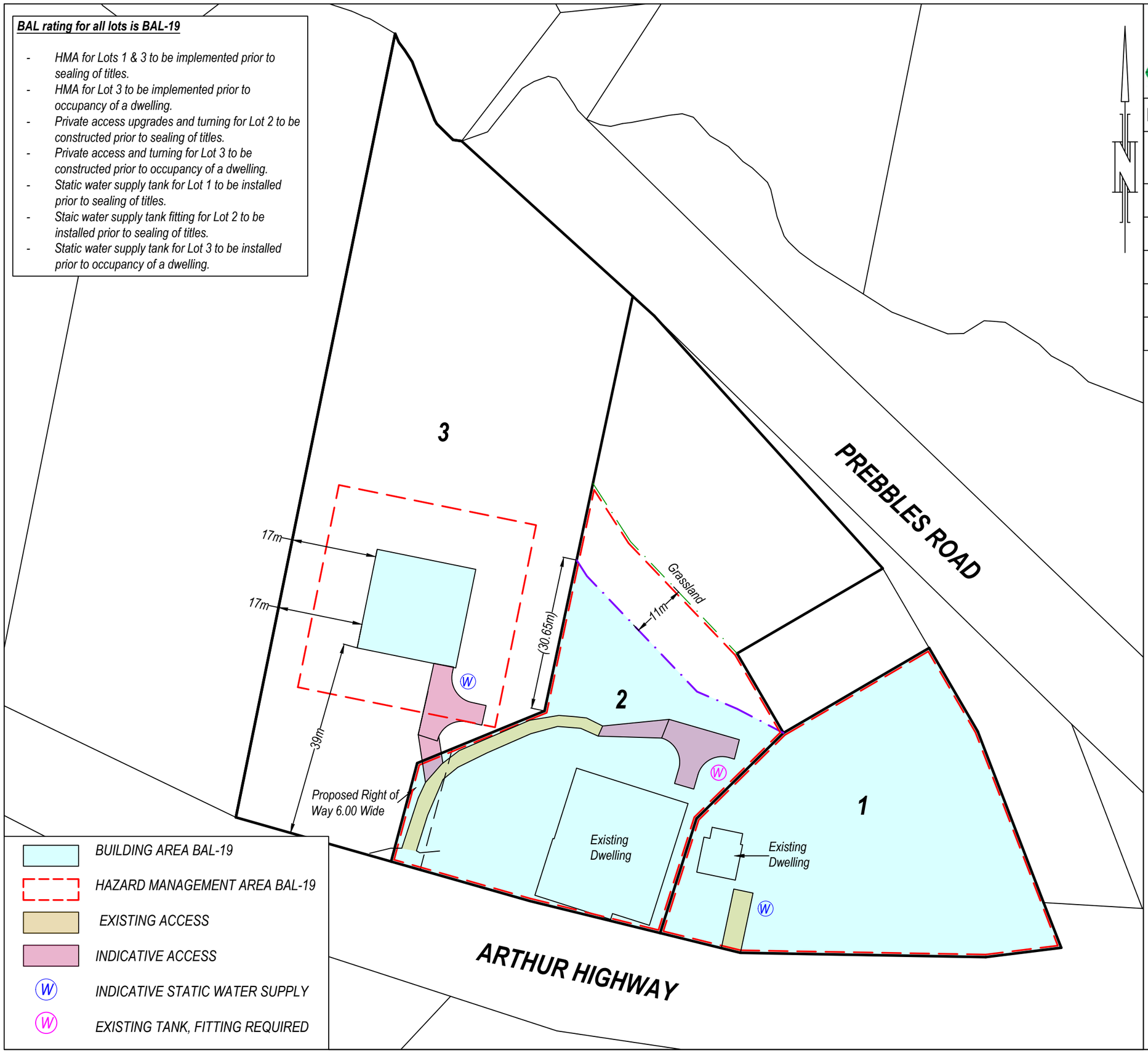
Proposed Subdivision

Date:	Reference:
21/08/2023	**WHITE01** 15104-00
Scale: 1:800 (A3)	Municipality: SORELL

10 APPENDIX C – BUSHFIRE HAZARD MANAGEMENT PLAN

BAL rating for all lots is BAL-19

- *HMA for Lots 1 & 3 to be implemented prior to sealing of titles.*
- *HMA for Lot 3 to be implemented prior to occupancy of a dwelling.*
- *Private access upgrades and turning for Lot 2 to be constructed prior to sealing of titles.*
- *Private access and turning for Lot 3 to be constructed prior to occupancy of a dwelling.*
- *Static water supply tank for Lot 1 to be installed prior to sealing of titles.*
- *Staic water supply tank fitting for Lot 2 to be installed prior to sealing of titles.*
- *Static water supply tank for Lot 3 to be installed prior to occupancy of a dwelling.*



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BUSHFIRE HAZARD MANAGEMENT PLAN

LOCATION:	2217 Arthur Highway, Copping TAS 7174
TITLE REFERENCE:	C.T.172538/1 & C.T.244710/2
PROPERTY ID:	3533689
MUNICIPALITY:	Sorell
DATE:	6th of December 2023 (v1.0)
SCALE: 1:750 @ A3	REFERENCE: WHITE01

REQUIREMENTS

1. HAZARD MANAGEMENT AREAS (HMA)
   - 1.1. HMA to be established to distances indicated on this plan and as set out in Section 4.1 of the Bushfire Hazard Report.
   - 1.2. Vegetation in the HMA needs to be strategically modified and then maintained in a low fuel state to protect future dwellings from direct flame contact and intense radiant heat. An annual inspection and maintenance of the HMA should be conducted prior to the bushfire season. All grasses or pastures must be kept short (<100 mm) within the HMA. Fine fuel loads at ground level such as leaves, litter and wood piles must be minimal to reduce the quantity of wind borne sparks and embers reaching buildings; and to halt or check direct flame attack.
   - 1.3. Some trees can be retained provided there is horizontal separation between the canopies; and low branches are removed to create vertical separation between the ground and the canopy. Small clumps of established trees and/or shrubs may act to trap embers and reduce wind speeds.
   - 1.4. No trees to overhang houses to prevent branches or leaves from falling on the building.
   - 1.5. Non-combustible elements including driveways, paths and short cropped lawns are recommended within the HMA.
   - 1.6. Fine fuels (leaves bark, twigs) should be removed from the ground periodically (pre-fire season) and all grasses or pastures must be kept short (<100 mm).
2. CONSTRUCTION STANDARDS
   - 2.1. Future dwellings within the specified building areas to be designed and constructed to BAL ratings shown on this plan in accordance with AS3959:2018 at the time of building approval
   - 2.2. Future outbuildings within 6m of a class 1a dwelling must be constructed to the same BAL as the dwelling or provide fire separation in accordance with Clause 3.2.3 of AS3959:2018.
3. PUBLIC AND FIRE-FIGHTING ACCESS REQUIREMENTS
   - 3.1. Access to all lots must comply with the design and construction requirements specified in Section 4.2 of the Bush Fire Report.
4. STATIC FIRE-FIGHTING WATER SUPPLY

4.1 New habitable dwellings and existing dwellings must be supplied with a static water supply that is;
- Dedicated solely for fire fighting purposes;
- Minimum capacity of 10,000L;
- is accessible by fire fighting vehicles and within 3.0m of a hardstand area; and
- Consistent with the specifications outlined in section 4.3 of the Bushfire Report.

This plan is to be read in conjunction with the preceding *Bushfire Assessment Report "Proposed 3 Lot Subdivision 2217 Arthur Highway, Copping" dated 28/11/2023.*

BHMP BY JAMES ROGERSON
ACCREDITED BUSHFIRE PRACTITIONER (BFP-161), scopes: 1, 2 & 3B

11 APPENDIX D – PLANNING CERTIFICATE

BUSHFIRE-PRONE AREAS CODE

CERTIFICATE[1] UNDER S51(2)(d) *LAND USE PLANNING AND APPROVALS ACT 1993*

1. Land to which certificate applies

The subject site includes property that is proposed for use and development and includes all properties upon which works are proposed for bushfire protection purposes.

Street address:	**2217 Arthur Highway, Copping TAS 7174**
Certificate of Title / PID:	**C.T.172538/1 & C.T.244710/2 / 3533689**

2. Proposed Use or Development

Description of proposed Use and Development:	**THREE LOT SUBDIVISION OF C.T.172538/1 & C.T.244710/2**
Applicable Planning Scheme:	**Tasmanian Planning Scheme - Sorell**

3. Documents relied upon

This certificate relates to the following documents:

Title	Author	Date	Version
SUBDIVISION PROPOSAL PLAN	ROGERSON & BIRCH SURVEYORS	21/08/2023	00
BUSHFIRE HAZARD REPORT – 2217 ARTHUR HIGHWAY, COPPING	JAMES ROGERSON – ROGERSON & BIRCH SURVEYORS	28/11/2023	1.0
BUSHFIRE HAZARD MANGAEMENT PLAN– 2217 ARTHUR HIGHWAY, COPPING	JAMES ROGERSON – ROGERSON & BIRCH SURVEYORS	07/12/2023	1.0

[1] This document is the approved form of certification for this purpose and must not be altered from its original form.

4. Nature of Certificate

The following requirements are applicable to the proposed use and development:

☐	**E1.4 / C13.4 – Use or development exempt from this Code**	
	Compliance test	**Compliance Requirement**
☐	E1.4(a) / C13.4.1(a)	

☐	**E1.5.1 / C13.5.1 – Vulnerable Uses**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.5.1 P1 / C13.5.1 P1	***Planning authority discretion required. A proposal cannot be certified as compliant with P1.***
☐	E1.5.1 A2 / C13.5.1 A2	
☐	E1.5.1 A3 / C13.5.1 A2	

☐	**E1.5.2 / C13.5.2 – Hazardous Uses**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.5.2 P1 / C13.5.2 P1	***Planning authority discretion required. A proposal cannot be certified as compliant with P1.***
☐	E1.5.2 A2 / C13.5.2 A2	
☐	E1.5.2 A3 / C13.5.2 A3	

☐	**E1.6.1 / C13.6.1 Subdivision: Provision of hazard management areas**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.6.1 P1 / C13.6.1 P1	***Planning authority discretion required. A proposal cannot be certified as compliant with P1.***
☐	E1.6.1 A1 (a) / C13.6.1 A1(a)	
☒	E1.6.1 A1 (b) / C13.6.1 A1(b)	Provides BAL-19 for all lots (including any lot designated as 'balance')
☐	E1.6.1 A1(c) / C13.6.1 A1(c)	

☐	**E1.6.2 / C13.6.2 Subdivision: Public and fire fighting access**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.6.2 P1 / C13.6.2 P1	
☐	E1.6.2 A1 (a) / C13.6.2 A1 (a)	
☒	E1.6.2 A1 (b) / C13.6.2 A1 (b)	Access complies with relevant Tables

☐	**E1.6.3 / C13.1.6.3 Subdivision: Provision of water supply for fire fighting purposes**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.6.3 A1 (a) / C13.6.3 A1 (a)	
☐	E1.6.3 A1 (b) / C13.6.3 A1 (b)	
☐	E1.6.3 A1 (c) / C13.6.3 A1 (c)	
☐	E1.6.3 A2 (a) / C13.6.3 A2 (a)	
☒	E1.6.3 A2 (b) / C13.6.3 A2 (b)	Static water supply complies with relevant the Table.
☐	E1.6.3 A2 (c) / C13.6.3 A2 (c)	

5. Bushfire Hazard Practitioner

Name:	JAMES ROGERSON	**Phone No:**	0488372283
Postal Address:	UNIT 1-2 KENNEDY DRIVE, CAMBRIDGE PARK	**Email Address:**	JR.BUSHFIREASSESSMENTS@GMAIL.COM
Accreditation No:	BFP – 161	**Scope:**	1, 2, 3B

6. Certification

I certify that in accordance with the authority given under Part 4A of the *Fire Service Act 1979* that the proposed use and development:

☐ Is exempt from the requirement Bushfire-Prone Areas Code because, having regard to the objective of all applicable standards in the Code, there is considered to be an insufficient increase in risk to the use or development from bushfire to warrant any specific bushfire protection measures, or

☒ The Bushfire Hazard Management Plan/s identified in Section 3 of this certificate is/are in accordance with the Chief Officer's requirements and compliant with the relevant **Acceptable Solutions** identified in Section 4 of this Certificate for lot 3.

Signed: *certifier*

Name: JAMES ROGERSON **Date:** 8/12/2023

Certificate Number: 161

(for Practitioner Use only)

BUSHFIRE-PRONE AREAS CODE

CERTIFICATE[1] UNDER S51(2)(d) *LAND USE PLANNING AND APPROVALS ACT 1993*

1. Land to which certificate applies

The subject site includes property that is proposed for use and development and includes all properties upon which works are proposed for bushfire protection purposes.

Street address:	**2217 Arthur Highway, Copping TAS 7174**
Certificate of Title / PID:	**C.T.172538/1 & C.T.244710/2 / 3533689**

2. Proposed Use or Development

Description of proposed Use and Development:	**THREE LOT SUBDIVISION OF C.T.172538/1 & C.T.244710/2**
Applicable Planning Scheme:	**Tasmanian Planning Scheme - Sorell**

3. Documents relied upon

This certificate relates to the following documents:

Title	Author	Date	Version
SUBDIVISION PROPOSAL PLAN	ROGERSON & BIRCH SURVEYORS	21/08/2023	00
BUSHFIRE HAZARD REPORT – 2217 ARTHUR HIGHWAY, COPPING	JAMES ROGERSON – ROGERSON & BIRCH SURVEYORS	28/11/2023	1.0
BUSHFIRE HAZARD MANGAEMENT PLAN– 2217 ARTHUR HIGHWAY, COPPING	JAMES ROGERSON – ROGERSON & BIRCH SURVEYORS	07/12/2023	1.0

[1] This document is the approved form of certification for this purpose and must not be altered from its original form.

4. Nature of Certificate

The following requirements are applicable to the proposed use and development:

☐	**E1.4 / C13.4 – Use or development exempt from this Code**	
	Compliance test	**Compliance Requirement**
☐	E1.4(a) / C13.4.1(a)	

☐	**E1.5.1 / C13.5.1 – Vulnerable Uses**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.5.1 P1 / C13.5.1 P1	***Planning authority discretion required. A proposal cannot be certified as compliant with P1.***
☐	E1.5.1 A2 / C13.5.1 A2	
☐	E1.5.1 A3 / C13.5.1 A2	

☐	**E1.5.2 / C13.5.2 – Hazardous Uses**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.5.2 P1 / C13.5.2 P1	***Planning authority discretion required. A proposal cannot be certified as compliant with P1.***
☐	E1.5.2 A2 / C13.5.2 A2	
☐	E1.5.2 A3 / C13.5.2 A3	

☐	**E1.6.1 / C13.6.1 Subdivision: Provision of hazard management areas**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.6.1 P1 / C13.6.1 P1	***Planning authority discretion required. A proposal cannot be certified as compliant with P1.***
☐	E1.6.1 A1 (a) / C13.6.1 A1(a)	
☒	E1.6.1 A1 (b) / C13.6.1 A1(b)	Provides BAL-19 for all lots (including any lot designated as 'balance')
☐	E1.6.1 A1(c) / C13.6.1 A1(c)	

☐	**E1.6.2 / C13.6.2 Subdivision: Public and fire fighting access**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.6.2 P1 / C13.6.2 P1	
☐	E1.6.2 A1 (a) / C13.6.2 A1 (a)	
☒	E1.6.2 A1 (b) / C13.6.2 A1 (b)	Access complies with relevant Tables

☐	**E1.6.3 / C13.1.6.3 Subdivision: Provision of water supply for fire fighting purposes**	
	Acceptable Solution	**Compliance Requirement**
☐	E1.6.3 A1 (a) / C13.6.3 A1 (a)	
☐	E1.6.3 A1 (b) / C13.6.3 A1 (b)	
☐	E1.6.3 A1 (c) / C13.6.3 A1 (c)	
☐	E1.6.3 A2 (a) / C13.6.3 A2 (a)	
☒	E1.6.3 A2 (b) / C13.6.3 A2 (b)	Static water supply complies with relevant the Table.
☐	E1.6.3 A2 (c) / C13.6.3 A2 (c)	

5. Bushfire Hazard Practitioner

Name:	JAMES ROGERSON	**Phone No:**	0488372283
Postal Address:	UNIT 1-2 KENNEDY DRIVE, CAMBRIDGE PARK	**Email Address:**	JR.BUSHFIREASSESSMENTS@GMAIL.COM
Accreditation No:	BFP – 161	**Scope:**	1, 2, 3B

6. Certification

I certify that in accordance with the authority given under Part 4A of the *Fire Service Act 1979* that the proposed use and development:

☐ Is exempt from the requirement Bushfire-Prone Areas Code because, having regard to the objective of all applicable standards in the Code, there is considered to be an insufficient increase in risk to the use or development from bushfire to warrant any specific bushfire protection measures, or

☒ The Bushfire Hazard Management Plan/s identified in Section 3 of this certificate is/are in accordance with the Chief Officer's requirements and compliant with the relevant **Acceptable Solutions** identified in Section 4 of this Certificate for lot 3.

Signed: *certifier*

Name: JAMES ROGERSON **Date:** 8/12/2023

Certificate Number: 161

(for Practitioner Use only)

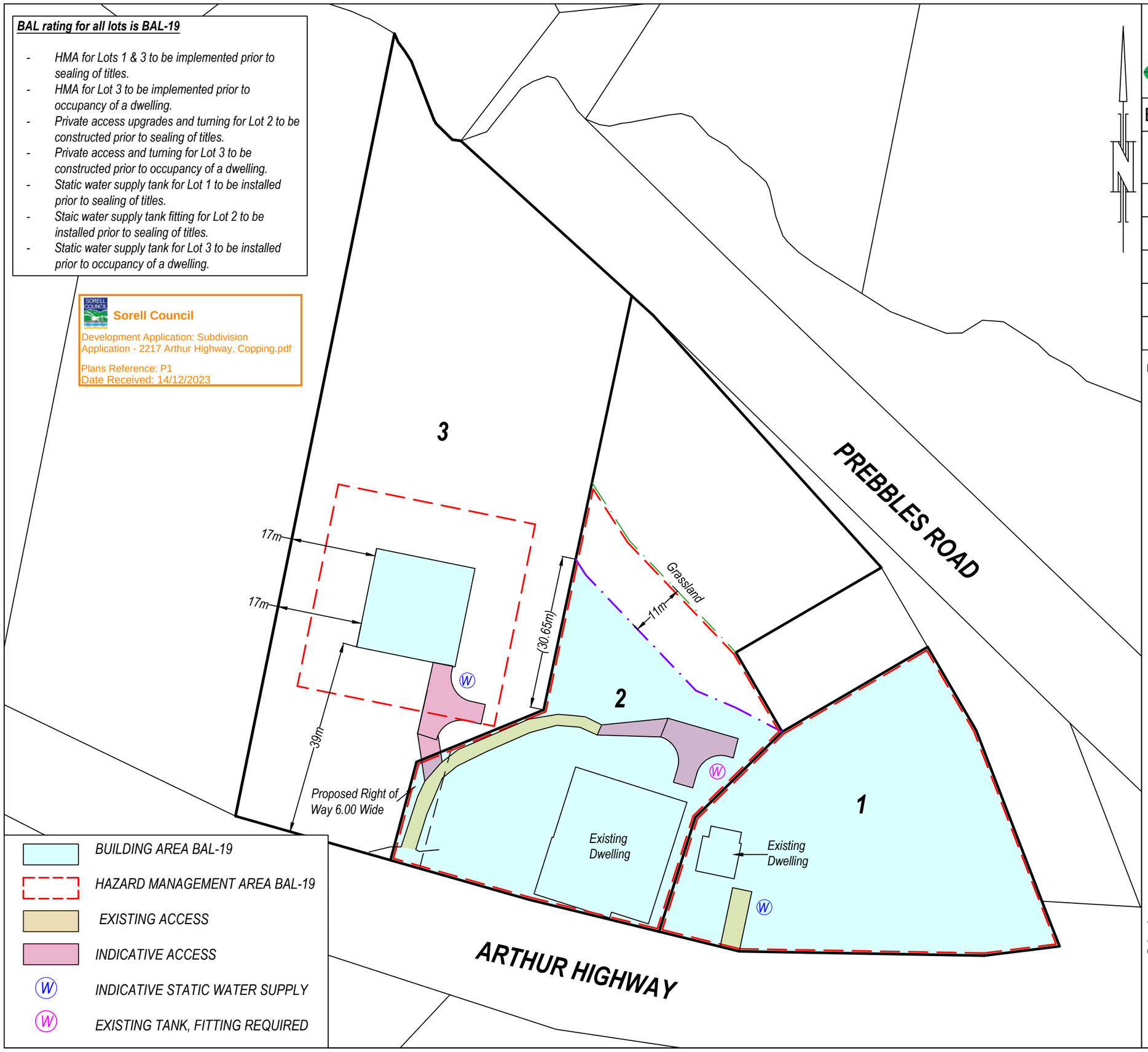
BAL rating for all lots is BAL-19

- *HMA for Lots 1 & 3 to be implemented prior to sealing of titles.*
- *HMA for Lot 3 to be implemented prior to occupancy of a dwelling.*
- *Private access upgrades and turning for Lot 2 to be constructed prior to sealing of titles.*
- *Private access and turning for Lot 3 to be constructed prior to occupancy of a dwelling.*
- *Static water supply tank for Lot 1 to be installed prior to sealing of titles.*
- *Staic water supply tank fitting for Lot 2 to be installed prior to sealing of titles.*
- *Static water supply tank for Lot 3 to be installed prior to occupancy of a dwelling.*

Sorell Council

Development Application: Subdivision Application - 2217 Arthur Highway, Copping.pdf

Plans Reference: P1
Date Received: 14/12/2023



ROGERSON & BIRCH SURVEYORS
UNIT 1, 2 KENNEDY DRIVE
CAMBRIDGE 7170
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WEB: www.rbsurveyors.com

BUSHFIRE HAZARD MANAGEMENT PLAN

LOCATION:	2217 Arthur Highway, Copping TAS 7174
TITLE REFERENCE:	C.T.172538/1 & C.T.244710/2
PROPERTY ID:	3533689
MUNICIPALITY:	Sorell
DATE:	6th of December 2023 (v1.0)
SCALE: 1:750 @ A3	REFERENCE: WHITE01

REQUIREMENTS

1. HAZARD MANAGEMENT AREAS (HMA)
   - 1.1. HMA to be established to distances indicated on this plan and as set out in Section 4.1 of the Bushfire Hazard Report.
   - 1.2. Vegetation in the HMA needs to be strategically modified and then maintained in a low fuel state to protect future dwellings from direct flame contact and intense radiant heat. An annual inspection and maintenance of the HMA should be conducted prior to the bushfire season. All grasses or pastures must be kept short (<100 mm) within the HMA. Fine fuel loads at ground level such as leaves, litter and wood piles must be minimal to reduce the quantity of wind borne sparks and embers reaching buildings; and to halt or check direct flame attack.
   - 1.3. Some trees can be retained provided there is horizontal separation between the canopies; and low branches are removed to create vertical separation between the ground and the canopy. Small clumps of established trees and/or shrubs may act to trap embers and reduce wind speeds.
   - 1.4. No trees to overhang houses to prevent branches or leaves from falling on the building.
   - 1.5. Non-combustible elements including driveways, paths and short cropped lawns are recommended within the HMA.
   - 1.6. Fine fuels (leaves bark, twigs) should be removed from the ground periodically (pre-fire season) and all grasses or pastures must be kept short (<100 mm).
2. CONSTRUCTION STANDARDS
   - 2.1. Future dwellings within the specified building areas to be designed and constructed to BAL ratings shown on this plan in accordance with AS3959:2018 at the time of building approval
   - 2.2. Future outbuildings within 6m of a class 1a dwelling must be constructed to the same BAL as the dwelling or provide fire separation in accordance with Clause 3.2.3 of AS3959:2018.
3. PUBLIC AND FIRE-FIGHTING ACCESS REQUIREMENTS
   - 3.1. Access to all lots must comply with the design and construction requirements specified in Section 4.2 of the Bush Fire Report.
4. STATIC FIRE-FIGHTING WATER SUPPLY

4.1 New habitable dwellings and existing dwellings must be supplied with a static water supply that is;
- Dedicated solely for fire fighting purposes;
- Minimum capacity of 10,000L;
- is accessible by fire fighting vehicles and within 3.0m of a hardstand area; and
- Consistent with the specifications outlined in section 4.3 of the Bushfire Report.

This plan is to be read in conjunction with the preceding *Bushfire Assessment Report "Proposed 3 Lot Subdivision 2217 Arthur Highway, Copping" dated 28/11/2023.*

BHMP BY JAMES ROGERSON
ACCREDITED BUSHFIRE PRACTITIONER (BFP-161), scopes: 1, 2 & 3B

This plan has been prepared only for the purpose of obtaining preliminary subdivsional approval from the local authority and is subject to that approval.

All measurements and areas are subject to the final survey.

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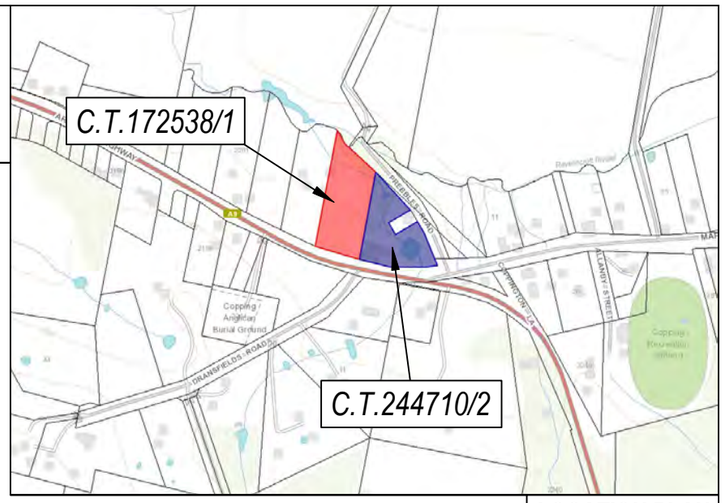
Base data from the LIST (www.thelist.tas.gov.au), © State of Tasmania



LOCATION PLAN

2
8,296m²

158.92
51.70
67.71
118.89
33.53
18.29
33.53
19.19
36.45
9.63
15.13
48.76
43.11
60.75

1
7,002m²

Existing Building
Existing Building
Existing Access
Existing Lot 1 Access

ARTHUR HIGHWAY

REV	AMENDMENTS	DRAWN	DATE	APPR.
E				
D				
C				
B				
A				

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WEB: www.rbsurveyors.com

OWNER: MARK D. WHITEHEAD
TITLE REFERENCE: C.T.172538/1 & C.T.244710/2
LOCATION: 2217 ARTHUR HIGHWAY, **COPPING**

Existing Site Plan

Date:	Reference:
21/08/2023	**WHITE01** 15104-00
Scale: 1:800 (A3)	Municipality: SORELL

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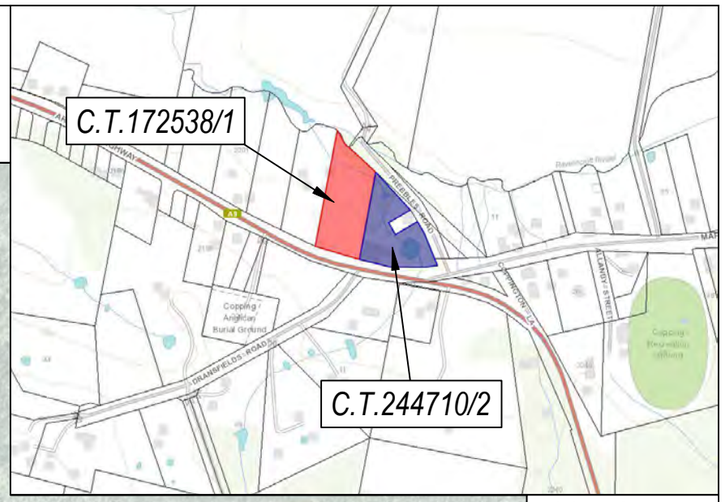

LOCATION PLAN

Sorell Council
Development Application: Response to Request for Information - 2217 Arthur Highway, Copping.pdf
Plans Reference: P5
Date Received: 27/02/2024

3
7,036m²±

2
5,168m²±

1
3095m²±

45.92
5.78
67.71
158.92
84.25
33.53
18.29
33.53
19.19
24.25
36.45
9.63
15.13
48.76
16.44
2.500
26.68
2.500
23.87
2.537
28.67
32.08
20.23
27.35

10m x 15m Min. Compliance Area

Existing Boundary to be adjusted

Proposed Right of Way 6.00 Wide

Existing Building

Existing Building

Existing Access for Lot 2 & Lot 3

access to Lot 1

ARTHUR HIGHWAY

Site Drainage

Lot 1: Existing On-site Water, Stormwater & Wastewater

Lot 2: Existing On-site Water, Stormwater & Wastewater

Lot 3: Proposed On-site Water, Stormwater & Wastewater

Development Standards for Subdivision
Sorell
12.0 Village Zone

P1 - All lots comply with requirements

A2 - All lots comply - Min. 10m frontage

A3 - All lots comply - vehicular access directly from road

12.5.2 Roads
A4 - All lots comply - no new roads

8.6.3 Services
A1 - All lots comply - On-site Water Management
A2 - All lots comply - On-site Waste-water Management
A3 - All lots comply - On-site Stormwater Management

REV	AMENDMENTS	DRAWN	DATE	APPR.
E				
D				
C				
B				
A				

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OWNER: *MARK D. WHITEHEAD*
TITLE REFERENCE: *C.T.172538/1 & C.T.244710/2*
LOCATION: *2217 ARTHUR HIGHWAY,* ***COPPING***

Proposed Subdivision

Date:	Reference:
21/08/2023	**WHITE01** 15104-00
Scale: 1:800 (A3)	Municipality: SORELL