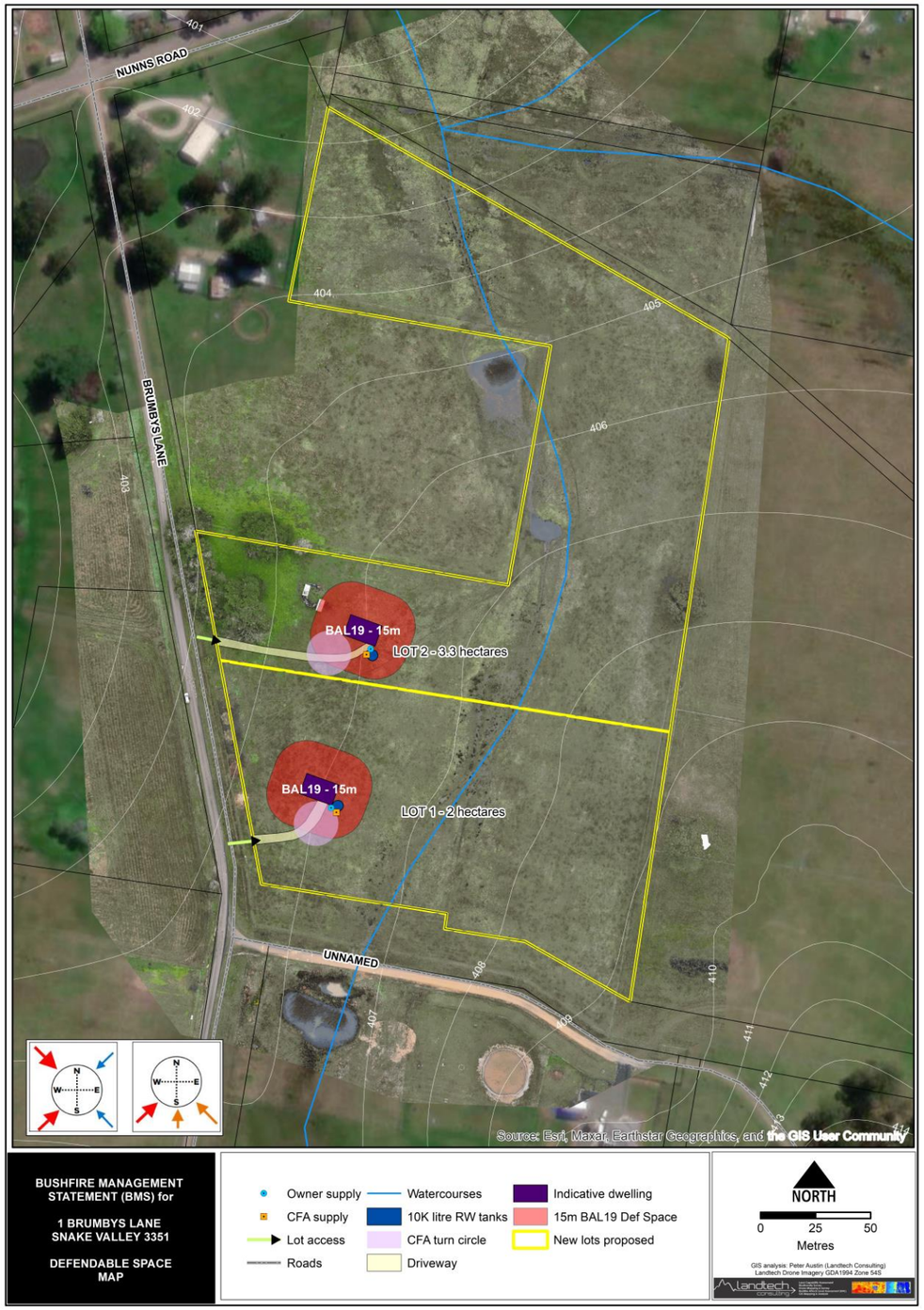
Bushfire Management Plan – 1 BRUMBYS LANE, SNAKE VALLEY, 3351, VICTORIA.



Prepared By: Peter Austin - LANDTECH CONSULTING Version: 2 Date: 5/12/2023

Bushfire Protection Measures

Mandatory Condition

The bushfire protection measures forming part of this permit or shown on the endorsed plans, including those relating to construction standards, defendable space, water supply and access, must be maintained to the satisfaction of the responsible authority on a continuing basis. This condition continues to have force and effect after the development authorised by this permit has been completed

a) Defendable Space

Defendable space is provided for a distance of **15** metres around the building or to the property boundary whichever is the lesser and managed in accordance with the following:

- Grass must be short cropped and maintained during the declared fire danger period.
- All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.
- Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.
- Plants greater than 10 centimetres in height must not be placed within 3m of a window or glass feature of the building.
- Shrubs must not be located under the canopy of trees.
- Individual and clumps of shrubs must not exceed 5 sq. metres in area and must be separated by at least 5 metres.
- Trees must not overhang or touch any elements of the building.
- The canopy of trees must be separated by at least 5 metres.
- There must be a clearance of at least 2 metres between the lowest tree branches and ground level.

b) Construction Standard

Building designed and constructed to a minimum Bushfire Attack Level of BAL – 19

c) Water Supply

The following requirements apply:

- An effective capacity of 10,000 litres.
- Be stored in an above ground water tank constructed of concrete or metal.
- Have all fixed above ground water pipes and fittings required for firefighting purposes made of corrosive resistant metal.
- Include a separate outlet for occupant use.

Where a 10,000 litre water supply is required, the following fire authority fittings and access must be provided:

- Be readily identifiable from the building or appropriate identification signage to the satisfaction of the relevant fire authority.
- Be located within 60 metres of the outer edge of the approved building.
- The outlet/s of the water tank must be within 4 metres of the accessway and unobstructed.
- Incorporate a separate ball or gate valve (British Standard Pipe (BSP 65 millimetre) and coupling (64 millimetre CFA 3 thread per inch male fitting).
- Any pipework and fittings must be a minimum of 65 millimetres (excluding the CFA coupling).

d) Access

Access Required: No ☐
Yes ✓ The following design and construction requirements apply:

- All-weather construction.
- A load limit of at least 15 tonnes.
- Provide a minimum trafficable width of 3.5 metres.
- Be clear of encroachments for at least 0.5 metres on each side and at least 4 metres vertically.
- Curves must have a minimum inner radius of 10 metres.
- The average grade must be no more than 1 in 7 (14.4%) (8.1°) with a maximum grade of no more than 1 in 5 (20%) (11.3°) for no more than 50 metres.
- Dips must have no more than a 1 in 8 (12.5%) (7.1°) entry and exit angle.

Length of access is greater 100 metres: Yes ☐ No ✓

Where length of access is greater than 100 metres the following design and construction requirements apply:

- A turning circle with a minimum radius of eight metres, or
- A driveway encircling the building, or
- The provision of other vehicle turning heads – such as a T or Y Head – which meet the specification of Austroad Design for an 8.8 metre Service Vehicle.

Length of driveway is greater than 200 metres: Yes ☐ No ✓

Where length of access is greater than 200 metres the following design and construction requirement applies:

- Passing bays are required at least every 200 metres that are a minimum 20 metres long and a minimum trafficable width of 6 metres.

Land Capability Assessment
Biodiversity Survey
Drone Mapping & Survey
Bushfire Attack Level Assessment (BAL)
GIS Mapping & Analysis

Client: [redacted]

Project: Bushfire Management Statement for proposed 2-lot subdivision at 1 BRUMBYS LANE, SNAKE VALLEY, 3351.

Date: December 5, 2023

Contact: [redacted]

Landtech: Peter Austin peteraustin.landtech@hotmail.com
PO BOX 5191 EAST GEELONG 3219. Ph.0408-615677.

Figure 1 – Typical grassland land cover within the proposed subdivision.

Document control

Assessment	Bushfire Management Statement for proposed 2-lot subdivision
Address	1 BRUMBYS LANE, SNAKE VALLEY, 3351. Victoria.
Project number	3351
Report manager	Peter Austin (Landtech Consulting)
Client	[redacted]
CFA Fire Region	West Region – District 16
CMA	Glenelg Hopkins CMA
Council	Pyrenees Shire Council

Acknowledgements

Disclaimer

Although Landtech Consulting have taken all the necessary steps to ensure that an accurate document has been prepared, the company accepts no liability for any damages or loss incurred as a result of reliance placed upon the report and its contents.

Figure 2 – Site feature map depicting the proposed two lots (and indicative dwellings only).

Summary

This report is prepared in support of a planning permit application to be lodged by [redacted] for the proposed 2-lot subdivision at 1 Brumbys Lane, Snake Valley, 3351, Victoria.

The planning permit application seeks	Approval for proposed 2-lot subdivision (within the Rural Living Zone RLZ).
The site is partly within the *Bushfire Management Overlay* and a highly bushfire-prone area	The nature of the development requires effective bushfire safety management measures to best protect property and life.
A *Bushfire Management Statement* has been sought by the applicant to demonstrate how relevant bushfire matters have been considered in the location and design of the proposal.	This Bushfire Management Statement (BMS) has been prepared by Landtech Consulting and should be read in conjunction with the accompanying planning permit application. In addition to informing the siting and design of the proposed dwelling location, critically this report will assist in an assessment of the proposal by the Country Fire Authority (CFA), and a decision on the permit application by the responsible authority. Further details on the design of the proposed subdivision is located in the Town Planning Report and Architectural Drawings enclosed with the planning permit application.
The proposed development considers defendable space requirements occurring within both lot boundaries.	A BAL19 construction standard is possible with setback of 15m within lot boundaries that includes managed defendable space (see *Figure 27*).
The site is covered by the Pyrenees *Shire Council Planning Scheme*,[1] a statement outlining how the proposed development responds to the purpose and objectives of Clause 53.02-3 Bushfire Protection Objective. The Bushfire Management Statement (BMS) has been prepared in response to the requirements of Clause 44.06 – Bushfire Management Overlay, and in accordance with the application requirements of Clause 53.02-4 applies to all other applications.	*Clause 53.02-3 applies to an application to construct a single dwelling or construct or carry out works associated with a single dwelling if all of the following requirements are met:* ■*The land is zoned Neighbourhood Residential Zone, General Residential Zone, Residential Growth Zone, Urban Growth Zone, Low Density Residential Zone, Township Zone or Rural Living Zone.* ■*There is only one dwelling on the lot.* ■*The application meets all of the approved measures contained in Clause 53.02-3,[2] including the decision guidelines of the Clause 44.06 Bushfire Management Overlay.[3]* ■*Clause 53.02-4 applies to all other applications.*
This BMS contains three components: This report has been prepared in accordance with guidance provided in the *Planning Permit Applications Bushfire Management Overlay Technical Guide* (DELWP, 2017).	This requires that approved measures AM 1.1, AM 1.2 and AM 1.3 be included in an application 1. 1. A **Bushfire Hazard Landscape Assessment** including a plan that describes the bushfire hazard of the general locality more than 150m from the site. Images or other techniques may be used to assist in describing the bushfire hazard. 2. A **Bushfire Hazard Site Assessment** including a plan that describes the bushfire hazard within 150m of the proposed development. The description of the hazard must be prepared in accordance with Section 2.2.5 of AS3959:2018 Construction of Buildings in Bushfire Prone Areas (Standards Australia), excluding paragraph (a) of Section 2.2.3.2. 3. A **Bushfire Management Statement** describes how the proposed development responds to requirements of Cause 44.06, 53.02 and 53.02-3. 53.02-4 24/01/2020 VC160 Bushfire protection objectives 53.02-4.1 Landscape, siting and design objectives - development is appropriate having regard to the nature of the bushfire risk arising from the surrounding landscape. Development is sited to minimise the risk from bushfire. Development is sited to provide safe access for vehicles, including emergency vehicles. Building design minimises vulnerability to bushfire attack. AM 2.1, AM 2.2, AM, AM 3.2, AM 4.1, AM 4.2, AM 5.1, AM 5.2, AM 5.3, AM 5.4 Alternative measures - AltM 3.3, 3.4, 3.5, 3.6, 5.5 53.02-4.4 Subdivision objectives - To provide lots that are capable of being developed in accordance with the objectives of Clause 53.02.

[1] Victorian Government; Vic Planning Scheme (Pyrenees Shire Council); Accessed from: https://www.pyrenees.vic.gov.au/Plan-Build/Planning/Pyrenees-Planning-Scheme
[2] Victorian Government; Vic Planning Scheme: Accessed from: https://www.pyrenees.vic.gov.au/Plan-Build/Planning/Pyrenees-Planning-Scheme
[3] DPCD 2020; Advisory Note 46; Bushfire Management Overlay Mapping Methodology and Criteria. Accessed from: https://www.planning.vic.gov.au/__data/assets/word_doc/0030/97572/AN46-Bushfire-Management-Overlay-Mapping-Methodology-and-Criteria.doc

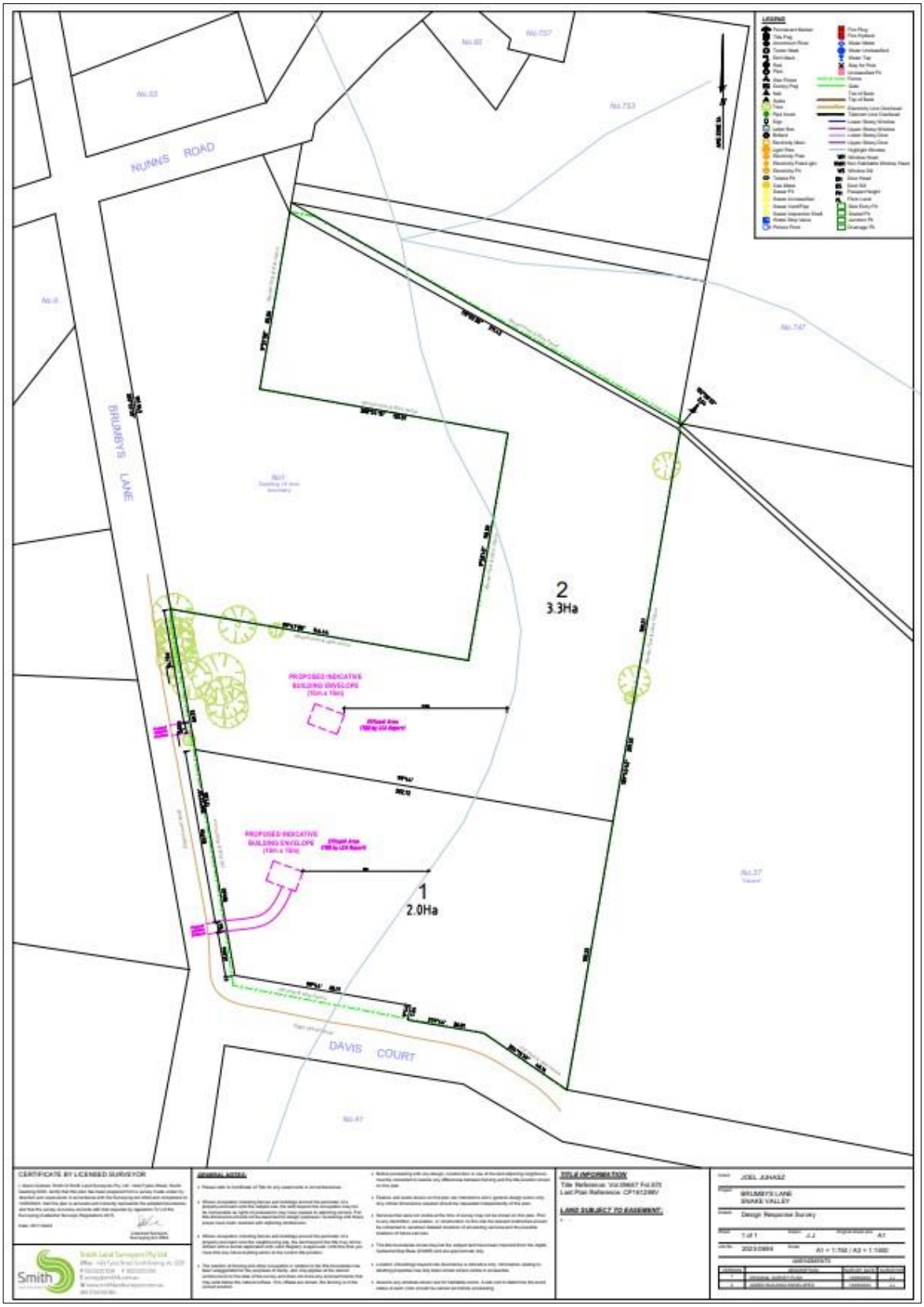


Figure 3 – Subdivision site with existing proximal site land uses and dominating land cover (Source: Smith Land Surveyors Pty Ltd 2023).

Figure 4 – Proposed 2-lot subdivision adjoining Brumbys Lane to the west.

Figure 5 – An ephemeral watercourse traverses the lots proposed from south to north (Source: CNES 2023).

CONTENTS

Figure 6 – Broader view of the proposed subdivision site and proximal bushfire source risks to the south-east, part of the Scarsdale Plantation (Source: CNES 2023).

1. PLANNING CONTROLS

a. Planning Policy Framework

The Planning Policy Framework (PPF) seeks to ensure the objectives of planning in Victoria (as set out in *Section 4 of the Planning and Environment Act 1987*) are fostered through appropriate land use, development policies, and practices.

The PPF informs the preparation and implementation of local planning policy objectives and the introduction of zone and overlay controls. It seeks to integrate relevant environmental, social, and economic factors in the interest of net community benefit and sustainable development.

The objective of *Clause 13.02-1S Bushfire Planning* is 'to strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life.'

Strategies to achieve the objective include identifying and assessing bushfire hazards, appropriate settlement planning, consideration to areas of high biodiversity conservation value, and use and development controls in a *Bushfire Prone Area*.

Hazards identified and risks are assessed in Clause 13.02-1S by:

→*Prioritising the protection of human life over all other policy considerations.*

→*Directing population growth and development to low risk locations and ensuring the availability of, and safe access to, areas where human life can be better protected from the effects of bushfire.*

→*Reducing the vulnerability of communities to bushfire through the consideration of bushfire risk in decision-making at all stages of the planning process.*

→*Not approving development where a landowner or proponent has not satisfactorily demonstrated that the relevant policies have been addressed, performance measures satisfied, or bushfire protection measures can be adequately implemented.*

b. Bushfire Management Overlay (BMO)

The purposes of the Bushfire Management Overly include:

- *To ensure that the development of land prioritises the protection of human life and strengthens community resilience to bushfire.*
- *To identify areas where the bushfire hazard warrants bushfire protection measures to be implemented.*
- *To ensure development is only permitted where the risk to life and property from bushfire can be reduced to an acceptable level.*

→Planning Advisory Note 46: Bushfire Management Overlay Mapping Methodology and Criteria outlines that the Bushfire Management Overlay generally applies to areas of significant bushfire hazard where head fire intensity is modelled to be 30,000 kW/m or more.

→Under the Bushfire Management Overlay a planning permit is required to construct a dwelling.

Figure 7 – Parent lot and adjoining site interface with main escape pathways and Scarsdale Plantation to the south-east (Source: CNES 2023).

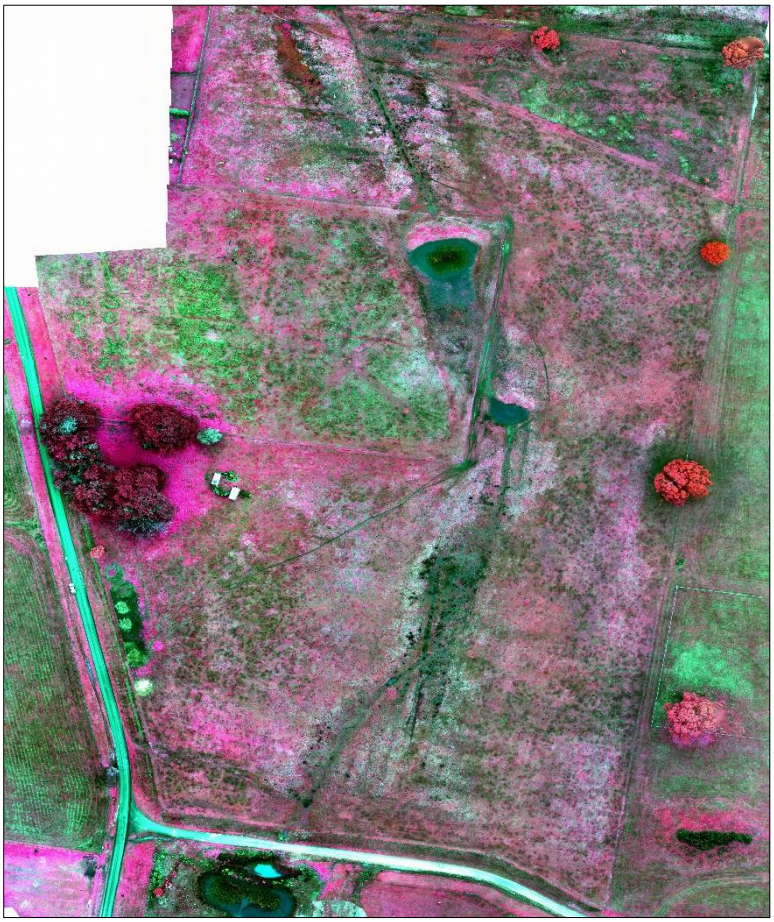


Figure 8 – False colour image depicting the extent of sparse tree and dominating grassland land cover across the site.

An application must meet the requirements contained in Clause 53.02 Bushfire Planning of the Pyrenees Shire Council Planning Scheme. The provisions of Clause 53.02 contain objectives:[4]

An objective describes the outcome that must be achieved in a completed development.

→Approved measures (AM) - An approved measure meets the objective.

→Alternative measures (AltM) - An alternative measure may be considered where the responsible authority is satisfied that the objective can be met. The responsible authority may consider other unspecified alternative measures.

→Decision guidelines - The decision guidelines set out the matters that the responsible authority must consider before deciding on an application, including whether any proposed alternative measure is appropriate.

Clause 53.02-1 applies to an application (under Clause 44.06 - Bushfire Management Overlay), unless the application meets all of the requirements specified in a schedule to Clause 44.06.

Clause 53.02-3 applies to an application to construct a single dwelling *or construct or carry out works* associated with a single dwelling.

Clause 53.02-4 applies to all other applications (such as subdivisions).

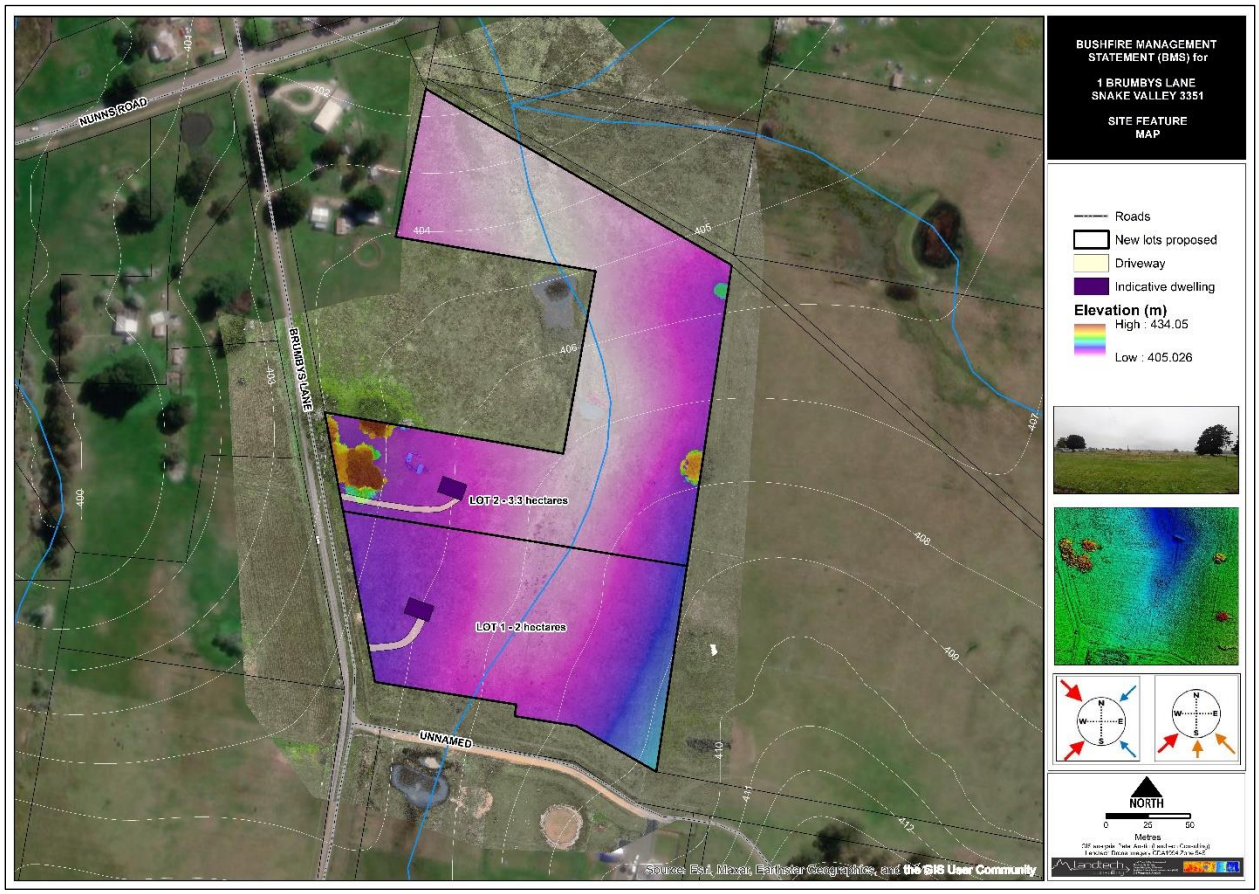


Figure 9 – Site surface feature model and proposed 2-lots.

[4] DELWP; Victorian Planning Schemes (2023); Accessed from: https://planning-schemes.app.planning.vic.gov.au/Pyrenees

c. APPROVAL PATHWAY[5]

PATHWAY 3 – Subdivisions

Clause 53.02-4 applies to all other applications including subdivisions.

→If an applicant chooses to include alternative measures, the application will be assessed under Pathway Three and all relevant approved or alternate measures of Clause 53.02-2 must be met.

PATHWAY THREE – CLAUSE 53.02 SUBDIVISION

Clause 53.02-2.4 contains requirements for subdivision. It does this by:

- providing subdivision specific approved measures and alternative measures, and
- cross-referencing the need to comply with other objectives and approved measures in Clause 53.02-2.

Other development controls - Zoning

The subject site is zoned Rural Living Zone (RLZ).

Other development controls - Overlays

The subject land is within a Bushfire Management Overlay.[6] This overlay has a focus on:

- *Implementing the Municipal Planning Strategy and the Planning Policy Framework.*
- *Ensuring that the development of land prioritises the protection of human life and strengthens community resilience to bushfire.*
- *To identify areas where the bushfire hazard warrants bushfire protection measures to be implemented. To ensure development is only permitted where the risk to life and property from bushfire can be reduced to an acceptable level.*

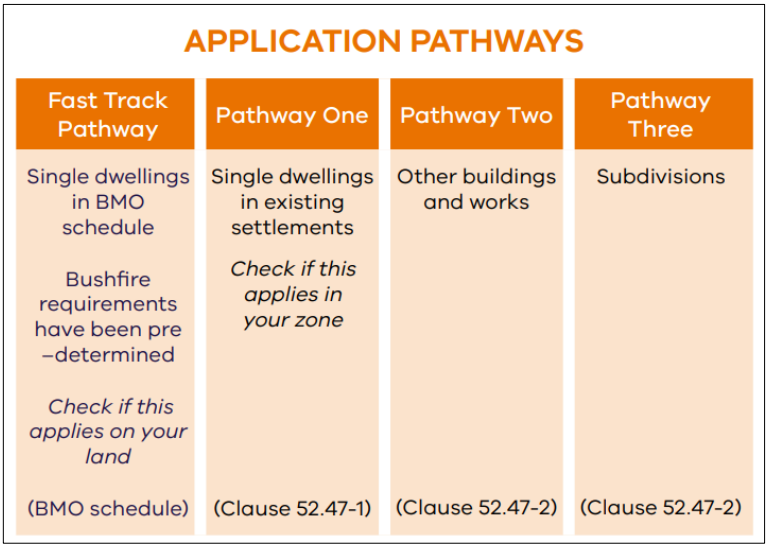


Figure 10 – Application pathway (three) relating to the subdivision proposed.

[5] Technical-Guide-Planning-Permit-Applications-Bushfire-Management-Overlay; Accessed from: https://www.planning.vic.gov.au/__data/assets/pdf_file/0029/107669/Technical-Guide-Planning-Permit-Applications-Bushfire-Management-Overlay.pdf
[6] Technical-Guide-Planning-Permit-Applications-Bushfire-Management-Overlay; Accessed from: https://www.planning.vic.gov.au/__data/assets/pdf_file/0029/107669/Technical-Guide-Planning-Permit-Applications-Bushfire-Management-Overlay.pdf

2. APPLICATION DETAILS

Table 1 – Application and lot details.

Proposal	Bushfire Management Statement for 2-lot subdivision (see *Figure 11*).
Address	1 Brumbys Lane, Snake Valley, 3351.
Council property number	710042900
Zoning	RURAL LIVING ZONE (RLZ) SCHEDULE TO THE RURAL LIVING ZONE (RLZ) BUSHFIRE MANAGEMENT OVERLAY (BMO)
Overlays	DESIGNATED BUSHFIRE-PRONE AREA - Special bushfire construction requirements apply. Planning provisions may apply.
Municipality	Pyrenees Shire Council

Figure 11 – Raw drone map depicting existing site built features.

Figure 12 – View from the west and Brumbys Lane across the proposed two-lot subdivision.

Figure 13 – 150m site buffer map and potential bushfire risk sources within and beyond the site.

3. BUSHFIRE HAZARD – LANDSCAPE ASSESSMENT

The bushfire hazard landscape assessment provides information on the bushfire hazard more than 150 metres from a development site. Considering bushfire from this broader landscape perspective is important as it affects the level of bushfire risk a development and its future occupants may be exposed to.[7]

Considering the bushfire risk arising from the broader landscape

Bushfire is a dynamic hazard and can be highly unpredictable with factors contributing to the bushfire risk diverse.
The purpose of the landscape assessment is not to predict the outcome of a bushfire event, but to provide information that builds a better understanding of the bushfire risk in a location, and to inform decision-making.

These seek to support more consistent decision-making, based on the risk from the landscape beyond the site.
The broader landscape and the potential size or scale of a bushfire is an important consideration in the assessment of a planning application. The likelihood of a bushfire, its severity and intensity, and the potential impact on life and property varies, depending on where a site is located in the surrounding landscape.

The defendable space and construction requirements in the BMO and Clause 53.02 Bushfire Planning are based on standard requirements. To determine these requirements, models are used to predict radiant heat from a fire-front based on specific inputs and assumptions. Considering the surrounding landscape in bushfire decisions is important because the accuracy of the models in reflecting bushfire exposure on a particular site varies in different landscapes.

This is because the scale of a bushfire and its potential destructive power is driven by the characteristics and previous management of the broader landscape, rather than those characteristics within 150 metres of the site.

How is the landscape assessment used in preparing and assessing a planning application?

The landscape assessment presents contextual information on a site and informs the following-stage Bushfire Hazard Site Assessment. It provides information critical to potential bushfire behaviour, and how the approved and alternative measures adequately mitigate the risk.

The landscape assessment is used where Clause 53.02 Bushfire Planning requires consideration of the bushfire risk from the landscape beyond the site. This requires that approved measures AM 1.1, AM 1.2 and AM 1.3 be included in an application and associated decision guidelines.

The assessment provides information that allows these provisions to be responded to as part of the bushfire management statement submitted with an application.

The bushfire hazard landscape assessment provides information on the bushfire hazard more than 150 metres away from a development site and includes:

- Factual information on the bushfire hazard (vegetation extent and slope);
- Information on key features of the general locality relevant to better understanding the protection provided by the location; and
- Provides contextual information on a site.

The landscape assessment does not assess a specific development proposal and is only required where Clause 53.02 Bushfire Planning requires consideration of the bushfire risk from the landscape beyond the site.

[7] DELWP 2017; Planning Permit Applications Bushfire Management Overlay Technical Guide; Accessed from: https://www.planning.vic.gov.au/__data/assets/pdf_file/0029/107669/Technical-Guide-Planning-Permit-Applications-Bushfire-Management-Overlay.pdf

3.1 Subject Site and interface

The study site is located within the south-eastern part of the Snake Valley township (1.3km) and located on elevated plain landforms among grassland landscapes and remnant woodland as part of the Scarsdale Plantation, 120m from the lot boundary (and an area of increased bushfire risk with wind-change events).

The site is contiguous with similar rural-living and agriculture-based land usage with dominant native and exotic open grassland within and beyond the study site.

There are numerous state forests and nature conservation reserves scattered beyond the localised area with lifestyle-blocks and vegetated roadside corridors providing direct linkage to the site. Other sites of potential bushfire concern within the 5-10km site interface include:

West – open grassland and reduced-sized remnants
North – open grassland and reduced-sized remnants
South – Scarsdale Plantation
East – open grassland and reduced-sized remnants

Core bushland remnants such as the Scarsdale Plantation to the south and south-east potentially presents the major large-scale ember-generating bushfire origin.

The proposed 2-lot subdivision has direct access to Brumbys Lane adjoining both lots western boundaries, a two-lane gravel road leading north to the Snake Valley township and escape pathways to the north, south, and east if required via sealed road networks.

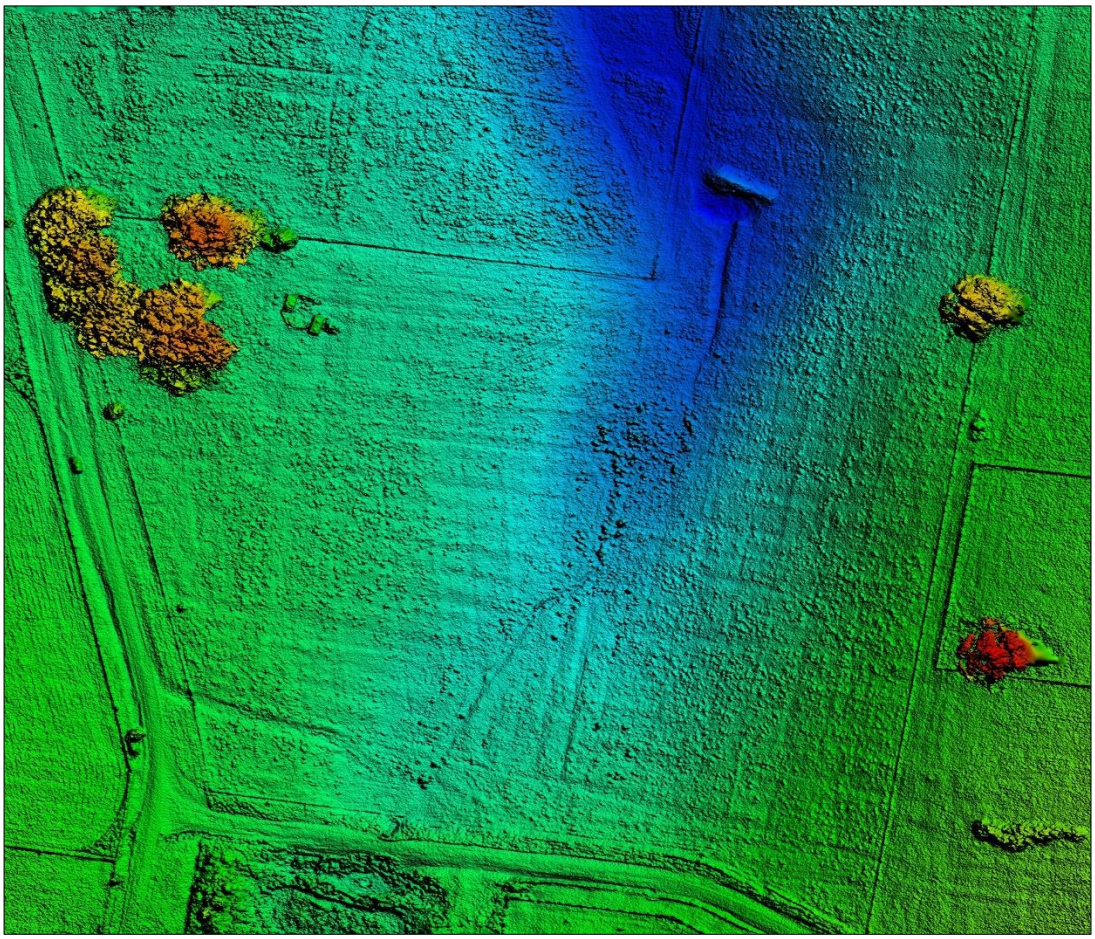


Figure 14 – The proposed 2-lot development includes a shallow drainage line across the site and dominating open grassland.

The proposed subdivision footprint includes sparsely-distributed single and grouped native and exotic planted and regrowth trees with a highly-maintained grassland ground-storey.

In its current maintained state this reduces the immediate bushfire risk however the site is surrounded in all directions by variably-managed large-acre and reserve-based woodland landscapes where bushfire mitigation management cannot be guaranteed. [8] Contiguous grassland and roadside vegetation link the site to grassland/woodland tracts further afield in all southerly directions.

The climate in the region is dominated by warm dry summers and cool wet winters. The bushfire season generally runs from November to April. Prevailing weather conditions associated with the bushfire season are warm to hot north-westerly winds accompanied by high temperatures and low relative humidity, followed by a cool south-westerly change.

The site includes strongly texture-contrast soils and hard-setting surface soils with a conspicuously bleached A2 horizon. Sodic, mottled, and alkaline subsoils are features of this soil type.

Under the State Government climate change projections, the Ballarat and Snake Valley region can expect: [9]

- To be hotter with the greatest increases in temperature expected in summer;
- To be drier with greatest decreases in rainfall expected in spring; and
- To have fewer rainy days but increasing rainfall intensity.

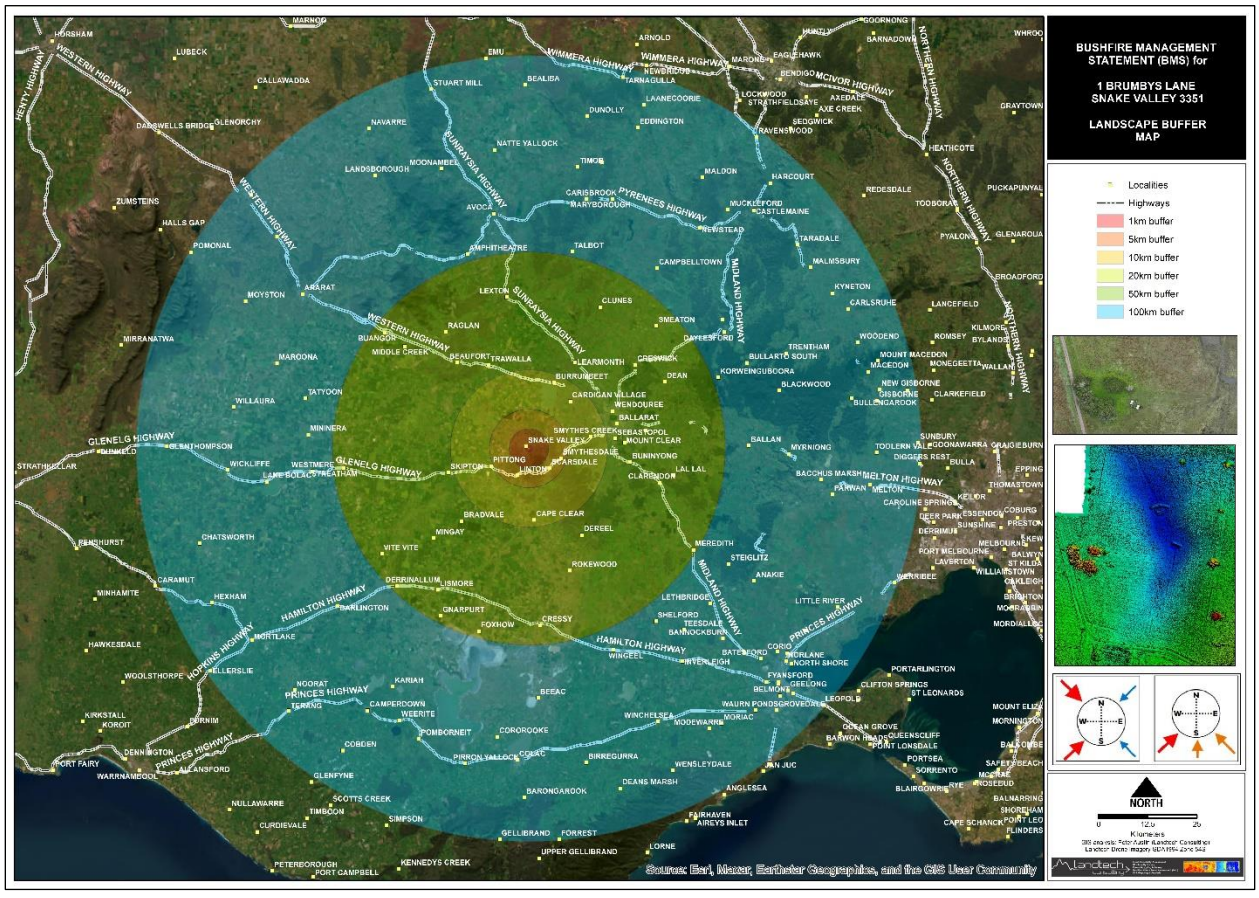


Figure 15 – Broad-scale (100km) landscape buffer assessment.

[8] Pyrenees Shire Council 2023; Snake Valley township plan; https://www.pyrenees.vic.gov.au/files/assets/public/planning/draft-pyrenees-futures-plans-exhibition/pyf-snake-valley-5nov2018_web.pdf

[9] Victorian Resources Online 2023; Linton/Snake Valley soil landforms; https://vro.agriculture.vic.gov.au/dpi/vro/glenlgregn.nsf/pages/soil_landform_soil_pits_mm162

3.2 Landscape Risk

The former *Planning Practice Note 65* provides useful guidance on describing landscape typology. The landscape typologies outlined in *Practice Note 65* range from low risk landscapes where there is little vegetation beyond 150m of the site and extreme bushfire behaviour is not possible, to extreme risk landscapes with limited or no evacuation options.

Once a bushfire is large, the weather and the interaction of the fire with itself becomes the dominant driver of fire behaviour. Variation in fuel and topography become less relevant as large bushfires tend to 'smooth' these out.

This should be remembered when classifying vegetation and determining slope in landscape types Three or Four and the assessment of these factors should be made with due caution. This will include:[10]

- Considering the influence of slope on fire behaviour beyond the 150m assessment area as well as within.
- Determining effective slope on worst case rather than an average.
- Choosing the more conservative fuel type in situations where the classifiable vegetation does not fit neatly into a specific vegetation class.
- For 'modified' vegetation to be considered a valid classification, the level of modification and the distance the fire has to travel through these modified fuels must be significant.
- In most instances it will not be appropriate to classify fuels as modified in landscape types Three or Four.
- Similarly, fuels must be significantly managed and clearly meet defendable space prescriptions before they can be classified as 'low threat'.

3.3 Landscape Scenario

It is considered that Landscape Scenario Three best represents the area surrounding the subject site although not specifically applying to this area.

• The type and extent of vegetation located more than 150 metres from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to a site.
• Bushfire can approach from more than one aspect.
• The site is located in an area that is not managed in a minimum fuel condition.
• Access to an appropriate place that provides shelter from bushfire is not certain.

The proposed subdivision site is located within flat to lightly-sloping open grassland-based landscapes within sub-catchments of Baillie Creek and Lake Burrumbeet. The flat to lightly-undulating localised landform dominates the subject site and local landscapes. Major core remnant bushland areas exist to the south and south-east of the two lots (120m south-east) presenting major bushfire risk.

Such core areas with a history of bushfires in various management states presents the greatest bushfire source risk. Landscapes include patches of regrowth woodland within historic broad-acre farming landscapes generally managed in a reduced fuel condition surrounding settled areas proximal to the Snake Valley settlement.

[10] CFA 2018; Applying the Bushfire Hazard Landscape Assessment in a Bushfire Management; Accessed from: https://www.cfa.vic.gov.au/ArticleDocuments/392/guidence-applying-the-landscape-assessment_V3.pdf.aspx

3.4 Bushfire Landscape Assessment Plan

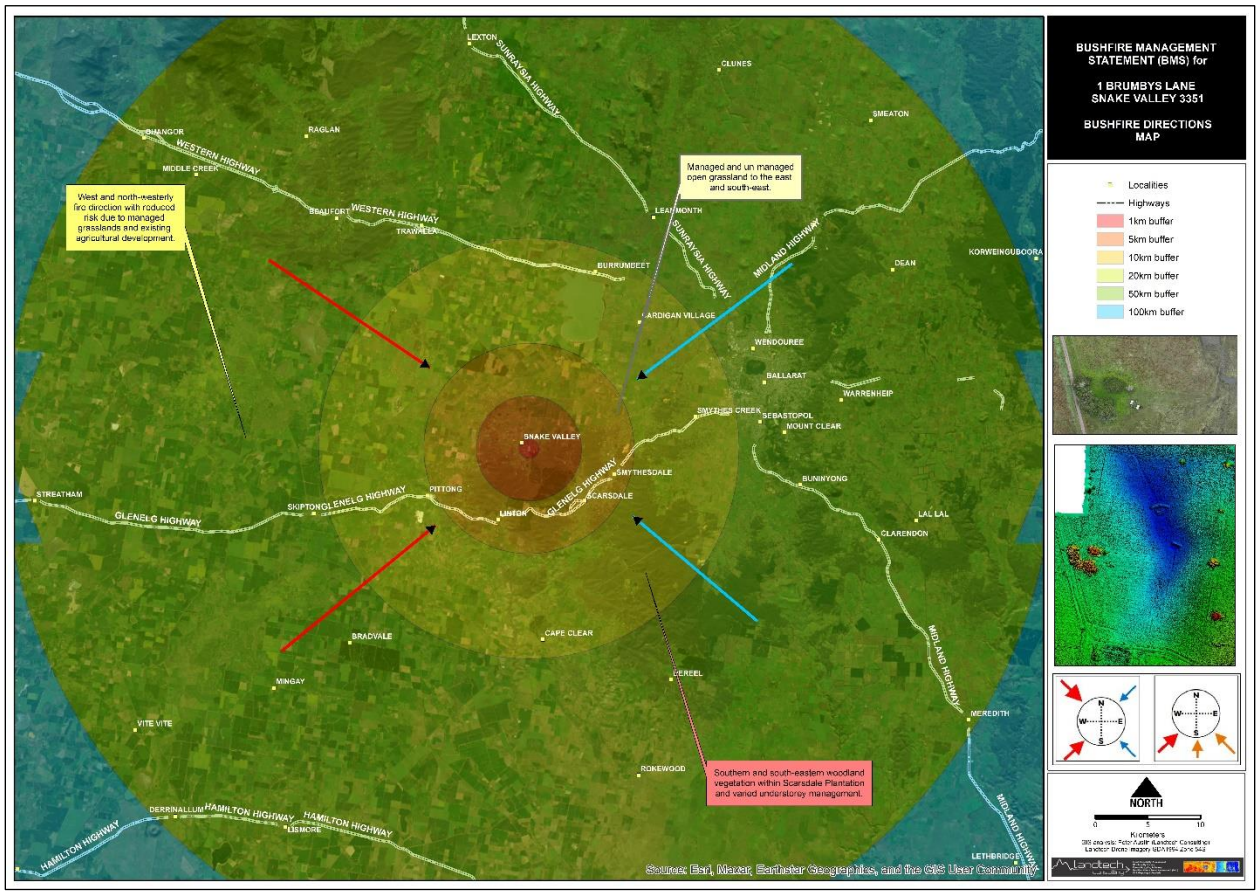


Figure 16 – Overarching landscape factors and potential fire directions within the broader landscape <20km from site.

Figure 17 – Existing site western Brumbys Lane interface and flat to lightly-sloping landform.

4. BUSHFIRE HAZARD – SITE ASSESSMENT

The Bushfire Hazard Site Assessment describes the subject site and bushfire hazard within 150m of the proposed development.

Pursuant to Clause 53.02 Bushfire Planning, "the description of the hazard must be prepared in accordance with Sections 2.2.3 to 2.2.5 of AS3959:2018 Construction of buildings in bushfire prone areas (Standards Australia) excluding paragraph (a) of section 2.2.3.2".[11]

This Bushfire Hazard Assessment:

→Provides factual information on the bushfire hazard (vegetation type and slope);

→Informs defendable space and building construction requirements; and

→Utilises the methodology contained in Australian Standard AS3959:2018 Construction of buildings in bushfire prone areas (AS3959) to provide contextual information on a site.

Grassland is the main classifiable vegetation type within and outside the 150m buffer and used for defendable space calculations.

4.1 Vegetation

Vegetation within 150 metres of the site has been classified in accordance with the descriptions contained in Section 2.2.3 in AS3959:2018 (Standards Australia: Construction of Buildings in Bushfire-prone Areas) and the CFA's Vegetation Classes guide.[12] Assessable classifiable vegetation (Grassland) exists beyond built elements and lot boundaries.

Figure 18 – Existing dominant grassland in currently managed condition however potential for increased risk in un-managed states.

[11] SAI 2018, Australian/New Zealand Standards; AS3959:2018 Construction of buildings in bushfire-prone areas; Accessed from: https://www.saiglobal.com/PDFTemp/Previews/OSH/as/as3000/3900/3959-2018.pdf

[12] CFA; Vegetation Classes – Bushfire Management Overlay 2018; Accessed from: https://www.cfa.vic.gov.au/documents/20143/69511/Vegetation-Classes-Victorian-Bushfire-Management-Overlay-v0-3.pdf/f29e4450-a4ea-bfcb-ffe5-13cbbf01c746

1. Grassland

Grasslands are widespread and consist not only of native grasslands, but also areas of cropping, pasture, and some cultivation.

Although trees or shrubs may be present, they are widely spaced, occur only occasionally and form less than 10% canopy cover.

Although strictly a shrubland, chenopod shrubland (e.g. Saltbush) is characterised by grass growth after a high-rainfall event.

This growth influences fire behaviour in the drier parts of the state and as such, these areas are described as grassland for the purposes of the BMO and AS 3959–2009 in Victoria.

The predominant native grasslands in Victoria are located on the volcanic plains in the southwest, the north-central plains, the Wimmera plains, and the Gippsland Plains in the south-east.

Clay soils support a diverse range of native grasses, herbs, forbs and small shrubs (<1 metre). Areas of modified woodland or forest that has been converted to pasture or crop are treated as grassland areas.

There may be scattered individual trees or tree lines along creeks within an otherwise treeless landscape.[13]

Figure 19 – Existing dominant grassland in currently managed condition however potential for increased risk in un-managed states.

[13] CFA; Vegetation Classes – Bushfire Management Overlay 2018; Accessed from: https://www.cfa.vic.gov.au/documents/20143/69511/Vegetation-Classes-Victorian-Bushfire-Management-Overlay-v0-3.pdf/f29e4450-a4ea-bfcb-ffe5-13cbbf01c746

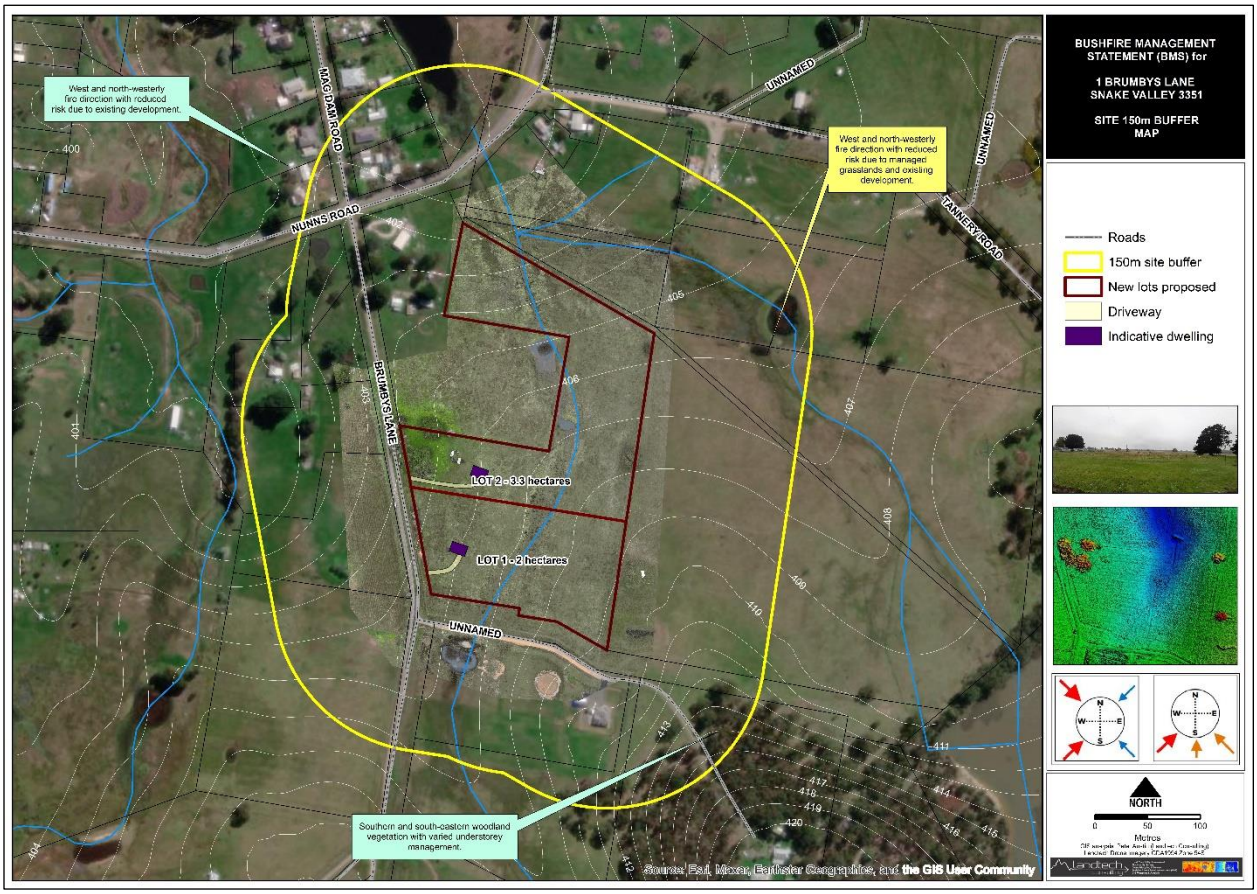


Figure 20 – Classified grassland vegetation within and beyond the 150m site buffer.

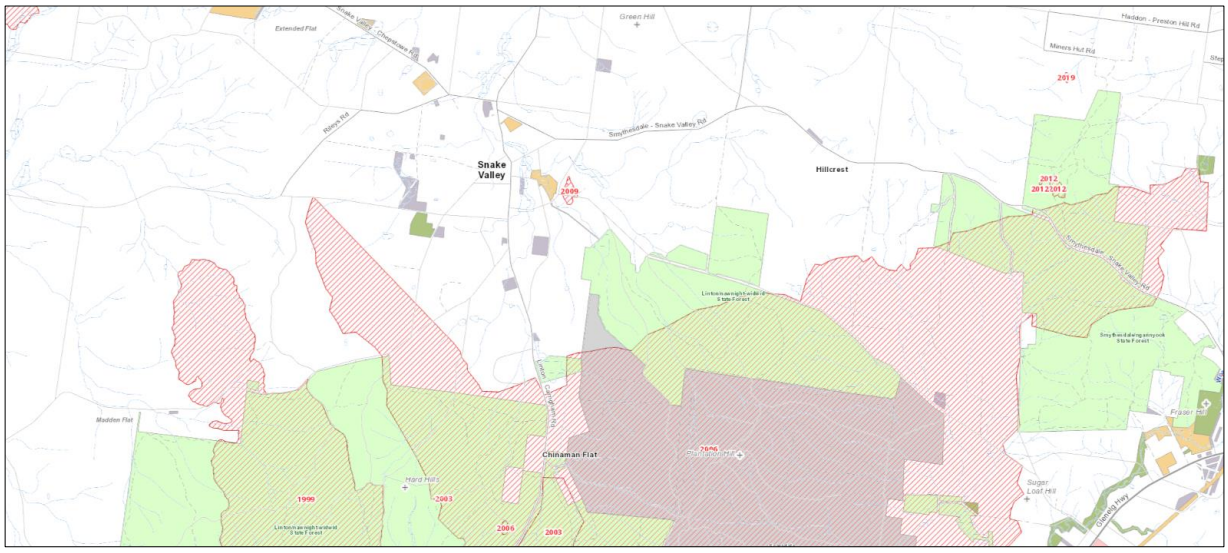


Figure 21 – Existing southern core remnants and smaller reserves within the subject site and localised region (Source: DELWP 2023).

4.2 Topography (under classified vegetation)

The slope of the land under the vegetation influences likely fire behaviour. As the slope increases so does the intensity and rate of spread of bushfire.

→The assessment requires the slope under classifiable vegetation to be identified according to the following classifications:

- All upslopes and flat land (0 degrees)
- Downslope >0 to 5 degrees
- Downslope >5 to 10 degrees
- Downslope >10 to 15 degrees
- Downslope >15 to 20 degrees
- Downslope greater than 20 degrees.

■Topography to the south of the lot (and within the 150m buffer) includes upslope of 0-5 degrees
■Topography to the north of the site includes downslope of 0-5 degrees
■Topography to the east of the lot includes flat landform
■Topography to the west of the site includes flat landform

Table 2 - Characteristics present within the site and surrounding environs.

Assessment area and analysis of the site	The site is irregular in shape with an area of 5.36 hectares. The 2-lot subdivision has direct access to Brumbys Lane to the west (and an un-named road adjoining the southern boundary of lot 1). Remnant core areas such as the Scarsdale Plantation, 120m to the south-east (of lot 1), and assorted adjoining patch remnants, contiguous roadside vegetation, and intervening large-acre and variably-managed lots, provide sources of increased bushfire risk approaching from all directions. The defendable spaced proposed is within both lots. The indicative dwellings are located where adequate setback can be provided for BAL12.5. The vegetation within the 150m buffer includes grassland in varying management states.
Vegetation classification (section 2.2.3 AS3959)	Vegetation within the assessable area (150m buffer of development footprint) is classifiable. Dominating surrounding Grassland classified vegetation is located within the 150m zone and matches the AS3959 vegetation groups referenced.
Low threat vegetation (managed, planted, windbreak) (section 2.2.3.2 f in AS3959)	Vegetation exclusions within the assessable area includes single and patch retained exotic and native trees within both proposed lots. This includes managed defendable space areas within each lot (managed to a state of 'low threat' and is therefore excludable pursuant to AS3959-2018 2.2.3.2 (f)).
Distance to classifiable vegetation	The closest classifiable vegetation is grassland located: • 0m beyond lot boundaries – both proposed lots
Slope under classifiable vegetation	The effective slope under the classified vegetation is as follows: Topography to the south of the lot includes upslope of 0-5 degrees Topography to the north of the site includes downslope of 0-5 degrees Topography to the east of the lot includes flat landform Topography to the west of the site includes flat landform *Note: where the vegetation classification is "Low Threat"; the prevailing slope has no bearing on the BAL rating.*
Reticulated water supply, Fire hydrant location	The closest fire hydrant is located at Cnr Linton-Carngham Road & Murrays St Snake Valley 3351 (based on information from the MEMP).[14]

[14] Pyrenees Shire Council MEMP; Accessed from: https://www.pyrenees.vic.gov.au/files/assets/public/emergencies/2020.05.19-memp-2020-final-adopted.pdf

4.3 Bushfire Site Assessment Plan

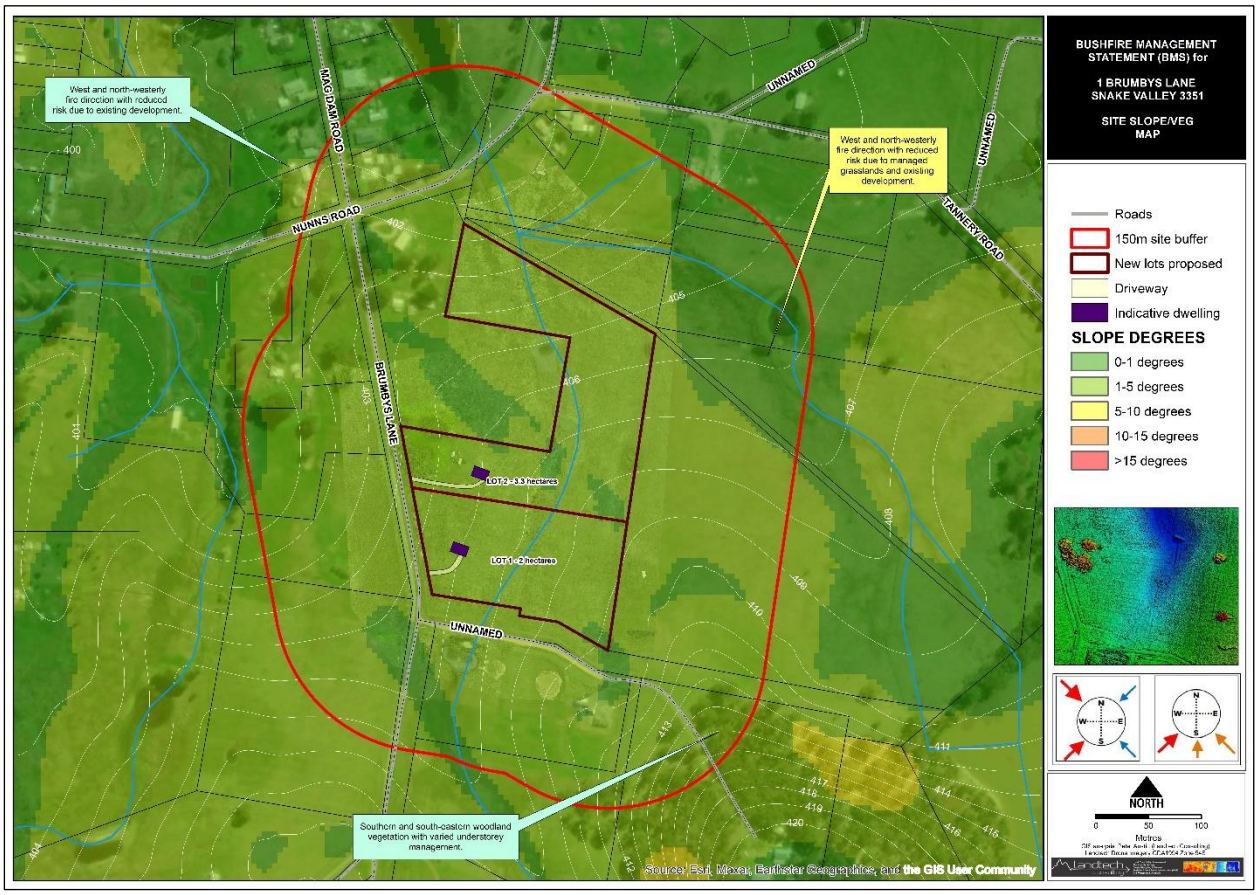


Figure 22 - Slope map (in degrees fall) showing the flat to lightly-sloping nature of the subject site.

4.4 Defendable Space Bushfire Attack Levels (BALs)

Defendable space is an area of land around a building where vegetation is modified and managed to reduce the effects of flame contact, radiant heat, and embers associated with bushfire. Flame contact, radiant heat, and embers are the way a bushfire attacks a building.

It is in the Client's interest to be setback as far as reasonably possible from this risk; accordingly building envelopes are setback from each site boundary and other dwellings as far as reasonably possible.

CFA referral regarding defendable space and construction requirements is suggested to support that building envelope layout has satisfactorily responded to Clause 53.02 Bushfire Planning.

Clause 53.02-2 Bushfire protection objectives

Clause 53.02-2 provides a performance based approach to implementing bushfire protection measures.

The objectives are:

- Clause 53.02-2.1 Landscape, siting, and design objectives
- Clause 53.02-2.2 Defendable space and construction objective
- Clause 53.02-2.3 Water supply and access objective

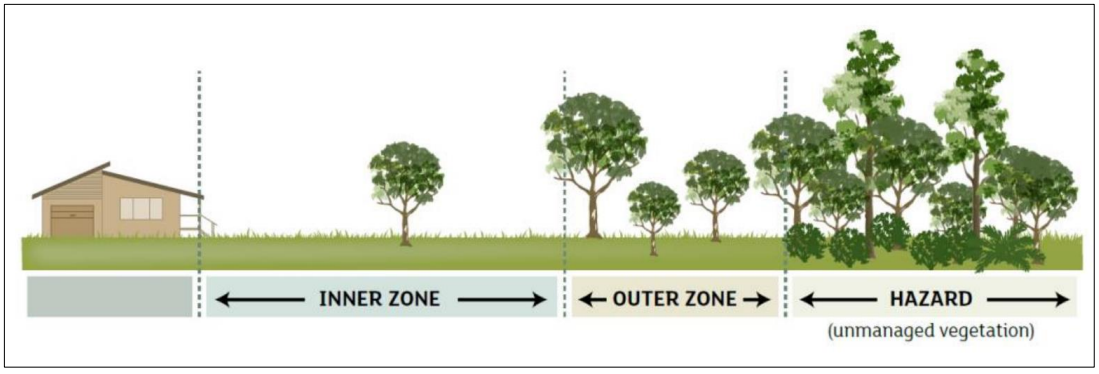


Figure 23 – Defendable space buffering between rural landscapes and built interfaces (Source: DELWP 2021).

Year	Fire Type	Fire Name	Details
Feb 2013	Bushfire	Wongetta/Stonleigh, Cross Roads	1800ha
Jan 2013	Bushfire	Chepstowe-Pittong Rd, Chepstowe	1266ha
March 2010	Bushfire/Wildfire	Buangor - Ferntree Waterfalls, Raglan, managed by Midway Plantations	1000 ha
2010	Bushfire	Mt Cole	Escaped burn from Public Land
2006	Bushfire	Langi Kal Kal	Lightning Strike
2006	Grassfire	Waubra	Escaped burn from private land
2006	Grassfire	Mt Misery	Lightning Strike
2006	Bushfire	Snake Valley	Suspicious
2003	Grassfire	Carranballac	Escaped burn from private land
2002	Bushfire	Mt Lonarch	Escaped burn from private plantation
2001	Bushfire	Glenpatrick/Mt Avoca Fire	Accidental Ignition
2000	Bushfire	Snake Valley/Linton	Suspicious
1998	Bushfire	Snake Valley/Linton	Escaped burn from private land
1985	Bushfire	Avoca	Fire spreading from sawmill

Figure 24 – Pyrenees Shire area bushfire incident history (Source: Pyrenees Shire 2023).

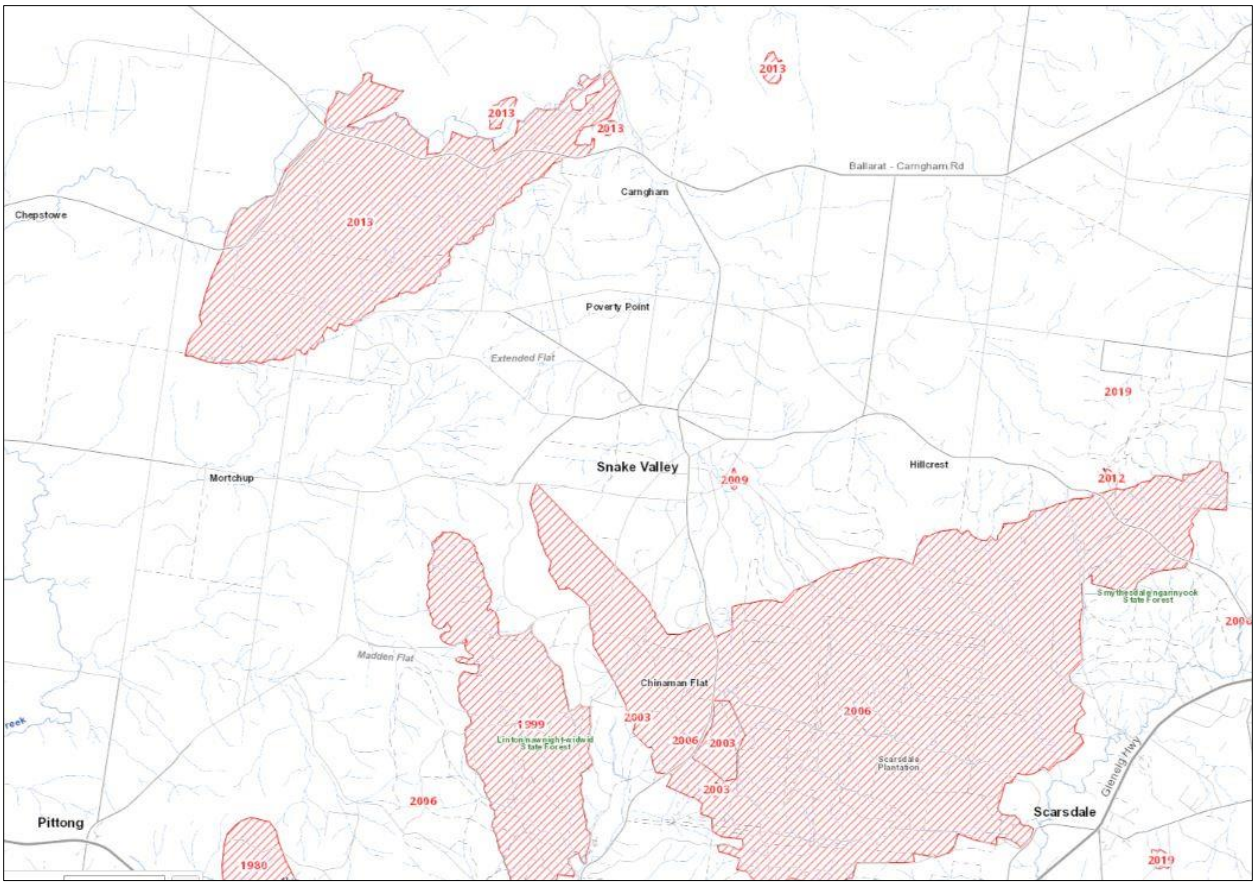


Figure 25 – Local Snake Valley bushfire distribution map depicting both grassland and woodland bushfires (Source: DELWP 2023).

Figure 26 – Existing Scarsdale core remnants and smaller reserves within the southern Snake Valley area (Source: DELWP 2023).

The defendable space required is determined by the vegetation type, slope, and the preferred BAL construction standard.[15]

The defendable space is due to the Grassland classified vegetation within all directions of each dwelling on a lightly-sloping (0-5 degrees) site at BAL19 equates to 15m.[16] This is then consistently applied in all directions (see *Figure 27*).

Defendable space for a distance of 15 metres within and around the building envelopes (or to the property boundary, whichever is the lesser distance) must be provided for lots 1 & 2 where vegetation (and other flammable materials) will be modified and managed in accordance with
the following requirements:"

- *Grass must be short cropped and maintained during the declared fire danger period.*
- *All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.*
- *Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.*
- *Plants greater than 10 centimetres in height must not be placed within 3m of a window or glass feature of the building.*
- *Shrubs must not be located under the canopy of trees.*
- *Individual and clumps of shrubs must not exceed 5m² in area and must be separated by at least 5 metres.*
- *Trees must not overhang or touch any elements of the building.*
- *The canopy of trees must be separated by at least 5 metres.*
- *There must be a clearance of at least 2 metres between the lowest tree branches and ground level.*

Table 3 – Defendable space and required construction standards as per AS3959:2018 and based on Columns A, B or C of Table 2 to Clause 53.02-5 for a subdivision that creates less than 10 lots.

Parameter	North	East	South	West
FDI	100	100	100	100
Classified vegetation type	Grassland	Grassland	Grassland	Grassland
Effective slope (degrees)	0-5 degs	Flat	0-5 degs	Flat
Distance to classified vegetation (metres)	>15m	>15m	>15m	>15m
Defendable Space Requirements (metres needed for BAL12.5)	15m required	15m required	15m required	15m required
Construction to BAL	19	19	19	19

-Defendable space wholly contained within the boundaries of the proposed subdivision.

-Defendable space may be shared between lots within the subdivision.

-Defendable space for a lot may utilise communal areas, such as roads, where that land can meet the requirements for defendable space.

-Vegetation management requirements in accordance with Table 6 to implement and maintain the defendable space required under this approved measure. Water supply and vehicle access that complies with AM 4.1.

- An application to subdivide land to create 10 or more lots provides a perimeter road adjoining the hazardous vegetation to support firefighting.

4.5 Defendable Space Plan

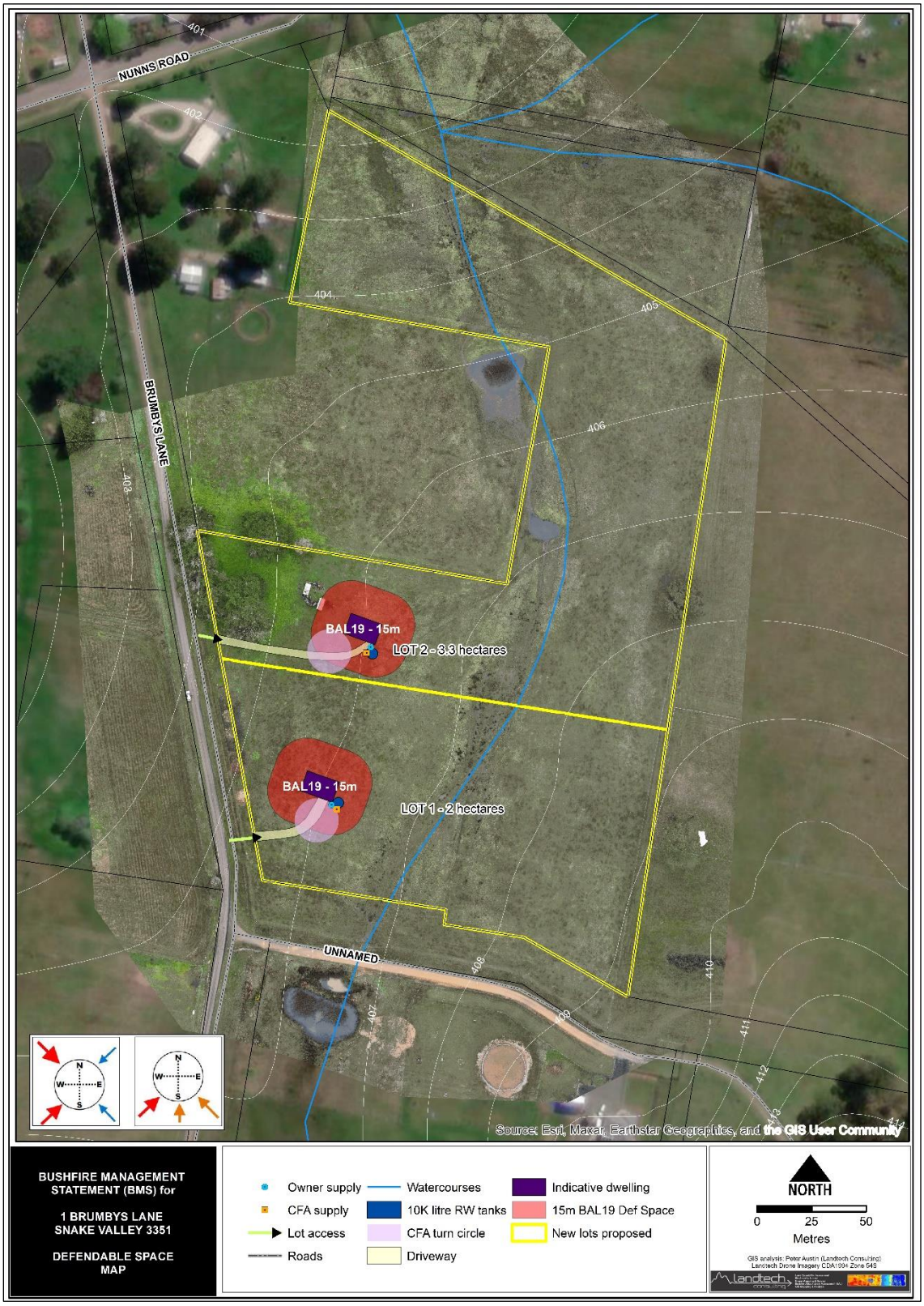


Figure 27 - Defendable Space Map.

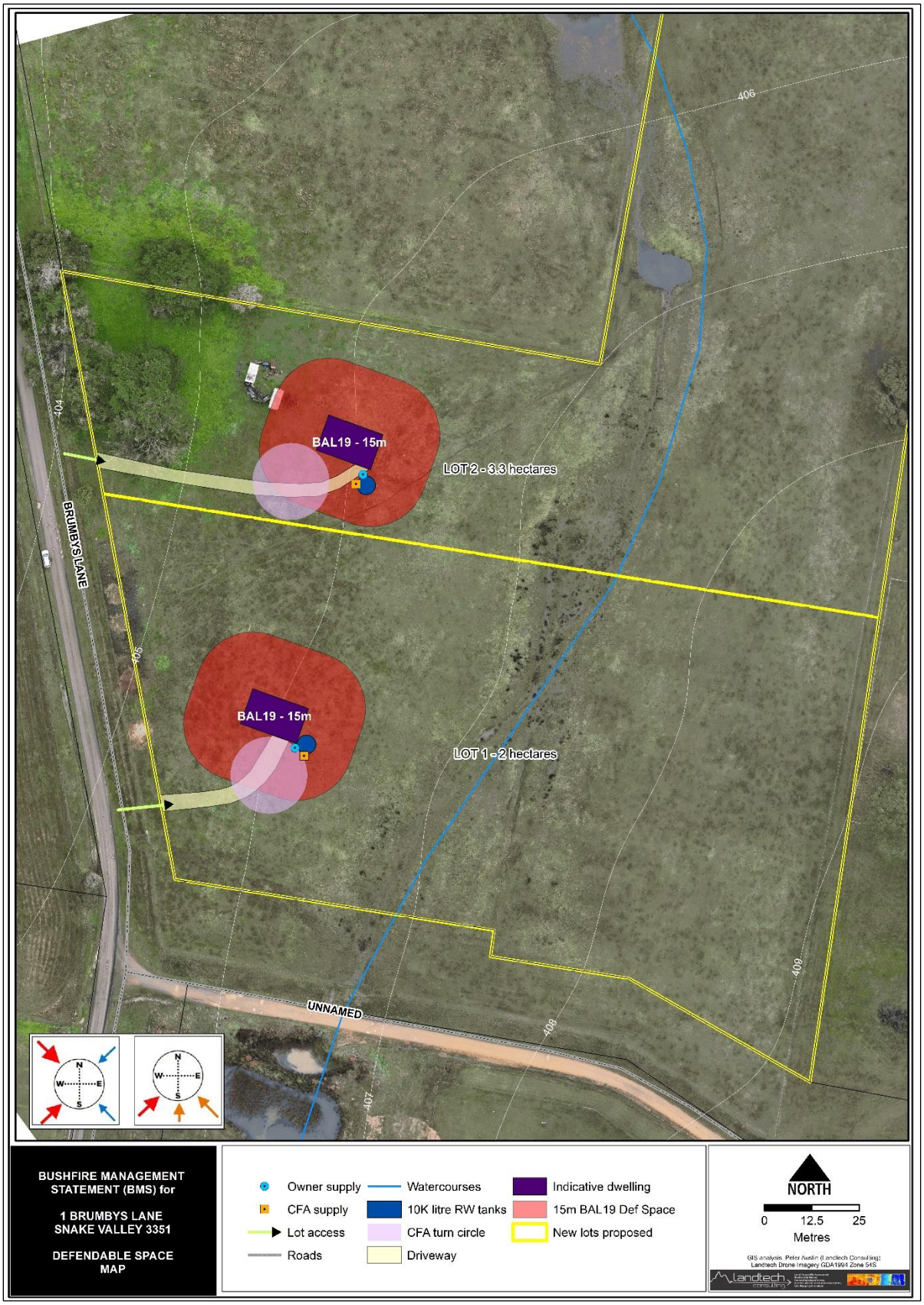


Figure 28 - Defendable Space Map.

5. Bushfire protection objectives

This section of the report describes how the proposal responds to requirements of Clause 44.06 (Bushfire Management Overlay) and Clause 53.02 (Bushfire Planning) (see *Appendix 4*).

The proposal is located within Pathway 3 in accordance with *Clause 53.02-3 (2018)* Subdivisions – *Bushfire protection* objective of the Pyrenees Shire Council Planning Scheme, which specifies requirements for bushfire design and construction measures to reduce the risk to life and property to an acceptable level. This is in addition to Clause 53.02-1 objectives and approved measures.

The dwellings must be constructed to a minimum Bushfire Attack Level of 19 (BAL19).

6. CONCLUSION

The proposed 2-lot subdivision at 1 Brumbys Lane, Snake Valley, Victoria, and potential residential dwellings on each lot has been assessed against the requirements of the *Pyrenees Shire Council Planning Scheme*.

The proposal requires Clause *53.02-4* application Pathway Three (Subdivisions – *OBJECTIVES AND APPROVED MEASURES FOR CLAUSE 53.02-3 of the Pyrenees Shire Council Planning Scheme).*

The surrounding landscape has been assessed as having a high bushfire risk. The site has the potential to be impacted by a landscape-scale fire approaching from any direction if topography and wind direction coincide to produce such a fire.

A fire from these directions would typically approach through existing proximal southern conservation reserves or linked grassland, driven by in the first instance, hot, dry, and variable northerly winds, which are then impacted typically by west south-westerly wind change.

While areas of grassland within the surrounding area may moderate the speed and intensity of the fire before it impacts the subject site, under conditions typical of severe, extreme or code red days, the subject site is likely to be impacted upon by ember attack.

Remnant core areas such as the Scarsdale Plantation (120m outside lot 1 boundary) and assorted proximal patch remnants, roadside vegetation, and intervening large-acre and variably-managed lots, provide sources of increased bushfire risk approaching from all directions.

In accordance with the requirements of the Bushfire Management Overlay, the following applies:

- A minimum of 15 metres defendable space for classified Grassland (in accordance with *Table 2 under Clause 53.02-4*) is required for BAL19. The site has setback in all directions within each lot and proximal to each proposed dwelling that would require ongoing modification to landscapes proximal to the built footprint proposed (and where space is defended to and maintained on a continuous basis).

- Brumbys Lane, a single lane gravel road provides western boundary direct access and egress for emergency vehicles to both lots. An un-named single lane gravel road exists along the proposed lot 1's southern boundary.

- A total (minimum) of 10,000 litres of static water supply must be provided onsite in an easily accessible location (proximal to road access point) for each dwelling.

- Each lot's site access may be required to be upgraded to accommodate emergency vehicles in accordance with requirements set out in *Table 5 under Clause 53.02-5*.

In light of the above, the 2-lot subdivision proposal is considered to appropriately adhere to the requirements of the Bushfire Management Overlay, ensuring risk to life and property have been reduced to an acceptable risk.

7. BUSHFIRE MANAGEMENT PLAN

7.1 Maintenance Schedule

Before the occupation of the building defendable space must be implemented on the land and thereafter maintained as specified below:

- Grass must be short cropped and maintained during the declared fire danger period.
- All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.
- Shrubs must not be located under the canopy of trees.
- Individual and clumps of shrubs must not exceed 5m² in area and must be separated by at least 5 metres.
- The canopy of trees must be separated by at least 5 metres.
- There must be a clearance of at least 2 metres between the lowest tree branches and ground level.

7.2 Additional requirements within 10 metre management zone:

- Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.
- Plants greater than 10 centimetres in height must not be placed within 3 metres of a window or glass feature of the building.
- Trees must be trimmed to provide a minimum of 10 metre clearance from the building.
- Trees must not overhang or touch any elements of the building.

Outside of the Bushfire Management Overlay, areas that are subject or likely to be subject to bushfire are included in the Bushfire Prone Area designated under the Building Regulations 2006 (regulation 810).

There are three forms of bushfire attack:

• ember attack which occurs when small burning twigs, leaves and bark are carried by the wind
• radiant heat which can ignite houses and other assets
• flame contact involving burning vegetation directly touching a house or other asset.

Passive risk mitigation through location, spacing and alignment of group accommodation and/or by establishing a buffer between the bushfire hazard and the development. The use of internal and perimeter roads, water bodies, and open spaces managed in a minimal fuel state, are examples of effective buffers.

Buffer distances may be determined using AS3959-2018 Building in bushfire prone areas (Standards Australia). The Australian Standard uses vegetation type and the slope of the land to determine minimum distances between a bushfire hazard and new development.

A buffer distance equivalent to a bushfire attack level of 12.5 for new developments should be used. Note that for land subject to the Bushfire Management Overlay different buffer distances apply. The following examples illustrate approaches that can be taken.

Where such approaches are adopted the bushfire risk should usually be considered to have been reduced to an acceptable level.

7.3 Static Water Supply Requirements

The dwellings must be provided with a static water supply (minimum 10,000 litres) for property protection purposes.

The water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies.

The water supply must be an above ground water tank constructed of concrete or metal.

All fixed above ground water pipes and fittings required for firefighting purposes made of corrosive resistant metal.

7.4 Water tank requirements

The water supply should be stored in an above ground water tank constructed of concrete, steel, or corrugated iron. The water supply should be identified.

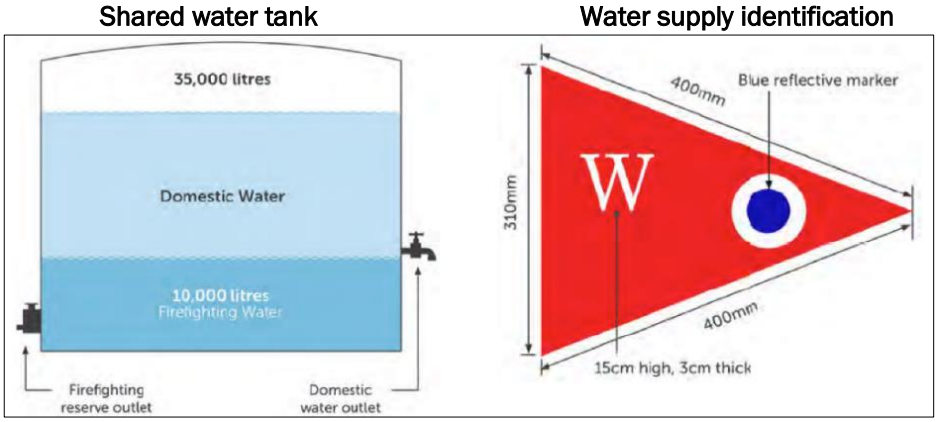


Figure 29 – Water tank and supply identification panels required (Source: CFA 2020).

7.5 Water supply outlet, pipe work and valves

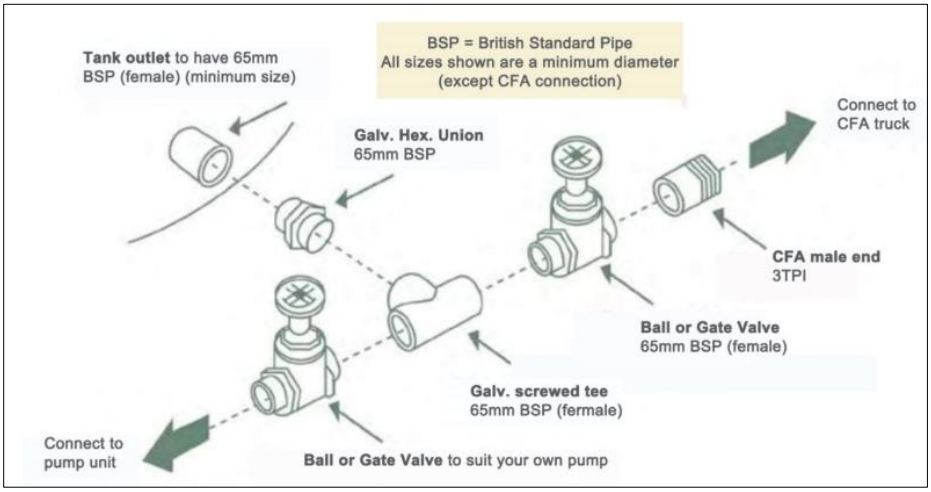


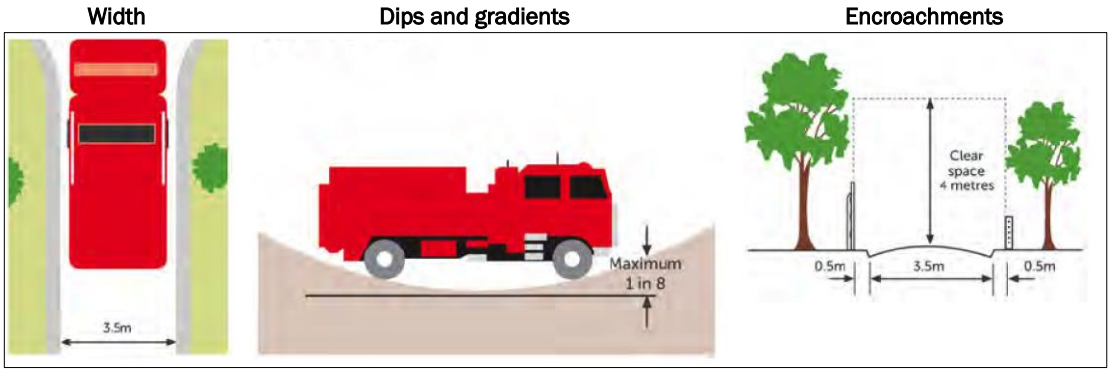
Figure 30 – Water supply outlet, pipework, and valves (Source: CFA 2020).

7.6 Access Requirement

Where the length of access is greater than 200 metres the following design and construction requirements apply:

- All-weather construction.
- A load limit of at least 15 tonnes.
- Provide a trafficable width of 3.5 metres.
- Be clear of encroachments for at least 0.5 metres on each side and at least 4 metres vertically.
- Curves must have a minimum inner radius of 10 metres.
- The average grade must be no more than 1 in 7 (14.4%) (8.1°) with a maximum grade of no more than 1 in 5 (20%) (11.3°) for no more than 50 metres.
- Dips must have no more than a 1 in 8 (12.5 per cent) (7.1 degrees) entry and exit angle.

- A turning area for fire fighting vehicles must be provided close to the building by one of the following:
  - A turning circle with a minimum radius of eight metres.
  - A driveway encircling the group accommodation.
  - The provision of other vehicle turning heads - such as a T or Y head - which meet the specification of *Austroad Design* for an 8.8 metre Service Vehicle.



No access requirement	
IF	• Fire authority access to the water supply is not required in Table 4 of Clause 52.47-3; and • The driveway is less than 30 metres.
THEN	• There are no access requirements under the Bushfire Management Overlay. • Apply the water supply requirements in Table 4.
Basic access requirement	
IF	• Fire authority access to the water supply is required in Table 4; and • The driveway is less than 30 metres.
THEN	• There are no access requirements subject to fire authority vehicles getting within 4 metres of the water supply using the access otherwise provided, (for example, residential dwelling). • Apply the water supply requirements in Table 4.
Tailored access requirement	
IF	• Fire authority access to the water supply is required in Table 4; and • The driveway is more than 30 metres.
THEN	• Access should be provided in accordance with Table 5, depending on the length of the access. • Apply the water supply requirements in Table 4.

Figures 31-32 – Access and encroachment dimensions (Source: CFA 2020).

8. OWNERS OBLIGATIONS

There are a range of obligations of the landowner. It is important that the landowner is aware of these obligations and understand what is required to ensure ongoing compliance.

1. Bushfire Attack Level (BAL) Rating and Construction Requirements

Buildings and works to the land must be developed within building envelopes and constructed to a minimum BAL 19.

2. Vegetation Management and Defendable Space

The following management prescriptions must be applied and maintained in all areas nominated as 'defendable space':

→Within 10 metres of a building, flammable objects such as plants, mulches and fences must not be located close to the vulnerable parts of the building such as windows, decks, and eaves.

→Trees must not overhang the roofline of the building, touch walls or other elements of a building.

→Grass around properties should be kept short. Five centimeters or less is considered short. All leaves and vegetation debris must be removed at regular intervals.

→Shrubs should not be planted under trees.

→Plants greater than 10 centimetres in height at maturity must not be placed directly in front of a window or other glass feature.

→Tree canopy separation of two metres and overall canopy cover of no more than 15 per cent at maturity.

3. Water supply construction and maintenance requirements

Onsite static water supply is required to be installed and must be designated solely for firefighting purposes.

APPENDIX 1 – SITE DESCRIPTION

Site description parameters

Site shape	The irregular-shaped parent lot on a north-south alignment adjoins Brumbys Lane to the west and an un-named gravel road to the south. The proposed subdivision exist within similar-sized Rural Living zoned holdings and now increasingly converting to edge-township lifestyle lots and from a bushfire perspective are adjacent or contain dominant grassland landscapes within and beyond the 150m site buffer.
Site dimensions	Proposed 2-lot site: Lot 1 – 2.09 hectares Lot 2 – 3.27 hectares
Site area	5.36 hectares
Existing use and siting of buildings and works on or near the study site	Existing shed/storage buildings within proposed lot 2. Potential development of new 4-bedroom dwellings on both lots with exact positioning still to be determined. Much of the existing vegetation consists of a maintained ex-farm site within grassland-based landscapes and single and grouped exotic/indigenous trees.
Existing vehicle access arrangements	Brumbys Lane adjoins both lots along their western boundary with an un-named gravel road on the southern boundary of lot 1 proposed. Both roads connect to secondary highways to the north and south and escape pathways to safer environments. Access to the site may require requiring modification to provide CFA access and water supply points at each lot entry.
Location of nearest fire hydrant	A fire hydrant exists within the Snake Valley township (CFA facility) 795m to the north. -Corner Linton-Carngham Road & Murrays St, Snake Valley, 3351 (based on information from the MEMP).[17] Reticulated water is not provided to the site.
Any other features of the site relevant to bushfire considerations	The proposed lots are flat to very lightly sloping north-west and have been historically used for grazing and general farming. The proposed lots have effective site escape to the west via road networks and adjoining highly-maintained lots and land cover. The subject site is grassland dominated and managed effectively with reduced fire risk It is important however that protection to grassland tracts in all directions is diligently maintained. An overarching grassland and southern woodland interface/ember threat surrounds both lots in a southerly direction. Patches of woodland where shrub and ground cover species exist in the understorey increases woodland bushfire threat. Core bushland remnants such as the southern (120m) Scarsdale Plantation and assorted adjoining reserves present the major bushfire threat. There are numerous smaller state forests and nature conservation reserves scattered throughout the local area based on its mining and agricultural past with roadsides and corridors providing linkage across the landscape. Ember attack from surrounding core remnants is possible given recent-decade fire conditions and unpredictable fire weather. Management and monitoring of many of these reserves are part of State-based Crown land regulations (DELWP).

[17] Pyrenees Shire Council MEMP; Accessed from: https://www.pyrenees.vic.gov.au/files/assets/public/emergencies/2020.05.19-memp-2020-final-adopted.pdf

APPENDIX 2 – DESCRIPTION OF SURROUNDING AREA

Surrounding area descriptors.

Parameter	Detail
Description of surrounding area	The surrounding subdivision site interface in all directions includes grassland-dominated sites as part of the northern flanks of the broader Scarsdale Plantation (to the south). The landscape influences interactions between vegetation, weather, and bushfire within landscapes potentially impacted by ember attack from such proximal large core remnant areas. Snake Valley and Linton have an active CFA community and established road and fire water storage infrastructure, including extensive experience dealing with significant grassland/woodland bushfire risk. This provides a background to mitigation processes detailed in this report. The surrounding landscape has a mixed fire history based on the broadscale 2006, 1983, and 1939 fires, followed by various fires within the local and national parks, State parks, and reserves. The likely bushfire event would originate from remnants to the south via post-frontal south-westerly wind change with embers assisting an un-controlled fire-front. Permanent fire protection can be provided within the Snake Valley township and the CFA's safer place (CFA Community Information Guide): - Cnr Linton-Carngham Road & Murrays St Snake Valley 3351 (based on information from the MEMP).[18] A westerly or northerly passage to larger provincial towns via the existing sealed road networks to the safer place or alternative areas provide escape routes and more permanent safety.

[18] Pyrenees Shire Council MEMP; Accessed from: https://www.pyrenees.vic.gov.au/files/assets/public/emergencies/2020.05.19-memp-2020-final-adopted.pdf

APPENDIX 3 – LANDSCAPE RISK THREATS BEYOND 150m BUFFER AREA

Landscape risk threats beyond a 150m buffer area

Parameter	Detail
Topography	Topography within the surrounding area consists of flat and 0-5% down/upslope generally uniform landscapes. The site has a northerly aspect within a flat to lightly-sloping site. From a fire risk perspective, the landscape beyond 150m in all directions influences the localised fire threat.
Potential classifiable vegetation	Classifiable vegetation (Grassland) exists within and beyond all boundaries:[19] All areas have been variably-cleared in the past due to past grazing activities reducing localised fire risk.
North	Landscapes to the north include large-acre and residential modified landscapes.
East	Landscapes to the east include grassland farming based sites and adjoining woodland remnant areas in variably-management states.
West	Landscapes to the west include open and grassy rural and residential landscapes.
South	Landscapes to the south include grassland, roadside grassland, and an adjoining woodland remnant area in variably-management states (Scarsdale Plantation).
Subject site information provided	*Landscape Assessment Plan (see Figures 15-16):* • *subject site* • *scale and distance bar* • *vegetation extent in the broader locality (0-100km)* • *road networks* • *fire run(s) into the site* • *a bushfire direction of travel diagram* • *history of bushfire in the area* • *any significant landscape features that are relevant to the considerations set out in Clause 53.02; and* • *information from the relevant Regional Bushfire Planning Assessments.*
	Landscape scale map with measured distances to indicate the following: *-20km, 50km, 100km (where relevant) landscape buffers;* *-proximity of the site to nearby urban, township or other areas where fuel is managed in a minimum fuel condition.*
Localised bushfire history	Fires have caused devastation in the region on many occasions including the following major incidents: 1983 – Ash Wednesday[20] The wind change moved through south-west Victoria by early evening. This was disastrous as the westerly winds caused the fires to change direction and size. Prior to the wind change, the fires had been relatively long and thin, with a narrow head, or front. After the wind change, the long side of the fire then became the head, or front, of the fire, burning across a much wider front. 1939 – Black Friday In January ("Black Friday") when 2 million hectares of Victoria burnt. **Municipal Emergency Management Plan** The Pyrenees Shire Council MFMP 2018 has been prepared[21] pursuant to section 55A of the *Country Fire Authority Act 1958.* The MEMP contains plans and input from Council, the Country Fire Authority, the Department of Environment Land Water and Planning, Parks Victoria, Forest Fire Management Victoria (FFMV), Victoria Police, and other key stakeholders.

[19] NVIM (DELWP 2023). Native vegetation type and extent information; Accessed from: https://nvim.delwp.vic.gov.au/Map
[20] Forest Fire Management Victoria (2023); Ash Wednesday; Accessed from: https://www.ffm.vic.gov.au/history-and-incidents/ash-wednesday-1983
[21] Pyrenees Shire Council MEMP; Accessed from: https://www.pyrenees.vic.gov.au/files/assets/public/emergencies/2020.05.19-memp-2020-final-adopted.pdf

Parameter	Detail
Provide further information for more complex locations	Fire Authorities have assessed Snake Valley and surrounds as having a HIGH bushfire risk. Local residents and visitors should be prepared for fire and have a plan for when the Fire Danger Rating is SEVERE, EXTREME or CODE RED. Typical bushfire scenarios are those typically associated with a wind change from the west-south-west post-northerly winds based on a potential proximal remnant or grass fire. This direction should not be discounted even where a catastrophic northerly fire approach is most likely. The Regional Bushfire Planning Assessment (DPCD 2012) identifies scattered remnant vegetation and vast tracts of unmanaged grassland as a known fire risk within the region. If a fire starts in a grassland, it can spread very quickly. However, grass fires produce less embers and burn for less days compared to forest fires. These factors mean that there is usually less house loss in grassland areas. Very large, fast-moving grass fires can impact on numerous communities in a single day. Impacts can include houses destroyed, farmland burnt, roads closed, choking smoke or the need to leave the area. As there is significant public land in this area, collaboration with the CFA and public landowners as they manage fuel on private land is required on an ongoing basis.[22]
Apply landscape typology	It is deemed the subject site and broader landscape type can be described as Broader Landscape Type 3 as referred to within *Practice Note 65*.

[22] State of Victoria 2015; Department of Environment, Land, Water and Planning; Strategic bushfire management plan, Accessed from: https://www.safertogether.vic.gov.au/__data/assets/pdf_file/0008/131021/DELWP0016B_BMP15_SouthWestern_web.pdf

APPENDIX 4 – BUSHFIRE PROTECTION OBJECTIVES[23]

Objective 53.02-2 Bushfire protection objectives

Approved measure - AM 2.1			
Requirement	AM 2.1 A building is designed to be responsive to the landscape risk and reduce the impact of bushfire on the building. This approved measure requires consideration of the landscape beyond the site in preparing and assessing an application. There are no 'design' elements to incorporate into a proposal. Where the bushfire hazard landscape assessment defines the location as landscape type one or two, an application that meets the other objectives in Clause 53.02-2 will mitigate the bushfire risk to an acceptable level. Where the bushfire hazard landscape assessment defines the location as landscape type three or four, the landscape beyond the site may present a significant bushfire risk.		
Response	This measure will be met via: -the bushfire hazard landscape assessment provides information on complex locations having regard to likely bushfire scenarios, bushfire management and prevention actions occurring around a site, and the proximity to nearby locations that can provide protection from the impact of extreme fire behaviour -all other approved measures can be implemented -if other approved measures cannot be implemented, the level of protection provided through the use of alternative measures -the decision guidelines in Clause 53.02-2.		
Has Approved Measure AM 2.1 been fully met?	Yes X	No	Partially met

Approved measure - AM 2.2			
Requirement	AM 2.2 A building is sited to ensure the site best achieves the following: The maximum separation distance between the building and the bushfire hazard. The building is in close proximity to a public road. Access can be provided to the building for emergency service vehicles.		
Response	- Vehicle access to be designed and constructed as specified in Table 5 Clause 53.02-3. -The bushfire hazard site assessment provides the information to respond to this approved measure. -Fire authority access and length of the access are the essential criteria to determine the applicable requirements under AM 1.3. Table 4 and the Fire Authority Requirements set out the fittings and access requirements. -Opportunities to minimise exposure to the bushfire hazard that will remain (for example, if the bushfire hazard is from neighbouring land). -Implement the defendable space required under the relevant approved measures. -If the bushfire hazard is on one or two aspects focus on maximising the separation distance on these sides of the building/dwelling.		
Has Approved Measure AM 2.2 been fully met?	Yes X	No	Partially met

53.02-4.2 Defendable space and construction objectives

Approved measure – AM 3.2			
Requirement	AM 3.2 A building used for accommodation (other than a dwelling or dependent person's unit), a child care centre, an education centre, a hospital, leisure and recreation or a place of assembly is Provided with defendable space in accordance with Table 3 and Table 6 to Clause 53.02-5		
Response	-Not applicable as dwellings only to be developed.		
Has Approved Measure AM 3.2 been fully met?	Yes X	No	Partially met

→Alternative measures (AltM) - An alternative measure may be considered where the responsible authority is satisfied that the objective can be met. The responsible authority may consider other unspecified alternative measures.

Alternative Measure – 3.3			
Requirement	AltM 3.3 Adjoining land may be included as defendable space where there is a reasonable assurance that the land will remain or continue to be managed in that condition as part of the defendable space. • Low-threat vegetation will often be suitable as off-site defendable space if it can be demonstrated that the adjoining land will remain in that condition. • If off-site defendable space can be justified the actual defendable space on that aspect is provided to the property boundary of the site subject to the application. • If adjoining land will be managed in future then a permit condition should require management to occur before development commences. • The bushfire management statement will need to provide evidence that the adjoining land will remain in that condition.		
Response	-No adjoining land will be used for defendable space.		
Has Alternative Measure AltM 3.3 been fully met?	Yes X	No	Partially met

Alternative Measure – 3.4			
Requirement	AltM 3.4 Defendable space and the bushfire attack level is determined using Method 2 of AS3959:2009 Construction of buildings in bushfire prone areas (Standards Australia) subject to any guidance published by the relevant fire authority. • AS3959 provides for a site-specific assessment of the bushfire hazard. • Downslopes greater than 20 degrees are not within the parameters of the approved measures and are shown as none specified in the tables. Use this alternative measure in these scenarios.		
Response	-Further information can be provided however both methods 1 and 2 correlate in this case. -The reduced-risk state of the site due to past and current selective vegetation removal.		
Has Alternative Measure AltM 3.4 been fully met?	Yes X	No	Partially met

Alternative Measure – 3.5			
Requirement	AltM 3.5 A building used for a dwelling (including an extension or alteration to a dwelling) may provide defendable space to the property boundary where it can be demonstrated that: AltM 3.5 The lot has access to urban, township, or other areas where: – Protection can be provided from the impact of extreme bushfire behaviour. – Fuel is managed in a minimum fuel condition. – There is sufficient distance or shielding to protect people from direct flame contact or harmful levels of radiant heat. Less defendable space and a higher construction standard is appropriate having regard to the bushfire hazard landscape assessment.		
Response	-Lot is within south-east of Snake Valley township area and northern escape pathways to highly-modified and residential areas. -Fuel management plans are in place for proximal nature reserves to the south (Pyrenees MFMP 2018). -The subdivision has half of all boundaries/interface as breaks/buffers (roadways) to mitigate harmful levels of radiant heat (coupled with site and defendable space management regimes).		
Has Alternative Measure AltM 3.5 been fully met?	Yes X	No	Partially met

Alternative measure 3.6			
Requirement	A building used for accommodation (other than a dwelling or dependent person's unit), child care centre, education centre, hospital, leisure and recreation or place of assembly may provide defendable space in accordance with Table 2 Columns A, B or C and Table 6 to Clause 53.02-5 where it can be demonstrated that: AltM 3.6 An integrated approach to risk management has been adopted that considers: – The characteristics of the likely future occupants including their age, mobility and capacity to evacuate during a bushfire emergency. – The intended frequency and nature of occupation. – The effectiveness of proposed emergency management arrangements, including a mechanism to secure implementation. – Less defendable space and a higher construction standard is appropriate having regard to the bushfire hazard landscape assessment.		
Response	Not applicable – dwelling development only.		
Has measure been fully met?	Yes X	No	Partially met

53.02-4.3 Water supply and access objectives

Alternative Measure AltM 4.1			
Requirement	AltM 4.1 A building used for a dwelling (including an extension or alteration to a dwelling), a dependent person's unit, industry, office, or retail premises is provided with: -A static water supply for firefighting and property protection purposes specified in Table 4 to Clause 53.02-5. -Vehicle access that is designed and constructed as specified in Table 5 to Clause 53.02-5. -The water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies.		
Response	-Vehicle access will be designed and constructed as specified in Table 5 to Clause 53.02-3. -The 10K litre water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies.		
Has Alternative Measure AltM 4.1 been fully met?	Yes X	No	Partially met

Alternative Measure AltM 4.2			
Requirement	AltM 4.2 A building used for accommodation (other than a dwelling or dependent person's unit), child care centre, education centre, hospital, leisure and recreation or place of assembly is provided with: A static water supply for firefighting and property protection purposes of 10,000 litres per 1,500 square metres of floor space up to 40,000 litres. Vehicle access that is designed and constructed as specified in Table 5 to Clause 53.02-5. • Fire authority access and length of the access are the essential criteria to determine the applicable requirements under AM 4.1 and AM 4.2. • The requirements should be identified in the bushfire management statement and shown on the submitted plans. • Buildings used for accommodation (other than a dwelling or dependent person's unit), child care centre, education centre, hospital, leisure and recreation or place of assembly may be occupied by people with increased vulnerability for reasons such age, mobility, or a lack of familiarity with a local area. AM 4.2 requires that this be considered in finalising the water supply and site access requirements for these activities.		
Response	• Not generally applicable however fire authority access and length of the access will be determined by the essential criteria and applicable requirements under AM 4.1 and AM 4.2. • The requirements are identified in the bushfire management statement and shown on the submitted plans.		
Has Alternative Measure AltM 4.2 been fully met?	Yes X	No	Partially met

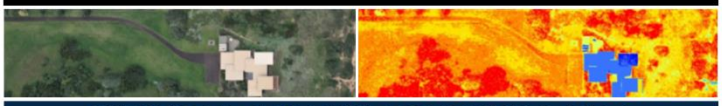
Alternative Measure AltM 4.3			
Requirement	An integrated approach to risk management that ensures the water supply and access arrangements will be effective based on the characteristics of the likely future occupants including their age, mobility, and capacity to evacuate during a bushfire emergency. The water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies.		
Response	• It is proposed that a minimum total capacity of 10,000L be provided as a dedicated static water supply for firefighting and property protection purposes (for each lot). • Water tank(s) will be non-combustible and sited so that firefighting vehicles can get within 4m of outlets. • The water supply outlet will be located within close proximity of the dwelling. Fittings must be in accordance with CFA requirements. All internal roads (where required) will provide access in accordance with the following vehicle design and construction requirements: – All-weather construction and load limit of at least 15 tonnes. – Provide a trafficable width of 3.5 metres and clear of encroachments for at least 0.5 metres on each side and at least 4 metres vertically. Curves must have a minimum inner radius of 10 metres. – The average grade must be no more than 1 in 7 (14.4%) (8.1°) with a maximum grade of no more than 1 in 5 (20%) (11.3°) for no more than 50 metres. Dips must have no more than a 1 in 8 (12.5 per cent) (7.1 degrees) entry and exit angle. – A turning area for fire fighting vehicles must be provided close to the building by one of the following: turning circle minimum radius of eight metres.		
Has Alternative Measure AltM 4.3 been fully met?	Yes X	No	Partially met

Approved measure 5.1			
Requirement	AM 5.1 An application to subdivide land, other than where AM 5.2 applies, demonstrates that each proposed lot is capable of meeting: AM 5.1 The defendable space in accordance with Table 2 Columns A, B or C and Table 6 to Clause 53.02-5. The approved measures in Clause 53.02-4.1 and Clause 53.02-4.3.		
Response	-Defendable space to 15m and based on Tables 2 and Table 6 has been allowed for; -This is met to lot boundaries and within adjoining lots based on lot configuration.		
Has measure been fully met?	Yes X	No	Partially met

Approved measure 5.2			
Requirement	AM 5.2 An application to subdivide land zoned for residential or rural residential purposes must be accompanied by a plan that shows: Each lot satisfies the approved measure in AM 2.1. A building envelope for a single dwelling on each lot that complies with AM 2.2 and provides defendable space in accordance with: – Columns A, B or C of Table 2 to Clause 53.02-5 for a subdivision that creates less than 10 lots. The bushfire attack level that corresponds to the defendable space provided in accordance with Table 2 to Clause 53.02-5 must be noted on the building envelope. -Defendable space for a lot may utilise communal areas, such as roads, where that land can meet the requirements for defendable space. -Vegetation management requirements in accordance with Table 6 to implement and maintain the defendable space required under this approved measure. -Water supply and vehicle access that complies with AM 4.1.		
Response	-Columns A, B, C of Table 2 to Clause 53.02-5 for a subdivision that less than 10 lots has been used for defendable space calculations. -Defendable space is wholly contained within the boundaries of the proposed subdivision. -Defendable space able to be shared between lots within the subdivision (not required). -Defendable space is provided and is managed in accordance with the following requirements: *-Grass must be short cropped and maintained during the declared fire danger period.* *-All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.* *-Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.* *-Plants greater than 10 centimetres in height must not be placed within 3 metres of a window or glass feature of the building.* *-Shrubs must not be located under the canopy of trees.* *-Individual and clumps of shrubs must not exceed 5 square metres in area and must be separated by at least 5 metres.* -Water supply and vehicle access that complies with AM 4.1. --Vehicle access will be designed and constructed as specified in Table 5 to Clause 53.02-3. -The 10K litre water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies.		
Has measure been fully met?	Yes X	No	Partially met

BUSHFIRE MANAGEMENT STATEMENTS (BMS) & BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT & REPORTING

Experienced and qualified fire ecologist, botanist, and landscape assessor



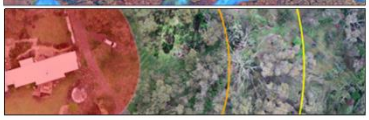
BUSHFIRE ATTACK LEVEL ASSESSMENTS (BALs)

What is a Bushfire Attack Level Assessment (BAL)?

Bushfire Prone Areas are areas that are subject to, or likely to be subject to bushfires.

Specific bushfire construction standards apply in designated bushfire prone areas in Victoria and NSW. These bushfire construction requirements are aimed at improving bushfire protection for residential buildings.

A Bushfire Attack Level (BAL) is a way of measuring the severity of a building's potential exposure to ember attack, radiant heat, and direct flame contact.



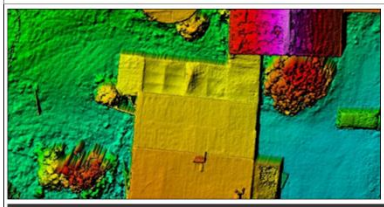
Landtech Consulting

Landtech Consulting provides site-based BAL assessment and reporting using drone and GIS technologies, supported by decades of bushfire and vegetation ecology and assessment experience. Peter Austin has extensive experience and working knowledge of bushfire regulation, planning processes and standards such as AS3959, planning regulations in NSW & Victoria,

Services include:

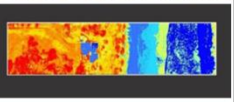
- ⇒ Bushfire Attack Level Assessments
- ⇒ Bushfire Management Statements
- ⇒ Property Management Plans
- ⇒ Vegetation Drone Mapping
- ⇒ Landscape Assessment Planning

Depending on the outcomes of your BAL assessment, building construction standards can be increased to meet the requirements of your assessed BAL. Alternatively, vegetation modification surrounding the allotment/dwelling can be undertaken to reduce the BAL and consequent exposure level during a bushfire.



landtech consulting

Land Capability Assessment
Biodiversity Survey
Drone Mapping & Survey
Bushfire Attack Level Assessment (BAL)
GIS Mapping & Analysis



Peter Austin (B.Sc., Grad. Dip Env Health, Dip Hort, Dip VET, Cert IV TAE)
Trading as Landtech Consulting, ABN: 4531 2192 419 Ph. 0408-615677 Email peteraustin.landtech@hotmail.com

LAND CAPABILITY ASSESSMENT
ONSITE DOMESTIC WASTEWATER SYSTEM MANAGEMENT REPORT

Client: Ena Turcinov

Project: Land Capability Assessment for proposed 2-lot subdivision and potential new 4-bedroom dwellings on each lot at 1 Brumbys Lane, Snake Valley, 3351, Victoria.

Date: December 8, 2023

Contact: Ena Turcinov joel@smithls.com.au

Landtech: Peter Austin peteraustin.landtech@hotmail.com
161 Skene St, Warrnambool Vic 3280
0408-615677

Figure 1 – Overhead true colour image of part of proposed lots 1 and 2 and central watercourse.

Peter Austin (B.Sc., Grad. Dip - Env Health, Dip Horticulture, Dip VET, Cert IV TAE) Member: Environmental Health Victoria & Environmental Health Professionals Australia. Trading as Landtech Consulting, ABN: 4531 2192 419
Ph. 0408-615677 Email peteraustin.landtech@hotmail.com

Document control

Assessment	Land Capability Assessment (LCA) for two-lot subdivision- and potential new 4-bedroom dwellings on each lot at 1 Brumbys Lane, Snake Valley, 3351, Victoria; and design of compliant onsite wastewater management for each lot (based on AS1547 & EPA CoP 891.4 2016).
Address	1 Brumbys Lane, Snake Valley, 3351.
Project number	23351
LCA manager	Peter Austin (Landtech Consulting)
Client	[redacted]
Council	Pyrenees Shire Council

Acknowledgements

Disclaimer

Although Landtech Consulting have taken all the necessary steps to ensure that an accurate document has been prepared, the company accepts no liability for any damages or loss incurred as a result of reliance placed upon the report and its contents.

Figure 2 – An ephemeral watercourse traverses the lots proposed from north to south (Source: CNES 2023).

SUMMARY

Landtech Consulting was commissioned by [redacted] to conduct a Land Capability Assessment (LCA) for a 2-lot subdivision and potential new 4-bedroom dwellings on each lot, within a cleared and unsewered lot and required EPA-compliant onsite wastewater management within the lot, at 1 Brumbys Lane, Snake Valley, 3351.

This assessment was undertaken to identify and characterise site and environmental constraints potentially impacting the proposed onsite wastewater systems.

Proposed onsite wastewater system design and effluent disposal calculations are based on EPA Code of Practice 891.4; Onsite Wastewater System Management (2016).[1]

NOTE: The amended *Environment Protection Act 2017* came into effect in Victoria on 1 July 2021. These new environment protection laws, and supporting regulations, focus on preventing waste and pollution impacts, rather than managing impacts after they have occurred.

Under the *Environment Protection Regulations 2021*, onsite wastewater management systems are a *prescribed permission activity (A20)*, and this is a permit activity that is administered by the council in whose municipal district the onsite wastewater management system is located.

It applies to proposed new systems and alterations to existing systems, which includes alterations that increase the system's flow or load, such as a house extension or installation of a spa.

A key method in minimising risk to the environment and public health from domestic wastewater, is to minimize the volume of wastewater produced. Minimising wastewater volumes can be achieved by:

- *Using water saving fixtures and fittings*
- *Installing a dry composting toilet*
- *Not installing a bath (low flow rate shower only)*
- *Not installing extra wastewater producing facilities (e.g. spa, kitchen food waste grinder)*
- *Adopting indoor recycling5 (toilet flushing and/or washing machine use) of advanced secondary-treated greywater.*

The *general environmental duty* is a centrepiece of the new laws and regulations. It applies to all Victorians. If you conduct activities that pose a risk to human health and the environment, you must understand those risks. You must also take reasonably practicable steps to eliminate or minimise them. Onsite wastewater management systems can be a risk to human health and the environment if they are poorly installed or maintained.

The general environmental duty is underpinned by the *Environment Protection Regulations 2021* which set out duties and obligations for persons in management or control of land where an onsite wastewater management system is located. These include requirements for the landholder or land manager to:

- *Take all reasonable steps to operate the system so it does not pose a risk to human health or the environment*
- *Take all reasonable steps to maintain the system in good working order (for residential properties, this applies to the owner but not to a renter)*
- *Check for signs the system may be failing or is not in good working order and, from 1 July 2022, notify council if this is the case*
- *Respond to system failures*
- *Provide information to occupiers regarding the correct operation and maintenance* of the system
- Keep maintenance records and, on request, provide them to council.

[1] EPA 2016; Code 891.4 Code of Practice Onsite Wastewater System Management; Accessed from: https://www.epa.vic.gov.au/about-epa/publications/891-4

Table 1 – Onsite wastewater compliance summary

Proposal	Land Capability Assessment (LCA) for proposed 2-lot subdivision and potential new 4-bedroom dwellings on each lot at 1 Brumbys Lane, Snake Valley, 3351, Victoria, and required onsite wastewater system compliance for the new dwellings (based on AS1547, EPA CoP 2016 891.4).
Property	Address: 1 Brumbys Lane, Snake Valley, 3351, Victoria Lot and Plan Number: More than one parcel Standard Parcel Identifier (SPI): More than one parcel Local Government Area (Council): PYRENEES Council Property Number: 710042900 Planning Scheme: Planning Scheme - PYRENEES UTILITIES Central Highlands Water Southern Rural Water Outside drainage boundary POWERCOR
Owner / Developer	[redacted]
Zoning/Overlays	RURAL LIVING ZONE (RLZ) SCHEDULE TO THE RURAL LIVING ZONE (RLZ) BUSHFIRE MANAGEMENT OVERLAY (BMO)
Key regulatory site constraints	35-03-2 RURAL LIVING ZONE – USE FOR DWELLING Each dwelling must be connected to reticulated sewerage, if available. If reticulated sewerage is not available, all wastewater from each dwelling must be treated and retained within the lot in accordance with the requirements of the Environment Protection Regulations under the *Environment Protection Act 2017* for an on-site wastewater management system.
Domestic water supply	Reticulated water supply not available.
Anticipated wastewater load[2] [3]	Potential new 4-bedroom dwellings = 4+1=5x180L/day=900L/day
Availability of sewer	The area is unsewered and is unlikely to be sewered in the short to medium term.
Local Government Area	PYRENEES SHIRE COUNCIL
Area of lot	Lot 1 - 2 hectares Lot 2 – 3.3 hectares
Legislation	ASNZS 1547 EPA Code of Practice 891.4 (2016); including Tables 4[4] & 5 Environment Protection Act 2017 (formerly 1970) State Environment Protection Policies (SEPPs) Planning and Environment Act 1987
Methods	A field assessment was undertaken on 27th of July 2023 to obtain information on land capability of the selected study area and assessment of potential wastewater system able to be used sustainably within the proposed lot. Soil sampling supported by ground-based and drone collected imagery and elevation data was collected for this report; to 1.2m (auger length) depth and based within proposed effluent envelope and reserve disposal areas. ArcMap and GlobalMapper GIS and mapping software was used to assist in the interpretation of site constraints and provision of proposed wastewater design location and infrastructure.
Results	Key summarised issues in relation to this LCA are based on EPA Code 891.4 (2016) and Light Silty Clay (5a) category (within the most limiting) soil texture, and where Landtech recommends the following (see *Figures 22-25*):[5] [6] **NEW 4-BEDROOM DWELLINGS** The potential new dwellings with 900L/day output would require the following: **LOTS 1- & 2** • Both lots could utilise either primary or secondary treatment options; • If primary treatment is preferred both lots will require a 750 litre pump-well to pump effluent upslope and outside the 60m watercourse buffer; • Primary treatment would utilise a 3200 litre septic tank and disposed via a pump-well to 125m lineal ETA trenches at 0.9m wide; • Upslope pumping is not considered best-practice however land is available outside the 60m buffer setback for location of the disposal system; • Secondary treatment could be used via an AWTS (Aerated Wastewater Treatment System) or Sand filter system that could utilise either 447m² subsurface irrigation or 84m lineal ETA trenches at 0.9m wide for disposal; • Disposal of effluent using secondary treatment can be sited downslope of the proposed dwellings and utilise land outside the 30m buffer setback; • Regardless of the treatment type used, land application areas/trenches should be inter-planted (vegetated using sedges and tussock grasses) around and specifically downslope from effluent disposal areas;

[2] Victorian EPA Code of Practice – Onsite Wastewater Management (publication 891.4:2016).
[3] AS/NZS 1547:2000 – Onsite Domestic Wastewater Management (Appendix 4.2D) for standard water reduction fixtures.
[4] Victorian EPA 2016; EPA Code of Practice 891.4 (2016); Table 4: Minimum daily wastewater flow rates and organic loading rates.
[5] Victorian EPA Code of Practice – Onsite Wastewater Management (publication 891.4:2016).
[6] AS/NZS 1547:2000 – Onsite Domestic Wastewater Management (Appendix 4.2D) for standard water reduction fixtures.

	• Gate valves and inspection pits should be placed before and after all system components (and raised to ground level inspection) so system components can be isolated when maintenance is required; • Pump size used within AWTS's and pump-well's must be matched to suit pumping requirements, with alarm systems wired to the central power supply; and • Suggested use of low phosphorus and low sodium (liquid) detergents to improve effluent quality and maintain soil properties for growing plants.
Site Limitations, Constraints	Surface water setback Minor soil texture constraint – light clay
Design Irrigation Rate (DIR)	3 mm/day (subsurface irrigation - secondary treatment) 8mm/day (ETA trenches – primary treatment) 12mm/day (ETA trenches – secondary treatment)
Land Application Area (LAA)	447m²
Reserve area available	Reserve trench areas can be provided
Wet Weather Storage	Built into design flows
Recommended Effluent Quality Criteria	The domestic on-site effluent treatment systems must be able to provide an effluent of a quality to achieve compliance with the following criteria; primary or secondary quality (20 mg/L BOD5, 30mg/L SS, 10 cfu/100mL).
Site Mitigation/Amelioration Measures	□ Re-use of wastewater to planted gardens, screen plantings etc; □ Within lot drainage designed to avoid cross site drainage (and into watercourse) in intense rain events (when wastewater systems can fail with surface discharge in such events) – completed at wastewater system application stage; □ System maintenance reporting to include treatment and disposal systems.
Operation and Maintenance	A basic operation and system maintenance plan should be incorporated when the system is installed with plumber input. The Plan will provide confirmation of manufacturer, treatment processes, and irrigation components. An operations and maintenance manual is to be included as an on-site tool for staff and service contractors.

Figure 3 – Broader view of the proposed subdivision site with Snake Valley township to the north (Source: CNES 2023).

Figure 4 – Western boundary adjoining Brumbys Lane with view to the east across the site.

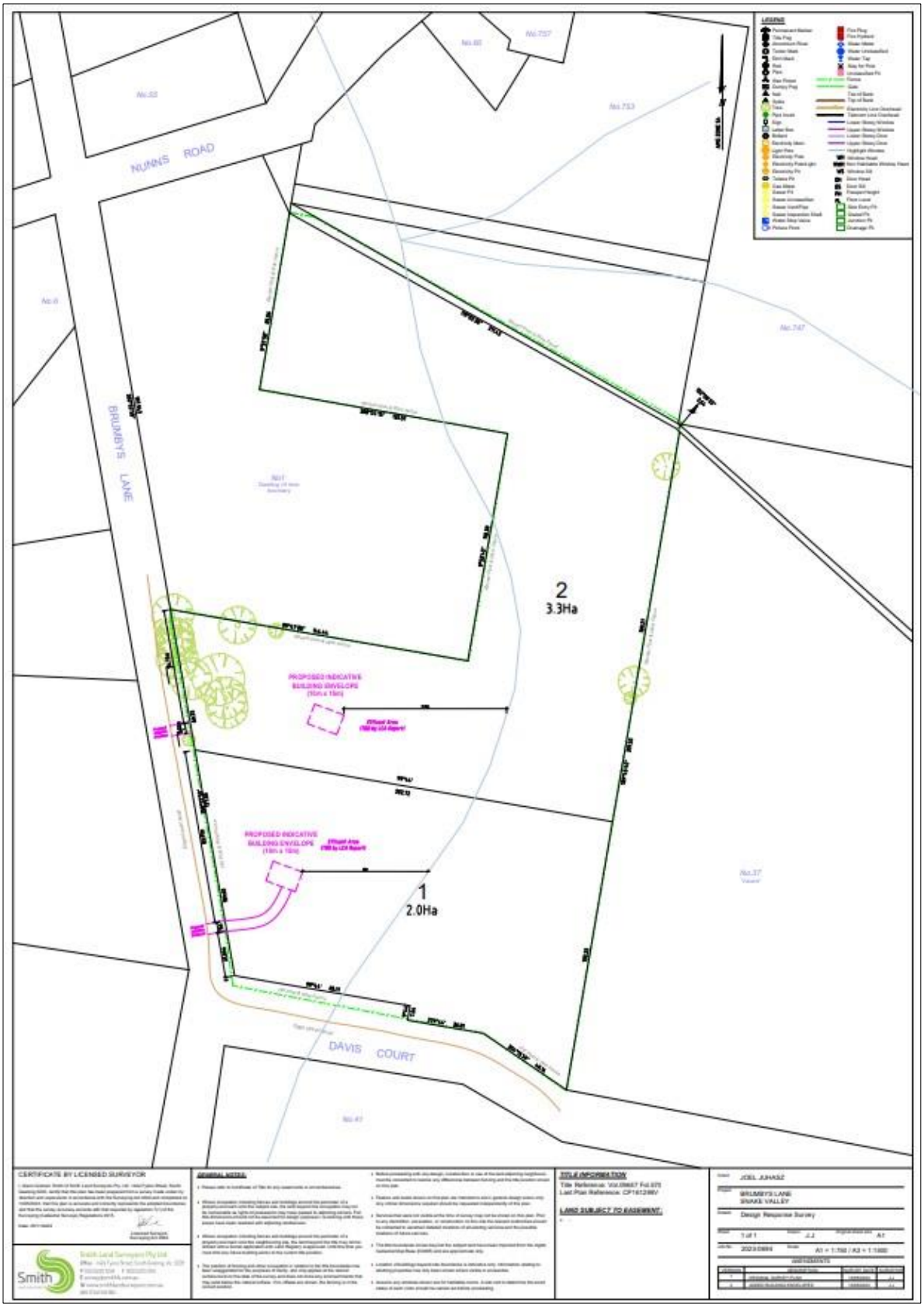


Figure 5 – Subdivision site with indicative building envelopes (Source: Smith Land Surveyors Pty Ltd 2023).

CONTENTS

Figure 6 – Open and cleared subdivision site that includes historic tree plantings.

1. DESCRIPTION OF PROPOSED DEVELOPMENT

Landtech Consulting was engaged to undertake a Land Capability Assessment for a proposed two-lot subdivision and potential new 4-bedroom dwellings within each lot; and required compliant onsite wastewater management at 1 Brumbys Lane, Snake Valley, 3351, Victoria (see *Figures 1-14 & 22-25 & Table 2*).

This report will accompany a *Planning Permit* to be submitted to Pyrenees Shire Council for such a development and the requirement for compliant onsite wastewater management within each proposed lot.

The site is a 5.3 hectare *Rural Living Zoned (RLZ)* parent lot within sub-catchments of Baillee Creek and Lake Burrumbeet. The elevated Snake Valley plateau comprises a range of intensive land uses, including grazing, forestry, rural living, recreation tourism, in addition to more recent small-acre lifestyle development.

The site is located on elevated floodplains adjoining forested and cleared volcanic plains, within the southern footslopes of the central highlands.[7]

The report will be based on wastewater load and best-practice onsite wastewater system for the two-lot subdivision and potential new 4-bedroom dwelling development on each lot. The LCA provides information regarding site and soil conditions and recommendations for the proposed treatment systems and land application methods (LAAs).

The owner can provide Council further specific information regarding future lot development/future site infrastructure intentions.

Figure 7 – Ephemeral watercourse traversing the central part of both proposed lots.

The LCA includes a conceptual design for suitable onsite wastewater systems for the proposed lot to meet *EPA guidelines (891.4:2016)*, including recommendations for system monitoring and management.

The field investigation and report has been undertaken and prepared by suitably qualified and experienced staff. *Landtech Consulting* has appropriate qualifications, experience, and professional indemnity insurance and certification documents available on request.

The assessment was completed in accordance with the *Environment Protection Authority's Code of Practice – Onsite Wastewater Management (EPA 891.4 - 2016)*, and guidelines such as *Land Capability Assessment for On-Site Wastewater Management (EPA Publication No. 746.1*, March 2003), and *On-Site Domestic Wastewater Management (AS/NZS 1547:2012).*

Operation, maintenance, and management of any treatment and disposal system must be in accordance with the manufacturer's recommendations, the *EPA Certificate of Conformity*, the *EPA Code of Practice 891.4 (2016),* Australian Standards, Guidelines, and recommendations made in this report.

Prescriptions built into the Council Permit conditions may include strict quarterly servicing of any septic tank or treatment plant and effluent disposal area; including the required use of WELLS & AAA-rated appliances and plumbing fixtures (see *Appendix 9*).

[7] Colac Otway Shire (2015). Colac Otway Shire Council Domestic Wastewater Management Plan - Technical Document; Accessed from: https://www.colacotway.vic.gov.au/My-property/Water-management/Domestic-Wastewater-Management-Plan

Figure 8 – Site feature map depicting lot configuration and soil test pit locations.

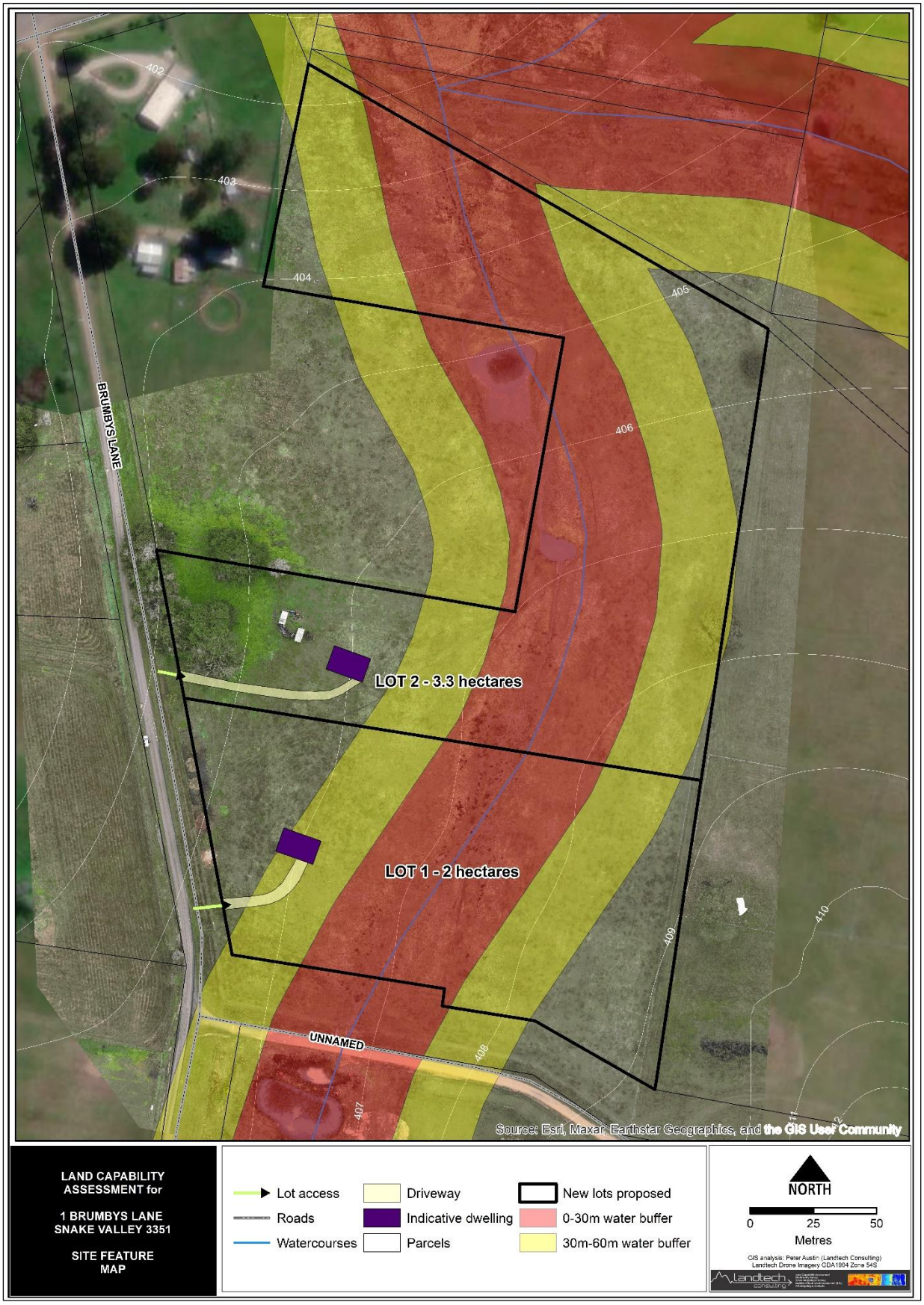


Figure 9 – Site feature map depicting lot configuration and watercourse setback requirements.

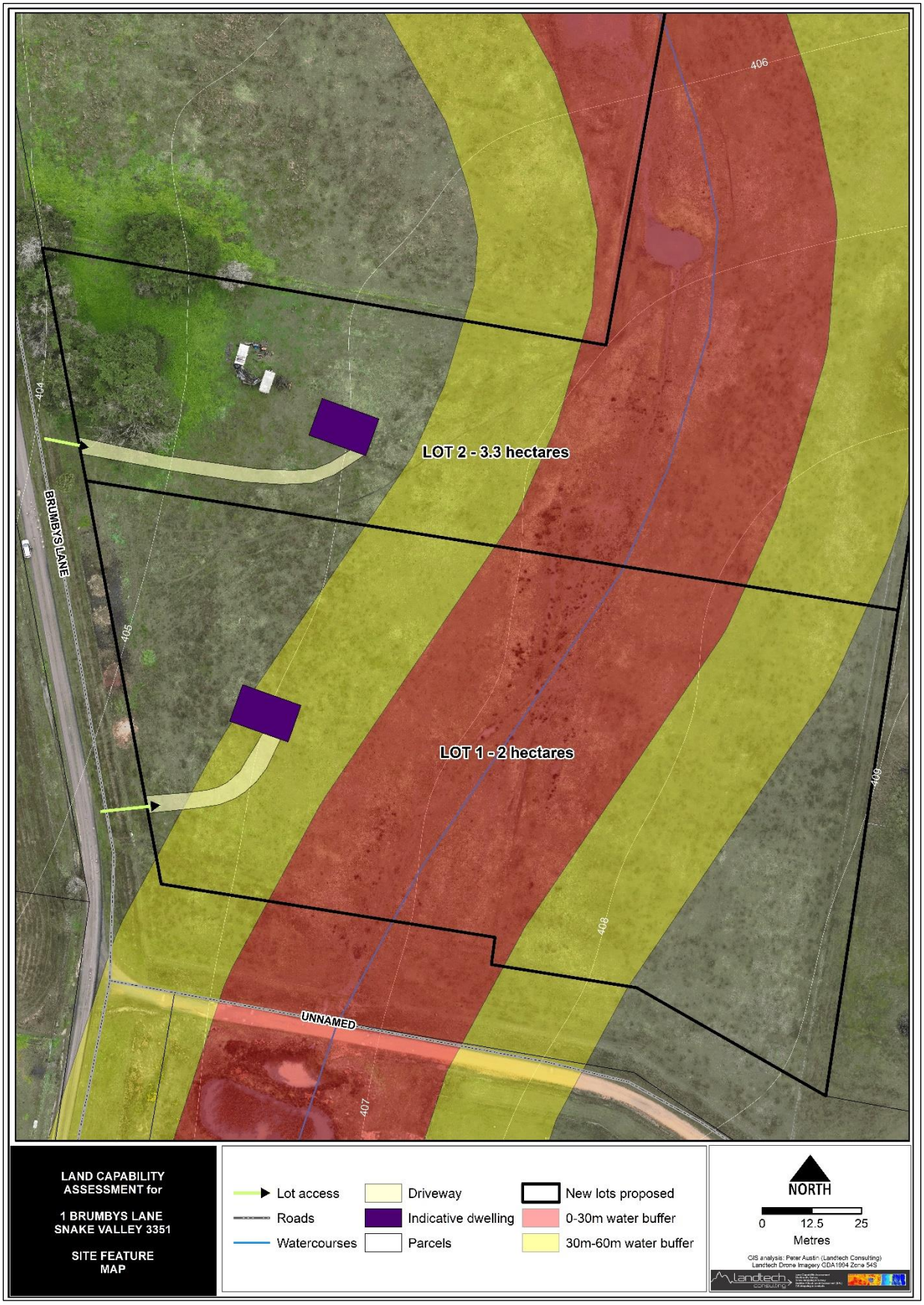


Figure 10 – Site feature map depicting lot configuration and watercourse setback requirements.

2. EXISTING SITE FEATURES & INFRASTRUCTURE

The LCA site is located within fringing south-east Snake Valley growth areas and former agricultural holdings, specifically cleared grazing acreage sites, and within a lightly-sloping eastern (aspect), *Rural Living Zone (RLZ)* parent lot.

The site includes, from an onsite wastewater perspective increased area, and uniformly sloping lots that can potentially support effective and sustainable onsite wastewater treatment (notwithstanding the lost land area to watercourse buffers to the east).

The lot is irregularly-shaped and configured north-south and traversed by a local ephemeral watercourse requiring setback for sustainable onsite disposal.

The lot includes an east, south-eastern aspect and exposed open sites for increased evapotranspirative disposal. The lot is entirely-cleared of woody vegetation apart from some exotic trees planted as part of former farm infrastructure to the central west of the parent lot (and within proposed lot 2).

Both lots potentially require siting disposal areas upslope (requiring pumping) unless secondary treatment is utilised, allowing disposal areas to be within the 30m and 60m watercourse buffer. Both lots will need to utilise western lot areas (of each lot) for disposal due to setback coverage.

The entire study site slopes to the east, southeast on a 1-5% slope with land cover dominated by exotic and common native pasture grasses (with entire parent lot boundary fencing). Access to both lots is from Brumbys Lane to the west.

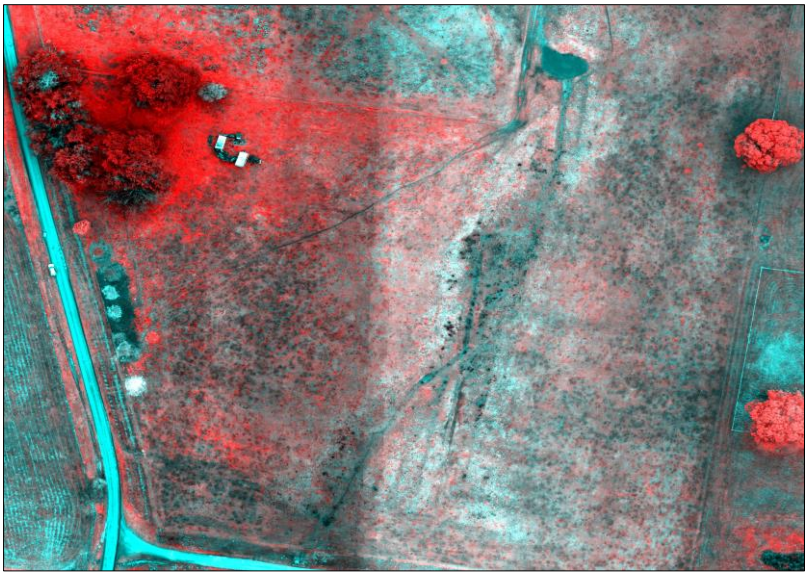


Figure 11 – Near-infrared image depicting extent of biomass growth across the lot.

Figure 12 – Parent lot and adjoining site interface with Scarsdale Plantation to the south-east (Source: CNES 2023).

3. DESCRIPTION OF SITE WASTEWATER CONSTRAINTS

Table 3 – Wastewater constraint issues and management within the site.

Wastewater constraint/issue	Information
Constraints	■ Surface water setback ■ Minor soil texture constraint – light clay
Service report to Council	■ Suggested use of primary (septic tank) or secondary treatment (via an AWTS or sand filter system including additional quarterly(AWTS)/annual (SFS) service reporting requirements). ■ If sewer is extended to the site in the medium-term, secondary treatment systems can continue to be used if quarterly maintenance occurs during an expected 15-20 year life span (of system) and agreement with water authority. After such a period the lot must be connected to sewer.
Vegetate effluent disposal areas	■ Requirement to vegetate and protect effluent disposal areas and actively maintain all effluent disposal system and areas. ■ Proposed effluent disposal areas exhibit strong pasture/vegetation growth, potentially providing enhanced evapotranspiration rate potential. ■ It is recommended that vegetation plantings be designed into land application areas.
Reserve areas	■ Reserve land application areas provide long-term alternative effluent disposal areas if the proposed effluent disposal area fails. The current lot configuration will allow for the provision of reserve trench areas. Council can provide advice on the requirement for a reserve land application areas.
Sustainable wastewater treatment and disposal	■ Integrated mitigation requirements should be followed such as low water use fittings for all built structures, water saving appliances, quarterly system and disposal field maintenance, and report to Council (Health Unit), provision and protection of reserve fields, use of subsurface irrigation with strategically vegetated effluent disposal area.
Performance monitoring	■ The Victorian EPA suggests effective management of a wastewater treatment plant is essential in achieving consistently high levels of environmental performance. ■ Field tests are an integral part of any treatment plant operation as they provide the operator with a simple way to assess the performance of all facets of the treatment process. Test results should be recorded with the flow and/or applied loading rates, and any alterations to the plant or operational procedures should be noted at the appropriate time.

Figure 13 – The site includes a 1-5% slope from the west to east providing uniform landscapes for disposal of effluent.

4. SITE KEY FEATURES

Site investigation was undertaken by Peter Austin on the 23rd July 2023.

A range of site features were assessed in terms of the degree of limitation they present for a range of onsite wastewater management systems.

Reference is made to features described in Table 1 of EPA (2003)[8] & EPA Code 891.4.

-*Table 4* summarises the key features in relation to effluent management at the site.

-*Figures 1 – 14* provide site and locality plans indicating the location of the site/proposed development.

-*Figures 22-25* provides site plans describing the physical site features, location of proposed development, and proposed wastewater management system components.

NOTE:

- The proposed area available to contain effluent is not constraining if mitigatory measures detailed within this report/conclusion are prescribed actions.
- The site's proposed for the effluent disposal areas (LAA) have the potential to be impacted by minor stormwater run-on/off due to the reduced slope and catchment upslope. The use of diversion drainage upslope from any proposed effluent disposal areas and vegetation bordering effluent disposal areas could be utilised to manage this issue.
- The lot is outside the 1 in 20-year and the 1 in 100-year flood coverage (and not within a *Declared Water Supply Catchment Area*).
- There is no evidence of a shallow watertable within 1km of the site reported to have groundwater at 30m depth (*VVG Groundwater Data*; *Bore: 54913 and virtual bore data, 2023*).[9]
- The site sits relatively high in the landscape between the 402m and 408m contours.
- Reserve land application areas are considered within this report due to best-practice provision.
- The lot can be considered to have sufficient land available for sustainable onsite effluent management that maintains appropriate buffers to limiting receptors.
- Key site factors and proposed development descriptors are listed in *Tables 4-5*.

Figure 14 – Existing groundwater bore network within a 2km site buffer (Source: VVG 2023).

[8] Land Capability Assessment for On-Site Wastewater Management (EPA Publication No. 746.1, March 2003); Table 1 of EPA (2003a).
[9] CERDI Visualising Victoria's Groundwater; Accessed from: https://www.vvg.org.au/view_bore.php?database=dse_gms&bore_id=4250136

Table 4 – Key site features.[10] (*NN: not needed).

	FEATURE	DETAIL	Nil or Minor	Moderate	Major	Level of constraint	MITIGATION MEASURES
1	**Aspect**	The site includes a west, north-west aspect.	*N NE NW*	*E W SE SW*	*South*	Nil	NN*
2	**Exposure**	The site has high sun and wind exposure.	*Full sun, high wind, minimal shading*	*Dappled light*	*Limited patches of light to heavily shaded all day*	Nil	NN*
3	**Climate**	The site has a temperate climate with a warm to hot summers and cold winters with rainfall exceeding evaporation in few Winter months only. The site experiences an average annual rainfall of 678mm (Durdiwarah) and an average of 115 rain days per year (>=0.1mm). Annual pan evaporation is taken as 1210mm (Creswick (088019)).	*Excess of evaporation over rainfall in the wettest months*	*Rainfall equal to evaporation*	*Excess of rainfall over evaporation in the wettest months*	Moderate	Calculate irrigation area using MAV guideline, EPA DIR's
4	**Erosion potential**	No evidence of sheet or rill erosion. The erosion hazard is minor with enhanced vegetation cover retained.	*Nil or minor*	*Moderate*	*Severe*	Nil	NN*
5	**Fill**	Natural soil profiles were observed throughout the site. No fill was observed and no filling is proposed in the effluent management area.	*No fill or minimal fill, or fill is good topsoil*	*Moderate coverage, fill is good quality*	*Extensive poor quality fill*	Nil	NN*
6	**Flood potential**	The potential house site and areas available for application of treated effluent lie above the 1:20 & 1:100-year flood level (Source: DataVic 1%AEP).	*Less than 1 in 100 years*	*Between 100 and 20 years*	*More than 1 in 20 years*	Nil	NN*
7	**Groundwater**	There are no signs of shallow groundwater tables above 1.5m depth. References suggest groundwater depth is 30m depth (VVG Groundwater Data; Bore: 54913. There is no use of groundwater bore for domestic purposes within 1km of the proposed effluent management area (VVG 2017).	*No bores onsite or on neighbouring properties*	*Setback distance from bore complies (EPA 891.4)*	*Setback distance from bore does not comply with (EPA 891.4)*	Nil	NN*
8	**Land suitability - available land application area**	All buffer distances recommended in *Table 5 of EPA 891.4* are achievable and do not significantly limit siting of the LAA in this case.	*Exceeds LAA, duplicate LAA, buffer distance requirements*	*Meets LAA, duplicate LAA, buffer distance requirements*	*Insufficient area for LAA*	Nil	NN*
9	**Landform**	The site consists of a 1-5% slope to the west, north-west with amenable sites for cross-slope/along contour land application.	*Convex or divergent side-slopes*	*Straight side-slopes*	*Concave or convergent side-slopes*	Minor	NN*
10	**Rocks and rock outcrops**	No surface rocks or outcrops evident at the immediate site.	*<10%*	*10-20%*	*>20%*	Nil	NN*
11	**Recommended buffer distances**	All buffer distances recommended in *Table 5 of EPA 891.4* buffer requirements are achievable and do not limit the siting of the LAA.	*Setback distance complies*		*Setback distance does not comply*	Nil	NN*
12	**Site drainage and subsurface drainage**	The house sites and proposed effluent management areas are expected to receive minor stormwater run-on which could be mitigated by an upslope (of effluent disposal field) diversion drain. There is no evidence of groundwater seepage, soaks or springs nearby.	*Rapidly drained. No visible signs or likelihood of dampness*	*Moderately well drained. Some signs or likelihood of dampness*	*Very poorly drained. Sedges, mosses, surface water ponding*	Nil	NN*
13	**Stormwater run-on, upslope seepage**	The house sites and proposed effluent management areas may receive minor stormwater run-on in intense rainfall events.	*Low likelihood of stormwater run-on*		*High likelihood stormwater run-on*	Nil	NN*
14	**Slope**	The overall site has sloping surfaces with an overall slope of 1-5% (based on DELWP 1:25000 elevation data and modelled DataVic data).	*<6%*	*6-15%*	*>15%*	Nil	NN*
15	**Surface water**	All setback distances can be complied with.	*Setback distance complies with 891.4*		*Setback distance does not comply with 891.4*	Nil	NN*
16	**Vegetation**	The site includes dominant and plentiful pasture vegetation.	*Plentiful vegetation, good potential for nutrient uptake*	*Limited variety of vegetation*	*Sparse or no vegetation*	Nil	NN*
17	**Landslip potential**	Published (DataVic – Land Systems Victoria 2015) mapping and site survey suggests low-moderate landslip potential.	*Nil*	*Minor to moderate*	*High or Severe*	Nil	NN*

[10] Key resources used for this assessment include the following:
http://www.bom.gov.au/climate/data/, http://nremap-sc.nre.vic.gov.au/MapShare.v2/imf.jsp?site=water, http://maps.cerdi.com.au/vvg.php, http://data.water.vic.gov.au/monitoring.htm, http://mapshare2.dse.vic.gov.au/MapShare2EXT/imf.jsp?site=bim, http://services.land.vic.gov.au/maps/pmo.jsp#Planning%20maps%20online

5. SOIL ASSESSMENT AND CONSTRAINTS

The site's soils have been assessed for their suitability for onsite wastewater management by a combination of soil survey and desktop review of published soil survey information as outlined below.

5.1 PUBLISHED SOILS INFORMATION

Soils of the site have been mapped and described in the Ballarat (1:250 000 G29355) map series (Geological Survey of Victoria)[11] and the related reports:

1. A Study of the Land in South-western Victoria (F R Gibbons and R G Downes 1964);
2. Soils and landforms of south-western Victoria Part 1, Inventory of soils and their associated landscapes (J Maher and J Martin 1987); and
3. A Land Resource Assessment of the Corangamite Region (Robinson *et al* 2003).

Western Uplands (WU) - 2.1 Dissected Uplands

Alluvial flats are a common feature in most valley floors. In some valleys, the majority of the alluvium has been deposited in episodes of drainage disruption and blockages during the Late Neogene volcanism. Examples include the extensive alluvial flats of the Lal Lal Swamp and Dog Trap Creek. Some minor sandy deposits are associated with the Lal lal swamp (lunette).

Soil types present include dark self-mulching clays, texture contrast soils, some gradational soils and minor sandy soils.

Alluvial systems within the Dissected Uplands of the Wimmera CMA region include Mount Cole Creek, Mount William Creek and the Wimmera River. Mount Cole Creek, the upper Wimmera River and other minor tributaries are supplied surface and groundwaters by Palaeozoic bedrock hilly terrain and Neogene cappings that line many lower hillslopes. As a tributary that supplies the Wimmera River, Mount William Creek rises on the slopes of Mt. William in the Grampians and flows slowly to the north-west through Dadswells Bridge. Extensive alluvial plains of this drainage system represent a low pass (geocol) that separates the Dissected Uplands (Midlands) to the east from the Grampians to the west.

These fluviatile alluvia plains are characterised by its effluents and anabranches which leave the main channels (Sibley 1967). The tributaries are called subsequent streams where streams have evolved along areas of rock belt weakness leaving folded or titled strata of differing resistance as prominent strike ridges (Hills 1975). Drainage networks of Mount William Creek, Salt Creek, upper Wimmera River/Mount Cole Creek and Wattle Creek are aligned in a north north-westerly alignment with strike ridges on a regular spacing of 10-15 kilometres. Valley flats, terraces and flood out plains are common with Mount William Creek broadest in cross tributary dimension (often in excess of 5 kilometres) while others are typically less than 2 kilometres. Slopes are gentle to very gently inclined with terrace slopes of greatest inclination (up to 10%) found along Mount Cole Creek and upper Wimmera River.

The entrenched valleys of Quaternary sediments including the Shepparton Formation (a thick sequence of unconsolidated fluvial and lacustrine sediments – coarse sand, silt and clay) occur largely as terraces, plains and drainage lines. Sediments have been derived through differential weathering of granite masses that are surrounded by ridges and peaks of resistant metamorphosed sediments. The Coonambidgal Formation (reworked Shepparton Formation of slightly micaceous silty clay, sand and gravel) occur within drainage lines subject to flooding and inset streams (Butler 1958, Krokowski de Vickerod, Moore & Cayle 1997).

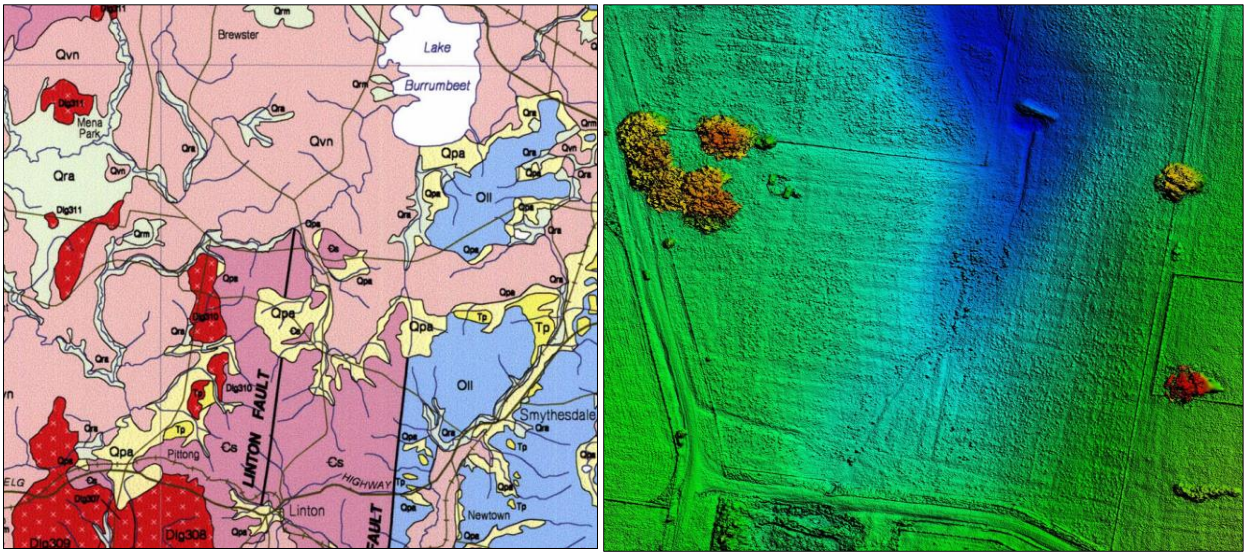
Flood plains of Mount William Creek are lined by aeolian deposits (sands) sourced from the Grampians and lined by River Red gums on subdued slopes of this inset stream. The plains and terraces of the upper reaches of the Wimmera River system around Mount Cole Creek, Concongella and Elmhurst have been formed by the more rapid weathering of granitic rocks in the area, accompanied by the deposition of recent alluvial sediments. Incipient weathering profiles of older fluvial deposits have some mottling reflecting poor site drainage and clay alleviation processes. Granitic detritus of these valley systems has high concentrations of quartzose sand intermixed with silts that often compose terraces occupying elevated positions above the current drainage plain.

Soils of the unit are deep grading into the generally unconsolidated regolith. These may range from texture contrast, generally sodic (Sodosols) to gradational earths and occasional clay (Vertosols, Dermosols) and sandy soils (Tenosols). Some soils may be waterlogged prone for at least 3 months of the year (Hydrosols).

[11] Ballarat 1996) map series (Geological Survey of Victoria). Accessed from: http://earthresources.efirst.com.au/product.asp?pID=152&cID=32

The texture contrast soils vary between the red non-sodic soils against the brown, yellow and grey sodic variants. All have sandy loam surfaces overlying a massive conspicuously bleached subsurface horizon. A clear change exists to light and medium clay subsoils where sodicity and colour are the distinguishing features. Importantly, the red texture contrast soils are commonly associated with terraces rather than current alluvial plains. Here most of the gradational yellow and brown soils (Kandosols) are found.

Remnant vegetation communities are dominated by forests (Heathy Dry Forest and Grassy Forest) closest to intersection of the Wimmera River downstream of Greens Creek where stream gradients are low and anabranching is well defined. Woodlands including Damp Sands Herb-rich Woodland, Plains Grassy Woodland, Creekline Grassy Woodland, Riparian Woodland, Plains Woodland, Grassy Woodland occur along Mount William Creek with Lateritic Woodland, Sand Heathland, Sand Forest, Red Gum Wetland and Sedge Wetland found on floodplains and flats away from the current drainage depression.



Figures 15-16 – Ballarat geology map depicting site and adjacent soil origins; surface model showing ephemeral central watercourse (Source: Agriculture Victoria 2020).

Heathy Dry Forest and Grassy Forest vegetation communities are associated with exposed areas of the alluvial plains of the Upper Wimmera River and Mount Cole Creek while Herb-rich Foothill Forest and Valley Grassy Forest are more associated with sheltered areas higher in the catchment. Various woodlands including Alluvial Terraces Herb-rich Woodland also occur across these valleys. Dry woodlands dominate drainage of Six Mile Creek/Seven Mile Creek and Salt Creek.

The alluvial plains often compose later derived sediments that overlie gravels and sands of these valley deposits. Large volumes of groundwater are attributed to these alluvial systems through contributions of Grampians colluvium where rainfall is often twice that of the plains. Wetlands line Mount William Creek especially north of Jallukar to its integration with the Wimmera River. Lake Lonsdale and Lake Fyans represent large swamps that have now been dammed to form water supply dams for Stawell and Ararat.

Further east, Greens Swamp (includes a main swamp and shallow ephemeral wetland) has been derived from a small catchment that has been unable to breach the levee of the Wimmera River (Hocking 2004). This swamp has a large clay lunette that predates major lake forming processes of the Murray Basin and reflects an intricate balance between climatic and groundwater conditions for lunette development.

5.2 SOIL SURVEY AND ANALYSIS

A soil survey was carried out at the site to determine suitability for application of treated effluent.

Subsoil investigations were conducted at four locations in the vicinity of the proposed land application envelopes using hand dug test pits/bore holes (represented as TP1 and TP2 due to uniformity across the site) to 1.2m depth (see *Figures 8 & 17-18*).

Full profile descriptions are provided in *Appendix 2*. Samples of all discrete soil layers for each soil type were collected for subsequent analysis of pH, Electrical Conductivity, and Emerson Aggregate Class.

Appendix 3 describes the soil constraints in detail for the soils encountered and provides an assessment of the physical and chemical characteristics at both test pit locations.

Soils in the vicinity of the proposed effluent envelope (TP1 & TP2) are characterised as Silty Clay Loam topsoils overlying Silty Light Clay subsoils.

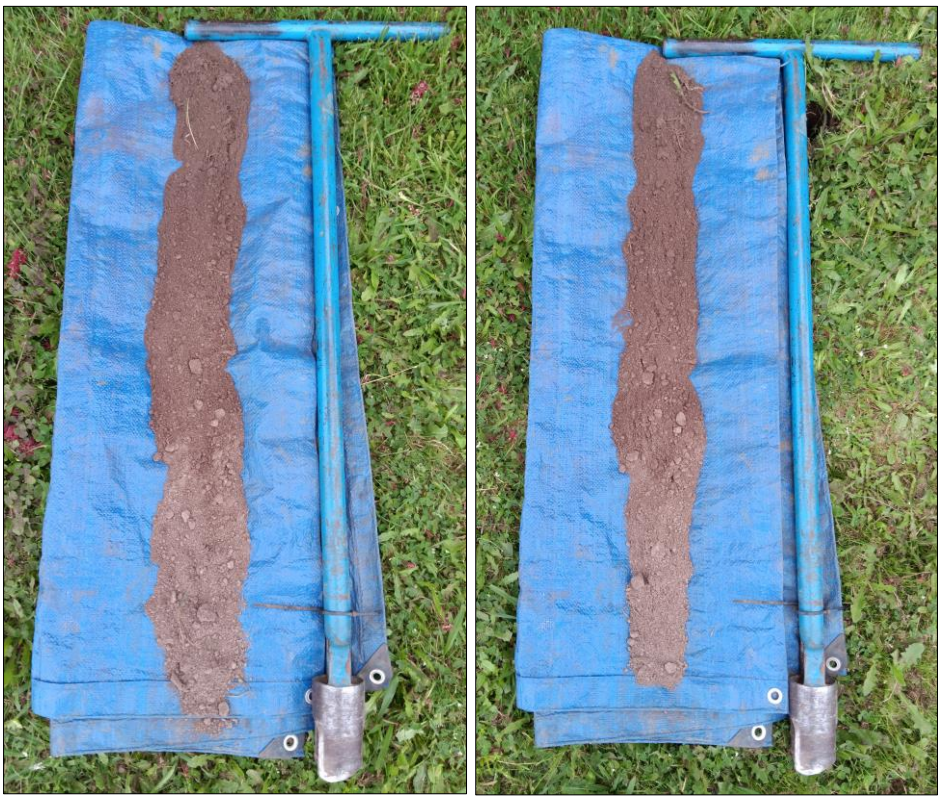
Subsoils of the A1 horizon exhibited a brown colouration (with no coarse fragments), with colour changing progressively to a lighter grey brown A2 horizon.

The soil sample contained very minor mottling within the lower portions of the A2 horizon although appears to provide a relatively free-draining soil profile (0.5-1m depth) for wastewater application.

The soils (within TP1 & TP2) are classified as graditional Grey Brown Vertosol using the Australian Soil Classification.[12]

After analysis of the most limiting soil texture and structure (TP1 & TP2 - most limiting / 0.5-1m depth) the soil category has been determined as a Category 5a Light Clay in accordance with Table 5.*1 AS/NZS1547:2012* and Table 9 of the *EPA Code of Practice* (*891.4*). The soil profile is free-draining reducing limitations to effluent application.

For the soil in the proposed land application area (Grey Brown Vertosol), no soil characteristics present major constraints providing various options within compliant (*EPA Code of Practice 891.4*) and mitigative wastewater management solutions.



Figures 17 & 18 – Profile of TP1 & TP2.

[12] Isbell, R.F. (1996). The Australian Soil Classification. CSIRO Publishing, Melbourne.

LAND CAPABILITY ASSESSMENT MATRIX

The land capability assessment matrix has been developed for the site and using the soils within the vicinity of the proposed effluent (LAA) envelope.

Table 5 – Land Capability Assessment Matrix[13]

Land features	Land Capability Class Rating					Site rating
	Very good (1)	Good (2)	Fair (3)	Poor (4)	Very poor (5)	
General characteristics						
Lot size	>10000m²	4000-10000m²	2000-4000m²	1000-2000m²	<1000m²	1
Site drainage	No visible signs of dampness	Moist soil but no standing water		Visible signs of dampness such as moisture-tolerant plants	Water ponding on surface	2
Run-off	None	Low	Moderate	High – need for diversionary structures	Very high – diversion not practical	2
Flood levels (1 in 100 yr)	Never		<1 in 100	<1 in 100 and <1 in 20	<1 in 20	2
Proximity to watercourses	>60m		30m		<60m	2
Slope %	0-2	2-8	8-12	12-20	>20	2
Landslip	No actual or potential failure		Low potential for failure	High potential for failure	Present or past failure	2
Groundwater (seasonal water-table depth in m)	>5	5-2.5	2.5-2	2-1.5	<1.5	1
Rock outcrop (% of land surface containing rocks > 200mm)	0	<10%	10-20%	20-50%	>50%	1
Erosion potential	No erosion	Minor	Moderate	High	Severe erosion potential	2
Exposure	High sun and wind exposure		Moderate	Low sun and wind exposure		2
Landform	Hill crests, convex side slopes and plains		Concave side slopes and foot slopes		Floodplains and incised channels	2
Vegetation type	Turf or pasture				Dense forest with little understorey	1
Average rainfall (mm/year)	<450	450-650	650-750	750-1000	>1000	3
Pan evaporation (mm/year)	>1500	1250-1500	1000-1250		<1000	2
Fill	No fill		Fill present			1
Soil profile characteristics						
Soil permeability category	2 and 3	4		5	1 and 6	4
Profile depth (m)	>2m	1.5m-2m	1.5m-1m	1m-0.5m	<0.5	1
Presence of mottling	None	Minor	Moderate		Extensive	2
Coarse fragments %	<10	10-20	20-40		>40	1
pH	6-8		4.5-6		<4.5, >8	1
Emerson aggregate	4,6,8	5	7	2,3	1	2
Electrical conductivity (Ec/dS/m)	<0.3	0.3-0.8	0.8-2	2-4	>4	2
OVERALL SITE RATING						**4**

As a guide, remedial measures should be considered whenever ratings of 3, 4, or 5 occur which may involve land improvement works, soil amelioration, or adoption of higher-level technologies to ensure environmental protection. The rating consists of the highest (most limiting) single rating and not the average.

The assessed site has been determined to have an overall land capability assessment risk rating of 4.
See *Appendix 4* for Rating 4 wastewater management prescriptions.

[13] Standards Australia / Standards New Zealand (2012). AS/NZS 1547:2012 On-site Domestic Wastewater Management.

6. WASTEWATER MANAGEMENT SYSTEM PROPOSED

This LCA will accompany a planning permit for the proposed two-lot subdivision and potential new 4-bedroom dwellings on each lot, including the requirement for compliant onsite wastewater management within each lot.

Table 5 of EPA Code 891.4 Code of Practice Onsite Wastewater System Management (2016)[14] and ASNZ1547 provides key flow-rate information to support effluent disposal calculation assumptions.

As such, this report provides recommendations for treatment and land application systems that are appropriate to the land capability, including sizing, design considerations, and justification for system selection.

Detailed design for the system should be undertaken at the time of the proposed development and submitted to Council.

It should also be noted that the site has *some flexibility* to locate the proposed treatment system and land application area in alternative locations (due to reduced land outside water setbacks) and should be based on future development plans and preferred site configurations.

Reductions in wastewater output can and should be achieved by installing high-water efficiency fittings such as with WELS-rated 3-star appliances and 4-star fittings and fixtures. Other suggested measures include; water-efficient front or top-loading washing machines, dual-flush toilets, water-efficient shower roses, water-efficient dishwashers, aerated taps, hot/cold water mixing taps, flow restrictors, hot water system with 'cold water diverter' (recirculates initial cold water flow when hot water tap used).

The proposed system should require maintenance, management, and performance monitoring and reporting. To ensure optimum performance of small wastewater treatment plants, it is important that maintenance personnel are adequately trained in maintenance and performance monitoring procedures.

Refer to the EPA website for the list of approved options (see *Appendix 16*) that are available: http://www.epa.vic.gov.au/en/your-environment/water/onsite-wastewater. Any of the treatment system options are capable of achieving the desired level of performance if they have adequate capacity.

Figure 19 – Land cover within both lots consists of exotic and native pasture species.

[14] EPA 2016; Code 891.4 Code of Practice Onsite Wastewater System Management; Accessed from: https://www.epa.vic.gov.au/about-epa/publications/891-4

6.1 THE TREATMENT SYSTEM COMPONENTS

Based on site and desktop assessment Landtech suggests the following treatment process components.

NEW 4-BEDROOM DWELLINGS

The potential new dwellings with 900L/day output would require the following:

LOTS 1- & 2

- Both lots could utilise either primary or secondary treatment options;
- If primary treatment is preferred both lots will require a 750 litre pump-well to pump effluent upslope and outside the 60m watercourse buffer;
- Primary treatment would utilise a 3200 litre septic tank and disposed via a pump-well to 125m lineal ETA trenches at 0.9m wide;
- Upslope pumping is not considered best-practice however land is available outside the 60m buffer setback for location of the disposal system;
- Secondary treatment could be used via an AWTS (Aerated Wastewater Treatment System) or Sand filter system that could utilise either 447m² subsurface irrigation or 84m lineal ETA trenches at 0.9m wide for disposal;
- Disposal of effluent using secondary treatment can be sited downslope of the proposed dwellings and utilise land outside the 30m buffer setback;
- Regardless of the treatment type used, land application areas/trenches should be inter-planted (vegetated using sedges and tussock grasses) around and specifically downslope from effluent disposal areas;
- Gate valves and inspection pits should be placed before and after all system components (and raised to ground level inspection) so system components can be isolated when maintenance is required;
- Pump size used within AWTS's and pump-well's must be matched to suit pumping requirements, with alarm systems wired to the central power supply; and
- Suggested use of low phosphorus and low sodium (liquid) detergents to improve effluent quality and maintain soil properties for growing plants.

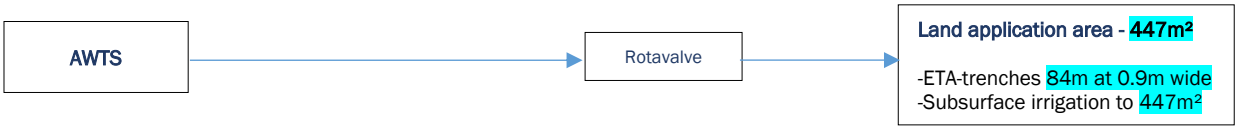


Figure 20 – Proposed system component option – use of secondary treatment and subsurface irrigation or ETA trenches.

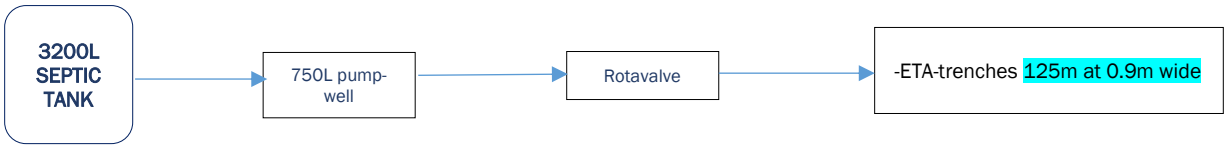


Figure 21 – Proposed primary treatment system component option – use of Septic Tank and ETA-trenches.

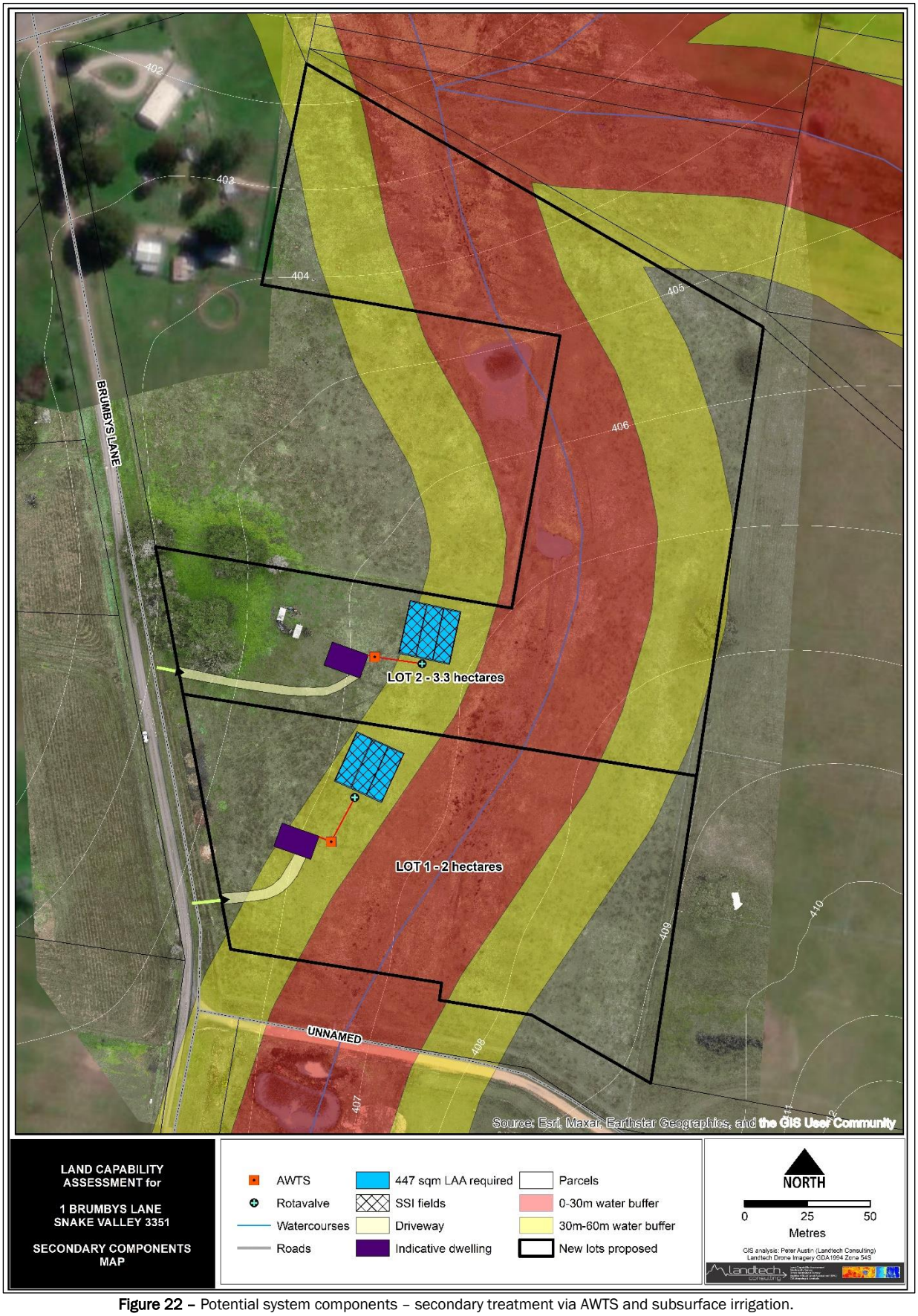


Figure 22 – Potential system components – secondary treatment via AWTS and subsurface irrigation.

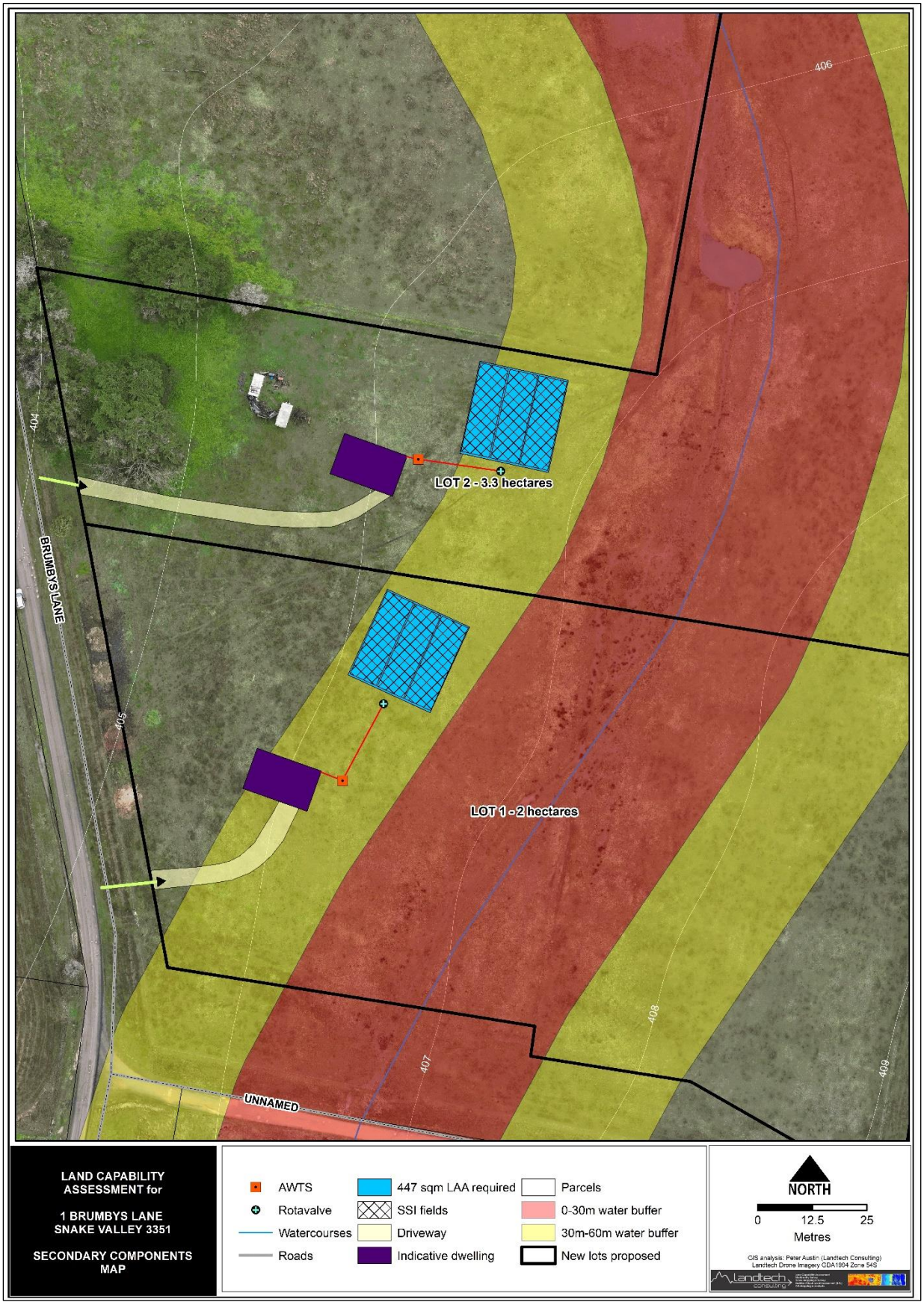


Figure 23 – Potential system components – secondary treatment via AWTS and subsurface irrigation.

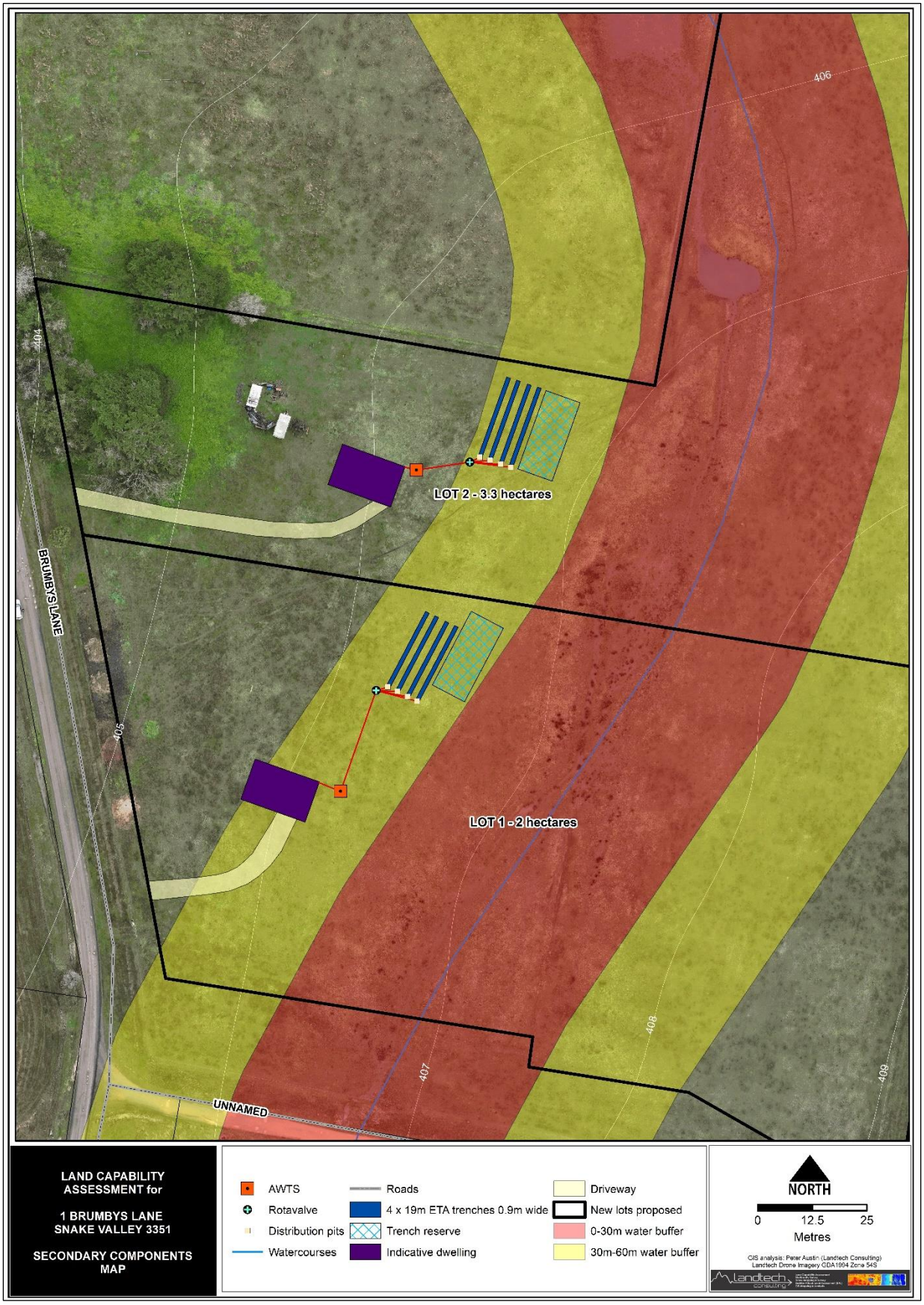


Figure 24 – Potential secondary treatment using an AWTS and ETA trenches at 0.9m wide.

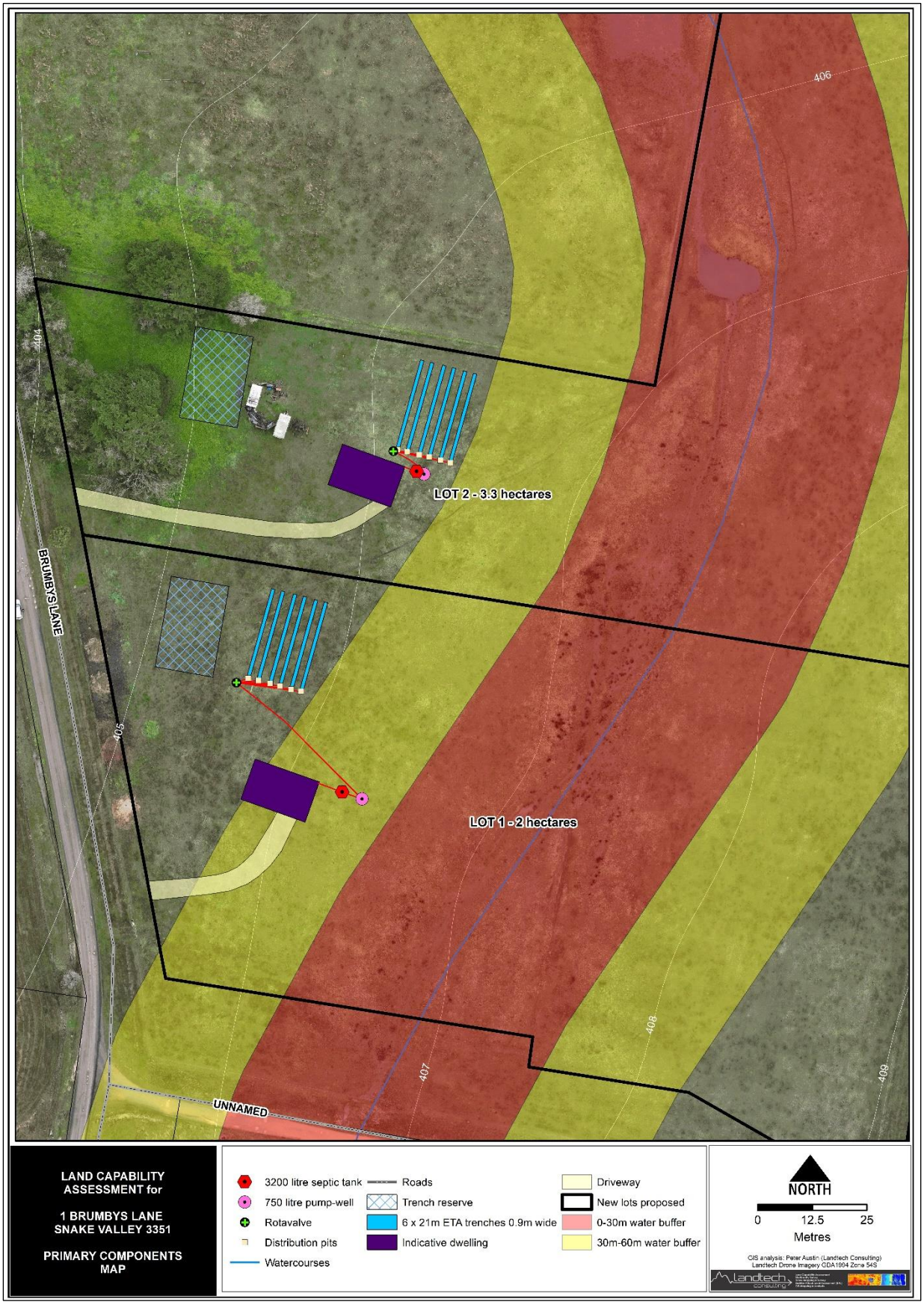


Figure 25 – Proposed primary treatment using septic tank and ETA trenches at 0.9m wide.

6.2 TREATMENT SYSTEM FURTHER INFORMATION

The author recommends the use of either primary treatment (3200L septic tank) or secondary treatment.

Secondary treatment (AWTS's or Sand Filter System) requires the capability to treat to 20:30:10 effluent quality including required quarterly (AWTS) or annual (SFS) servicing requirements.

Sand filtration could be considered due to potential reduced cost impact to the owner (annual maintenance vs quarterly costs for AWTS) however install costs and additional components needed increase the cost for SFS also.

Using secondary treatment unlike primary (septic tank) treatment, owners will gain the benefit of wastewater re-use via plant/pasture uptake, useful in periods of low rainfall, and the requirement on the site to retain maximum vegetation cover.

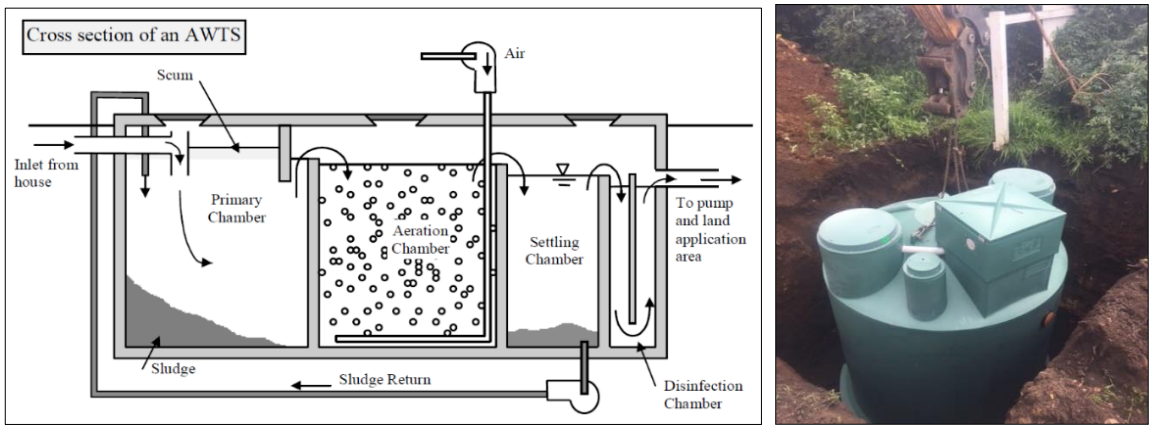
This is a significant benefit in the long term using secondary treatment systems over primary treated effluent which limits disposal options and increases disposal footprint area required.

AWTS's – Aerated Wastewater Treatment Systems

Commercial AWTS's are prefabricated, mechanically aerated wastewater treatment systems, designed to treat wastewater flows of >2,000L/day.

AWTS's are tank-based systems, comprising either one or two discrete tanks that typically employ the following processes: [15]

- Settling of solids and flotation of scum in an anaerobic primary chamber or separate primary tank (effectively operating as a septic tank). This stage is omitted in some models.
- Oxidation and consumption of organic matter through aerobic biological processes using (active or passive) mechanical aeration.
- Clarification – secondary settling of solids.
- Disinfection – usually by chlorination but occasionally using ultraviolet irradiation.
- Regular removal of sludge to maintain the process.



Figures 26-27 – Cross-sectional view of an aerated wastewater treatment system (AWTS); Aerated Wastewater Treatment System (Source: EHPA, Ozzikleen 2017).

AWTS's treat wastewater through a combination of biological treatment and aeration, resulting in a higher standard of wastewater effluent. This provides greater options for the disposal of treated effluent, although AWTS will require power to operate, and be subject to regular quarterly maintenance. Treated effluent is normally disposed of via pressure compensating sub-surface irrigation to a suitably sized and vegetated area, although dosed soil absorption trenches can be used in certain situations.

The extra treatment provided by an aerated septic tank reduces pathogen levels, (and can sometimes reduce nutrients) as long as the system is kept well maintained and the disinfection unit is functioning properly. AWTS's may also be used to treat greywater to a standard suitable for garden watering of non-food plants. AWTS are typically supplied as stand-alone, proprietary systems. They require regular maintenance in accordance with the EPA Certificate of Approval for the specific model (usually quarterly) to ensure satisfactory performance and adequate disinfection.

The operating (power) costs of AWTS are relatively high compared to more passive systems such as trickling filters and reed beds, as the aerobic treatment phase requires air blowers to be run for several hours each day.[16] AWTS's must not be switched off when not in use as the deprivation of oxygen will kill the aerobic bacteria within a few days and populations can take weeks to be re-established when the system is turned on and wastewater supply resumes. Some AWTS models have a low-flow switch which re-circulates effluent to keep aerobic bacteria alive when not in use.

[15] Corangamite Shire Council (2014). Corangamite Shire Council Domestic Wastewater Management Plan; Accessed from: https://www.corangamite.vic.gov.au/Property/Building/Wastewater-systems/Domestic-Wastewater-Management-Plan-DWMP-2014
[16] Colac Otway Shire (2016). Colac Otway Shire Council Domestic Wastewater Management Plan - Technical Document, Accessed from: http://www.colacotway.vic.gov.au/files/assets/public/trimfiles/my-property/domestic-wastewater-management-plan/dwmp-webpage-locality_info_cororooke.pdf

7. LAND APPLICATION SYSTEM (EFFLUENT DISPOSAL)

A range of possible land application systems have been considered such as Subsurface Irrigation, Evapo-transpiration-absorption (ETA) trenches, Wick-Trenches, and Rhizopod-based treatment/disposal.

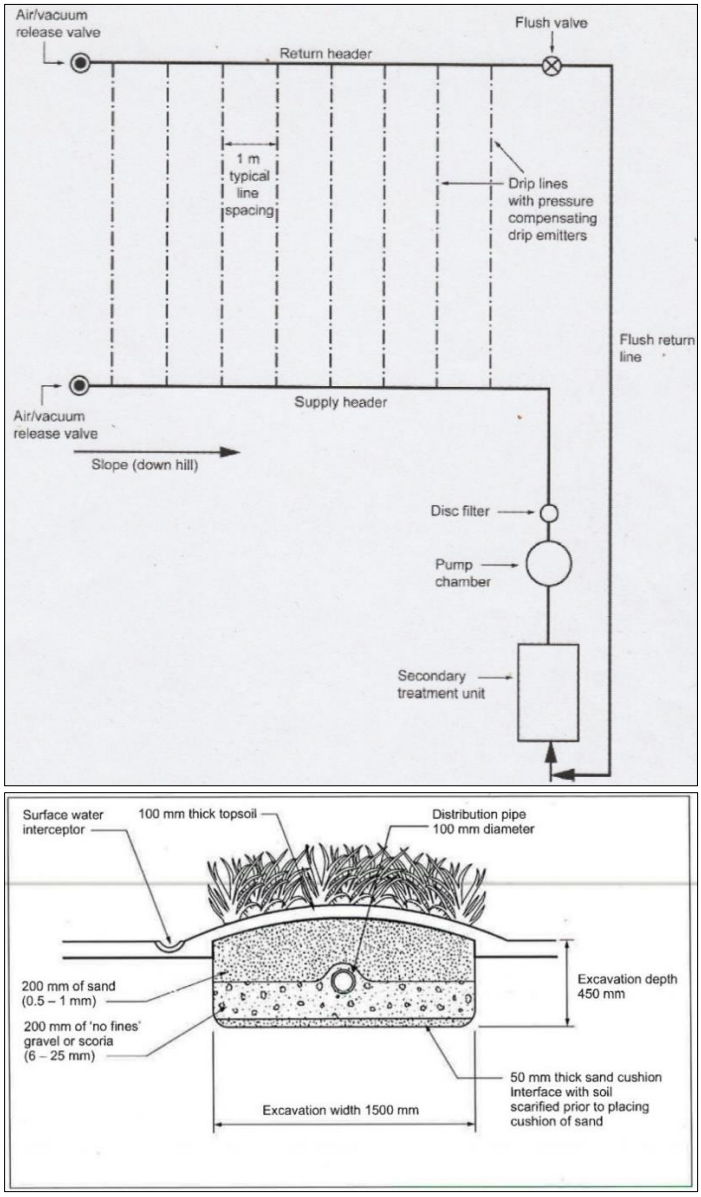
ETA trenches could be utilised to maximise treatment prior to disposal to clay-textured sub-soils. The use of ETA trenches with secondary treatment reduces disposal footprints required.

The use of subsurface irrigation allows application of effluent over large areas within topsoil and root zones of pastures, grasses, and trees, in addition for the potential usage via targeted tree and shrub plantings (based on a lineal (m) or area (^{2}) measure of required irrigation (see *Figure 28).*

Future lot owners are encouraged to plant areas of indigenous grasses and sedges (such as *Lomandra sp., Lepidosperma sp., Poa sp.*) in blocks and linear multi-row plantings above and below and LAA.

This will assist in ensuring the risk of effluent transported off-site (and to groundwater or watercourse) should be negligible or highly-mitigated.

The proposed land application area must be permanently protected from stock, person activity, or compacting machinery / parked vehicles etc. Failure to complete this will inevitably reduce the long-term sustainability of the system and lost investment.



Figures 28-29 – Subsurface irrigation configuration and ETA trench diagram based on ASNZS 1547 (Source: ASNZS 1547).

7.1 SIZING THE EFFLUENT DISPOSAL SYSTEM

To determine the necessary size of the land application/effluent disposal areas, water and nutrient balance modelling has been undertaken in accordance with EPA Code of Practice 891.4 (2016) and AS/NZS1547.

The *nominated land application area (LAA) method* has been used to calculate the area required to balance all inputs and outputs to the water balance of the system and soil profiles presenting.

For the site MAV Irrigation spreadsheets (using 3mm DIR as per Silty Light Clay soil texture) were used to calculate such areas.[17]

4-BEDROOM DWELLING	HYDRAULIC	NITROGEN	PHOSPHOROUS	LAA REQUIRED
900L/day	447	299	397	447

As a result of hydraulic balance calculations, both lots require the above-listed required areas to achieve zero wet weather storage.

1	Victorian Land Capability Assessment Framework				
2	**Trench & Bed Sizing**				
3					
4	**FORMULA FOR TRENCH AND BED SIZING**				
5	**L = Q/DLR x W**			From AS/NZS 1547:2012	
6	**Where:**	Units			
7	L = Trench or bed length	m		Total trench or bed length required	
8	Q = Design Wastewater Flow	L/day		Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)	
9	DLR = Design Loading Rate	mm/day		Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)	
10	W = Trench or bed width	m		As selected by designer/installer	
11					
12	**INPUT DATA**				
13	Design Wastewater Flow	Q	900	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013
14	Design Loading Rate	DLR	8.0	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)
15	Trench basal area required	B	112.5	m^2	
16	Selected trench or bed width	W	0.9	m	As selected by designer/installer
17					
18	**OUTPUT**				
19	Required trench or bed length	L	125.0	m	
20					

Figure 30 – Trench sizing - 4-bedroom – primary treatment ETA trenches at 0.9m wide

1	Victorian Land Capability Assessment Framework				
2	**Trench & Bed Sizing**				
3					
4	**FORMULA FOR TRENCH AND BED SIZING**				
5	**L = Q/DLR x W**			From AS/NZS 1547:2012	
6	**Where:**	Units			
7	L = Trench or bed length	m		Total trench or bed length required	
8	Q = Design Wastewater Flow	L/day		Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)	
9	DLR = Design Loading Rate	mm/day		Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)	
10	W = Trench or bed width	m		As selected by designer/installer	
11					
12	**INPUT DATA**				
13	Design Wastewater Flow	Q	900	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013
14	Design Loading Rate	DLR	12.0	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)
15	Trench basal area required	B	75.0	m^2	
16	Selected trench or bed width	W	0.9	m	As selected by designer/installer
17					
18	**OUTPUT**				
19	Required trench or bed length	L	83.3	m	
20					

Figure 31 – Trench sizing – primary treatment - ETA trenches at 0.9m wide

[17] EPA Victoria; EPA Code of Practice 891.4 (2016). Table 4: Minimum daily wastewater flow rates and organic loading rates Accessed from: https://www.epa.vic.gov.au/about-epa/publications/891-4

7.2 SITING AND CONFIGURATION OF THE EFFLUENT DISPOSAL SYSTEM

Notwithstanding the impact of *reduced lot area for disposal due to watercourse setbacks*, there is adequate area for location and configuration of an effluent disposal system (LAA and trench reserve areas) within both lots.

Figures 22-25 show effluent envelopes on landscapes suitable for effluent management according to the water and nutrient balance calculations.

Reserve land application areas provide long-term alternative effluent disposal areas if the (proposed) effluent disposal area fails. The current proposal configuration will allow provision for reserve trench areas.

The location of the system is based on plans, previous technical assessement documents, and advice, provided by the owner and architect/surveyor. It is recommended that the owner consult an appropriately registered plumbing/drainage practitioner to quote, supply, and install the system.

Final placement and configuration of the effluent system will be determined by the client/owner and plumber, with prescriptive input from Council (and Landtech if required).

Whilst there is area for application of the effluent, it is important that appropriate buffer distances to boundaries and proposed built structures such as dwellings, embankments, driveways, rainwater tanks, and sheds (refer *Table 5 EPA Code of Practice 891.4: 2016 and AS/NZS 1547*).

7.3 BUFFER DISTANCES

All buffer distances are achievable. The relevant buffer distances for this site, taken from *Table 5* of the Code (891.4 - 2016) are:

- *50 metres from groundwater bores in sandy soils; and*
- *60 metres from non-potable watercourses; and*
- *100m from potable watercourses (declared water supply catchment area); and*
- *3 metres if area up-gradient and 1.5 metres if area down-gradient of property boundaries, swimming pools and buildings (secondary treatment).*

Figure 32 – In-situ view of house connection to treatment system (Source: Taylex 2023).

7.4 INSTALLATION OF THE EFFLUENT DISPOSAL SYSTEM

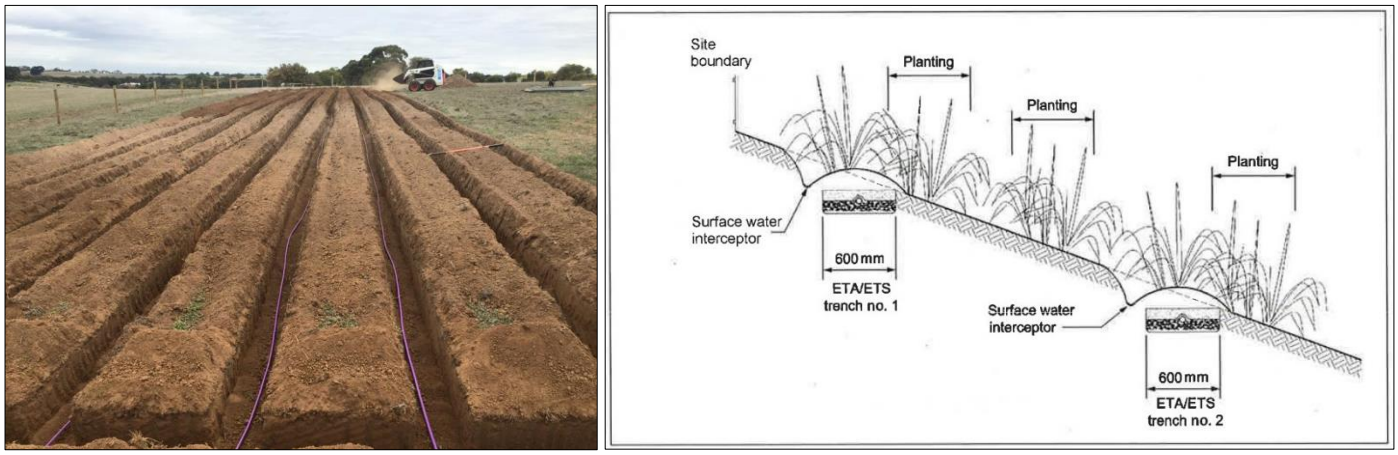
Careful design and specific installation of the proposed effluent disposal system is required in light clay-textured soils such as occurs at the subject site (see *Figures 22-25*).

→ The addition of gypsum can assist with clodding unstructured clay soils and thus improving potential wastewater infiltration.

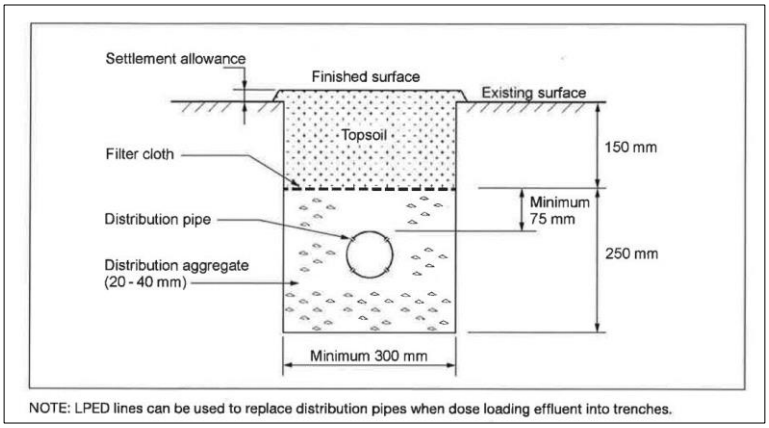
→ The addition of organic matter to disposal area footprints additionally improves nutrient retention and treatment due to increased microbial activity, enhanced soil structure, and increased colloidal sites for nutrient store and treatment. Moisture is held for longer periods enhancing the surface-based (top 150mm) treatment and evapotranspiration of wastewater.

Other key issues include installation via:

1. A suitably qualified, licensed plumber must carry out installation of the effluent disposal system as per AS/NZS 1547;
2. The effluent disposal area must be vegetated or revegetated immediately following installation of the system, preferably with turf or native sedges and grasses (border of entire effluent area if possible); and
3. The area should be fenced or otherwise isolated (such as by landscaping), to prevent vehicle and stock access; and
4. Signs should be erected to inform householders and visitors of the extent of the effluent irrigation area, and to limit their access and impact on the area.



Figures 33-34 –Subsurface irrigation site preparation; ETA trenching on sloping ground (Source: ASNZ1547).



Figures 35-36 – Cross-section of soil absorption trench; Rotavalve for dosing disposal areas (Source: ASNZ1547).

8. CONCLUSION

As a result of our investigations we conclude that sustainable onsite wastewater management is feasible with appropriate mitigation measures as outlined.

NEW 4-BEDROOM DWELLINGS

The potential new dwellings with 900L/day output would require the following:

LOTS 1 & 2

- Both lots could utilise either primary or secondary treatment options;
- If primary treatment is preferred both lots will require a 750 litre pump-well to pump effluent upslope and outside the 60m watercourse buffer;
- Primary treatment would utilise a 3200 litre septic tank and disposed via a pump-well to 125m lineal ETA trenches at 0.9m wide;
- Upslope pumping is not considered best-practice however land is available outside the 60m buffer setback for location of the disposal system;
- Secondary treatment could be used via an AWTS (Aerated Wastewater Treatment System) or Sand filter system that could utilise either 447m² subsurface irrigation or 84m lineal ETA trenches at 0.9m wide for disposal;
- Disposal of effluent using secondary treatment can be sited downslope of the proposed dwellings and utilise land outside the 30m buffer setback;
- Regardless of the treatment type used, land application areas/trenches should be inter-planted (vegetated using sedges and tussock grasses) around and specifically downslope from effluent disposal areas;
- Gate valves and inspection pits should be placed before and after all system components (and raised to ground level inspection) so system components can be isolated when maintenance is required;
- Pump size used within AWTS's and pump-well's must be matched to suit pumping requirements, with alarm systems wired to the central power supply;
- Suggested use of low phosphorus and low sodium (liquid) detergents to improve effluent quality and maintain soil properties for growing plants;

- *Figures 22-25* depict areas that could support adequate effluent envelopes within each lot (required for effluent management) (and according to the water and nutrient balance calculations);
- Treatment systems installed should require maintenance, management, and performance monitoring completed quarterly (and report to Council procedures);
- System maintenance and report to Council prescriptions should be built into the Council Permit to Alter/Use (with conditions such as quarterly servicing of AWTS and effluent disposal areas, pumps, and alarm systems);
- Operation, maintenance, and management of the treatment and disposal system must be in accordance with the manufacturer's recommendations, the *EPA Certificate of Conformity*, the *EPA Code of Practice 891.4 (2016),* Council permit conditions, and the recommendations made in this report;

  →The effluent irrigation area must be located as follows:

  1. In an area that is not subject to vehicular traffic.
  2. >3.0m from a gas or water pipe (primary treatment).
  3. >3.0m on the low side or 6.0m on the high side of a property boundary (primary treatment).
  4. >1.5m from a gas or water pipe (secondary treatment).
  5. >1.5m on the low side or >3.0m on the high side of a property boundary (secondary treatment).
  6. >3.0m from a swimming pool or stormwater drain.

- A *Permit to Install* an all waste system must be lodged and approved by the Responsible Authority prior to the commencement of works on any lot. Such system shall be designed and installed to the satisfaction of the Responsible Authority before a *Permit to Use* the system can be issued.
- Future accommodation development to include installation WELLS & AAA-rated appliances, plumbing fixtures, and water-saving appliances to minimise effluent load (see *Appendix 9*).

APPENDIX 1 - COUNCIL REGULATORY REQUIREMENTS[18]

The Pyrenees Shire's Domestic Wastewater Management Plan 2015-18 (DWMP) was adopted by Council in July 2015.

The DWMP covers the assessment of new installations and alterations across the entire Shire. It also sets out a requirement to make sure existing systems do not pose a threat to the environment, particularly in areas that are part of Declared Potable Water Catchments.

The current DWMP sets out Inspection requirements based on Risk Level to all properties with existing systems within the Declared Potable Water Catchment areas of Loddon River/Laanecoorie, McCallum Creek, Wimmera Systems, Malakoff Creek/Wimmera Systems and St Enochs Spring Skipton.

These areas include in and/or around the townships of Evansford, Lexton, Waubra and Landsborough amongst others. The Raglan Borefields and Trawalla Creek Catchment are also covered under the Shire's DWMP.

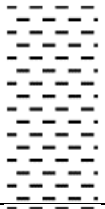
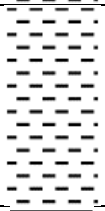
The DWMP also specifies a requirement for Inspections to assess the health of existing systems within five of the unsewered townships in the Shire - Amphitheatre, Landsborough, Moonambel, Raglan and Redbank.

[18] Pyrenees Shire Council (2015-18); Domestic Wastewater Management Plan; Accessed from: https://www.pyrenees.vic.gov.au/Plan-Build/Wastewater-and-Septic-Tanks/Domestic-Wastewater-Management-Plan

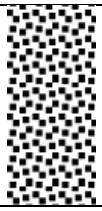
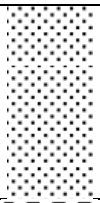
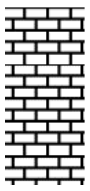
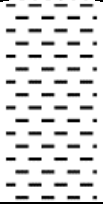
APPENDIX 2: SOIL BORE LOG

SOIL BORE LOG		LANDTECH CONSULTING	
Client	[redacted]	**Test pit no.**	1 & 2
Site	1 Brumbys Lane, Snake Valley, 3351.	**Excavated by**	Landtech Consulting
Date	23.7.2023	**Excavation type**	Hand-auger
Notes	Refer *Figure 8* for position of Test Pits		

PROFILE DESCRIPTION

Depth mm	Graphic log	Sample name	Horizon	Texture	Structure	Colour	Mottles	Coarse fragments	Moisture condition	COMMENTS
0-250		TP1 & TP2	A1	Silty Loam	Moderate	Brown	Nil	Nil	Dry	Nil
250-700		TP1 & TP2	A2	Silty Loam	Moderate	Grey Brown	Nil	Nil	Moist	Nil
700-1200		TP1 & TP2	A2	Silty Light Clay	Moderate	Light Grey Brown	Minor	Nil	Moist	Nil

KEY TO SOIL BORELOGS

Watertable depth	W	Depth of refusal	X	Sample collected	·
S - Sand **LS** - Loamy sand **CS** - Clayey sand		**CL** – Clay loam **SCL** – Sandy clay loam **SiCL** – Silty clay loam		Gravel (G)	
SL – Sandy loam		**LC** - Light clay **SC** - Sandy clay		Parent material (stiff)	
L – Loam **LFS** – Loam fine sand **SiL** – Silty loam		**MC** – Medium clay **HC** – Heavy clay		Parent material (weathered)	

APPENDIX 3 – SOIL SURVEY – RISK ASSESSMENT IDENTIFICATION.[19]

TEST PITS 1 & 2 – GREY BROWN VERTOSOL			Nil or Minor	Moderate	Major	Assessed Level of Constraint
Soil Depth	Soil depth greater than 1200mm and no hardpans occur. Topsoil: <700mm; Subsoil: >1200 mm.		>1.5 m	1.5 – 1 m	<1 m	Nil
Depth to watertable	Groundwater not encountered; test hole terminated at 1.2m. Mapping indicates groundwater depth 30m (VVG 2023).		>2 m	2 – 1.5 m	<1.5 m	Nil
Coarse Fragments (%)	Minor coarse fragments occur within the soil profile.		0 – 10%	10 – 20 %	>20%	Moderate
	TOPSOIL	**SUBSOIL**				
Soil texture AS/NZS/1547:2012	Silty Clay Loam	Light Clay	Cat. 2b, 3a, 3b, 4a	Cat. 4b, 4c, 5a, (5b)	Cat. 1, 2a, 5c, 6	Moderate
Soil colour	Light Brown 7.5YR/5/3	Brown 5YR/4/6				
Soil structure	Highly structured	Highly structured	Highly or Moderately structured	Weakly-structured	Structureless, Massive or hardpan	Nil
Soil Permeability AS/NZS1547:2012	1.5 - 3m/day saturated conductivity (K_{sat})	0.12 – 0.5m/day saturated conductivity (K_{sat})	0.5 – 3m/day	0.06 – 0.5m/day	>3 or <0.06m/day	Moderate
Gleying (see Munsell Soil Colour Chart)	Nil	Nil	Nil	Some evidence greenish grey / black or bluish grey / black soil colours	Predominant greenish grey / black, bluish grey / black colours	Nil
Mottling (Munsell Soil Colour Chart)	Nil	Minor	Very well to well-drained soils - uniform brownish or reddish colour	Moderately well to imperfectly drained soils - grey and/or yellow brown mottles higher in the profile	Poorly drained soils, dominant grey colours, yellow brown or reddish brown mottles	Nil
Soil Category (Table 9, EPA Code of Practice 891.4)	3a	5a	Cat. 2b, 3a, 3b, 4a	Cat. 4b, 4c, 5a, (5b)	Cat. 1, 2a, 5c, 6	Nil
Design Irrigation Rate	4 (DIR mm/day) for Subsurface Irrigation	3 (DIR mm/day) for Subsurface Irrigation	*(Table 9 – Vic EPA COP 891.4) Inferred with reference to Table 4 Vic EPA – Code of Practice 891.4; describes conservative design loading rates (DLRs) and Design Irrigation Rates (DIRs) for various effluent application systems according to soil texture. Reduced loading rates applies to primary treatment systems.*			
Design Loading Rate	15 (DLR mm/day) for ETA beds and trenches	8 (DLR mm/day) for ETA beds and trenches				
pH The pH of 1:5 soil/water using a *Hanna* hand-held pH/EC meter.	6.7 - slightly acid. Soil conditions do not appear to be affecting plant growth.	7.1 - slightly alkaline. Soil conditions do not appear to be affecting plant growth.	5.5 - 8	4.5 - 5.5	<4.5, >8	Nil
Electrical Conductivity (Ec) (dS/m) measure of soil salinity.	0.124 deciSiemens per metre. Negligible salinity exists and will therefore not impact long-term operation of the system.	0.231 deciSiemens per metre. Negligible salinity exists and will therefore not impact long-term operation of the system.	<0.8	0.8 - 2	>2	Nil
Emerson Aggregate Class	EA Class 5 (some slaking, no dispersion or swelling)	EA Class 5 (some slaking, no dispersion or swelling)	4, 5, 6, 8	7	1, 2, 3	Nil

[19] Municipal Association of Victoria, Department of Environment and Sustainability and EPA Victoria (2013) Victorian Land Capability Assessment Framework.

APPENDIX 4 – SITE RISK RATING LIMITATIONS[20]

Rating	Degree of limitation	Detail
Rating 1	None to very slight	The effluent envelope is suitable for on-site disposal of septic discharge. The limitations or environmental hazard from long-term use is considered very slight. Standard performance measures for design, installation and management should prove satisfactory.
Rating 2	Slight	The site has been identified as generally suitable for on-site effluent disposal but there is a slight associated environmental hazard expected. One or more land limitations are present, which may not be compatible with straight forward conventional on-site disposal. The wastewater management program will require careful planning, adherence to specifications and adequate supervision.
Rating 3	Moderate	The site has only a fair capability for on-site effluent disposal with a moderate associated environmental risk always present. Very careful site selection, preparation and specialised design will be required to address the identified land constraints. A management program should be delivered to the responsible authority with the development application and prior to earthworks commencing. It is recommended that in order to achieve BPEM, wastewater processing systems which can attain a higher level of treatment with basic monitoring should be considered as an alternative to standard conventional trench disposal.
Rating 4	High	Areas have poor capability rating with a high associated environmental risk. Considerable difficulties are expected during siting and installation of the wastewater treatment system and during routine operation. A very high engineering input and close supervision would be needed to minimise the environmental impact. Alternative wastewater processing systems capable of consistently producing high quality secondary effluent (such as aerated wastewater treatment plants) together with a close monitoring program should be seriously investigated and adopted.
Rating 5	Severe	Areas have a very poor capability and there is a severe associated environmental risk. The areas are not generally considered suitable for disposal of septic tank effluent by trench systems. The high levels of engineering input and management needed at all stages are unlikely to adequately address the identified land constraints and achieve a sustainable outcome.

[20] Standards Australia / Standards New Zealand (2012). AS/NZS 1547:2012 On-Site Domestic Wastewater Management.

APPENDIX 5 - THE WATER BALANCE

The water balance can be expressed by the following equation:

Precipitation + Effluent Applied = Evapotranspiration + Percolation

Based on the use of primary treatment and soil absorption trenches and site soil texture, the design loading rate based on Table 9 of the *EPA Code of Practice 891.4 (2016)* is 3mm/day.

A conservative approach has been taken in this instance where higher rainfall totals have been used in water and nutrient balance calculations to maximise buffering of the selected treatment system.

- Mean monthly rainfall (Durdiwarah) and mean monthly pan evaporation (Creswick 88019);
- Average daily effluent load – 900L/day (from Table 4 of the *Code 891.4*);
- Design loading rate (DLR) – 3mm/day used (from Table 9 of the *Code 891.4*);
- Crop factor – 0.7;
- Retained rainfall – 80%

The nominated area method is used to calculate the area required to balance all inputs and outputs to the water balance.

As a result of these calculations both lots require 447m^2 land application area required to achieve zero wet weather storage (see *Figure 37*).

Victorian Land Capability Assessment Framework

Please read the attached notes before using this spreadsheet

Irrigation area sizing using Nominated Area Water Balance for Zero Storage

Site Address:	1 BRUMBYS LANE SNAKE VALLEY 3351				
Date:	23.7.2023		**Assessor:**	Landtech Consulting	

INPUT DATA

Design Wastewater Flow	Q	900	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)
Design Irrigation Rate	DIR	3.0	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)
Nominated Land Application Area	L	267	m^2	[1]
Crop Factor	C	0.6-0.8	unitless	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type[2]
Rainfall Runoff Factor	RF	0.8	unitless	Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff
Mean Monthly Rainfall Data	Durdiwarah			BoM Station and number
Mean Monthly Pan Evaporation Dat	Creswick (088019)			BoM Station and number

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month	D		days	31	28	31	30	31	30	31	31	30	31	30	31	**365**
Rainfall	R		mm/month	42.3	47.4	50	55.5	57.2	57.2	53.5	60.1	68.3	68.7	62.4	55.3	**677.9**
Evaporation	E		mm/month	207.7	184.8	127.1	81.0	49.6	27.0	27.9	43.4	66.0	111.6	129.0	155.0	**1210.1**
Crop Factor	C		unitless	0.80	0.80	0.70	0.70	0.60	0.60	0.60	0.60	0.70	0.80	0.80	0.80	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	166	148	89	57	30	16	17	26	46	89	103	124	**911.09**
Percolation	B	DIRxD	mm/month	93.0	84	93.0	90.0	93.0	90.0	93.0	93.0	90.0	93.0	90.0	93.0	**1095.0**
Outputs		ET+B	mm/month	259.2	231.84	182.0	146.7	122.8	106.2	109.7	119.0	136.2	182.3	193.2	217.0	**2006.1**
INPUTS																
Retained Rainfall	RR	RxRF	mm/month	33.84	37.92	40	44.4	45.76	45.76	42.8	48.08	54.64	54.96	49.92	44.24	**542.32**
Applied Effluent	W	(QxD)/L	mm/month	104.5	94.4	104.5	101.1	104.5	101.1	104.5	104.5	101.1	104.5	101.1	104.5	**1230.3**
Inputs		RR+W	mm/month	138.3	132.3	144.5	145.5	150.3	146.9	147.3	152.6	155.8	159.5	151.0	148.7	**1772.7**
STORAGE CALCULATION																
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	27.5	68.2	105.7	133.3	158.8	136.0	93.8	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-120.8	-99.5	-37.5	-1.2	27.5	40.7	37.6	33.5	19.6	-22.8	-42.2	-68.3	
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	27.5	68.2	105.7	139.3	158.8	136.0	93.8	25.6	
Maximum Storage for Nominated Area	N		mm	158.83												
	V	NxL	L	42408												
LAND AREA REQUIRED FOR ZERO STORA			m^2	124	130	197	264	362	447	417	393	331	219	188	161	

MINIMUM AREA REQUIRED FOR ZERO STORAGE 447.0 m^2

Figure 37 – Water balance calculations (MAV 2016).

APPENDIX 6 - THE NUTRIENT BALANCE

A nutrient balance (nitrogen / phosphorous) has been undertaken to check that the proposed LAA is of sufficient size to ensure nutrients are effectively assimilated by soils and vegetation (see *Figure 38 and the table below*).

The model used here is based on a simplistic methodology but improves on this by incorporating more variables in the respective nutrient cycles to more accurately model actual processes.

It acknowledges that a proportion of nitrogen will be retained in the soil through processes such as mineralisation (the conversion of organic nitrogen to ammonia) and volatilisation.[21] It also accounts for crop growth rates (and hence nutrient uptake rates) for a typical pasture.

Some assumptions used in the modelling follow:

- Hydraulic loading – 900L/day
- Nitrogen concentration in effluent – 30 mg/L
- Nitrogen percentage lost to soil processes – 20%
- Phosphorus concentration in effluent – 10 mg/L
- Critical nutrient loading rates – 220 kg/ha/year (60 mg/m²/day) for nitrogen and 50 kg/ha/year (14mg/m²/day) for P
- Soil phosphorus sorption capacity – 3375 kg/ha of soil
- Proportion of phosphorus sorption capacity utilised – 50%
- Design life of system - 50 years

4	**Nitrogen Balance**								
5	**Site Address:**	**1 BRUMBYS LANE SNAKE VALLEY 3351**							
6	**SUMMARY - LAND APPLICATION AREA REQUIRED BASED NITROGEN BALANCE**							**299**	m^2
7	**INPUT DATA**[1]								
8	**Wastewater Loading**				**Nutrient Crop Uptake**				
9	Hydraulic Load	900	L/day	Crop N Uptake	220	kg/ha/yr	which equals	60.27	$mg/m^2/day$
10	Effluent N Concentration	25	mg/L						
11	% N Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal						
12	Total N Loss to Soil	4500	mg/day						
13	Remaining N Load after soil loss	18000	mg/day						
14	**NITROGEN BALANCE BASED ON ANNUAL CROP UPTAKE RATES**								
15	**Minimum Area required with zero buffer**			**Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)**					
16	Nitrogen	299	m^2	Nominated LAA Size	267	m^2			
17				Predicted N Export from LAA	0.70	kg/year			
18				Minimum Buffer Required for excess nutrient	32	m^2			

Figure 38 - Nutrient balance calculations (MAV 2016).

PHOSPHOROUS BALANCE	
1 Determine the daily P load	Effluent concentration P – 10mg/L Daily hydraulic load – 900 L/day 10 x 900 = 9000 mg/day
2 Determine the annual P load	9000 mg/day x 365 days = 3285,000 mg - Annual P load = 3.285 kg
3 Allow for an uptake by plants (application rate) of 50 kg P/ha/yr	This figure is suitable for a regularly maintained grass cover.
4 Determine P sorption each year for 50 years	3285 / 50 x 0.5 (actual field sorption multiplier) = 3.285 kg/ha/year
5 Determine total annual application rate	Plant uptake + P sorption = 32.85 + 50 (Total P application rate) = 82.85 kg/ha/year
6 Divide the annual P load by the application rate	3.285 / 82.85 = 0.03964ha - multiply by 10 000 m²
Minimum area required for P assimilation over 50 years	The area required for phosphorous assimilation requires 396.4 **(397m²).**

[21] Geary, P. and Gardner, E. (1996). On-site Disposal of Effluent. In Proceedings from the one day conference Innovative Approaches to the Management of Waste and Water, Lismore 1996.

APPENDIX 7 - MONITORING, OPERATION AND MAINTENANCE

Maintenance is to be carried out in accordance with the *EPA Certificate of Approval/Conformity* of the selected wastewater system, manufacturer's warranty, and Council's permit conditions. The system will only function adequately if appropriately and regularly maintained.

To ensure the system functions adequately, residents must:

- Use household cleaning products that are suitable for wastwater systenms;
- Keep as much fat and oil out of the system as possible; and
- Conserve water (AAA rated fixtures and appliances ar recommended).

To ensure the land application system functions adequately, residents must:

- Regularly harvest (mow) vegetation within the Land Application Area (LAA) and remove this to maximise uptake of water and nutrients;
- Not erect any structures and paths over the LAA;
- Avoid vehicle and livestock access to the LAA, to prevent compaction and damage; and
- Ensure that the LAA is kept level by filling any depressions with good quality topsoil (not clay).

Monitoring and Maintenance suggested scheduling.

Item	System components	Service regularity	Details	Report to Council
1	5K AWTS 3.2K - 5K septic tanks	3 months	Desludge Blowers Electrical Disinfection (if applicable)	Yes
2	Pump-wells	3 months	Electrical Operation Desludge if required	Yes
3	Indexing valve	3 months	Check operation and manufacturer service requirements	Yes
4	Subsurface irrigation fields	6 months	Wetting patterns Blockages System flushing Effectiveness	Yes
5	Alarms	3 months	Electrical Operation Off-site signalling	Yes
6	Performance testing	3 months	Series of tests detailed in EPA Publication 500	Yes
7	Maintenance report	Annual	Report annual tests/service completed to Council	Yes

WATER CONSERVATION, WATER QUALITY, AND STORMWATER MANAGEMENT

Effective water conservation is an important aspect in the overall management of onsite systems. It will be important for the ongoing performance of both the treatment and land application system that they are not overloaded hydraulically.

Stormwater run-on may be a moderate concern for the proposed land application area. An upslope (of LAA) diversion drain should be installed during the construction of the system. Stormwater from roofs and other impervious surfaces must not be disposed of into the wastewater treatment system or onto the effluent management area.

APPENDIX 8 - PUMP-WELL SYSTEMS

The following issues should be taken into consideration when designing pump-wells into the treatment system.[22]

a) The location of a pump well is normally determined by site conditions but if practicable they should be located after a settling tank;
b) The selection of pumps should be governed by the volume of waste to be pumped;
c) Pumps may also serve as a dosing device and/or flow equaliser for the plant; and
d) Multiple pumps with automatic operation and changeover must be installed in all systems except for single dwellings or premises where the daily flow is less than 1000 litres.

Section 8.2 Suggested Measures of EPA Publication 500:

- Pump wells are constructed in accordance with diagrams provided;
- Pump stop and start (cut-out/in) levels to be located so that the duty pump will discharge a volume of liquid equal to approximately one (1) hour of MDF;
- In emergency situations – such as power failure the well has an additional liquid storage capacity of at least (1) hour of MDF between pump cut-in and well inlet levels.
- Alarm systems and controls are provided in an accessible location to indicate failure of the pumping system.
- The system has a suitable and permanently installed visual/audible warning device with mute facility.
- In the case of remote systems – such as those serving subdivisions – a telemetry alarm system with interrogation should be provided.

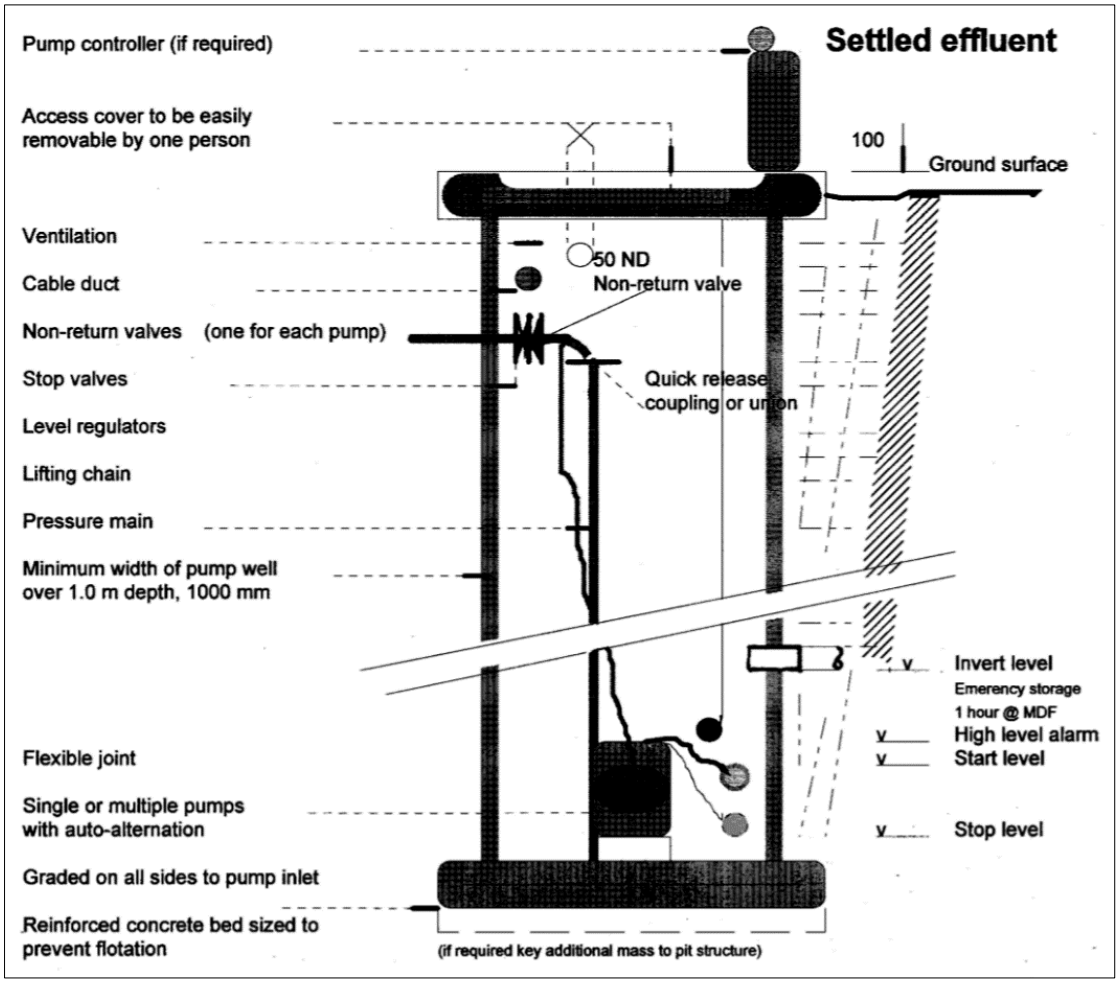


Figure 39 - Pump-well system template cross-section with system components required (Source: Vic EPA 1997).

[22] Victorian EPA Publication 500, 1997: Accessed from: https://www.epa.vic.gov.au/about-epa/publications/500

DESIGN EXAMPLE – PUMP WELL AND PUMPS

Requirement

Settled wastewater from a septic tank serving a 20 site camping park is required to be pumped to a stabilisation pond system located 150m away. The invert depth of the tank outlet is 1.6 m below the surface level and the proposed pond water level is 3 m above this level.

1. Determine the daily flow (MDF) and peak hourly flow (PHF)

Assume 3.5 people per site @ 100 litres per person and a peak to average hourly flow ratio of 6 (Table 2 and Figure 4)

a) Daily flow = 20 sites x 3.5 people x 100 litres/person
= 7,000 litres per day (7 kL/d)

b) Average hourly flow = 7,000/24
= 292 litres per hour

c) Peak hourly flow = 292 x 6
= 1,752 litres per hour

2. Determine size of pump well

a) Pump well capacity between well inlet and invert to accommodate discharge volume and emergency storage (Figure 12)

= Pump cycle + emergency storage
= 2h@MDF
= 2 x 292
= 584 litres

b) Calculated pump cycle capacity plus emergency storage – assuming a pump well diameter of 1,050 mm

Well depth = $4 \times 0.584/3.14 \times (1.05)^2$
= 0.67m (Cut-in /out 350 mm)
(Inlet/cut-in 350 mm)

c) Check if mass of pump well is sufficient to prevent well floating to external hydrostatic forces when empty.

Mass of pump well = mass of liquid displaced

Mass of RCP + T & B slabs = mass of water displaced by well
= 2.4×655 kg/m + $3.14/4\ (1.05 + 0.15)^2 \times 2{,}500$ kg/m^3 x
= $3.14/4\ (1.2)^2 \times 2.4 \times 1{,}000$ kg/m = m^3

Depth of top and bottom slabs 'd' = 0.4 m

Construction pump well using 2 No. 1.2 m x 1,050 mm RCPs walls 70 mm thick, top slab 100 mm and base slab 300 mm deep.

3. Selection of pump size

i) Hydraulic capacity (PHF) = 1,752 L/h (0.5 L/s)
ii) Total pumping head = static discharge head + other head losses

From pump manufacturer's tables and data sheets select pumps (duty and standby) for hydraulic capacity of 0.5 L/s at total pumping head.

Figure 40 – Pump-well design example (Source: Victorian EPA 1997).

APPENDIX 9 - REDUCE THE VOLUME OF WASTEWATER GENERATED[23]

Based on *Section 2.3.5.1 Reducing wastewater and in accordance with the principles of the waste hierarchy*, the following steps are recommended to limit the amount of wastewater generated and beneficially use the resultant water resource onsite.

1. High 'Water Efficiency Labelling Scheme' (WELS)-rated water-efficient fittings (minimum '3 Stars' for appliances and minimum '4 Stars' for all fittings and fixtures):
2. Water-efficient clothes washing machines (front or top loading)
3. Dual-flush (6.5/3.5L or less) toilets
4. Water-efficient shower roses
5. Water-efficient dishwashers
6. Aerated taps
7. Hot and cold-water mixer taps (especially for the shower)
8. Flow restrictors
9. Hot water system fitted with a 'cold water diverter' which recirculates the initial flow of cold water until it is hot enough for a shower.

In addition, general steps may include avoiding generating excess wastewater by:

1. constructing a house with fewer bedrooms

2. installing a dry composting toilet

3. not installing a spa

4. not installing a bath (low flow rate shower only)

5. not installing a kitchen food waste grinder.
II. Reduce the volume of wastewater generated by installing:

6. High 'Water Efficiency Labelling Scheme' (WELS)-rated water-efficient fittings (minimum '3 Stars' for appliances and minimum '4 Stars' for all fittings and fixtures):
a. water-efficient clothes washing machines (front or top loading)
b. dual-flush (6.5/3.5L or less) toilets
c. water-efficient shower roses
d. water-efficient dishwashers
e. aerated taps
f. hot and cold water mixer taps (especially for the shower)
g. flow restrictors
h. hot water system fitted with a 'cold water diverter' which recirculates the initial flow of cold water until it is hot enough for a shower.
III. Reuse (another use without any treatment) wastewater by:

7. washing fruit and vegetables in tap water in a container and reusing the water for another purpose in the house such as watering pot plants

8. collecting the initial cold water from showers in buckets and using it for another purpose such as soaking feet, hand washing clothes or washing the car on the lawn.

[23] Environment Protection Agency Victoria (2016). EPA Code of Practice; Onsite Wastewater Management; 891.4. Accessed from: http://www.epa.vic.gov.au/our-work/publications/publication/2016/july/891-4

APPENDIX 10 - SYSTEM INSTALLATION, USE AND MAINTENANCE

A Council Permit to Install is required before the installation of any treatment system and the associated effluent recycling/disposal system. Once installed, the onsite wastewater management system may not be used until Council has issued a Certificate to Use.

Before commissioning, Council must be given suitable notice (the required timeframe will vary between Councils) that the treatment and irrigation systems have been installed (but not buried) and are ready for Council inspection.

The Certificate to Use is issued after Council has received the Plumbing Compliance Certificate and is satisfied the treatment and irrigation systems were installed in accordance with the Permit to Install and this Code.

APPENDIX 11 - SERVICE CONTRACTS[24]

The treatment and irrigation/disposal systems must be operated and maintained in accordance with the conditions in the Council Permit to Install/Alter and this Code to ensure that human health and the environment are protected.

Where a property is served by a treatment system other than a gravity-flow primary treatment and land application system, it is mandatory that the property owner has a service contract with an accredited and trained service technician who will routinely service and maintain the treatment unit and land application system in accordance with the Permit conditions.

Council may fine a property owner under section 53N and Schedule A of the Act for failing to have the treatment system *regularly serviced* on an ongoing basis in accordance with the conditions on the Council Septic Tank Permit.

APPENDIX 12 - MAINTAINING LAND APPLICATION AREA (LAA)

To ensure that a LAA functions efficiently long-term, all the following actions should be undertaken by the land application designer and/or property owner:

• Realistic estimates of water, salt and sodium balances should be made to ensure that sufficient leaching occurs and no salts or sodium can accumulate in the root zone of vegetation. Sufficient gypsum should be applied to the garden to displace sodium from the soil particles and replace lost calcium.

• New land application areas should be vegetated immediately after installation (see list of suitable plants).

• Care should be taken to protect the vegetation growing across soil absorption trenches because plants, together with sunlight and wind, play a vital role in supporting the utilisation and dispersal of wastewater.

• Effluent recycling/disposal areas should be isolated as much as possible from other domestic facilities and activities to protect people and pets from potential contamination with wastewater and to protect the land from disturbance.

• Signs should be erected to inform householders and visitors of the proximity of the LAA and to limit their access and impact on the area.

• Paving, driveways, patios, fences, building extensions, sheds, children's playgrounds, utility service trenching must not be built over or encroach on the disposal/recycling area.

• The long-term functionality of the LAA will depend on the actual (as distinct from the proposed) hydraulic loading, the composition of the wastewater, and the ongoing maintenance of the treatment plant and LAA system.

[24] Environment Protection Agency Victoria (2016). EPA Code of Practice; Onsite Wastewater Management; 891.4. Accessed from: http://www.epa.vic.gov.au/our-work/publications/publication/2016/july/891-4

APPENDIX 13 – SUBSURFACE IRRIGATION INSTALLATION

Subsurface drip irrigation or covered-surface drip irrigation systems are becoming more popular in recent years. Properly designed systems apply effluent at much lower volumetric rates and over larger areas than absorption or ETA trenches/beds or mounds. Coverage is often better than can be achieved by surface irrigation.

Effluent is applied in the root zone of plants (100-150mm below the surface) at a rate that more closely matches plant and soil requirements (evapotranspiration), leading to more effective effluent reuse. The reliance on soil absorption is relatively low and hence the risk of contaminants accumulating in the soil or leaching to groundwater is also low.

Subsurface drip irrigation typically comprises a network of proprietary, pressure-compensating drip-irrigation line that is specially designed for use with effluent and contains specially designed emitters that reduce the risk of blockage, biofilm development and root intrusion.

Subsurface irrigation virtually eliminates the risk of people inadvertently coming into contact with effluent and also minimises the risk of effluent being transported off-site, even during rain.

Subsurface irrigation may be installed on sloping properties/parcels, provided the application rate is reduced accordingly to ensure that effluent migration down slope is taken up adequately within the root system (as per Table M2 of AS/NZS 1547:2012).

When properly designed, installed and operated, the system will ensure good distribution of effluent at uniform, controlled application rates. By properly sizing the land application areas to ensure sustainable hydraulic and nutrient loading rates, water and nutrients can be effectively utilised and are unlikely to seep to groundwater or run-off to surface waters.

Care must be taken in designing and installing irrigation systems in areas that experience temperatures below freezing. Table 9 of the EPA Code of Practice (2013) and Table 5.2 of AS1547:2012 provide Design Irrigation Rates (DIRs) for subsurface irrigation systems.

These requirements are not exhaustive but summarise the main requirements under the *EPA Code of Practice Onsite Wastewater Management and AS/NZS 1547:2012*. For exact requirements go to http://www.epa.vic.gov.au/your-environment/water/onsite-wastewater

The default land application system for sustainably recycling secondary treated sewage or greywater effluent to land is pressure-compensating sub-surface irrigation (with disc or mesh filters and scour and vacuum valves), which evenly distributes effluent throughout the irrigation area.

A detailed irrigation system design is beyond the scope of this report; however a general description of subsurface irrigation is provided here for the information of the client and Council.

Subsurface irrigation comprises a network of drip-irrigation lines that is specially designed for use with wastewater. The pipe contains pressure compensating emitters (drippers) that employ a biocide to prevent build-up of slimes and inhibit root penetration.

The lateral pipes are usually 0.8 apart, installed parallel along the contour. Installation depth is 100-150 mm in accordance with *AS/NZS 1547:2012*. It is critical that the irrigation pump be sized properly, to ensure adequate pressure and delivery rate to the irrigation network.

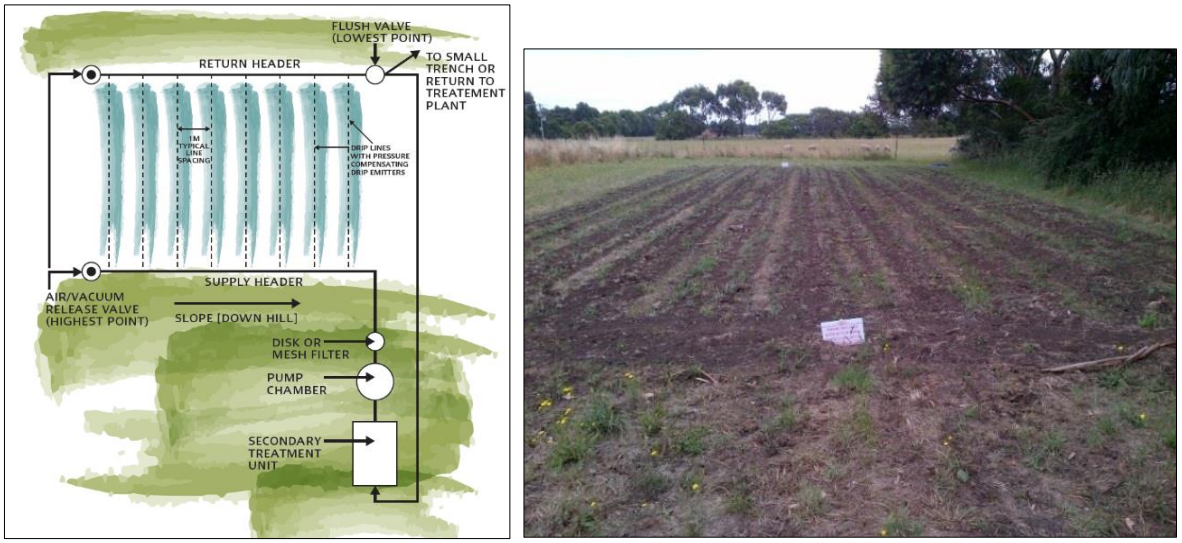
The distribution pipes (drip-lines) fill up with effluent until a certain pressure is reached which opens the emitter valves. For a 450m^2 irrigation field with 13mm diameter pipes, at least 60L may be required to be pumped into the pipes to reach the required pressure to open the emitters.
More controlled pressure can be applied when the field is divided into two or more zones with alternate areas intermittently dosed using a sequencing valve.

A filter is installed in the main line to remove fine particulates that could block the emitters. This must be cleaned regularly (typically monthly) following manufacturer's instructions.

Vacuum breakers should be installed at the high point/s in the system to prevent air and soil being sucked back into the drippers when the pump shuts off.

Flushing valves are an important component and allow periodic flushing of the lines, which should be done at six monthly intervals. Flush water can be either returned to the treatment system or should be released to a small, dedicated gravel-based trench.

All trenching used to install the pipes must be backfilled properly to prevent preferential subsurface flows along trench lines.



Figures 41-42 – Technical specifications for subsurface irrigation; recently completed irrigation field (Source: EHPA 2012).

Irrigation areas must not be subject to high foot traffic movement, and vehicles and livestock must not have access to the area otherwise compaction around emitters can lead to premature system failure.

Gravity-flow effluent irrigation systems are not allowed, due to the lack of even distribution. Irrigation distribution pipes must not have dripper-holes drilled or cut into them after purchase because the effluent will flow out of the holes in the first few metres of pipe at a far higher rate than the system is designed for, and higher than the soil is capable of sustainably absorbing.

Secondary treated effluent should be applied using the *Design Irrigation Rates* specified as a maximum. Secondary quality effluent is a valuable water and nutrient resource and should be used beneficially to support vegetation growth, and not be discharged deep in the soil profile where it provides very little beneficial use to the land or vegetation.

The default for recycling secondary quality effluent is sub-surface irrigation because water is not wasted by evaporation or runoff, flexible garden designs are possible, water is delivered to the plants' roots in the topsoil layer, and it provides the highest protection for environmental and public health.

Figures 43-45 – Flush valves, filters (Source: Mornington Shire Council 2014).

Subsurface irrigation can be flexibly used and for example run (1.5m setback) along fence lines to water trees and shrubs. Trenches only required to be dug to 150-200mm in depth (as compared to soil absorption trenches 450mm).

All irrigation pipe must be laid in 3-8mm gravel/aggregate and covered with strips of geotextile fabric. This is also required due to the high failure rate experienced by systems installed directly into topsoil.

• The international colour-coded pipe for plumbing installations for recycled water is lilac, but it is generally referred to as purple in Victoria (i.e. 'purple pipe') for pipework connecting the treatment unit and irrigation area.

The new irrigation field must have appropriate signage in accordance with the most recent version of *AS/NZS 3500: Drainage and Plumbing*.

Where a treatment system is retrofitted to existing irrigation pipes that are not purple-coloured, the above-ground fixtures such as taps, pumps and hatches, must be covered with purple paint or tape.

• If the permeability of the soil is very low (i.e. heavy clay), the soil in the irrigation area must be improved by rotary hoeing and adding gypsum to the dedicated wastewater disposal area.

• The irrigation area must be a permanent dedicated area for effluent disposal and must not be parked or driven on.

• For pressure compensating pipe vacuum breakers (air valve) must be installed at the high point of the disposal area and a flushing valve must be installed at the low point of the disposal area.

This allows for the disposal area to be flushed out preventing any blockages from sludge/scum build-up and therefore prolonging the life of the system. The flushing valve must either be connected so the wastewater is returned to the system (preferable option) or disposed of via sub-soil absorption trenches.

The effluent disposal area must be vegetated or revegetated immediately following installation of the system, preferably with turf or native sedges and grasses (planted surrounding the border of the effluent area).

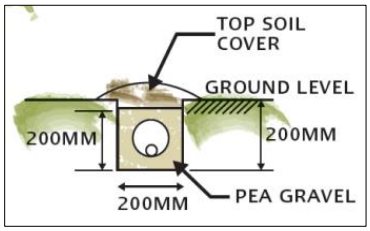


Figure 46 – Preferred method of laying subsurface irrigation.

The area should be fenced or otherwise isolated (such as by landscaping), to prevent vehicle and stock access; and signs should be erected to inform householders and visitors of the extent of the effluent irrigation area, and to limit their access and impact on the area. Installation of the irrigation system must be carried out by a suitably qualified, licensed plumber or drainer experienced with effluent irrigation systems.

To ensure even distribution of effluent, it is essential that the pump capacity is adequate for the size and configuration of the irrigation system, taking into account head and friction losses due to changes in elevation, pipes, valves, fittings etc. An additional, optional measure to achieve even coverage is to divide the irrigation area into two or more separate sub-zones of minimum 300m^2 each; dosed alternately using an automatic indexing or sequencing valve.

The irrigation area and surrounding area must be vegetated or revegetated immediately following installation of the system, preferably with turf or native sedges and grasses (planted surrounding the border of the effluent area).

The area should be fenced or otherwise isolated (such as by landscaping), to prevent vehicle and stock access; and signs should be erected to inform householders and visitors of the extent of the effluent irrigation area, and to limit their access and impact on the area.

Irrigation Construction Specifics[25]

1. Design for relatively uniform slope. Additional design work may be required where slope exceeds 12% or if system is to be installed over undulating ground.
2. An earth bank diversion drain must be constructed upslope of the area to divert stormwater run-on if this is appreciable.
3. Secondary treatment system – the irrigation pump must provide a minimum 25 m head and a flow rate that matches the design output of the selected dripline. Flow rate will vary depending on emitter spacing, flow rate and lineal metres of line. A full hydraulic design must be carried out. Each area should be capable of discharging a minimum of 80 L/min.
4. Filtration and flushing mechanism (see Inset A) – a field flush valve must be installed on the return line to facilitate periodic flushing to the treatment tank. An additional filter flush valve should be installed downstream of the field flush valve. A 100-150-micron cylindrical filter should be installed and cleaned regularly. Where there are potential problems in returning irrigation field flush back to the treatment tank, a small (approximately 3 m x 0.6 m) absorption area sited below the effluent irrigation area can be used to accommodate the flushed effluent.
5. An automatic, hydraulically operated sequencing valve should be installed to deliver effluent evenly to the two areas.
6. Air release valves must be installed at high points in each area. Additional air release valves may be required in undulating terrain.
7. Check valves are required for each irrigation field to facilitate periodic flushing.
8. Distribution manifolds should be 25 mm uPVC or polyethylene pipe buried 300 mm below the ground surface. Flushing return manifold should be 25 mm uPVC or polyethylene pipe buried 100- 150 mm below the ground surface within the irrigation area. Outside this area, the pipe must be buried at a minimum of 300 mm depth.
9. Pressure compensating (PC) subsurface drip line laterals (typically 16 mm) with emitters and laterals at approximately 600 mm spacings (maximum 1,000 mm spacings) and buried to a depth 100-150 mm. Only subsurface dripline specifically designed for effluent irrigation must be used.

[25] WaterNSW (2018). Sydney Catchment Authority; Design and Installation of On-site Wastewater Systems, Section 13: Subsurface Irrigation. Accessed from: https://www.waternsw.com.au/__data/assets/pdf_file/0005/114818/Section-13-Subsurface-Irrigation.pdf

APPENDIX 14 - ISSUES TO CONSIDER WHEN SELECTING WASTEWATER TREATMENT SYSTEM

- The sustainability of the proposed system;
- The expectations of the owners of the development;
- Current property owners' ability to adequately manage the system;
- Site suitability, including environmental sensitivity;
- The availability of service agents in the area;
- System costs (both capital and on-going);
- The need for the proposed system to be replaced or refurbished at some later date;
- The development of contingency plans in the event of system failure
- The impact of the system on the amenity of the area

APPENDIX 15 - MITIGATION MEASURES FOR LAND APPLICATION AREAS

This information may be required for sites or LAAs requiring specific measures to mitigate observed constraints, usually prior to or during installation/construction of the effluent management system.

Examples of mitigation measures include (but are not limited to):

- Terracing for steep slopes;
- Imported topsoil fill to increase soil quality and depth;
- Application of gypsum or lime to improve soil condition;
- Construction of stormwater diversion berms or swales upslope of the LAA;
- Flood mitigation – such as installing seals, access risers and backflow prevention devices on treatment systems (in accordance with manufacturers' requirements), raising or bunding LAAs;
- Ripping of compacted or low-permeability soils (particularly for mound systems)
- Vegetation clearing over LAA; and
- Manual removal of coarse rock fragments or unsuitable fill materials.

APPENDIX 16 - APPROVED TYPES OF WASTEWATER & GREYWATER TREATMENT SYSTEMS

Table 2 of the Code of Practice (891.4: 2016)[26] specifies the approved types of wastewater and greywater treatment systems and effluent reuse and disposal systems for both sewered and unsewered areas.
Any wastewater treatment system proposed for installation in Victoria must have a current CA (*Certificate of Conformity*) issued by EPA and displayed on the EPA website. There is a broad range of treatment systems with current *Certificates of Conformity* including:

- Wet or dry composting toilets (greywater treatment system also required);
- Septic tanks;
- Aerobic biological filters (wet composting, vermiculture);
- Aerated wastewater treatment systems (AWTS);
- Ozonation;
- Textile filters;
- Sand filters (following primary treatment);
- Trickling aerobic filters (using foam, plastic or similar media);
- Membrane filtration;
- Reed beds (following primary treatment);
- Sand mounds (following primary or secondary treatment).

The default for recycling secondary quality effluent is sub-surface irrigation[27] because water is not wasted by evaporation or runoff, flexible garden designs are possible, water is delivered to the plants' roots in the topsoil layer, and it provides the highest protection for environmental and public health.

[26] Environment Protection Agency Victoria (2016). EPA Code of Practice; Onsite Wastewater Management; 891.4. Accessed from: http://www.epa.vic.gov.au/our-work/publications/publication/2016/july/891-4
[27] Environment Protection Agency Victoria (2016). EPA Code of Practice; Onsite Wastewater Management; 891.4. Accessed from: http://www.epa.vic.gov.au/our-work/publications/publication/2016/july/891-4

Table 2: Onsite wastewater management options for sewered and unsewered areas

	Onsite Wastewater Treatment Systems [1, 7]	For sewered or unsewered areas	Effluent recycling options [2, 3, 6, 7]	Effluent dispersal options
DRY	Primary Treatment Dry Composting Toilets	All areas	N/A	Excess liquid discharged to sewer, or to a soil Absorption Trench in unsewered areas
DRY	Incineration Toilets	Unsewered only		
WATER-BASED	Primary Treatment Anaerobic (Septic Tank), Aerobic Biological Filter (wet composting, vermiculture)	Unsewered areas only	N/A	Absorption Trenches/Beds Evapo-Transpiration Absorption (ETA) Beds Low Pressure Effluent Distribution (LPED) Mounds Wick Trench & Beds
WATER-BASED	Secondary Treatment Sewage and Greywater AWTS (Aerated Wastewater Treatment Systems) Biological Filters (wet composting, vermiculture) Membrane Filtration Ozonation Reed beds Sand Filters Textile Filters Trickling Aerobic Filters: (foam, plastic, mixture of media)	All-waste sewage treatment systems in unsewered areas only [10]	Sub-surface irrigation Surface irrigation [11]	Absorption Trenches/Beds Evapo-Transpiration Absorption (ETA) beds Low Pressure Effluent Distribution (LPED) Mounds Wick Trench & Beds
WATER-BASED		Greywater systems in all areas	Single domestic households [5, 8, 9] 10/10/10: Toilet flushing Cold water supply to washing machines Surface irrigation Sub-surface irrigation Hand-held purple hose [12] 10/10, 20/30/10, 20/30: Sub-surface Surface irrigation	
WATER-BASED			Multi-dwelling residential, business and community [4] 10/10, 10/10/10 20/30/10, 20/30: Sub-surface irrigation [13]	

1. It is recommended that onsite sewerage systems used by patients with transplants or on dialysis or chemotherapy are more frequently serviced and/or pumped-out as the drugs are likely to kill the beneficial microbes in the treatment system.
2. Sub-surface irrigation is the dispersal of water from pipes laid 100 mm to 150 mm below the ground surface (i.e. in the unsaturated biologically-active topsoil layer) (see AS/NZS 1547). The minimum water quality required is 20/30 standard.
3. Treated sewage or greywater must not come in contact with the edible parts of herbs, fruit or vegetables.
4. Treated greywater from multi-dwellings, schools, business or commercial premises must not be used for toilet flushing or used in the washing machine (see Section 2.2.3).
5. The use of treated greywater for clothes washing may not always result in the desired outcome, especially when

Figure 47 – OWS options (Source: Victorian EPA 2016)

APPENDIX 17 – BUFFER REQUIREMENTS BASED ON EPA CODE 891.4 2016

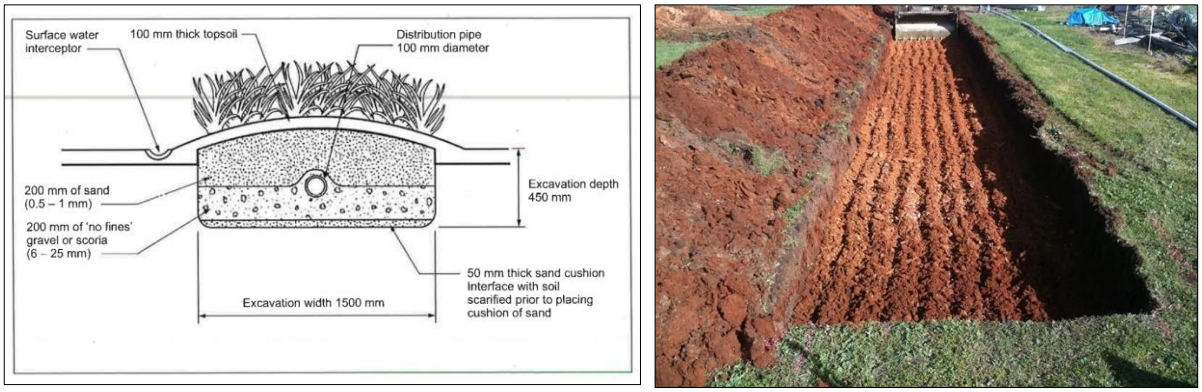
Landscape feature or structure	Setback distances (m)		
	Primary sewage and greywater systems	Secondary sewage and greywater systems	Advanced secondary greywater systems [3]
Building			
Wastewater field up-slope of building [7]	6	3	3
Wastewater field down-slope of building	3	1.5	1.5
Wastewater up-slope of cutting/escarpment [12]	15	15	15
Allotment boundary			
Wastewater field up-slope of adjacent lot	6	3	1
Wastewater field down-slope of adjacent lot	3	1.5	0.5
Services			
Water supply pipe	3	1.5	1.5
Wastewater up-slope of potable supply channel	300	150	150
Wastewater field down-slope of potable supply channel	20	10	10
Gas supply pipe	3	1.5	1.5
In-ground water tank [14]	15	7.5	3
Stormwater drain	6	3	2
Recreational areas			
Children's grassed playground [15]	6	3 [16]	2 [16]
In-ground swimming pool	6	3 [16]	2 [16]
Surface waters (up-slope of:)			
Dam, lake or reservoir (potable water supply) [8, 13]	300	300 [4]	150
Waterways (potable water supply) [9, 13]	100	100 [4, 5, 17]	50
Waterways, wetlands (continuous or ephemeral, non-potable); estuaries, ocean beach at high-tide mark; dams, reservoirs or lakes (stock and domestic, non-potable) [8, 9]	60	30	30
Groundwater bores			
Category 1 and 2a soils	NA[11]	50[19],	20
Category 2b to 6 soils	20	20	20
Watertable			
Vertical depth from base of trench to the highest seasonal water table [18]	1.5	1.5	1.5
Vertical depth from irrigation pipes to the highest seasonal water table [18]	NA	1.5	1.5

Figure 48 – Setbacks to site features (Source: Victorian EPA 2016)

APPENDIX 18 – ETA TRENCHES

ETA beds and trenches can be an effective effluent management system in areas with constraining soil textures, limited soil depth, and high water tables. The basic principle of an ETA bed design is to pass the effluent from a septic tank system through a distribution network in a specially prepared mass of suitable sand and gravel layers, and that by capillary action and shallow rooting perennial plants, water is lost by evapotranspiration.

Essentially, an ETA bed is a large, constructed sponge of sand and gravel, sealed from the surrounding soil, with an inbuilt water storage capacity, and a vegetated surface from which evapotranspiration is maximised.



Figures 49-50 – ETA-trench/bed cross-section and site preparation (Source: ASNZS 1547 2018).

When the base of the bed is used for soil absorption (percolation) of effluent in addition to the evaporative demand of the surface, the system is called an evapotranspiration absorption bed (ETA).

The success of any wastewater system is dependent upon not only the appropriate design and siting of the system, but upon continued vigilance of wastewater quantity and quality in the house, and regular inspections and maintenance of the operating in-field system.

An ETA bed is usually used to dispose of wastewater from a septic tank, but it can also be used to manage secondary treated effluent.

ETA beds are generally unlined beds with some deep seepage. Capillary action draws effluent up through the sand in the upper part of the ETA bed from the storage in the void spaces in the gravel bed beneath. Effluent is distributed through the bed by a system of slotted pipes.

This supplies the root zone of the vegetation (usually grass) on the top of the bed to optimise evapotranspiration. Vegetation cover must be well maintained to ensure strong growth for maximum uptake by transpiration.

The surrounding landscape and vegetation must also be maintained to minimise shading and maximise exposure.

Absorption beds shall be pressure dosed so that effluent is distributed evenly throughout the length of each bed.

Dosing can be achieved by installing a 25-40mm diameter pipe inside each 90mm distribution pipe, with 3-4mm holes drilled in the top of the inner pipe at 300-400mm spacings.

The pipes are then connected at the end of the bed with a flush valve brought to finished ground level. Effluent is pumped through the 25-40mm pipe from the pump chamber and triggered by a float switch.

The dosing pump should create a minimum squirt height (or residual head) of 1.5m at each orifice. The pressure manifold should then be covered with slotted PVC and geo-fabric to prevent blockage, root entry, and bio film build up.

An ETA bed is usually used to dispose of wastewater from a septic tank, but it can also be used to manage secondary treated effluent.

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This supplies the root zone of the vegetation (usually grass) on the top of the bed to optimize evapotranspiration. Vegetation cover must be well maintained to ensure strong growth for maximum uptake by transpiration.

The surrounding landscape and vegetation must also be maintained to minimise shading and maximise exposure.

The ETA bed should be sized according to the recommendations in AS/NZS1547:2012. The following points should also be considered: All ETA beds should be designed using hydraulic balance modelling. This will ensure the best bed size and contain construction costs.

The hydraulic balance determines the volume of storage in the gravel bed. This ensures the bed does not overtop in prolonged wet periods when evapotranspiration losses are lower than inputs from rainfall and effluent load. The bed must be turfed immediately following construction.

ETA beds are constructed with a domed upper surface to shed rainfall. The steeper the slope the more rainfall that will be shed. The bed must be located where it will be well exposed to ensure maximum evapotranspiration.

TABLE L1
RECOMMENDED DESIGN LOADING RATES FOR TRENCHES AND BEDS

Soil category	Soil texture	Structure	Indicative permeability (K_{sat})(m/d)	Design loading rate (DLR) (mm/d)			
				Trenches and beds			ETA/ETS beds and trenches
				Primary treated effluent		Secondary treated effluent	
				Conservative rate	Maximum rate		
1	Gravels and sands	Structureless (massive)	> 3.0	20 (see Note 1)	35 (see Note 1)	50 (see Note 1)	(see Note 4)
2	Sandy loams	Weakly structured	> 3.0	20 (see Note 1)	30 (see Note 1)	50 (see Note 1)	
		Massive	1.4 – 3.0	15	25	50	
3	Loams	High/ moderate structured	1.5 – 3.0	15	25	50	
		Weakly structured or massive	0.5 – 1.5	10	15	30	
4	Clay loams	High/ moderate structured	0.5 – 1.5	10	15	30	12
		Weakly structured	0.12 – 0.5	6	10	20	8
		Massive	0.06 – 0.12	4	5	10	5
5	Light clays	Strongly structured	0.12 – 0.5	5	8	12	8
		Moderately structured	0.06 – 0.12	(see Notes 2 & 3)	5	10	5 (see Notes 2, 3, & 5)
		Weakly structured or massive	< 0.06			8	
6	Medium to heavy clays	Strongly structured	0.06 – 0.5				
		Moderately structured	< 0.06				
		Weakly structured or massive	< 0.06				

NOTES:
1 The treatment capacity of the soil and not the hydraulic capacity of the soil or the growth of the clogging layer govern the effluent loading rate in Category 1 and weakly structured Category 2 soils. Land application systems in these soils require design by a suitably qualified and experienced person, and distribution techniques to help achieve even distribution of effluent over the full design surface (see L6.2 and Figure L4 for recommended discharge method by discharge control trench). These soils have low nutrient retention capacities, often allowing accession of nutrients to groundwater.
2 To enable use of such soils for on-site wastewater land application systems, special design requirements and distribution techniques or soil modification procedures will be necessary. For any system designed for these soils, the effluent absorption rate shall be based upon soil permeability testing. Specialist soils advice and special design techniques will be required for clay dominated soils having dispersive (sodic) or shrink/swell behaviour. Such soils shall be treated as Category 6 soils. In most situations, the design will need to rely on more processes than just absorption by the soil.
3 If K_{sat} < 0.06 m/d, a full water balance for the land application can be used to calculate trench/bed size (see Appendix Q).
4 ETA/ETS systems are not normally used on soil Categories 1 to 3.
5 For Category 6 soils ETA/ETS systems are suitable only for use with secondary treated effluent.

Figure 51 – Recommended design loading rates for ETA trenches (Source: ASNZS1547).

APPENDIX 19 - SAND FILTER SYSTEM (Secondary Treatment)

These sand filter system guidelines are not exhaustive but summarise the main requirements under the *EPA Code of Practice Onsite Wastewater Management* and the *EPA Certificate of Approval 1.3/03.*

Figures 52-53 – Above and below-ground Sand Filter systems (Source: Murray Valley Septics 2019, William Kromer 2016).

TECHNICAL SPECIFICATIONS

• Sand filter systems are restricted to treating domestic-type sewage with flows less than 5000 litres/day.

• Filter sand should be supplied by an approved supplier and conform with the requirements of *Code of Practice for Small Wastewater Treatment Plants and CA 1.3/03* in relation to particle size and consistency (contain less than 5% clay and fine silt, has an effective size between 0.25mm and 0.60mm, has a uniformity co-efficient less than 4). A copy of the Sieve Analysis test is to be provided after installation occurs.

• In determining wastewater flows based on number of bedrooms, a study/rumpus may be included if of significant size.

• All effluent must be retained on-site.

• Installation of kitchen disposal units will increase the Sand Filter capacity by 33% to the specified value.

• It is imperative that <=250-300 mm of good quality topsoil is placed on top of the Sand Filter.

This soil must be mounded with high quality organic loam to shed stormwater and support vegetative growth. Backfilling with clay is not permitted as it is likely to 'seal' the system and give rise to anaerobic conditions.

• Plumbing work is to be kept as close to ground level as possible otherwise an extra pump well will need to be installed prior to the sand filter. This will add extra upfront costs as well as additional maintenance and associated repair costs.

When installing a sand filter system, to ensure the reduction process remains balanced, the sand filter needs to be sized according to the hydraulic and organic load for the proposed system.

To assist property owners who are considering a sand filter system, the table below provides *recommended minimum sand filter sizes.* These have been calculated based on *AS1547 and the EPA Code of Practice (891.4).*

Sand filter bed size (m^2)

Water usage fixtures	1-bedroom	2-bedroom	3-bedroom	4-bedroom	5 bedroom
Standard	$11m^2$	$15m^2$	$18m^2$	$22m^2$	$26m^2$
Reduced	$9m^2$	$12m^2$	$15m^2$	$18m^2$	$21m^2$

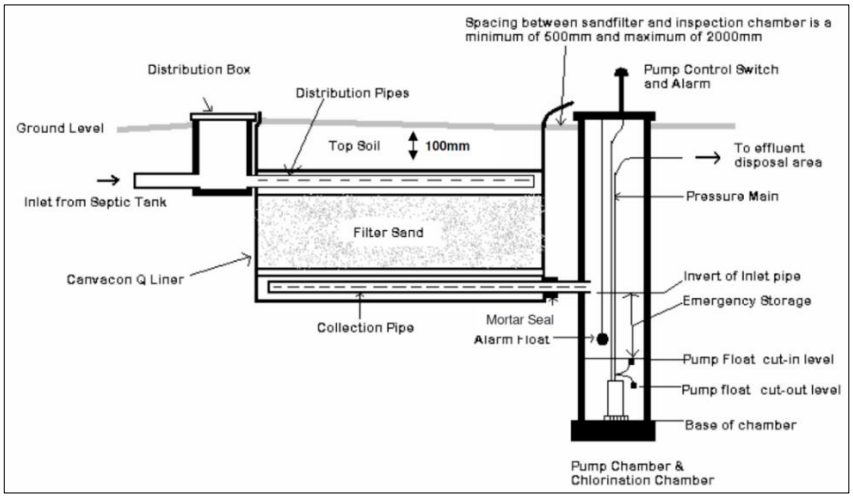
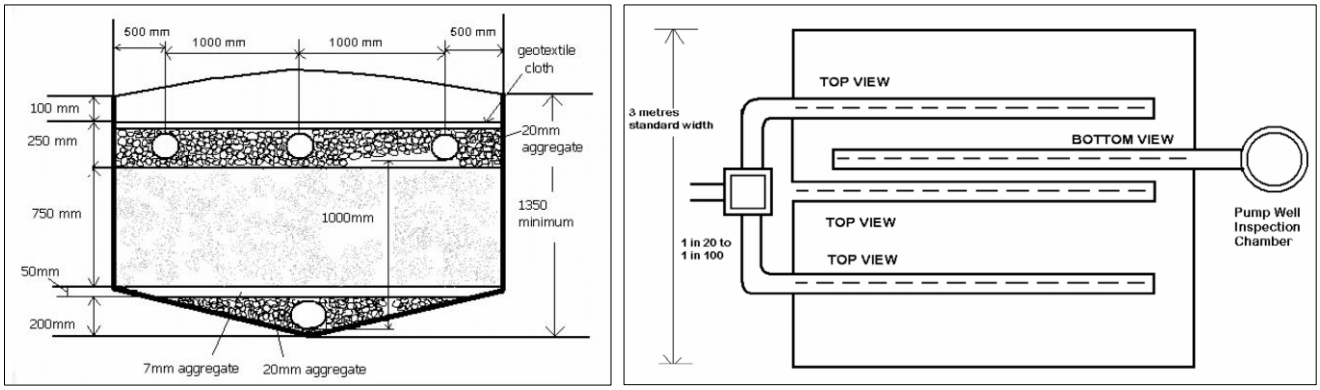


Figure 54 – Sand Filter construction detail *(Based on EPA Certificate of Approval N. 1.3/03 and Section 7 of EPA Publication No. 500 – Code of Practice for Small Wastewater Treatment Plants)* (Source: Golden Plains Shire 2015).

Construction Specifications		Filter Sand Specifications
Liner	Canvacon required if water table is close to surface	Use clean washed sand complying with these requirements. For sand filters loaded at less than 50L/sq metre/day sand: ▪ Must contain less than 5% of clay and fine silt by volume ▪ Must have an effective size between 0.25 and 0.60mm ▪ Must have a uniformity coefficient less than 4
Distribution box	Minimum internal width 250 mm	
Distribution pipes	Slotted 90 mm plastic pipe (Complying with AS 2439)	
Inlet from Septic	100 mm Sewer Grade Plastic Pipe (Complying with AS 1260)	
Collection Pipe	100 mm Sewer Grade Slotted Pipe (Complying with AS 2439)	
Pump chamber	▪ Minimum internal diameter 750 mm ▪ Base of Chamber 1000 mm below sand filter outlet invert	
Alarm Float	100 mm above cut in	
Pressure Main	Minimum 40 mm diameter	
Alarm	An alarm or light indicating a pump failure must be fitted to the pump well or within the building being services by the septic system	

Figure 55 – Sand Filter specifications.



Figures 56-57 – Cross-section and Top-View of Sand Filter
(Source: Rootzone & Golden Plains Shire 2015).

APPENDIX 20 – INDIGENOUS WASTEWATER PLANTS

Common plant name	*soil type*							*Botanical name*
Common plant name	**Wet**	**Dry**	**Margin**	**Clay**	**Sand**	**Loam**	**Salt tolerant**	**Genus and species**
Grasses & sedges								**Grasses & sedges**
southern cordrush	✔		✔	✔	✔	✔		*Baloskion australe*
tassel cordrush	✔		✔	✔	✔	✔		*Baloskion tetraphyllum*
tall sedge	✔		✔	✔		✔		*Carex appressa*
tassell sedge	✔		✔	✔		✔		*Carex fascicularis*
curly sedge		✔	✔	✔		✔		*Carex tasmanica*
spreading flaxlily		✔	✔	✔	✔	✔		*Dianella revoluta*
forest flaxlily	✔	✔	✔	✔	✔	✔		*Dianella tasmanica*
western flag-iris	✔		✔	✔	✔	✔		*Diplarrena latifolia*
white flag-iris	✔	✔	✔	✔	✔	✔		*Diplarrena moraea*
knobby clubsedge	✔	✔	✔	✔	✔	✔	✔	*Ficinia nodosa*
cutting grass	✔		✔	✔		✔		*Gahnia grandis*
sea rush	✔		✔	✔	✔	✔	✔	*Juncus kraussii*
pale rush	✔		✔	✔	✔	✔		*Juncus pallidus*
sagg		✔	✔	✔	✔	✔		*Lomandra longifolia*
silver tussockgrass	✔	✔	✔	✔	✔	✔		*Poa labillardierei*
velvet tussockgrass		✔	✔	✔		✔		*Poa rodwayi*
Low shrubs (up to 1.5m)								**Low shrubs (up to 1.5m)**
wiry bauera			✔			✔		*Bauera rubioides*
hop native-primrose	✔	✔	✔	✔	✔	✔		*Goodenia ovata*
slender honeymyrtle	✔		✔	✔		✔		*Melaleuca gibbosa*
Tall shrubs/trees (2-5m)								**Tall shrubs/trees (2-5m)**
silver wattle		✔	✔		✔	✔		*Acacia dealbata*
blackwood	✔		✔	✔		✔		*Acacia melanoxylon*
arching wattle	✔		✔	✔		✔		*Acacia riceana*
prickly moses			✔	✔	✔	✔		*Acacia verticillata*
yellow bottlebrush		✔	✔	✔		✔		*Callistemon pallidus*
prickly bottlebrush	✔		✔	✔		✔		*Callistemon viridiflorus*
native hop		✔	✔	✔	✔	✔		*Dodonaea viscosa*
smoky teatree		✔	✔		✔	✔		*Leptospermum glaucescens*
woolly teatree	✔	✔	✔	✔		✔		*Leptospermum lanigerum*
shiny teatree	✔		✔	✔		✔		*Leptospermum nitidium*
river teatree	✔		✔	✔		✔		*Leptospermum riparium*
common teatree		✔	✔	✔	✔	✔		*Leptospermum scoparium*
warty paperbark	✔		✔	✔		✔		*Melaleuca pustulata*
swamp honeymyrtle	✔		✔	✔		✔		*Melaleuca squamea*
scented paperbark	✔		✔	✔		✔		*Melaleuca squarrosa*
common dogwood	✔		✔	✔		✔		*Pomaderris apetala*
Trees (>10m)								**Trees (>10m)**
black gum	✔		✔	✔		✔		*Eucalyptus ovata*
Exotics								
Pittosporum bicolor								
Pittosporum Tenuifolium								
coleonema								
acemena (lillypilly)								
ceanothus								
hebe all varieties are very good with the exception of hebe emerald green								
penstemon								
abelia								
buxus sempervirens								
*Fruit trees are not recommended in an irrigation area.								

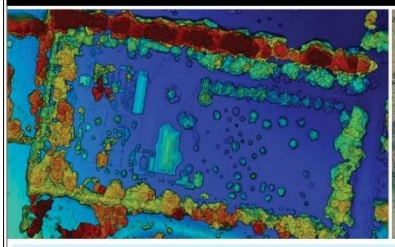
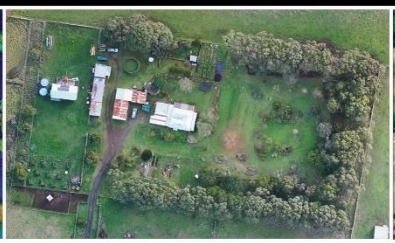
Figure 58 – Vegetation able to be used to assimilate wastewater.

LAND CAPABILITY ASSESSMENTS (LCA)

ONSITE WASTEWATER SYSTEM DESIGN + CONSULTANCY SERVICES

Completed by a qualified and experienced Environmental Scientist, Environmental Health Officer (Vic, NSW), and onsite wastewater specialist

SERVICING NORTH-EAST, CENTRAL, WESTERN + SOUTH-WEST VICTORIA


What is an LCA?

A comprehensive LCA report provides recommendations on suitability of particular on-site wastewater treatment and effluent disposal systems for the site context, and identifying environmental constraints that may influence sustainable wastewater management, treatment, and disposal.

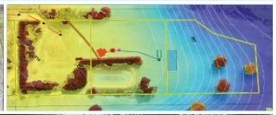
For all proposed unsewered residential developments, an LCA should be undertaken prior to a residential development proceeding. Typically your Council will advise if an LCA is required and the level of investigation required.

The objective of the LCA process is:

1. To assess the capability of the site to sustainably manage wastewater within allotment boundaries; and
2. To identify a management program to minimise health and environmental impacts of the onsite wastewater management system.

Landtech Consulting has developed relationships with local government EHO's across Victoria and understand their specific requirements regarding onsite wastewater management and land capability assessment. Landtech Consulting will complete all necessary negotiation with Council to streamline the LCA and planning/building permit approval processes.

Landtech Consulting has appropriate qualifications, experience, and public and professional indemnity insurance with certification documents available on request.

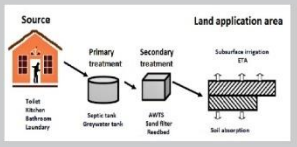




Services include desktop scoping, site inspection, drone elevation mapping, soil sampling and analysis, wastewater system and effluent disposal design, and identification of innovative and best-practice wastewater treatment options.


Services

LCA reporting for:

+ New/existing dwellings
+ Subdivisions
+ Commercial, Municipal
+ Broad-area LCA projects



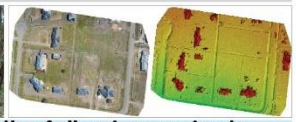


Landtech Consulting

Peter Austin (Landtech Consulting) is a qualified and experienced Environmental Scientist and Environmental Health Officer (EHO at Moyne, Warrnambool & Coffs Harbour Shire Councils) with extensive experience (Vic, NSW) and working knowledge of wastewater approvals regulation and planning processes.

LCA reports are consistent with the MAV's (Municipal Association of Victoria) Model LCA Report which is the procedure recommended by the EPA and is the minimum LCA standard expected by Victorian Councils. LCA's are based on key legislation/guidelines such as:

+AS/NZS 1547, EP Act, SEPP Waters, EPA Code of Practice 891.4 (2016).
+Vic EPA commercial system (>5000L/day) guidelines, publications 500, 168.

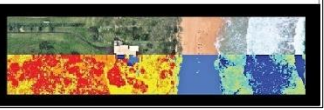
Landtech has completed the following projects

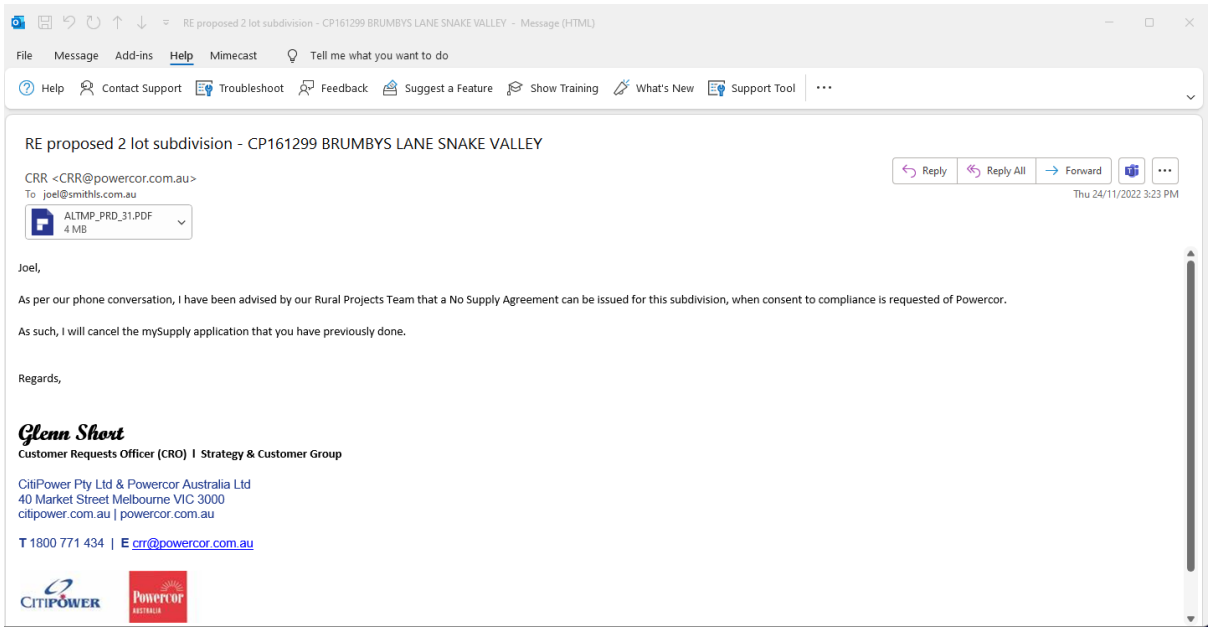
-150+ LCA/consultation reports - dwellings, subdivisions, commercial;
-Warrnambool City & Moyne Shire Council DWMPs 2018, 2020;
-Whole of subdivision wastewater LCA reports and consultancy services;
-Coffs Harbour City Council Onsite Wastewater Policy & Strategy 2021;
-Expert Witness VCAT, NSW L&E Court;
-EPA Works Approvals - sport facility, microbrewery, accommodation;
-Broad-area LCA Reports Nth Wangoom, Cudgee, Winslow townships;
-Risk mapping as part of DWMP's;
-Wastewater educational materials for web use and/or publication;
-Risk-based database mapping and GIS analysis.

Peter Austin (B.Sc., Grad. Dip - Env Health, Dip Horticulture, Dip VET, Cert IV TAE) Member: Environmental Health Victoria.
ABN: 4531 2192 419
0408-615677 peteraustin.landtech@hotmail.com

landtech consulting

LCA Land Capability Assessment (Vic)
OSMS Site & Soil Assessment (NSW)
Onsite Wastewater Consultancy Services
Bushfire Management Statements (BMS, BALs)
Biodiversity Assessment Services
Drone Mapping & GIS Analysis




RE proposed 2 lot subdivision - CP161299 BRUMBYS LANE SNAKE VALLEY - Message (HTML)
File Message Add-ins Help Mimecast Tell me what you want to do
Help Contact Support Troubleshoot Feedback Suggest a Feature Show Training What's New Support Tool
RE proposed 2 lot subdivision - CP161299 BRUMBYS LANE SNAKE VALLEY
CRR <CRR@powercor.com.au>
To joel@smithls.com.au
ALTMP_PRD_31.PDF
4 MB
Reply Reply All Forward
Thu 24/11/2022 3:23 PM
Joel,
As per our phone conversation, I have been advised by our Rural Projects Team that a No Supply Agreement can be issued for this subdivision, when consent to compliance is requested of Powercor.
As such, I will cancel the mySupply application that you have previously done.
Regards,
Glenn Short
Customer Requests Officer (CRO) I Strategy & Customer Group
CitiPower Pty Ltd & Powercor Australia Ltd
40 Market Street Melbourne VIC 3000
citipower.com.au | powercor.com.au
T 1800 771 434 | E crr@powercor.com.au
CITIPOWER
Powercor
AUSTRALIA

GENERAL NOTES:

- Please refer to Certificate of Title for any easements or encumberances.
- This plan has been prepared for pre-application purposes only & has not been based on survey.
- Before proceeding with any design, construction or use of the land adjoining neighbours must be consulted to resolve any differences between fencing and the title position shown on this plan.
- The title boundaries shown beyond the subject land have been imported from the Digital Cadastral Map Base (DCMB) and are approximate only.

Smith Land Surveyors Pty Ltd
Office - 142a Fyans Street, South Geelong, Vic, 3220
P (03) 5222 1234 F (03) 5223 3141
E survey@smithls.com.au
W www.smithlandsurveyors.com.au
ABN 72 142 046 964

CONCEPT PLAN OVERLAY

BRUMBYS LANE
SNAKE VALLEY

[redacted]

SCALE: 1:250	SURVEY DATE:N/A	
DATE: 16/10/22	DATUM: N/A	SHEET: 1 OF 1
DRAFTED: J.J	JOB: 2022-3000	ORIGINAL SHEET A3
SURVEYOR:N/A	VERSION: 01	

GENERAL NOTES:

- Please refer to Certificate of Title for any easements or encumberances.
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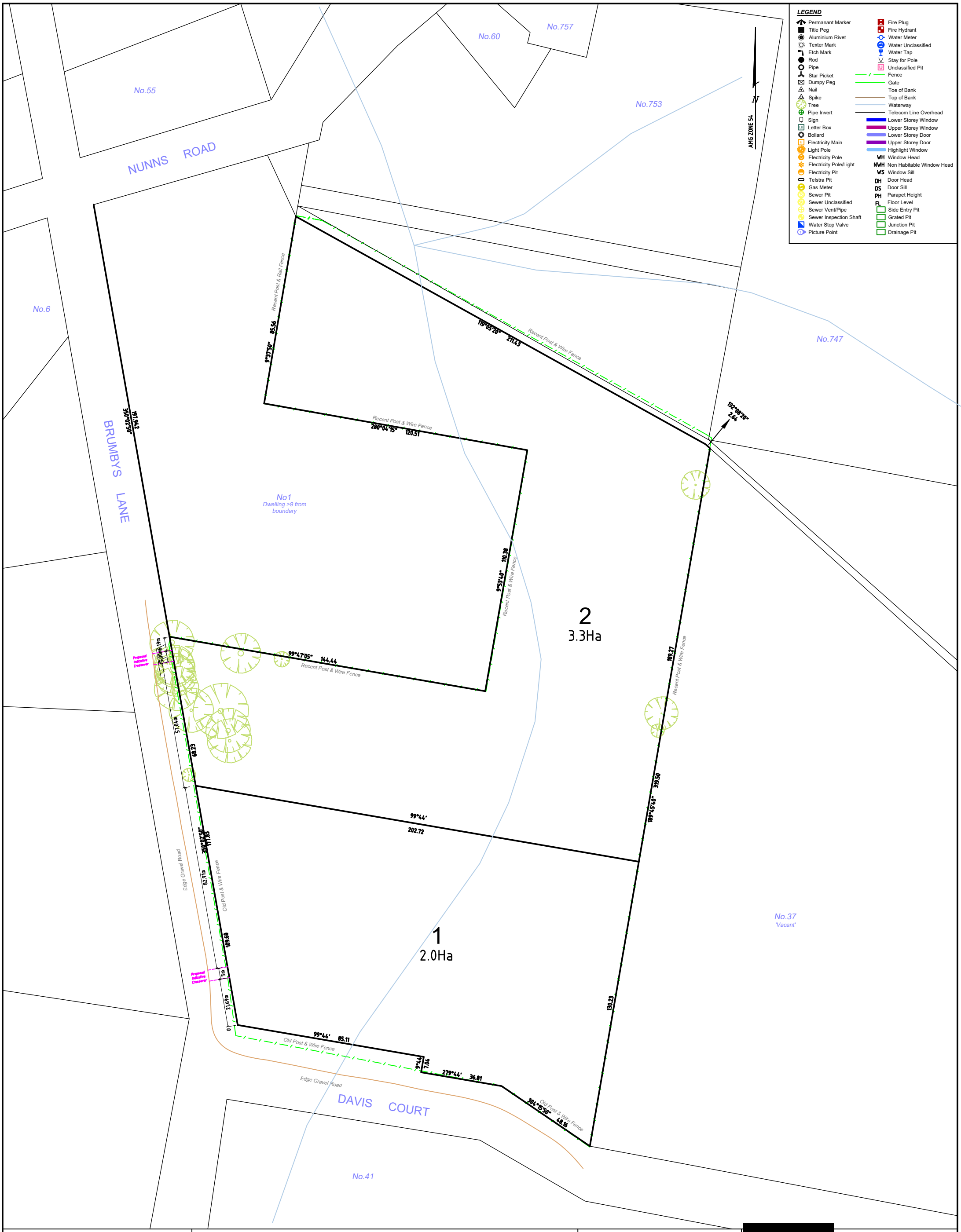
CONCEPT PLAN OVERLAY BRUMBYS LANE SNAKE VALLEY	SCALE: 1:250	SURVEY DATE:N/A	
	DATE: 16/10/22	DATUM: N/A	SHEET: 1 OF 1
	DRAFTED: J.J	JOB: 2022-3000	ORIGINAL SHEET A3
	SURVEYOR:N/A	VERSION: 01	
CLIENT: ENA TURCINOV	THIS ELECTRONIC DRAWING IS PRODUCED BY, AND REMAINS THE PROPERTY OF SMITH LAND SURVEYORS PTY. LTD. IT MAY NOT BE REPRODUCED IN ANY FORM WITHOUT WRITTEN PERMISSION.		



CERTIFICATE BY LICENSED SURVEYOR

I, Glenn Graham Smith of Smith Land Surveyors Pty. Ltd. 142a Fyans Street, South Geelong 3220, certify that this plan has been prepared from a survey made under my direction and supervision in accordance with the Surveying Act 2004 and completed on 13/05/2023, that this plan is accurate and correctly represents the adopted boundaries and that the survey accuracy accords with that required by regulation 7(1) of the Surveying (Cadastral Surveys) Regulations 2015.

Date: 11/07/2023

Licensed Surveyor,
Surveying Act 2004.

GENERAL NOTES:

- Please refer to Certificate of Title for any easements or encumberances.
- Where occupation including fences and buildings around the perimeter of a property encroach onto the subject site, the land beyond the occupation may not be recoverable as rights of possession may have passed to adjoining owners. Full title dimensions should not be assumed for design purposes / re-fencing until these issues have been resolved with adjoining landowners.
- Where occupation including fences and buildings around the perimeter of a property encroach onto the neighbouring site, the land beyond the title may not be utilized until a formal application with Land Registry is approved. Until this time you must limit any future building works to the current title position.
- The position of fencing and other occupation in relation to the title boundaries has been exaggerated for the purposes of clarity, and only applies at the natural surface level on the date of the survey and does not show any encroachments that may exist below the natural surface. If no offsets are shown, the fencing is in the correct position.
- Before proceeding with any design, construction or use of the land adjoining neighbours must be consulted to resolve any differences between fencing and the title position shown on this plan.
- Feature and levels shown on this plan are intended to aid in general design works only. Any critical dimensions required should be requested independently of this plan.
- The title boundaries shown beyond the subject land have been imported from the digital Cadastral Map Base (DCMB) and are approximate only.
- Location of waterways and watercourse have been imported from vicplan and were not present on site at the time of survey.
- All vegetation is to be retained
- This is a preliminary plan prepared for marketing purposes only, dimensions and boundary position is subject to final survey.

TITLE INFORMATION

Title Reference: Vol.09647 Fol.570
Last Plan Reference: CP161299V

LAND SUBJECT TO EASEMENT:

- -

[redacted]

Project: BRUMBYS LANE
SNAKE VALLEY

Details: Design Response Survey

Sheet: 1 of 1 | Drawn: J.H | Original sheet size: A1

Job No.: 2023-0694 | Scale: A1 = 1:1500 / A3 = 1:3000

AMENDMENTS

VERSION	DESCRIPTION	SURVEY DATE	SURVEYOR
1	ORIGINAL SURVEY PLAN	13/05/2023	J.J

Pyrenees Shire Council

Planning Enquiries
Phone: (03) 5382 9777
Web: www.hrcc.vic.gov.au

Office Use Only

VicSmart: **No**

Specify class of VicSmart application:

Application No: **REFPA20230115**

Date Lodged: **15/07/2023**

Application for
Planning Permit

If you need help to complete this form, read How to complete the Application for Planning Permit form.

⚠ Any material submitted with this application, including plans and personal information, will be made available for public viewing, including electronically, and copies may be made for interested parties for the purpose of enabling consideration and review as part of a planning process under the *Planning and Environment Act 1987*. If you have any concerns, please contact Council's planning department.

⚠ **Questions marked with an asterisk (*) are mandatory and must be completed.**

⚠ **If the space provided on the form is insufficient, attach a separate sheet.**

Application type

Is this a VicSmart Application?* No

If yes, please specify which VicSmart class or classes:

⚠ If the application falls into one of the classes listed under Clause 92 or the schedule to Clause 94, it is a VicSmart application

Pre-application meeting

Has there been a pre-application meeting with a Council planning officer? **False**

If 'yes', with whom?:

Date: day / month / year

The Land ⓘ

Address of the land. Complete the Street Address and one of the Formal Land Descriptions.

Street Address*

Unit No:	St. No:	St. Name: **brumbys lane**

Suburb/Locality: **snake valley** Postcode: **3351**

Formal Land Description*
Complete either A or B

⚠ This information can be found on the certificate of title.

A Lot No: ○ Lodged Plan ○ Title Plan ○ Plan of Subdivision No: **CP161299**

OR

B Crown Allotment No: Section No: **15**

Parish/Township Name: **CARNGHAM**

If this application relates to more than one address, please attach details.

The Proposal

⚠ You must give full details of your proposal and attach the information required to assess the application. Insufficient or unclear information will delay your application.

ⓘ For what use, development or other matter do you require a permit?*

2 lot subdivision of the land in question

📎 Provide additional information on the proposal, including: plans and elevations; any information required by the planning scheme, requested by Council or outlined in a Council planning permit checklist; and if required, a description of the likely effect of the proposal.

ⓘ Estimated cost of development for which the permit is required*

Cost **$0.00**

⚠ You may be required to verify this estimate
Insert '0' if no development is proposed

Insert '0' if no development is proposed (eg. change of use, subdivision, removal of covenant, liquor licence)

Existing Conditions ⓘ

Describe how the land is used and developed now*

Eg. vacant, three dwellings, medical centre with two practitioners, licensed restaurant with 80 seats, grazing.

vacant lot

📎 Provide a plan of the existing conditions. Photos are also helpful.

Title Information ⓘ

Encumbrances on title*

If you need help about the title, read: How to complete the Application for Planning Permit form

Does the proposal breach, in any way, an encumbrance on title such as a restrictive covenant, section 173 agreement or other obligation such as an easement or building envelope?

- ◯ Yes. (if 'yes' contact Council for advice on how to proceed before continuing with this application.)
- ◯ No
- ◯ Not applicable (no such encumbrance applies).

📎 Provide a full, current copy of the title for each individual parcel of land forming the subject site.
(The title includes: the covering 'register search statement', the title diagram and the associated title documents, known as 'instruments' eg restrictive covenants.)

[redacted]

[redacted]

Information Requirements

Is the required information provided?

Contact Council's planning department to discuss the specific requirements for this application and obtain a planning permit checklist.

- ◯ Yes
- ◯ No

Declaration ⓘ

This form must be signed by the applicant*

⚠ Remember it is against the law to provide false or misleading information, which could result in a heavy fine and cancellation of the permit

I declare that I am the applicant; and that all the information in this application is true and correct and the owner (if not myself) has been notified of the permit application.

Signature:

Date:15 July 2023

day / month / year

Checklist ⓘ

Have you:

- ☐ Filled in the form completely?
- ☐ Paid or included the application fee?

⚠ Most applications require a fee to be paid. Contact Council to determine the appropriate fee.

Provided all necessary supporting information and document?

- ☐ A full and current copy of the information for each individual parcel of land forming the subject site.
- ☐ A plan of existing conditions.
- ☐ Plans showing the layout and details of the proposal.
- ☐ Any information required by the planning scheme, requested by council or outlined in a council planning permit checklist.
- ☐ If required, a description of the likely effect of the proposal (eg traffic, noise, environmental impacts).

Lodgement ⓘ

Lodge the completed and signed form and all documents with:

Pyrenees Shire Council
5 Lawrence Street BEAUFORT Vic 3373

Telephone: (03) 5349 1100

Contact information:
Telephone: (03) 5349 1100
Email: pyrenees@pyrenees.vic.gov.au

Bushfire Management Plan – 1 BRUMBYS LANE, SNAKE VALLEY, 3351, VICTORIA.

Prepared By: Peter Austin - LANDTECH CONSULTING Version: 1 Date: 4/07/2023

Bushfire Protection Measures

Mandatory Condition

The bushfire protection measures forming part of this permit or shown on the endorsed plans, including those relating to construction standards, defendable space, water supply and access, must be maintained to the satisfaction of the responsible authority on a continuing basis. This condition continues to have force and effect after the development authorised by this permit has been completed

a) Defendable Space

Defendable space is provided for a distance of **22** metres around the building or to the property boundary whichever is the lesser and managed in accordance with the following:

- Grass must be short cropped and maintained during the declared fire danger period.
- All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.
- Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.
- Plants greater than 10 centimetres in height must not be placed within 3m of a window or glass feature of the building.
- Shrubs must not be located under the canopy of trees.
- Individual and clumps of shrubs must not exceed 5 sq. metres in area and must be separated by at least 5 metres.
- Trees must not overhang or touch any elements of the building.
- The canopy of trees must be separated by at least 5 metres.
- There must be a clearance of at least 2 metres between the lowest tree branches and ground level.

b) Construction Standard

Building designed and constructed to a minimum Bushfire Attack Level of BAL – 12.5

c) Water Supply

The following requirements apply:

- An effective capacity of 10,000 litres.
- Be stored in an above ground water tank constructed of concrete or metal.
- Have all fixed above ground water pipes and fittings required for firefighting purposes made of corrosive resistant metal.
- Include a separate outlet for occupant use.

Where a 10,000 litre water supply is required, the following fire authority fittings and access must be provided:

- Be readily identifiable from the building or appropriate identification signage to the satisfaction of the relevant fire authority.
- Be located within 60 metres of the outer edge of the approved building.
- The outlet/s of the water tank must be within 4 metres of the accessway and unobstructed.
- Incorporate a separate ball or gate valve (British Standard Pipe (BSP 65 millimetre) and coupling (64 millimetre CFA 3 thread per inch male fitting).
- Any pipework and fittings must be a minimum of 65 millimetres (excluding the CFA coupling).

d) Access

Access Required: No ☐
Yes ✓ The following design and construction requirements apply:

- All-weather construction.
- A load limit of at least 15 tonnes.
- Provide a minimum trafficable width of 3.5 metres.
- Be clear of encroachments for at least 0.5 metres on each side and at least 4 metres vertically.
- Curves must have a minimum inner radius of 10 metres.
- The average grade must be no more than 1 in 7 (14.4%) (8.1°) with a maximum grade of no more than 1 in 5 (20%) (11.3°) for no more than 50 metres.
- Dips must have no more than a 1 in 8 (12.5%) (7.1°) entry and exit angle.

Length of access is greater 100 metres: Yes ☐ No ✓

Where length of access is greater than 100 metres the following design and construction requirements apply:

- A turning circle with a minimum radius of eight metres, or
- A driveway encircling the building, or
- The provision of other vehicle turning heads – such as a T or Y Head – which meet the specification of Austroad Design for an 8.8 metre Service Vehicle.

Length of driveway is greater than 200 metres: Yes ☐ No ✓

Where length of access is greater than 200 metres the following design and construction requirement applies:

- Passing bays are required at least every 200 metres that are a minimum 20 metres long and a minimum trafficable width of 6 metres.

Land Capability Assessment
Biodiversity Survey
Drone Mapping & Survey
Bushfire Attack Level Assessment (BAL)
GIS Mapping & Analysis

Client: Ena Turcinov

Project: Bushfire Management Statement for proposed 2-lot subdivision at 1 BRUMBYS LANE, SNAKE VALLEY, 3351.

Date: July 4, 2023

[redacted]

Landtech: Peter Austin peteraustin.landtech@hotmail.com
PO BOX 5191 EAST GEELONG 3219. Ph.0408-615677.

Figure 1 – Typical grassland land cover within the proposed subdivision.

Document control

Assessment	Bushfire Management Statement for proposed 2-lot subdivision
Address	1 BRUMBYS LANE, SNAKE VALLEY, 3351. Victoria.
Project number	3351
Report manager	Peter Austin (Landtech Consulting)
[redacted]	
CFA Fire Region	West Region – District 16
CMA	Glenelg Hopkins CMA
Council	Pyrenees Shire Council

Acknowledgements

Disclaimer

Although Landtech Consulting have taken all the necessary steps to ensure that an accurate document has been prepared, the company accepts no liability for any damages or loss incurred as a result of reliance placed upon the report and its contents.

Figure 2 – Site feature map depicting the proposed two lots (and indicative dwellings only).

Summary

This report is prepared in support of a planning permit application to be lodged by Ena Turcinov for the proposed 2-lot subdivision at 1 Brumbys Lane, Snake Valley, 3351, Victoria.

The planning permit application seeks	Approval for proposed 2-lot subdivision (within the Rural Living Zone RLZ).
The site is partly within the *Bushfire Management Overlay* and a highly bushfire-prone area	The nature of the development requires effective bushfire safety management measures to best protect property and life.
A *Bushfire Management Statement* has been sought by the applicant to demonstrate how relevant bushfire matters have been considered in the location and design of the proposal.	This Bushfire Management Statement (BMS) has been prepared by Landtech Consulting and should be read in conjunction with the accompanying planning permit application. In addition to informing the siting and design of the proposed dwelling location, critically this report will assist in an assessment of the proposal by the Country Fire Authority (CFA), and a decision on the permit application by the responsible authority. Further details on the design of the proposed subdivision is located in the Town Planning Report and Architectural Drawings enclosed with the planning permit application.
The proposed development considers defendable space requirements occurring within both lot boundaries.	A BAL12.5 construction standard is possible with setback of 22m within both lot boundaries that includes managed defendable space (see *Figure 28*).
The site is covered by the Pyrenees *Shire Council Planning Scheme*,[1] a statement outlining how the proposed development responds to the purpose and objectives of Clause 53.02-3 Bushfire Protection Objective. The Bushfire Management Statement (BMS) has been prepared in response to the requirements of Clause 44.06 – Bushfire Management Overlay, and in accordance with the application requirements of Clause 53.02-4 applies to all other applications.	*Clause 53.02-3 applies to an application to construct a single dwelling or construct or carry out works associated with a single dwelling if all of the following requirements are met:* ■*The land is zoned Neighbourhood Residential Zone, General Residential Zone, Residential Growth Zone, Urban Growth Zone, Low Density Residential Zone, Township Zone or Rural Living Zone.* ■*There is only one dwelling on the lot.* ■*The application meets all of the approved measures contained in Clause 53.02-3,[2] including the decision guidelines of the Clause 44.06 Bushfire Management Overlay.[3]* ■*Clause 53.02-4 applies to all other applications*.
This BMS contains three components: This report has been prepared in accordance with guidance provided in the *Planning Permit Applications Bushfire Management Overlay Technical Guide* (DELWP, 2017).	This requires that approved measures AM 1.1, AM 1.2 and AM 1.3 be included in an application 1. 1. A **Bushfire Hazard Landscape Assessment** including a plan that describes the bushfire hazard of the general locality more than 150m from the site. Images or other techniques may be used to assist in describing the bushfire hazard. 2. A **Bushfire Hazard Site Assessment** including a plan that describes the bushfire hazard within 150m of the proposed development. The description of the hazard must be prepared in accordance with Section 2.2.5 of AS3959:2018 Construction of Buildings in Bushfire Prone Areas (Standards Australia), excluding paragraph (a) of Section 2.2.3.2. 3. A **Bushfire Management Statement** describes how the proposed development responds to requirements of Cause 44.06, 53.02 and 53.02-3. 53.02-4 24/01/2020 VC160 Bushfire protection objectives 53.02-4.1 Landscape, siting and design objectives - development is appropriate having regard to the nature of the bushfire risk arising from the surrounding landscape. Development is sited to minimise the risk from bushfire. Development is sited to provide safe access for vehicles, including emergency vehicles. Building design minimises vulnerability to bushfire attack. Approved measures – AM 1.1, AM 1.2, AM 1.3, AM 2.1, AM 2.2, AM 2.3, AM 3.1, AM 3.2, AM 4.1, AM 4.2, AM 5.1, AM 5.2, AM 5.3, AM 5.4 Alternative measures - AltM 3.3, 3.4, 3.5, 3.6, 5.5 53.02-4.4 Subdivision objectives - To provide lots that are capable of being developed in accordance with the objectives of Clause 53.02.

[1] Victorian Government; Vic Planning Scheme (Pyrenees Shire Council); Accessed from: https://www.pyrenees.vic.gov.au/Plan-Build/Planning/Pyrenees-Planning-Scheme
[2] Victorian Government; Vic Planning Scheme: Accessed from: https://www.pyrenees.vic.gov.au/Plan-Build/Planning/Pyrenees-Planning-Scheme
[3] DPCD 2020; Advisory Note 46; Bushfire Management Overlay Mapping Methodology and Criteria. Accessed from: https://www.planning.vic.gov.au/__data/assets/word_doc/0030/97572/AN46-Bushfire-Management-Overlay-Mapping-Methodology-and-Criteria.doc

Figure 3 – Subdivision site with existing proximal site land uses and dominating land cover (Source: Smith Land Surveyors Pty Ltd 2022).

Figure 4 – Proposed 2-lot subdivision adjoining Brumbys Lane to the west.

Figure 5 – An ephemeral watercourse traverses the lots proposed from south to north (Source: CNES 2023).

CONTENTS

Figure 6 – Broader view of the proposed subdivision site and proximal bushfire source risks to the south-east, part of the Scarsdale Plantation (Source: CNES 2023).

1. PLANNING CONTROLS

a. Planning Policy Framework

The Planning Policy Framework (PPF) seeks to ensure the objectives of planning in Victoria (as set out in *Section 4 of the Planning and Environment Act 1987*) are fostered through appropriate land use, development policies, and practices.

The PPF informs the preparation and implementation of local planning policy objectives and the introduction of zone and overlay controls. It seeks to integrate relevant environmental, social, and economic factors in the interest of net community benefit and sustainable development.

The objective of *Clause 13.02-1S Bushfire Planning* is 'to strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life.'

Strategies to achieve the objective include identifying and assessing bushfire hazards, appropriate settlement planning, consideration to areas of high biodiversity conservation value, and use and development controls in a *Bushfire Prone Area*.

Hazards identified and risks are assessed in Clause 13.02-1S by:

→*Prioritising the protection of human life over all other policy considerations.*

→*Directing population growth and development to low risk locations and ensuring the availability of, and safe access to, areas where human life can be better protected from the effects of bushfire.*

→*Reducing the vulnerability of communities to bushfire through the consideration of bushfire risk in decision-making at all stages of the planning process.*

→*Not approving development where a landowner or proponent has not satisfactorily demonstrated that the relevant policies have been addressed, performance measures satisfied, or bushfire protection measures can be adequately implemented.*

b. Bushfire Management Overlay (BMO)

The purposes of the Bushfire Management Overly include:

- *To ensure that the development of land prioritises the protection of human life and strengthens community resilience to bushfire.*
- *To identify areas where the bushfire hazard warrants bushfire protection measures to be implemented.*
- *To ensure development is only permitted where the risk to life and property from bushfire can be reduced to an acceptable level.*

→Planning Advisory Note 46: Bushfire Management Overlay Mapping Methodology and Criteria outlines that the Bushfire Management Overlay generally applies to areas of significant bushfire hazard where head fire intensity is modelled to be 30,000 kW/m or more.

→Under the Bushfire Management Overlay a planning permit is required to construct a dwelling.

Figure 7 – Parent lot and adjoining site interface with main escape pathways and Scarsdale Plantation to the south-east (Source: CNES 2023).

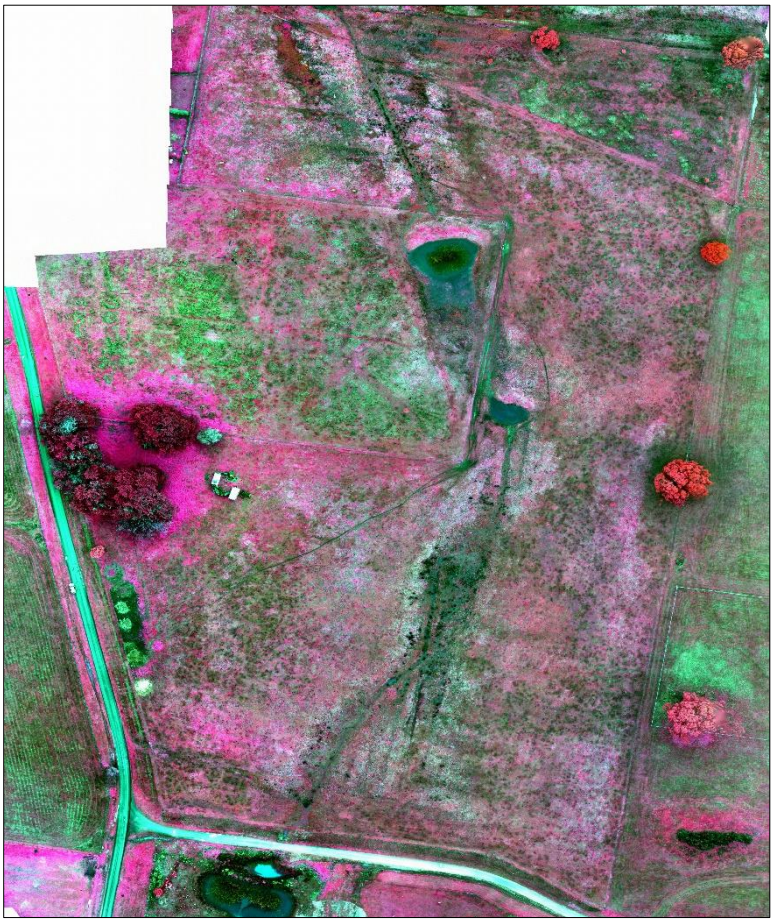


Figure 8 – False colour image depicting the extent of sparse tree and dominating grassland land cover across the site.

An application must meet the requirements contained in Clause 53.02 Bushfire Planning of the Pyrenees Shire Council Planning Scheme. The provisions of Clause 53.02 contain objectives:[4]

An objective describes the outcome that must be achieved in a completed development.

→Approved measures (AM) - An approved measure meets the objective.

→Alternative measures (AltM) - An alternative measure may be considered where the responsible authority is satisfied that the objective can be met. The responsible authority may consider other unspecified alternative measures.

→Decision guidelines - The decision guidelines set out the matters that the responsible authority must consider before deciding on an application, including whether any proposed alternative measure is appropriate.

Clause 53.02-1 applies to an application (under Clause 44.06 - Bushfire Management Overlay), unless the application meets all of the requirements specified in a schedule to Clause 44.06.

Clause 53.02-3 applies to an application to construct a single dwelling *or construct or carry out works* associated with a single dwelling.

Clause 53.02-4 applies to all other applications (such as subdivisions).

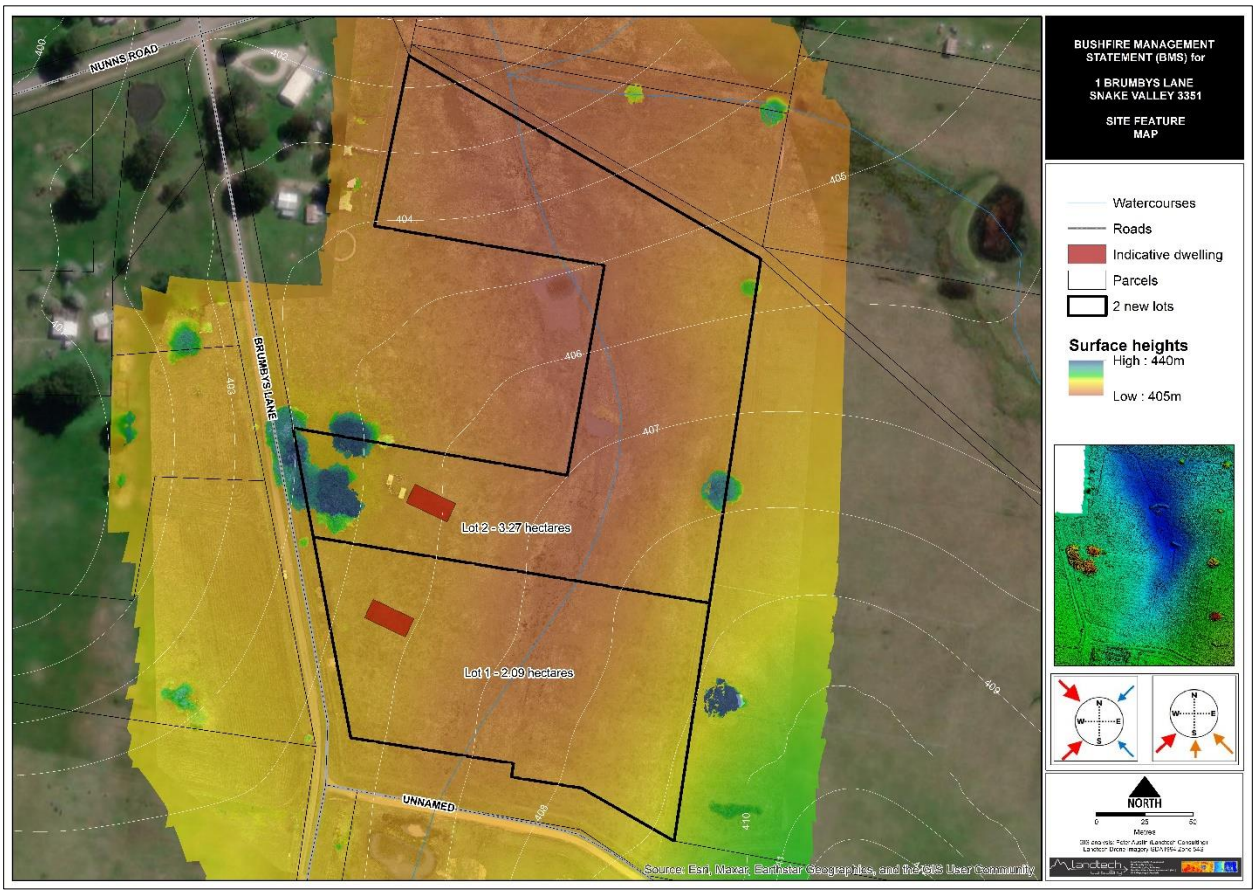


Figure 9 – Site surface feature model and proposed 2-lots.

[4] DELWP; Victorian Planning Schemes (2023); Accessed from: https://planning-schemes.app.planning.vic.gov.au/Pyrenees

c. APPROVAL PATHWAY[5]

PATHWAY 3 – Subdivisions

Clause 53.02-4 applies to all other applications including subdivisions.

→If an applicant chooses to include alternative measures, the application will be assessed under Pathway Three and all relevant approved or alternate measures of Clause 52.47-2 must be met.

PATHWAY THREE – CLAUSE 52.47-2 SUBDIVISION

Clause 52.47-2.4 contains requirements for subdivision. It does this by:

- providing subdivision specific approved measures and alternative measures, and
- cross-referencing the need to comply with other objectives and approved measures in Clause 52.47-2.

Other development controls - Zoning

The subject site is zoned Rural Living Zone (RLZ).

Other development controls - Overlays

The subject land is within a Bushfire Management Overlay.[6] This overlay has a focus on:

- *Implementing the Municipal Planning Strategy and the Planning Policy Framework.*
- *Ensuring that the development of land prioritises the protection of human life and strengthens community resilience to bushfire.*
- *To identify areas where the bushfire hazard warrants bushfire protection measures to be implemented. To ensure development is only permitted where the risk to life and property from bushfire can be reduced to an acceptable level.*

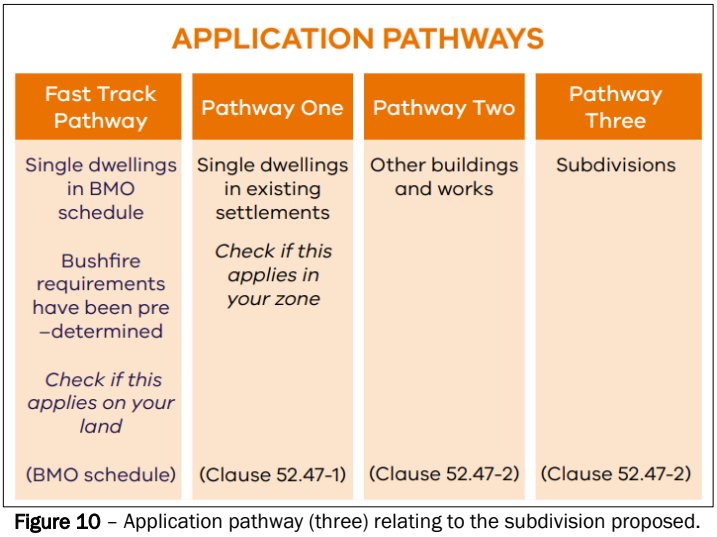


Figure 10 – Application pathway (three) relating to the subdivision proposed.

[5] Technical-Guide-Planning-Permit-Applications-Bushfire-Management-Overlay; Accessed from: https://www.planning.vic.gov.au/__data/assets/pdf_file/0029/107669/Technical-Guide-Planning-Permit-Applications-Bushfire-Management-Overlay.pdf
[6] Technical-Guide-Planning-Permit-Applications-Bushfire-Management-Overlay; Accessed from: https://www.planning.vic.gov.au/__data/assets/pdf_file/0029/107669/Technical-Guide-Planning-Permit-Applications-Bushfire-Management-Overlay.pdf

2. APPLICATION DETAILS

Table 1 – Application and lot details.

Proposal	Bushfire Management Statement for 2-lot subdivision (see *Figure 11*).
Address	1 Brumbys Lane, Snake Valley, 3351.
Council property number	710042900
Zoning	RURAL LIVING ZONE (RLZ) SCHEDULE TO THE RURAL LIVING ZONE (RLZ) BUSHFIRE MANAGEMENT OVERLAY (BMO)
Overlays	DESIGNATED BUSHFIRE-PRONE AREA - Special bushfire construction requirements apply. Planning provisions may apply.
Municipality	Pyrenees Shire Council

Figure 11 – Site feature map depicting proposed lots, indicative dwellings, and overarching lightly-sloping landform.

Figure 12 – View from the west and Brumbys Lane across the proposed two-lot subdivision.

Figure 13 – 150m site buffer map and potential bushfire risk sources within and beyond the site.

3. BUSHFIRE HAZARD – LANDSCAPE ASSESSMENT

The bushfire hazard landscape assessment provides information on the bushfire hazard more than 150 metres from a development site. Considering bushfire from this broader landscape perspective is important as it affects the level of bushfire risk a development and its future occupants may be exposed to.[7]

Considering the bushfire risk arising from the broader landscape

Bushfire is a dynamic hazard and can be highly unpredictable with factors contributing to the bushfire risk diverse.
The purpose of the landscape assessment is not to predict the outcome of a bushfire event, but to provide information that builds a better understanding of the bushfire risk in a location, and to inform decision-making.

These seek to support more consistent decision-making, based on the risk from the landscape beyond the site.
The broader landscape and the potential size or scale of a bushfire is an important consideration in the assessment of a planning application. The likelihood of a bushfire, its severity and intensity, and the potential impact on life and property varies, depending on where a site is located in the surrounding landscape.

The defendable space and construction requirements in the BMO and Clause 53.02 Bushfire Planning are based on standard requirements. To determine these requirements, models are used to predict radiant heat from a fire-front based on specific inputs and assumptions. Considering the surrounding landscape in bushfire decisions is important because the accuracy of the models in reflecting bushfire exposure on a particular site varies in different landscapes.

This is because the scale of a bushfire and its potential destructive power is driven by the characteristics and previous management of the broader landscape, rather than those characteristics within 150 metres of the site.

How is the landscape assessment used in preparing and assessing a planning application?

The landscape assessment presents contextual information on a site and informs the following-stage Bushfire Hazard Site Assessment. It provides information critical to potential bushfire behaviour, and how the approved and alternative measures adequately mitigate the risk.

The landscape assessment is used where Clause 53.02 Bushfire Planning requires consideration of the bushfire risk from the landscape beyond the site. This requires that approved measures AM 1.1, AM 1.2 and AM 1.3 be included in an application and associated decision guidelines.

The assessment provides information that allows these provisions to be responded to as part of the bushfire management statement submitted with an application.

The bushfire hazard landscape assessment provides information on the bushfire hazard more than 150 metres away from a development site and includes:

- Factual information on the bushfire hazard (vegetation extent and slope);
- Information on key features of the general locality relevant to better understanding the protection provided by the location; and
- Provides contextual information on a site.

The landscape assessment does not assess a specific development proposal and is only required where Clause 53.02 Bushfire Planning requires consideration of the bushfire risk from the landscape beyond the site.

[7] DELWP 2017; Planning Permit Applications Bushfire Management Overlay Technical Guide; Accessed from: https://www.planning.vic.gov.au/__data/assets/pdf_file/0029/107669/Technical-Guide-Planning-Permit-Applications-Bushfire-Management-Overlay.pdf

3.1 Subject Site and interface

The study site is located within the south-eastern part of the Snake Valley township (1.3km), and located on elevated plain landforms among grassland landscapes and remnant woodland as part of the Scarsdale Plantation, 120m from the lot boundary (and an area of increased bushfire risk with wind-change events).

The site is contiguous with similar rural-living and agriculture-based land usage with dominant native and exotic open grassland within and beyond the study site.

There are numerous state forests and nature conservation reserves scattered beyond the localised area with lifestyle-blocks and vegetated roadside corridors providing direct linkage to the site. Other sites of potential bushfire concern within the 5-10km site interface include:

West – open grassland and reduced-sized remnants
North – open grassland and reduced-sized remnants
South – Scarsdale Plantation
East – open grassland and reduced-sized remnants

Core bushland remnants such as the Scarsdale Plantation to the south and south-east potentially presents the major large-scale ember-generating bushfire origin.

The proposed 2-lot subdivision has direct access to Brumbys Lane adjoining both lots western boundaries, a two-lane gravel road leading north to the Snake Valley township and escape pathways to the north, south, and east if required via sealed road networks.

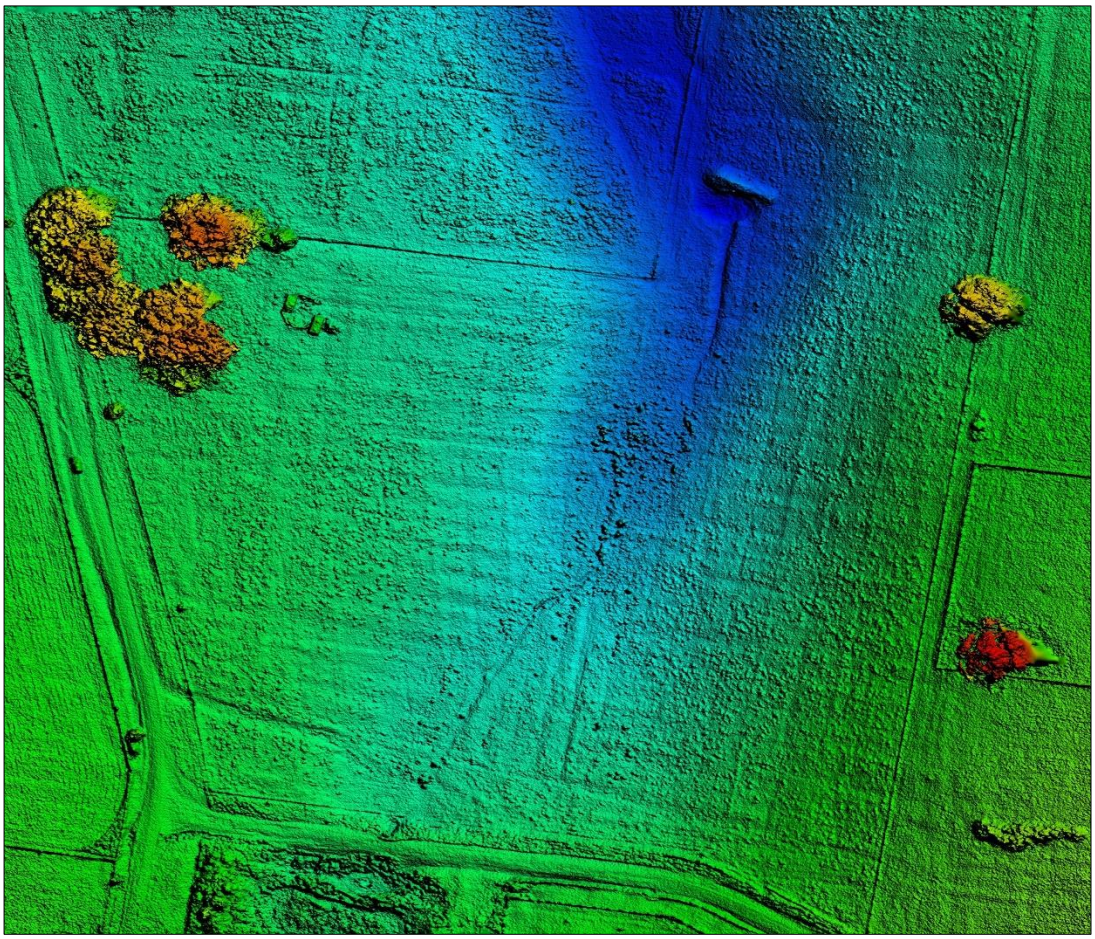


Figure 14 – The proposed 2-lot development includes a shallow drainage line across the site and dominating open grassland.

The proposed subdivision footprint includes sparsely-distributed single and grouped native and exotic planted and regrowth trees with a highly-maintained grassland ground-storey.

In its current maintained state this reduces the immediate bushfire risk however the site is surrounded in all directions by variably-managed large-acre and reserve-based woodland landscapes where bushfire mitigation management cannot be guaranteed. [8] Contiguous grassland and roadside vegetation link the site to grassland/woodland tracts further afield in all southerly directions.

The climate in the region is dominated by warm dry summers and cool wet winters. The bushfire season generally runs from November to April. Prevailing weather conditions associated with the bushfire season are warm to hot north-westerly winds accompanied by high temperatures and low relative humidity, followed by a cool south-westerly change.

The site includes strongly texture-contrast soils and hard-setting surface soils with a conspicuously bleached A2 horizon. Sodic, mottled, and alkaline subsoils are features of this soil type.

Under the State Government climate change projections, the Ballarat and Snake Valley region can expect: [9]

- To be hotter with the greatest increases in temperature expected in summer;
- To be drier with greatest decreases in rainfall expected in spring; and
- To have fewer rainy days but increasing rainfall intensity.

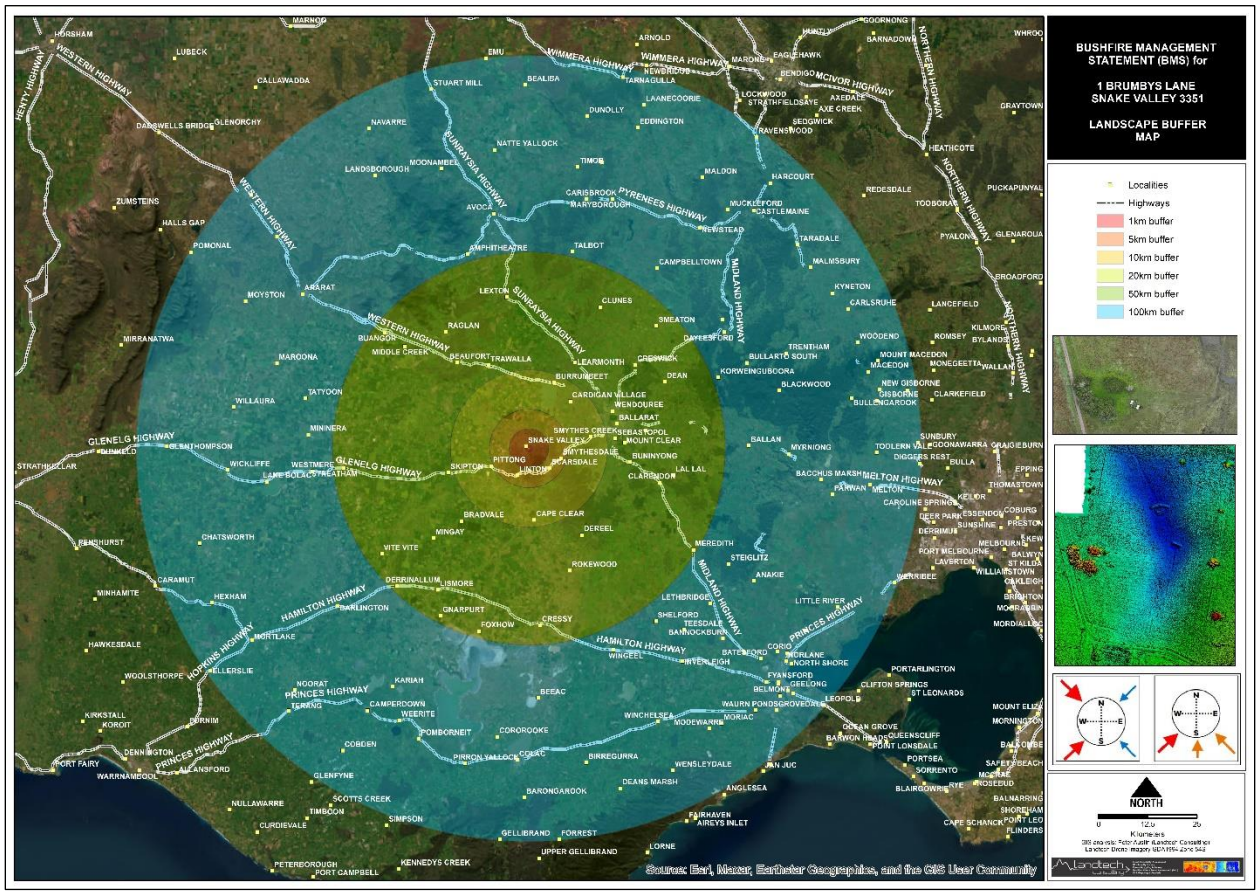


Figure 15 – Broad-scale (100km) landscape buffer assessment.

[8] Pyrenees Shire Council 2023; Snake Valley township plan; https://www.pyrenees.vic.gov.au/files/assets/public/planning/draft-pyrenees-futures-plans-exhibition/pyf-snake-valley-5nov2018_web.pdf

[9] Victorian Resources Online 2023; Linton/Snake Valley soil landforms; https://vro.agriculture.vic.gov.au/dpi/vro/glenlgregn.nsf/pages/soil_landform_soil_pits_mm162

3.2 Landscape Risk

The former *Planning Practice Note 65* provides useful guidance on describing landscape typology. The landscape typologies outlined in *Practice Note 65* range from low risk landscapes where there is little vegetation beyond 150m of the site and extreme bushfire behaviour is not possible, to extreme risk landscapes with limited or no evacuation options.

Once a bushfire is large, the weather and the interaction of the fire with itself becomes the dominant driver of fire behaviour. Variation in fuel and topography become less relevant as large bushfires tend to 'smooth' these out.

This should be remembered when classifying vegetation and determining slope in landscape types Three or Four and the assessment of these factors should be made with due caution. This will include:[10]

- Considering the influence of slope on fire behaviour beyond the 150m assessment area as well as within.
- Determining effective slope on worst case rather than an average.
- Choosing the more conservative fuel type in situations where the classifiable vegetation does not fit neatly into a specific vegetation class.
- For 'modified' vegetation to be considered a valid classification, the level of modification and the distance the fire has to travel through these modified fuels must be significant.
- In most instances it will not be appropriate to classify fuels as modified in landscape types Three or Four.
- Similarly, fuels must be significantly managed and clearly meet defendable space prescriptions before they can be classified as 'low threat'.

3.3 Landscape Scenario

It is considered that Landscape Scenario Three best represents the area surrounding the subject site although not specifically applying to this area.

• The type and extent of vegetation located more than 150 metres from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to a site.
• Bushfire can approach from more than one aspect.
• The site is located in an area that is not managed in a minimum fuel condition.
• Access to an appropriate place that provides shelter from bushfire is not certain.

The proposed subdivision site is located within flat to lightly-sloping open grassland-based landscapes within sub-catchments of Baillie Creek and Lake Burrumbeet. The flat to lightly-undulating localised landform dominates the subject site and local landscapes. Major core remnant bushland areas exist to the south and south-east of the two lots (120m south-east) presenting major bushfire risk.

Such core areas with a history of bushfires in various management states presents the greatest bushfire source risk. Landscapes include patches of regrowth woodland within historic broad-acre farming landscapes generally managed in a reduced fuel condition surrounding settled areas proximal to the Snake Valley settlement.

[10] CFA 2018; Applying the Bushfire Hazard Landscape Assessment in a Bushfire Management; Accessed from: https://www.cfa.vic.gov.au/ArticleDocuments/392/guidence-applying-the-landscape-assessment_V3.pdf.aspx

3.4 Bushfire Landscape Assessment Plan

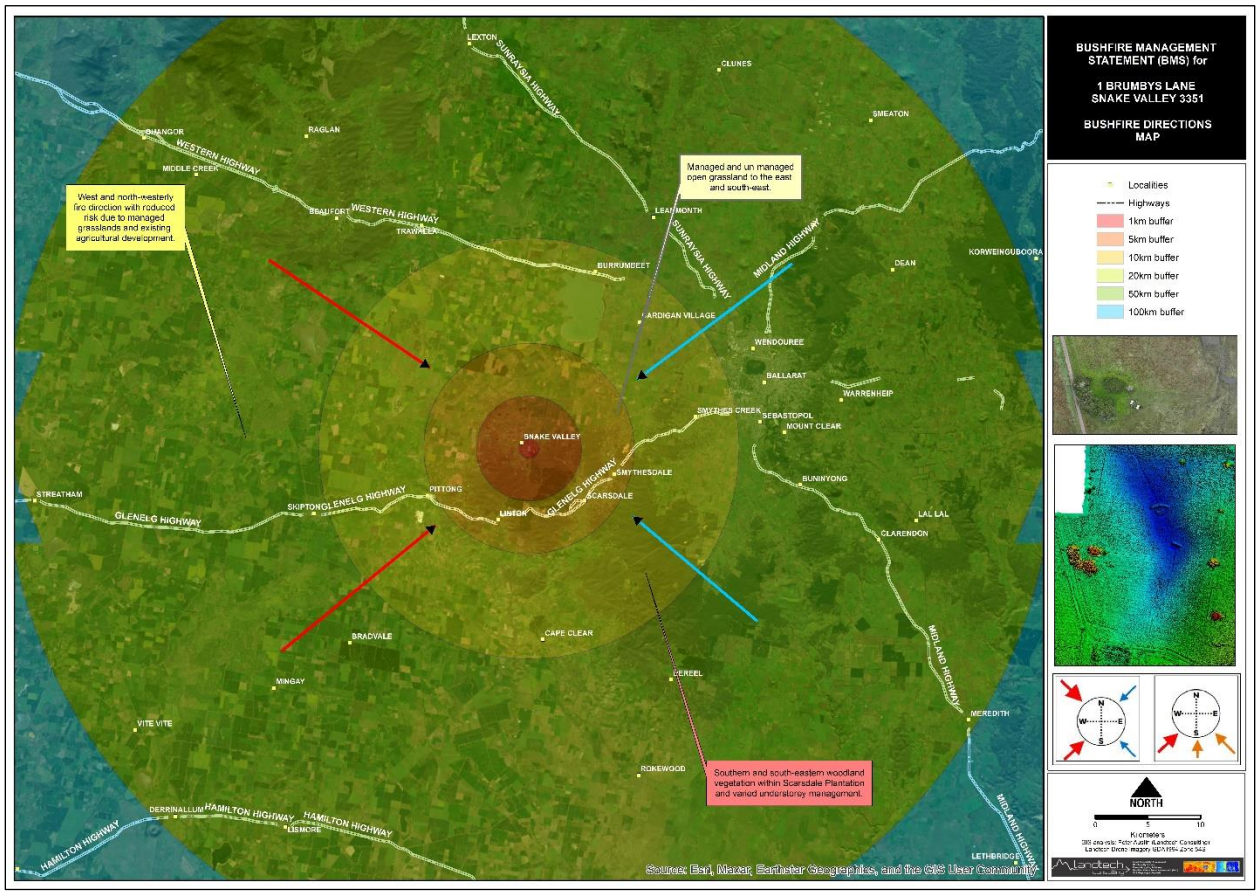


Figure 16 – Overarching landscape factors and potential fire directions within the broader landscape <20km from site.

Figure 17 – Existing site western Brumbys Lane interface and flat to lightly-sloping landform.

4. BUSHFIRE HAZARD – SITE ASSESSMENT

The Bushfire Hazard Site Assessment describes the subject site and bushfire hazard within 150m of the proposed development.

Pursuant to Clause 53.02 Bushfire Planning, "the description of the hazard must be prepared in accordance with Sections 2.2.3 to 2.2.5 of AS3959:2018 Construction of buildings in bushfire prone areas (Standards Australia) excluding paragraph (a) of section 2.2.3.2".[11]

This Bushfire Hazard Assessment:

→Provides factual information on the bushfire hazard (vegetation type and slope);

→Informs defendable space and building construction requirements; and

→Utilises the methodology contained in Australian Standard AS3959:2018 Construction of buildings in bushfire prone areas (AS3959) to provide contextual information on a site.

Grassland is the main classifiable vegetation type within and outside the 150m buffer and used for defendable space calculations.

4.1 Vegetation

Vegetation within 150 metres of the site has been classified in accordance with the descriptions contained in Section 2.2.3 in AS3959:2018 (Standards Australia: Construction of Buildings in Bushfire-prone Areas) and the CFA's Vegetation Classes guide.[12] Assessable classifiable vegetation (Grassland) exists beyond built elements and lot boundaries.

Figure 18 – Existing dominant grassland in currently managed condition however potential for increased risk in un-managed states.

[11] SAI 2018, Australian/New Zealand Standards; AS3959:2018 Construction of buildings in bushfire-prone areas; Accessed from: https://www.saiglobal.com/PDFTemp/Previews/OSH/as/as3000/3900/3959-2018.pdf

[12] CFA; Vegetation Classes – Bushfire Management Overlay 2018; Accessed from: https://www.cfa.vic.gov.au/documents/20143/69511/Vegetation-Classes-Victorian-Bushfire-Management-Overlay-v0-3.pdf/f29e4450-a4ea-bfcb-ffe5-13cbbf01c746

1. Grassland

Grasslands are widespread and consist not only of native grasslands, but also areas of cropping, pasture, and some cultivation.

Although trees or shrubs may be present, they are widely spaced, occur only occasionally and form less than 10% canopy cover.

Although strictly a shrubland, chenopod shrubland (e.g. Saltbush) is characterised by grass growth after a high-rainfall event.

This growth influences fire behaviour in the drier parts of the state and as such, these areas are described as grassland for the purposes of the BMO and AS 3959–2009 in Victoria.

The predominant native grasslands in Victoria are located on the volcanic plains in the southwest, the north-central plains, the Wimmera plains, and the Gippsland Plains in the south-east.

Clay soils support a diverse range of native grasses, herbs, forbs and small shrubs (<1 metre). Areas of modified woodland or forest that has been converted to pasture or crop are treated as grassland areas.

There may be scattered individual trees or tree lines along creeks within an otherwise treeless landscape.[13]

Figure 19 – Indicative dwelling 150m buffer map and existing vegetation within.

[13] CFA; Vegetation Classes – Bushfire Management Overlay 2018; Accessed from: https://www.cfa.vic.gov.au/documents/20143/69511/Vegetation-Classes-Victorian-Bushfire-Management-Overlay-v0-3.pdf/f29e4450-a4ea-bfcb-ffe5-13cbbf01c746

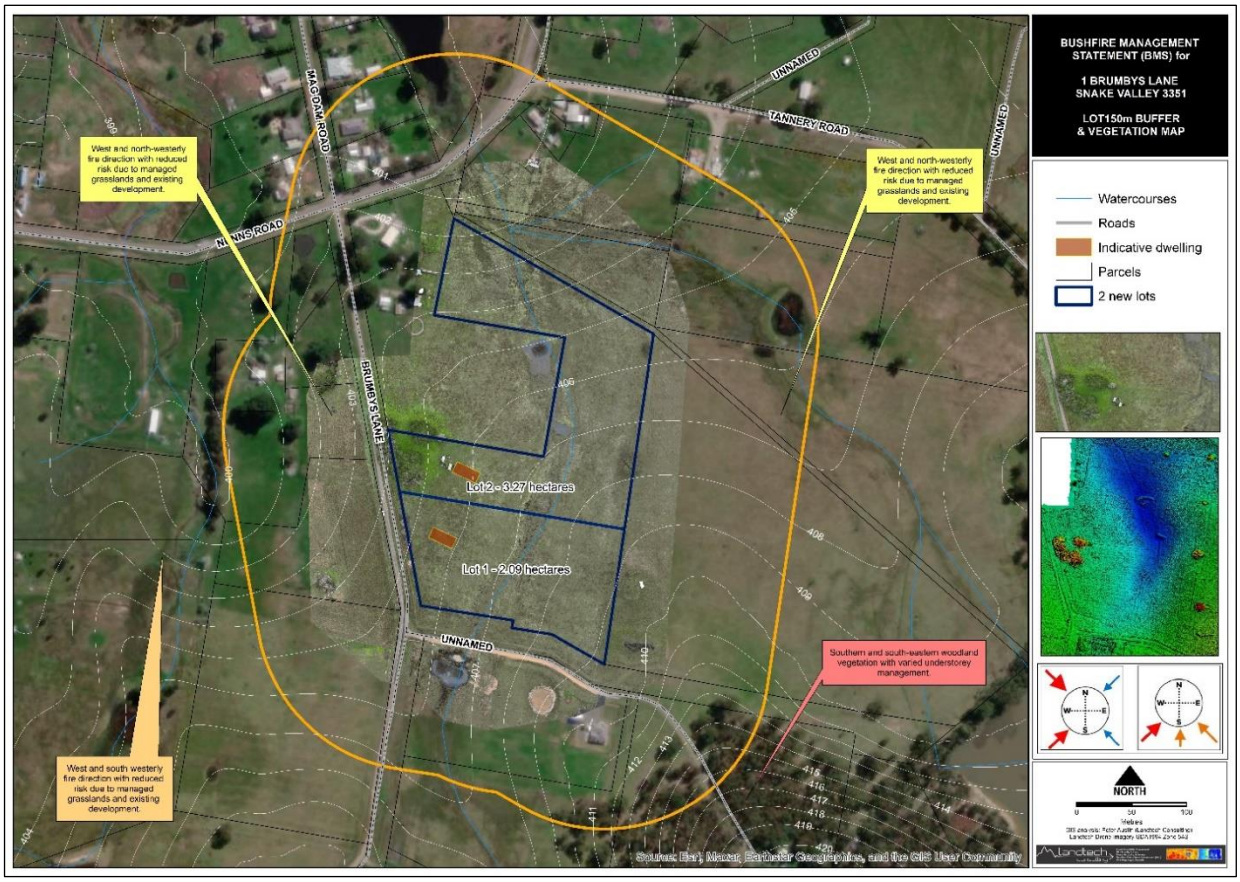


Figure 20 – Classified grassland vegetation within and beyond the 150m site buffer.

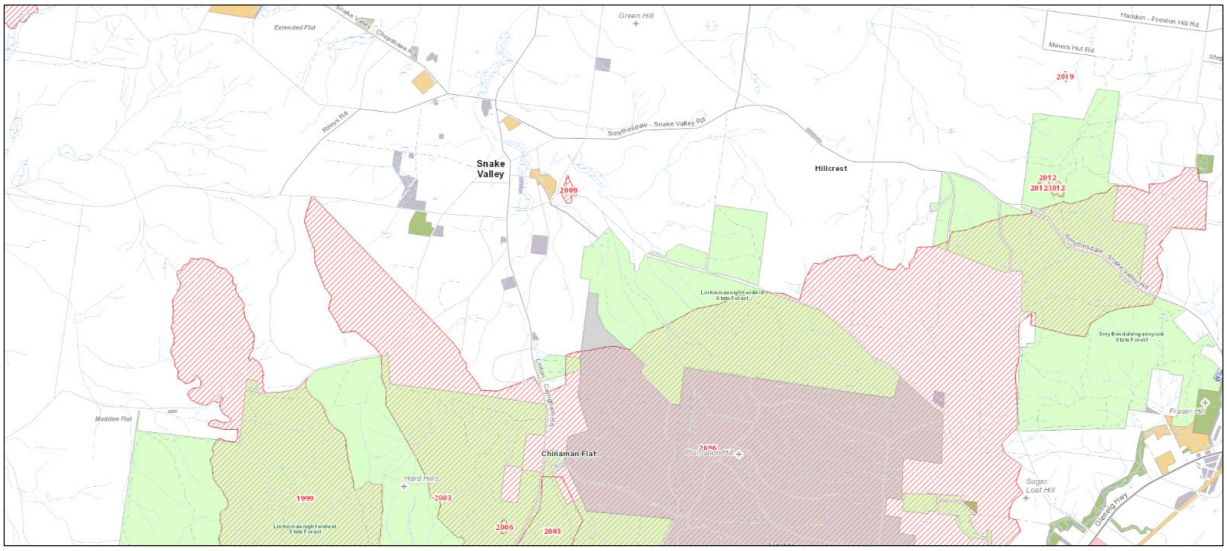


Figure 21 – Existing southern core remnants and smaller reserves within the subject site and localised region (Source: DELWP 2023).

4.2 Topography (under classified vegetation)

The slope of the land under the vegetation influences likely fire behaviour. As the slope increases so does the intensity and rate of spread of bushfire.

→The assessment requires the slope under classifiable vegetation to be identified according to the following classifications:

- All upslopes and flat land (0 degrees)
- Downslope >0 to 5 degrees
- Downslope >5 to 10 degrees
- Downslope >10 to 15 degrees
- Downslope >15 to 20 degrees
- Downslope greater than 20 degrees.

■Topography to the south of the lot (and within the 150m buffer) includes upslope of 0-5 degrees
■Topography to the north of the site includes downslope of 0-5 degrees
■Topography to the east of the lot includes flat landform
■Topography to the west of the site includes flat landform

Table 2 - Characteristics present within the site and surrounding environs.

Assessment area and analysis of the site	The site is irregular in shape with an area of 5.36 hectares. The 2-lot subdivision has direct access to Brumbys Lane to the west (and an un-named road adjoining the southern boundary of lot 1). Remnant core areas such as the Scarsdale Plantation, 120m to the south-east (of lot 1), and assorted adjoining patch remnants, contiguous roadside vegetation, and intervening large-acre and variably-managed lots, provide sources of increased bushfire risk approaching from all directions. The defendable spaced proposed is within both lots. The indicative dwellings are located where adequate setback can be provided for BAL12.5. The vegetation within the 150m buffer includes grassland in varying management states.
Vegetation classification (section 2.2.3 AS3959)	Vegetation within the assessable area (150m buffer of development footprint) is classifiable. Dominating surrounding Grassland classified vegetation is located within the 150m zone and matches the AS3959 vegetation groups referenced.
Low threat vegetation (managed, planted, windbreak) (section 2.2.3.2 f in AS3959)	Vegetation exclusions within the assessable area includes single and patch retained exotic and native trees within both proposed lots. This includes managed defendable space areas within each lot (managed to a state of 'low threat' and is therefore excludable pursuant to AS3959-2018 2.2.3.2 (f)).
Distance to classifiable vegetation	The closest classifiable vegetation is grassland located: • 0m beyond lot boundaries – both proposed lots
Slope under classifiable vegetation	The effective slope under the classified vegetation is as follows: Topography to the south of the lot includes upslope of 0-5 degrees Topography to the north of the site includes downslope of 0-5 degrees Topography to the east of the lot includes flat landform Topography to the west of the site includes flat landform *Note: where the vegetation classification is "Low Threat"; the prevailing slope has no bearing on the BAL rating.*
Reticulated water supply, Fire hydrant location	The closest fire hydrant is located at Cnr Linton-Carngham Road & Murrays St Snake Valley 3351 (based on information from the MEMP).[14]

[14] Pyrenees Shire Council MEMP; Accessed from: https://www.pyrenees.vic.gov.au/files/assets/public/emergencies/2020.05.19-memp-2020-final-adopted.pdf

4.3 Bushfire Site Assessment Plan

Figure 22 - Slope map (in degrees fall) showing the flat to lightly-sloping nature of the subject site.

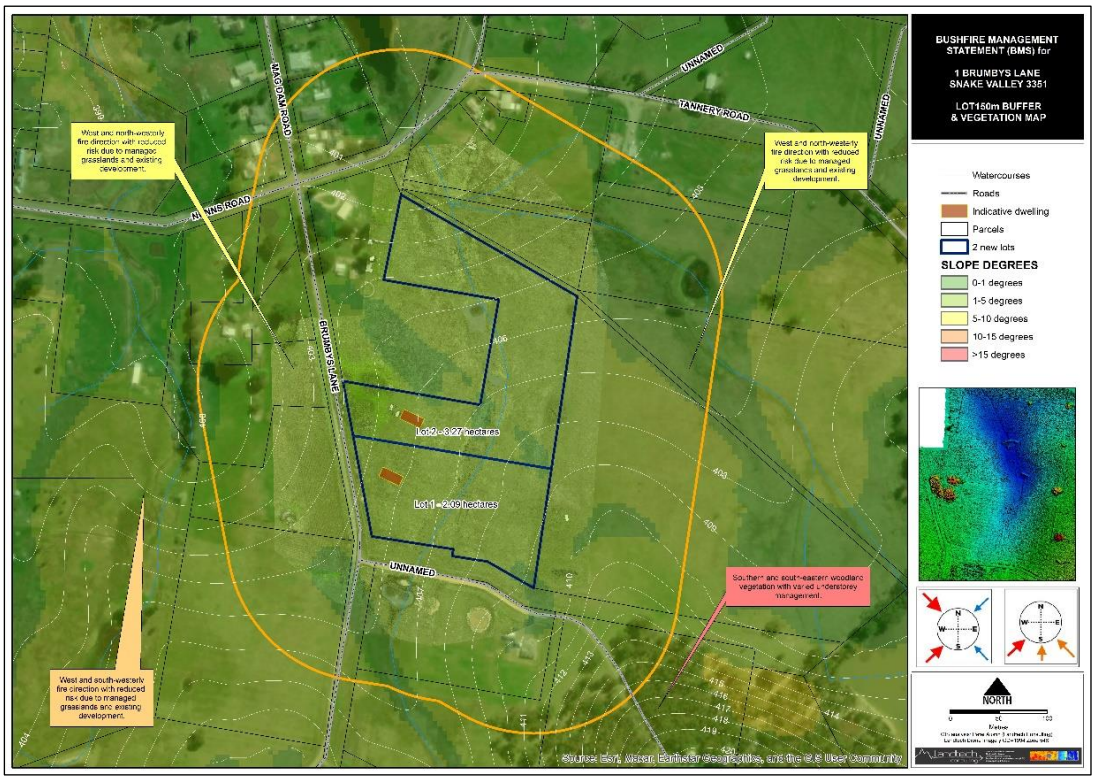


Figure 23 – Grassland classified vegetation that is within and outside the lot.

4.4 Defendable Space Bushfire Attack Levels (BALs)

Defendable space is an area of land around a building where vegetation is modified and managed to reduce the effects of flame contact, radiant heat, and embers associated with bushfire. Flame contact, radiant heat, and embers are the way a bushfire attacks a building.

It is in the Client's interest to be setback as far as reasonably possible from this risk; accordingly building envelopes are setback from each site boundary and other dwellings as far as reasonably possible.

CFA referral regarding defendable space and construction requirements is suggested to support that building envelope layout has satisfactorily responded to Clause 53.02 Bushfire Planning.

Clause 52.47-2 Bushfire protection objectives

Clause 52.47-2 provides a performance based approach to implementing bushfire protection measures.

The objectives are:

- Clause 52.47-2.1 Landscape, siting, and design objectives
- Clause 52.47-2.2 Defendable space and construction objective
- Clause 52.47-2.3 Water supply and access objective

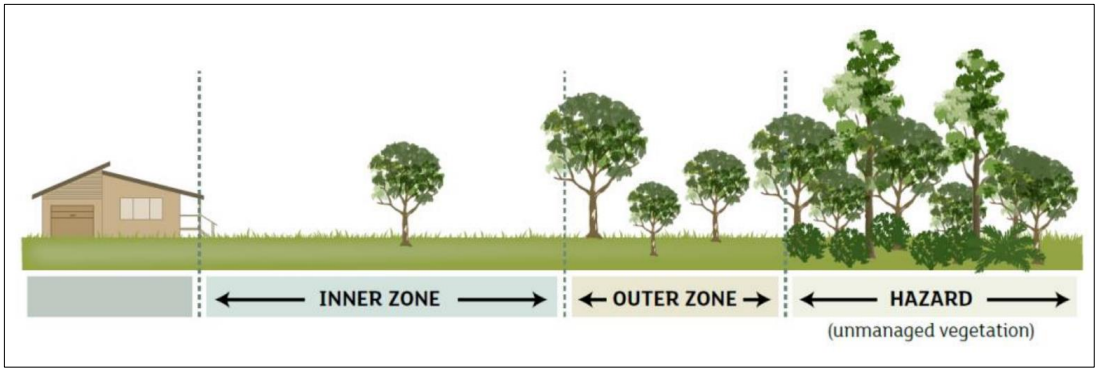


Figure 24 – Defendable space buffering between rural landscapes and built interfaces (Source: DELWP 2021).

Year	Fire Type	Fire Name	Details
Feb 2013	Bushfire	Wongetta/Stonleigh, Cross Roads	1800ha
Jan 2013	Bushfire	Chepstowe-Pittong Rd, Chepstowe	1266ha
March 2010	Bushfire/Wildfire	Buangor - Ferntree Waterfalls, Raglan, managed by Midway Plantations	1000 ha
2010	Bushfire	Mt Cole	Escaped burn from Public Land
2006	Bushfire	Langi Kal Kal	Lightning Strike
2006	Grassfire	Waubra	Escaped burn from private land
2006	Grassfire	Mt Misery	Lightning Strike
2006	Bushfire	Snake Valley	Suspicious
2003	Grassfire	Carranballac	Escaped burn from private land
2002	Bushfire	Mt Lonarch	Escaped burn from private plantation
2001	Bushfire	Glenpatrick/Mt Avoca Fire	Accidental Ignition
2000	Bushfire	Snake Valley/Linton	Suspicious
1998	Bushfire	Snake Valley/Linton	Escaped burn from private land
1985	Bushfire	Avoca	Fire spreading from sawmill

Figure 25 – Pyrenees Shire area bushfire incident history (Source: Pyrenees Shire 2023).

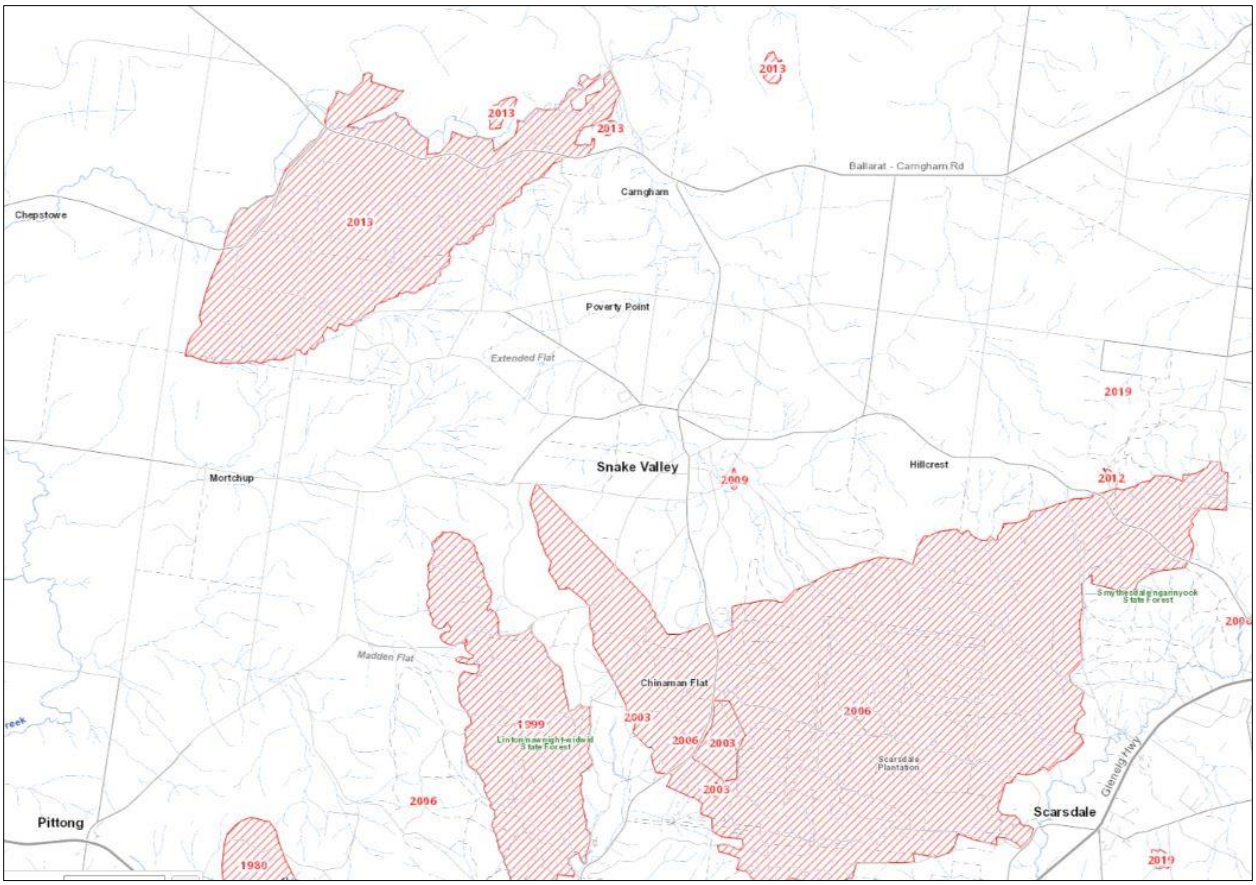


Figure 26 – Local Snake Valley bushfire distribution map depicting both grassland and woodland bushfires (Source: DELWP 2023).

Figure 27 – Existing Scarsdale core remnants and smaller reserves within the southern Snake Valley area (Source: DELWP 2023).

The defendable space required is determined by the vegetation type, slope, and the preferred BAL construction standard.[15]

The defendable space is due to the Grassland classified vegetation within all directions of each dwelling on a lightly-sloping (0-5 degrees) site at BAL12.5 equates to 22m.[16] This is then consistently applied in all directions.

Defendable space for a distance of 22 metres around the proposed/indicative dwellings (or to the property boundary, whichever is the lesser distance) must be provided where vegetation (and other flammable materials) will be modified and managed in accordance with the following requirements (see *Figure 28*):

- *Grass must be short cropped and maintained during the declared fire danger period.*
- *All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.*
- *Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.*
- *Plants greater than 10 centimetres in height must not be placed within 3m of a window or glass feature of the building.*
- *Shrubs must not be located under the canopy of trees.*
- *Individual and clumps of shrubs must not exceed 5m² in area and must be separated by at least 5 metres.*
- *Trees must not overhang or touch any elements of the building.*
- *The canopy of trees must be separated by at least 5 metres.*
- *There must be a clearance of at least 2 metres between the lowest tree branches and ground level.*

Table 3 – Defendable space and required construction standards as per AS3959:2018 and based on Columns A, B or C of Table 2 to Clause 53.02-5 for a subdivision that creates less than 10 lots.

Parameter	North	East	South	West
FDI	100	100	100	100
Classified vegetation type	Grassland	Grassland	Grassland	Grassland
Effective slope (degrees)	0-5 degs	Flat	0-5 degs	Flat
Distance to classified vegetation (metres)	>22m	>22m	>22m	>22m
Defendable Space Requirements (metres needed for BAL12.5)	22m required	22m required	22m required	22m required
Construction to BAL	12.5	12.5	12.5	12.5

-Defendable space wholly contained within the boundaries of the proposed subdivision.

-Defendable space may be shared between lots within the subdivision.

-Defendable space for a lot may utilise communal areas, such as roads, where that land can meet the requirements for defendable space.

-Vegetation management requirements in accordance with Table 6 to implement and maintain the defendable space required under this approved measure. Water supply and vehicle access that complies with AM 4.1.

- An application to subdivide land to create 10 or more lots provides a perimeter road adjoining the hazardous vegetation to support firefighting.

4.5 Defendable Space Plan

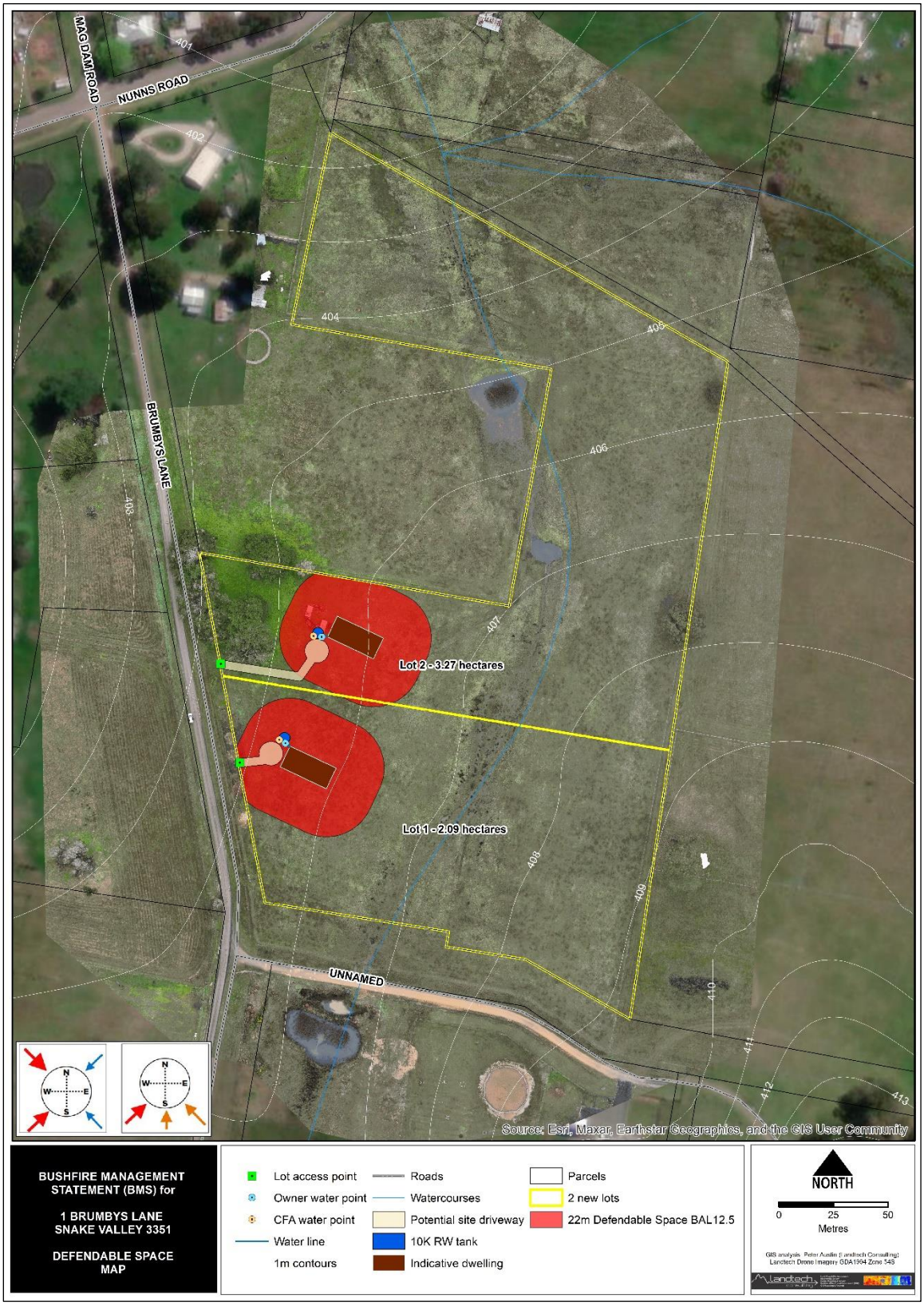


Figure 28 - Defendable Space Map.

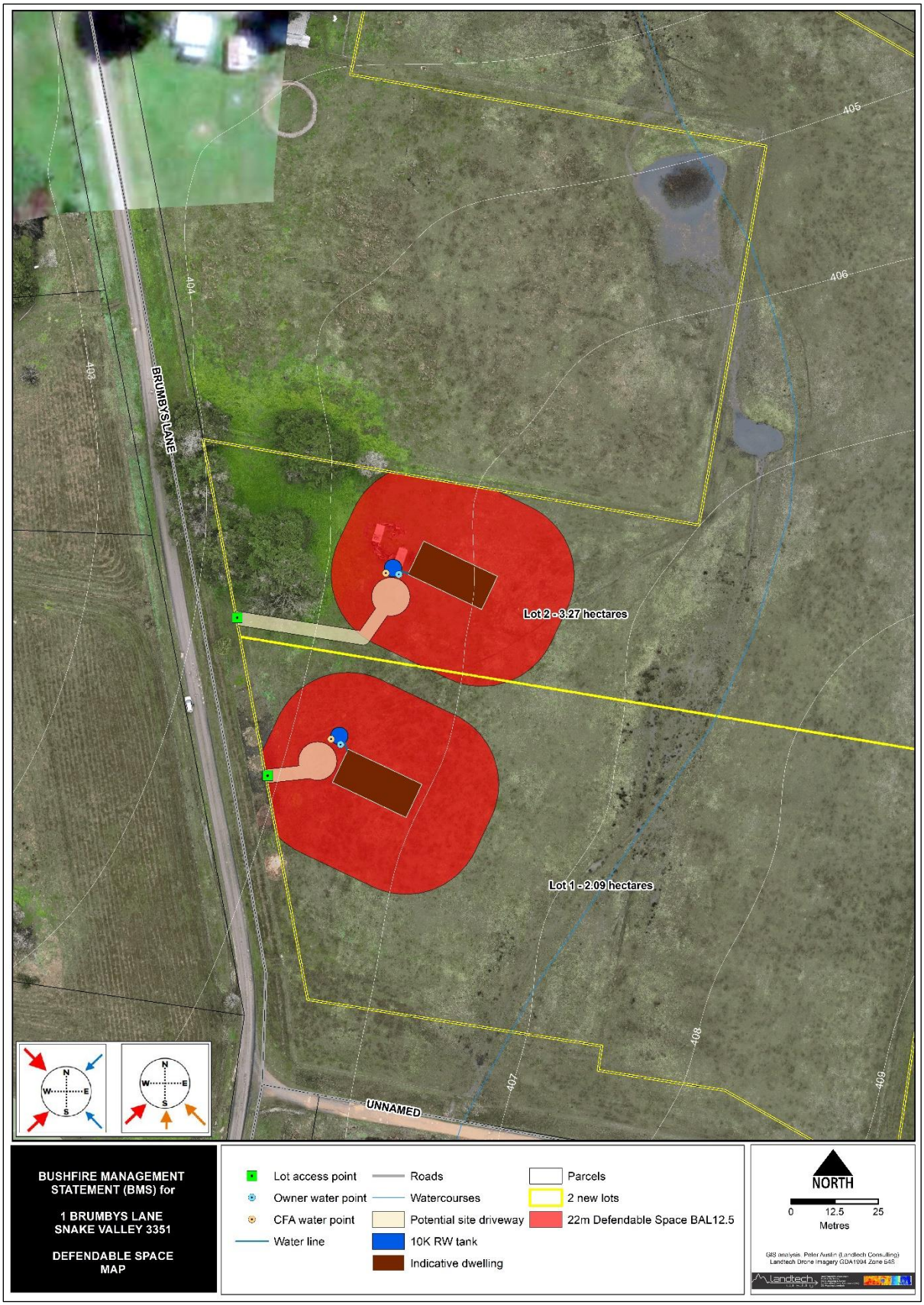


Figure 29 - Defendable Space Map.

5. Bushfire protection objectives

This section of the report describes how the proposal responds to requirements of Clause 44.06 (Bushfire Management Overlay) and Clause 53.02 (Bushfire Planning) (see *Appendix 4*).

The proposal is located within Pathway 3 in accordance with *Clause 53.02-3 (2018)* Subdivisions – *Bushfire protection* objective of the Pyrenees Shire Council Planning Scheme, which specifies requirements for bushfire design and construction measures to reduce the risk to life and property to an acceptable level. This is in addition to Clause 52.47-1 objectives and approved measures.

The dwellings must be constructed to a minimum Bushfire Attack Level of 12.5 (BAL12.5).

Objective 52.47-1.1 Siting

Approved measure AM 1.1: Siting

AM 1.1 Siting

A building is sited to ensure the site best achieves the following:

-The maximum separation distance between the building and the bushfire hazard.
-The building is in close proximity to a public road.
-Access can be provided to the building for emergency service vehicles.
-A building provides the defendable space in accordance with Table 1 Columns A, B, C, D or E and Table 6 to Clause 53.02--
-Adjoining land may be included as defendable space where there is a reasonable assurance that the land will remain or continue to be managed in that condition as part of the defendable space.

Objective 52.47-1.2 Defendable Space and Construction

Approved measure AM 1.2: Defendable space and construction
Approved measure AM 1.2 (continued): Defendable space on adjoining land

AM 1.2 Defendable Space

-A building is constructed to the bushfire attack level: That corresponds to the defendable space provided in accordance with Table 1 to Clause 53.02-5, or the next lower bushfire attack level that corresponds to the defendable space provided in accordance with Table 1 to Clause 53.02-5 where all of the following apply:

– A private bushfire shelter (a Class 10c building within the meaning of the Building Regulations 2006) is constructed on the same land as the dwelling.

– A minimum bushfire attack level of BAL12.5 is provided in all circumstances.

Objective 52.47-1.3 Water Supply and Access

Approved measure AM 1.3: Water supply and access

AM 1.3 Water Supply & Access

A building is provided with: A static water supply for firefighting and property protection purposes specified in Table 4 to Clause 53.02-5.

The water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies.

Vehicle access that is designed and constructed as specified in Table 5 to Clause 53.02-5.

6. CONCLUSION

The proposed 2-lot subdivision at 1 Brumbys Lane, Snake Valley, Victoria, and potential residential dwellings on each lot has been assessed against the requirements of the *Pyrenees Shire Council Planning Scheme*.

The proposal requires Clause *53.02-4* application Pathway Three (Subdivisions – *OBJECTIVES AND APPROVED MEASURES FOR CLAUSE 52.47-3 of the Pyrenees Shire Council Planning Scheme)*.

The surrounding landscape has been assessed as having a high bushfire risk. The site has the potential to be impacted by a landscape-scale fire approaching from any direction if topography and wind direction coincide to produce such a fire.

A fire from these directions would typically approach through existing proximal southern conservation reserves or linked grassland, driven by in the first instance, hot, dry, and variable northerly winds, which are then impacted typically by west south-westerly wind change.

While areas of grassland within the surrounding area may moderate the speed and intensity of the fire before it impacts the subject site, under conditions typical of severe, extreme or code red days, the subject site is likely to be impacted upon by ember attack.

Remnant core areas such as the Scarsdale Plantation (120m outside lot 1 boundary) and assorted proximal patch remnants, roadside vegetation, and intervening large-acre and variably-managed lots, provide sources of increased bushfire risk approaching from all directions.

In accordance with the requirements of the Bushfire Management Overlay, the following applies:

- A minimum of 22 metres defendable space for classified Grassland (in accordance with *Table 2 under Clause 53.02-4*) is required for BAL12.5. The site has setback in all directions within each lot and proximal to each proposed dwelling that would require ongoing modification to landscapes proximal to the built footprint proposed (and where space is defended to and maintained on a continuous basis).

- Brumbys Lane, a single lane gravel road provides western boundary direct access and egress for emergency vehicles to both lots. An un-named single lane gravel road exists along the proposed lot 1's southern boundary.

- A total (minimum) of 10,000 litres of static water supply must be provided onsite in an easily accessible location (proximal to road access point) for each dwelling.

- Each lot's site access may be required to be upgraded to accommodate emergency vehicles in accordance with requirements set out in *Table 5 under Clause 53.02-5*.

In light of the above, the 2-lot subdivision proposal is considered to appropriately adhere to the requirements of the Bushfire Management Overlay, ensuring risk to life and property have been reduced to an acceptable risk.

7. BUSHFIRE MANAGEMENT PLAN

7.1 Maintenance Schedule

Before the occupation of the building defendable space must be implemented on the land and thereafter maintained as specified below:

- Grass must be short cropped and maintained during the declared fire danger period.
- All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.
- Shrubs must not be located under the canopy of trees.
- Individual and clumps of shrubs must not exceed 5m² in area and must be separated by at least 5 metres.
- The canopy of trees must be separated by at least 5 metres.
- There must be a clearance of at least 2 metres between the lowest tree branches and ground level.

7.2 Additional requirements within 10 metre management zone:

- Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.
- Plants greater than 10 centimetres in height must not be placed within 3 metres of a window or glass feature of the building.
- Trees must be trimmed to provide a minimum of 10 metre clearance from the building.
- Trees must not overhang or touch any elements of the building.

Outside of the Bushfire Management Overlay, areas that are subject or likely to be subject to bushfire are included in the Bushfire Prone Area designated under the Building Regulations 2006 (regulation 810).

There are three forms of bushfire attack:

• ember attack which occurs when small burning twigs, leaves and bark are carried by the wind
• radiant heat which can ignite houses and other assets
• flame contact involving burning vegetation directly touching a house or other asset.

Passive risk mitigation through location, spacing and alignment of group accommodation and/or by establishing a buffer between the bushfire hazard and the development. The use of internal and perimeter roads, water bodies, and open spaces managed in a minimal fuel state, are examples of effective buffers.

Buffer distances may be determined using AS3959-2018 Building in bushfire prone areas (Standards Australia). The Australian Standard uses vegetation type and the slope of the land to determine minimum distances between a bushfire hazard and new development.

A buffer distance equivalent to a bushfire attack level of 12.5 for new developments should be used. Note that for land subject to the Bushfire Management Overlay different buffer distances apply. The following examples illustrate approaches that can be taken.

Where such approaches are adopted the bushfire risk should usually be considered to have been reduced to an acceptable level.

7.3 Static Water Supply Requirements

The dwellings must be provided with a static water supply (minimum 10,000 litres) for property protection purposes.

The water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies.

The water supply must be an above ground water tank constructed of concrete or metal.

All fixed above ground water pipes and fittings required for firefighting purposes made of corrosive resistant metal.

7.4 Water tank requirements

The water supply should be stored in an above ground water tank constructed of concrete, steel, or corrugated iron. The water supply should be identified.

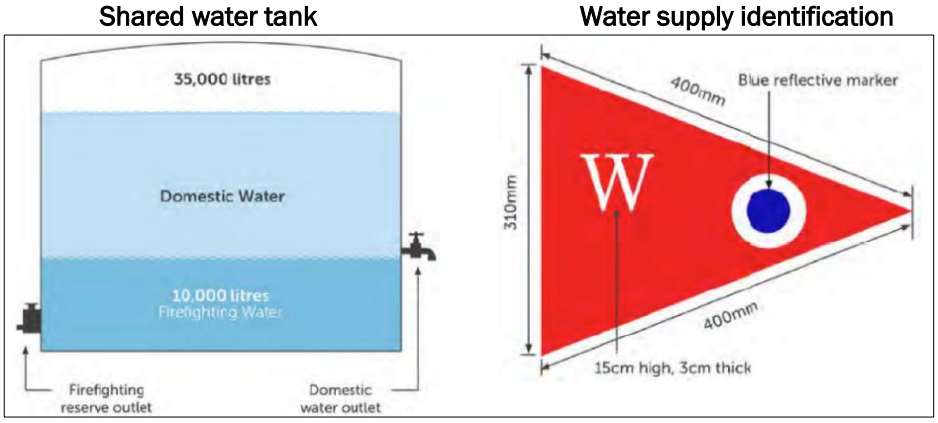


Figure 30 – Water tank and supply identification panels required (Source: CFA 2020).

7.5 Water supply outlet, pipe work and valves

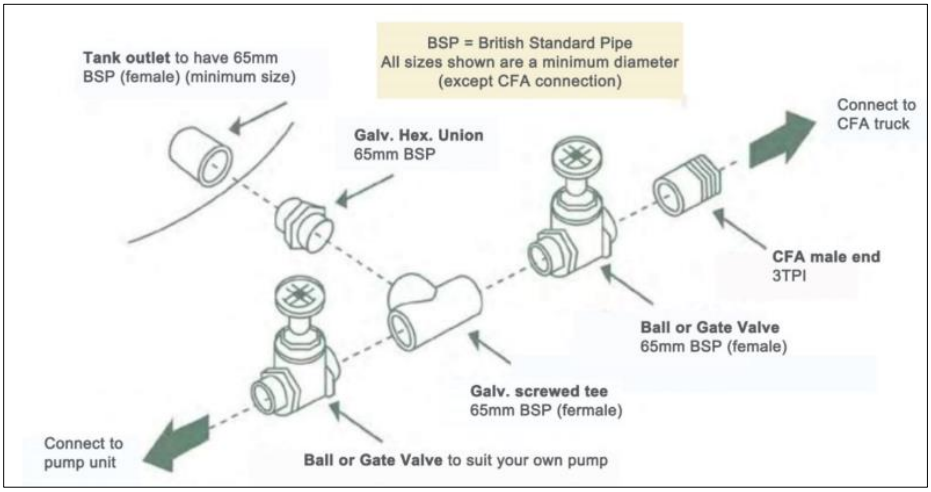


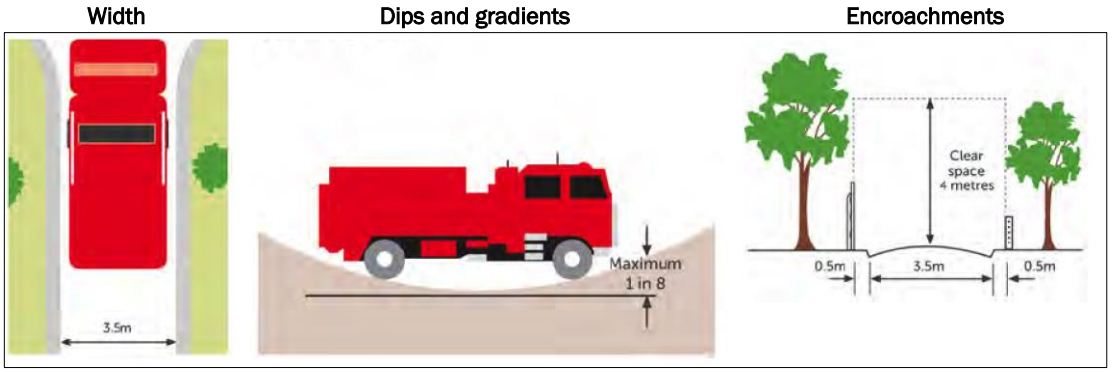
Figure 31 – Water supply outlet, pipework, and valves (Source: CFA 2020).

7.6 Access Requirement

Where the length of access is greater than 200 metres the following design and construction requirements apply:

- All-weather construction.
- A load limit of at least 15 tonnes.
- Provide a trafficable width of 3.5 metres.
- Be clear of encroachments for at least 0.5 metres on each side and at least 4 metres vertically.
- Curves must have a minimum inner radius of 10 metres.
- The average grade must be no more than 1 in 7 (14.4%) (8.1°) with a maximum grade of no more than 1 in 5 (20%) (11.3°) for no more than 50 metres.
- Dips must have no more than a 1 in 8 (12.5 per cent) (7.1 degrees) entry and exit angle.

- A turning area for fire fighting vehicles must be provided close to the building by one of the following:
  - A turning circle with a minimum radius of eight metres.
  - A driveway encircling the group accommodation.
  - The provision of other vehicle turning heads - such as a T or Y head - which meet the specification of *Austroad Design* for an 8.8 metre Service Vehicle.



No access requirement	
IF	• Fire authority access to the water supply is not required in Table 4 of Clause 52.47-3; and • The driveway is less than 30 metres.
THEN	• There are no access requirements under the Bushfire Management Overlay. • Apply the water supply requirements in Table 4.
Basic access requirement	
IF	• Fire authority access to the water supply is required in Table 4; and • The driveway is less than 30 metres.
THEN	• There are no access requirements subject to fire authority vehicles getting within 4 metres of the water supply using the access otherwise provided, (for example, residential dwelling). • Apply the water supply requirements in Table 4.
Tailored access requirement	
IF	• Fire authority access to the water supply is required in Table 4; and • The driveway is more than 30 metres.
THEN	• Access should be provided in accordance with Table 5, depending on the length of the access. • Apply the water supply requirements in Table 4.

Figures 32-33 – Access and encroachment dimensions (Source: CFA 2020).

8. OWNERS OBLIGATIONS

There are a range of obligations of the landowner. It is important that the landowner is aware of these obligations and understand what is required to ensure ongoing compliance.

1. Bushfire Attack Level (BAL) Rating and Construction Requirements

Buildings and works to the land must be developed within building envelopes and constructed to a minimum BAL 12.5.

2. Vegetation Management and Defendable Space

The following management prescriptions must be applied and maintained in all areas nominated as 'defendable space':

→Within 10 metres of a building, flammable objects such as plants, mulches and fences must not be located close to the vulnerable parts of the building such as windows, decks, and eaves.

→Trees must not overhang the roofline of the building, touch walls or other elements of a building.

→Grass around properties should be kept short. Five centimeters or less is considered short. All leaves and vegetation debris must be removed at regular intervals.

→Shrubs should not be planted under trees.

→Plants greater than 10 centimetres in height at maturity must not be placed directly in front of a window or other glass feature.

→Tree canopy separation of two metres and overall canopy cover of no more than 15 per cent at maturity.

3. Water supply construction and maintenance requirements

Onsite static water supply is required to be installed and must be designated solely for firefighting purposes.

APPENDIX 1 – SITE DESCRIPTION

Site description parameters

Site shape	The irregular-shaped parent lot on a north-south alignment adjoins Brumbys Lane to the west and an un-named gravel road to the south. The proposed subdivision exist within similar-sized Rural Living zoned holdings and now increasingly converting to edge-township lifestyle lots and from a bushfire perspective are adjacent or contain dominant grassland landscapes within and beyond the 150m site buffer.
Site dimensions	Proposed 2-lot site: Lot 1 – 2.09 hectares Lot 2 – 3.27 hectares
Site area	5.36 hectares
Existing use and siting of buildings and works on or near the study site	Existing shed/storage buildings within proposed lot 2. Potential development of new 4-bedroom dwellings on both lots with exact positioning still to be determined. Much of the existing vegetation consists of a maintained ex-farm site within grassland-based landscapes and single and grouped exotic/indigenous trees.
Existing vehicle access arrangements	Brumbys Lane adjoins both lots along their western boundary with an un-named gravel road on the southern boundary of lot 1 proposed. Both roads connect to secondary highways to the north and south and escape pathways to safer environments. Access to the site may require requiring modification to provide CFA access and water supply points at each lot entry.
Location of nearest fire hydrant	A fire hydrant exists within the Snake Valley township (CFA facility) 795m to the north. -Corner Linton-Carngham Road & Murrays St, Snake Valley, 3351 (based on information from the MEMP).[17] Reticulated water is not provided to the site.
Any other features of the site relevant to bushfire considerations	The proposed lots are flat to very lightly sloping north-west and have been historically used for grazing and general farming. The proposed lots have effective site escape to the west via road networks and adjoining highly-maintained lots and land cover. The subject site is grassland dominated and managed effectively with reduced fire risk It is important however that protection to grassland tracts in all directions is diligently maintained. An overarching grassland and southern woodland interface/ember threat surrounds both lots in a southerly direction. Patches of woodland where shrub and ground cover species exist in the understorey increases woodland bushfire threat. Core bushland remnants such as the southern (120m) Scarsdale Plantation and assorted adjoining reserves present the major bushfire threat. There are numerous smaller state forests and nature conservation reserves scattered throughout the local area based on its mining and agricultural past with roadsides and corridors providing linkage across the landscape. Ember attack from surrounding core remnants is possible given recent-decade fire conditions and unpredictable fire weather. Management and monitoring of many of these reserves are part of State-based Crown land regulations (DELWP).

[17] Pyrenees Shire Council MEMP; Accessed from: https://www.pyrenees.vic.gov.au/files/assets/public/emergencies/2020.05.19-memp-2020-final-adopted.pdf

APPENDIX 2 – DESCRIPTION OF SURROUNDING AREA

Surrounding area descriptors.

Parameter	Detail
Description of surrounding area	The surrounding subdivision site interface in all directions includes grassland-dominated sites as part of the northern flanks of the broader Scarsdale Plantation (to the south). The landscape influences interactions between vegetation, weather, and bushfire within landscapes potentially impacted by ember attack from such proximal large core remnant areas. Snake Valley and Linton have an active CFA community and established road and fire water storage infrastructure, including extensive experience dealing with significant grassland/woodland bushfire risk. This provides a background to mitigation processes detailed in this report. The surrounding landscape has a mixed fire history based on the broadscale 2006, 1983, and 1939 fires, followed by various fires within the local and national parks, State parks, and reserves. The likely bushfire event would originate from remnants to the south via post-frontal south-westerly wind change with embers assisting an un-controlled fire-front. Permanent fire protection can be provided within the Snake Valley township and the CFA's safer place (CFA Community Information Guide): - Cnr Linton-Carngham Road & Murrays St Snake Valley 3351 (based on information from the MEMP).[18] A westerly or northerly passage to larger provincial towns via the existing sealed road networks to the safer place or alternative areas provide escape routes and more permanent safety.

[18] Pyrenees Shire Council MEMP; Accessed from: https://www.pyrenees.vic.gov.au/files/assets/public/emergencies/2020.05.19-memp-2020-final-adopted.pdf

APPENDIX 3 – LANDSCAPE RISK THREATS BEYOND 150m BUFFER AREA

Landscape risk threats beyond a 150m buffer area

Parameter	Detail
Topography	Topography within the surrounding area consists of flat and 0-5% down/upslope generally uniform landscapes. The site has a northerly aspect within a flat to lightly-sloping site. From a fire risk perspective, the landscape beyond 150m in all directions influences the localised fire threat.
Potential classifiable vegetation	Classifiable vegetation (Grassland) exists within and beyond all boundaries:[19] All areas have been variably-cleared in the past due to past grazing activities reducing localised fire risk.
North	Landscapes to the north include large-acre and residential modified landscapes.
East	Landscapes to the east include grassland farming based sites and adjoining woodland remnant areas in variably-management states.
West	Landscapes to the west include open and grassy rural and residential landscapes.
South	Landscapes to the south include grassland, roadside grassland, and an adjoining woodland remnant area in variably-management states (Scarsdale Plantation).
Subject site information provided	*Landscape Assessment Plan (see Figures 15-16):* • *subject site* • *scale and distance bar* • *vegetation extent in the broader locality (0-100km)* • *road networks* • *fire run(s) into the site* • *a bushfire direction of travel diagram* • *history of bushfire in the area* • *any significant landscape features that are relevant to the considerations set out in Clause 53.02; and* • *information from the relevant Regional Bushfire Planning Assessments.*
	Landscape scale map with measured distances to indicate the following: *-20km, 50km, 100km (where relevant) landscape buffers;* *-proximity of the site to nearby urban, township or other areas where fuel is managed in a minimum fuel condition.*
Localised bushfire history	Fires have caused devastation in the region on many occasions including the following major incidents: 1983 – Ash Wednesday[20] The wind change moved through south-west Victoria by early evening. This was disastrous as the westerly winds caused the fires to change direction and size. Prior to the wind change, the fires had been relatively long and thin, with a narrow head, or front. After the wind change, the long side of the fire then became the head, or front, of the fire, burning across a much wider front. 1939 – Black Friday In January ("Black Friday") when 2 million hectares of Victoria burnt. **Municipal Emergency Management Plan** The Pyrenees Shire Council MFMP 2018 has been prepared[21] pursuant to section 55A of the *Country Fire Authority Act 1958.* The MEMP contains plans and input from Council, the Country Fire Authority, the Department of Environment Land Water and Planning, Parks Victoria, Forest Fire Management Victoria (FFMV), Victoria Police, and other key stakeholders.

[19] NVIM (DELWP 2023). Native vegetation type and extent information; Accessed from: https://nvim.delwp.vic.gov.au/Map
[20] Forest Fire Management Victoria (2023); Ash Wednesday; Accessed from: https://www.ffm.vic.gov.au/history-and-incidents/ash-wednesday-1983
[21] Pyrenees Shire Council MEMP; Accessed from: https://www.pyrenees.vic.gov.au/files/assets/public/emergencies/2020.05.19-memp-2020-final-adopted.pdf

Parameter	Detail
Provide further information for more complex locations	Fire Authorities have assessed Snake Valley and surrounds as having a HIGH bushfire risk. Local residents and visitors should be prepared for fire and have a plan for when the Fire Danger Rating is SEVERE, EXTREME or CODE RED. Typical bushfire scenarios are those typically associated with a wind change from the west-south-west post-northerly winds based on a potential proximal remnant or grass fire. This direction should not be discounted even where a catastrophic northerly fire approach is most likely. The Regional Bushfire Planning Assessment (DPCD 2012) identifies scattered remnant vegetation and vast tracts of unmanaged grassland as a known fire risk within the region. If a fire starts in a grassland, it can spread very quickly. However, grass fires produce less embers and burn for less days compared to forest fires. These factors mean that there is usually less house loss in grassland areas. Very large, fast-moving grass fires can impact on numerous communities in a single day. Impacts can include houses destroyed, farmland burnt, roads closed, choking smoke or the need to leave the area. As there is significant public land in this area, collaboration with the CFA and public landowners as they manage fuel on private land is required on an ongoing basis.[22]
Apply landscape typology	It is deemed the subject site and broader landscape type can be described as Broader Landscape Type 3 as referred to within *Practice Note 65.*

[22] State of Victoria 2015; Department of Environment, Land, Water and Planning; Strategic bushfire management plan, Accessed from: https://www.safertogether.vic.gov.au/__data/assets/pdf_file/0008/131021/DELWP0016B_BMP15_SouthWestern_web.pdf

APPENDIX 4 – BUSHFIRE PROTECTION OBJECTIVES[23]

Objective 52.47-1.1 Siting

Approved measure - AM 1.1 Siting			
Requirement	Bushfire protection can be enhanced by considering the separation of a dwelling from the bushfire hazard, proximity to public roads, and emergency service vehicle access to a site. Considering these elements together supports the selection of an appropriate place to site a dwelling. Each application can demonstrate that the best possible site for the dwelling is selected, even if there are siting constraints, such as lot size. AM 1.1 can therefore be implemented on all sites. AM 1.1 A building is sited to ensure the site best achieves the following: • The maximum separation distance between the building and the bushfire hazard. • The building is in close proximity to a public road. • Access can be provided to the building for emergency service vehicles.		
Response	-All dwelling and bushfire mitigation infrastructure siting options will be further considered with potential for variation with advice from CFA and the Responsible Authority. -Existing cleared areas (with removal of minor exotic vegetation) have been generally selected as sites for the proposed/indicative dwellings. -The existing/proposed dwellings have been sited to achieve BAL12.5 defendable space and within lot defendable space. -The single dwellings will be provided with defendable space within property boundaries. -The proposed developments will include immediate vehicle access to Brumbys Lane to the west to further sealed escape pathways to the north and east. -Consultation will occur with surrounding property owners to minimise exposure to the bushfire hazard from neighbouring land (lots in all directions). -The preferred siting options are detailed in the bushfire management statement and defendable space maps. -As the bushfire hazard is from all potential directions, managed defendable space is maximised to increase the separation distance on these sides of the proposed dwellings. -Siting complies with neighbouring development and complies with local planning schemes and building regulations.		
Has Approved Measure AM 1.1 been fully met?	Yes X	No	Partially met

Objective 52.47-1.2 Defendable Space and Construction

Approved measure - AM 1.2a Defendable Space & Construction			
Requirement	The main feature is to consider defendable space around a structure that mitigates the effects of flame contact, radiant heat, and embers on buildings, and to apply the corresponding construction standard (referred to as a bushfire attack level). A building provides the defendable space in accordance with Column A, B, C of Table 2 to Clause 52.47-3. Table 6 (BMO Technical Guide) sets out the vegetation management requirements within the defendable space. Adjoining land may be included as defendable space where there is a reasonable assurance that the land will remain or continue to be managed in that condition as part of the defendable space. A building is constructed to the bushfire attack level: • That corresponds to the defendable space provided in accordance with Table 2 to Clause 52.47-3, or • The next lower bushfire attack level that corresponds to the defendable space provided in accordance with Table 2 to Clause 52.47-3 where all of the following apply: -A private bushfire shelter (a Class 10c building within the meaning of the Building Regulations 2006) is constructed on the same land as the dwelling. -A minimum bushfire attack level of BAL 12.5 is provided in all circumstances.		
Response	• The indicative dwelling locations provide defendable space in accordance with Columns A, B, and C of Table 2 to Clause 52.47-3. • Adjoining land will not be relied upon as defendable space. • AM 1.2 provides information for the choice of how much defendable space is provided (the less defendable space provided the higher the construction standard and associated cost). • The applicable construction standard (bushfire attack level) has been applied. • Table 2 was used to obtain the applicable bushfire attack level. • Consideration was given to whether the next lower bushfire attack level is more appropriate. The bushfire attack level can never be lower than BAL 12.5 (basic ember protection).		
Has Approved Measure AM 1.2a been fully met?	Yes X	No	Partially met

Objective 52.47-1.2b Defendable Space and Construction

Approved measure - AM 1.2b Defendable Space on Adjoining Land			
Requirement	Adjoining land can be 'included' as defendable space where it is managed in a condition that achieves the same outcome as if it was managed and located on site. A reasonable assurance however that the land will remain or continue to be managed in that condition as part of the defendable space is required. The bushfire hazard site assessment suggests reliance on adjoining land for defendable space requirements cannot be guaranteed. The bushfire hazard site assessment should justify that any adjoining land meets the defendable space requirements if this approved measure is included in an application. Design suggestions include: • Low-threat vegetation will often be suitable as off-site defendable space if it can be demonstrated that the adjoining land will remain in that condition. • If off-site defendable space can be justified the actual defendable space on that aspect is provided to the property boundary of the site subject to the application. • If adjoining land will be managed in future then a permit condition should require management to occur before development commences. • The bushfire management statement will need to provide evidence that the adjoining land will remain in that condition.		
Response	-The bushfire hazard site assessment suggests reliance on adjoining land for defendable space is not required and in any case cannot be guaranteed. In this case within-lot defendable space will be used only. -If adjoining land will be managed in future then a permit condition should require management to occur before development commences. -Managed defendable space will only be on the land subject to the application on each lot.		
Has Approved Measure AM 1.2b been fully met?	Yes X	No	Partially met

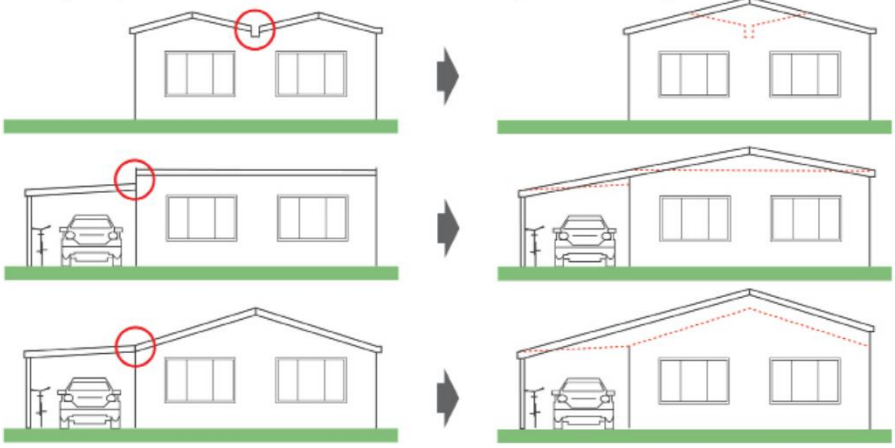
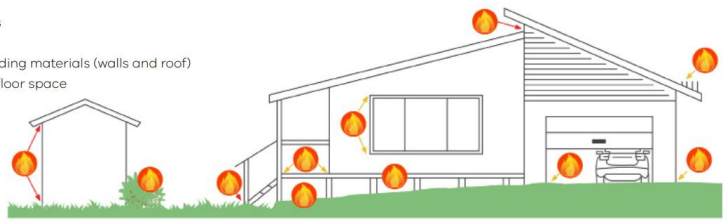
Objective 52.47-1.3 Water Supply and Access

Approved measure - AM 1.3 Water Supply & Access			
Requirement	Once a site for a dwelling is selected the static water supply and vehicle access design and construction standards can be applied. A building is provided with water supply and access features such as: • A static water supply for firefighting and property protection purposes specified in Table 4 to Clause 52.47-3. The water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies. • Vehicle access that is designed and constructed as specified in Table 5 to Clause 52.47-3. Information The bushfire hazard site assessment provides the information to respond to this approved measure. • Fire authority access and length of the access are the essential criteria to determine the applicable requirements under AM 1.3. Table 4 and the Fire Authority Requirements set out the fittings and access requirements. • Incorporating this approved measure simply involves: -identifying the applicable requirements in the bushfire management statement -showing the applicable requirements on the submitted plans. Fire authority access to the water supply (if required) will be an important factor when considering where to site the structure in AM 1.1. • The water supply and vehicle access design and construction standards will be a condition on the planning permit.		
Response	• It is proposed that a minimum total capacity of 10,000L be provided as a dedicated static water supply (each lot/dwelling) for firefighting and property protection purposes. • Water tank(s) will be non-combustible and sited so that firefighting vehicles can get within 4m of supply outlets. • The water supply outlet will be located within close proximity of the dwelling. • Fittings will be in accordance with CFA requirements. All internal roads will provide access in accordance with the following vehicle design and construction requirements: – All-weather construction and load limit of at least 15 tonnes. – Provide a trafficable width of 3.5 metres and clear of encroachments for at least 0.5m on each side and at least 4m vertically. – Curves must have a minimum inner radius of 10m. – The average grade must be no more than 1 in 7 (14.4%) (8.1°) with a maximum grade of no more than 1 in 5 (20%) (11.3°) for no more than 50 metres. – Dips must have no more than a 1 in 8 (12.5 per cent) (7.1 degrees) entry and exit angle. – A turning area for fire fighting vehicles must be provided close to the building by one of the following: turning circle minimum radius of 8 metres.		
Has Approved Measure AM 1.3 been fully met?	Yes X	No	Partially met

Objective 52.47-2 Bushfire protection objectives

Approved measure - AM 2.1			
Requirement	AM 2.1 A building is designed to be responsive to the landscape risk and reduce the impact of bushfire on the building. This approved measure requires consideration of the landscape beyond the site in preparing and assessing an application. There are no 'design' elements to incorporate into a proposal. Where the bushfire hazard landscape assessment defines the location as landscape type one or two, an application that meets the other objectives in Clause 52.47-2 will mitigate the bushfire risk to an acceptable level. Where the bushfire hazard landscape assessment defines the location as landscape type three or four, the landscape beyond the site may present a significant bushfire risk.		
Response	This measure will be met via: -the bushfire hazard landscape assessment provides information on complex locations having regard to likely bushfire scenarios, bushfire management and prevention actions occurring around a site, and the proximity to nearby locations that can provide protection from the impact of extreme fire behaviour -all other approved measures can be implemented -if other approved measures cannot be implemented, the level of protection provided through the use of alternative measures -the decision guidelines in Clause 52.47-2.		
Has Approved Measure AM 2.1 been fully met?	Yes X	No	Partially met

Approved measure - AM 2.2			
Requirement	AM 2.2 A building is sited to ensure the site best achieves the following: The maximum separation distance between the building and the bushfire hazard. The building is in close proximity to a public road. Access can be provided to the building for emergency service vehicles.		
Response	- Vehicle access to be designed and constructed as specified in Table 5 Clause 52.47-3. -The bushfire hazard site assessment provides the information to respond to this approved measure. -Fire authority access and length of the access are the essential criteria to determine the applicable requirements under AM 1.3. Table 4 and the Fire Authority Requirements set out the fittings and access requirements. -Opportunities to minimise exposure to the bushfire hazard that will remain (for example, if the bushfire hazard is from neighbouring land). -Implement the defendable space required under the relevant approved measures. -If the bushfire hazard is on one or two aspects focus on maximising the separation distance on these sides of the building/dwelling.		
Has Approved Measure AM 2.2 been fully met?	Yes X	No	Partially met

Approved measure - AM 2.3			
Requirement	AM 2.3 Building design that avoids for embers to lodge in re-entrant corners, complex roof lines, gaps between building materials and unenclosed underfloor spaces.		
Response	Building design has yet to be completed for the lots however will follow the following suggested prescriptions: -Construction of a concrete slab or fully enclose under floor spaces; -For BAL 12.5 and 19 decks, eaves and fascia should be constructed to comply with BAL 29; -Fire induced winds have been considered via constructing to lower cyclone levels; -External materials attached to the building are non-combustible; and -Building should be of simple design with minimal re-entrant corners and basic roof lines. **Improvements to roof design** **Existing complex roof design** **Improved roof design**  **Minimise ember hazard** **Existing complex roof design** Building design should minimise ember hazards. **Ember Hazards** Re-entrant corners Complex roof lines Gaps between building materials (walls and roof) Unenclosed underfloor space 		
Has Approved Measure AM 2.3 been fully met?	Yes X	No	Partially met

53.02-4.2 Defendable space and construction objectives

Approved measure – AM 3.1			
Requirement	AM 3.1 A building used for a dwelling (including an extension or alteration to a dwelling), a dependent person's unit, industry, office, or retail premises is provided with defendable space in accordance with: Table 2 Columns A, B or C and Table 6 to Clause 53.02-5 wholly within the title boundaries of the land; or -If there are significant siting constraints, Table 2 Column D and Table 6 to Clause 53.02-5. -The building is constructed to the bushfire attack level that corresponds to the defendable space provided in accordance with Table 2 to Clause 53.02-5.		
Response	-Column A, B or C (Table 2) and Table 6 to Clause 53.02-5 defendable space has been considered. -The significance of the siting constraint has been considered by the responsible authority in making a decision. -The bushfire management statement identifies constraints and the basis for its significance. -Vegetation management will be in accordance with Table 6 unless otherwise agreed in writing by the relevant fire authority.		
Has Approved Measure AM 3.1 been fully met?	Yes X	No	Partially met

Approved measure – AM 3.2			
Requirement	AM 3.2 A building used for accommodation (other than a dwelling or dependent person's unit), a child care centre, an education centre, a hospital, leisure and recreation or a place of assembly is Provided with defendable space in accordance with Table 3 and Table 6 to Clause 53.02-5		
Response	-Not applicable as dwellings only to be developed.		
Has Approved Measure AM 3.2 been fully met?	Yes X	No	Partially met

→Alternative measures (AltM) - An alternative measure may be considered where the responsible authority is satisfied that the objective can be met. The responsible authority may consider other unspecified alternative measures.

Alternative Measure – 3.3			
Requirement	AltM 3.3 Adjoining land may be included as defendable space where there is a reasonable assurance that the land will remain or continue to be managed in that condition as part of the defendable space. • Low-threat vegetation will often be suitable as off-site defendable space if it can be demonstrated that the adjoining land will remain in that condition. • If off-site defendable space can be justified the actual defendable space on that aspect is provided to the property boundary of the site subject to the application. • If adjoining land will be managed in future then a permit condition should require management to occur before development commences. • The bushfire management statement will need to provide evidence that the adjoining land will remain in that condition.		
Response	-No adjoining land will be used for defendable space.		
Has Alternative Measure AltM 3.3 been fully met?	Yes X	No	Partially met

Alternative Measure – 3.4			
Requirement	AltM 3.4 Defendable space and the bushfire attack level is determined using Method 2 of AS3959:2009 Construction of buildings in bushfire prone areas (Standards Australia) subject to any guidance published by the relevant fire authority. • AS3959 provides for a site-specific assessment of the bushfire hazard. • Downslopes greater than 20 degrees are not within the parameters of the approved measures and are shown as none specified in the tables. Use this alternative measure in these scenarios.		
Response	-Further information can be provided however both methods 1 and 2 correlate in this case. -The reduced-risk state of the site due to past and current selective vegetation removal.		
Has Alternative Measure AltM 3.4 been fully met?	Yes X	No	Partially met

Alternative Measure – 3.5			
Requirement	AltM 3.5 A building used for a dwelling (including an extension or alteration to a dwelling) may provide defendable space to the property boundary where it can be demonstrated that: AltM 3.5 The lot has access to urban, township, or other areas where: – Protection can be provided from the impact of extreme bushfire behaviour. – Fuel is managed in a minimum fuel condition. – There is sufficient distance or shielding to protect people from direct flame contact or harmful levels of radiant heat. Less defendable space and a higher construction standard is appropriate having regard to the bushfire hazard landscape assessment.		
Response	-Lot is within south-east of Snake Valley township area and northern escape pathways to highly-modified and residential areas. -Fuel management plans are in place for proximal nature reserves to the south (Pyrenees MFMP 2018). -The subdivision has half of all boundaries/interface as breaks/buffers (roadways) to mitigate harmful levels of radiant heat (coupled with site and defendable space management regimes).		
Has Alternative Measure AltM 3.5 been fully met?	Yes X	No	Partially met

Alternative measure 3.6			
Requirement	A building used for accommodation (other than a dwelling or dependent person's unit), child care centre, education centre, hospital, leisure and recreation or place of assembly may provide defendable space in accordance with Table 2 Columns A, B or C and Table 6 to Clause 53.02-5 where it can be demonstrated that: AltM 3.6 An integrated approach to risk management has been adopted that considers: – The characteristics of the likely future occupants including their age, mobility and capacity to evacuate during a bushfire emergency. – The intended frequency and nature of occupation. – The effectiveness of proposed emergency management arrangements, including a mechanism to secure implementation. – Less defendable space and a higher construction standard is appropriate having regard to the bushfire hazard landscape assessment.		
Response	Not applicable – dwelling development only.		
Has measure been fully met?	Yes X	No	Partially met

53.02-4.3 Water supply and access objectives

Alternative Measure AltM 4.1			
Requirement	AltM 4.1 A building used for a dwelling (including an extension or alteration to a dwelling), a dependent person's unit, industry, office, or retail premises is provided with: -A static water supply for firefighting and property protection purposes specified in Table 4 to Clause 53.02-5. -Vehicle access that is designed and constructed as specified in Table 5 to Clause 53.02-5. -The water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies.		
Response	-Vehicle access will be designed and constructed as specified in Table 5 to Clause 52.47-3. -The 10K litre water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies.		
Has Alternative Measure AltM 4.1 been fully met?	Yes X	No	Partially met

Alternative Measure AltM 4.2			
Requirement	AltM 4.2 A building used for accommodation (other than a dwelling or dependent person's unit), child care centre, education centre, hospital, leisure and recreation or place of assembly is provided with: A static water supply for firefighting and property protection purposes of 10,000 litres per 1,500 square metres of floor space up to 40,000 litres. Vehicle access that is designed and constructed as specified in Table 5 to Clause 53.02-5. • Fire authority access and length of the access are the essential criteria to determine the applicable requirements under AM 4.1 and AM 4.2. • The requirements should be identified in the bushfire management statement and shown on the submitted plans. • Buildings used for accommodation (other than a dwelling or dependent person's unit), child care centre, education centre, hospital, leisure and recreation or place of assembly may be occupied by people with increased vulnerability for reasons such age, mobility, or a lack of familiarity with a local area. AM 4.2 requires that this be considered in finalising the water supply and site access requirements for these activities.		
Response	• Not generally applicable however fire authority access and length of the access will be determined by the essential criteria and applicable requirements under AM 4.1 and AM 4.2. • The requirements are identified in the bushfire management statement and shown on the submitted plans.		
Has Alternative Measure AltM 4.2 been fully met?	Yes X	No	Partially met

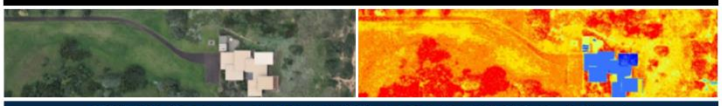
Alternative Measure AltM 4.3			
Requirement	An integrated approach to risk management that ensures the water supply and access arrangements will be effective based on the characteristics of the likely future occupants including their age, mobility, and capacity to evacuate during a bushfire emergency. The water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies.		
Response	• It is proposed that a minimum total capacity of 10,000L be provided as a dedicated static water supply for firefighting and property protection purposes (for each lot). • Water tank(s) will be non-combustible and sited so that firefighting vehicles can get within 4m of outlets. • The water supply outlet will be located within close proximity of the dwelling. Fittings must be in accordance with CFA requirements. All internal roads (where required) will provide access in accordance with the following vehicle design and construction requirements: – All-weather construction and load limit of at least 15 tonnes. – Provide a trafficable width of 3.5 metres and clear of encroachments for at least 0.5 metres on each side and at least 4 metres vertically. Curves must have a minimum inner radius of 10 metres. – The average grade must be no more than 1 in 7 (14.4%) (8.1°) with a maximum grade of no more than 1 in 5 (20%) (11.3°) for no more than 50 metres. Dips must have no more than a 1 in 8 (12.5 per cent) (7.1 degrees) entry and exit angle. – A turning area for fire fighting vehicles must be provided close to the building by one of the following: turning circle minimum radius of eight metres.		
Has Alternative Measure AltM 4.3 been fully met?	Yes X	No	Partially met

Approved measure 5.1			
Requirement	AM 5.1 An application to subdivide land, other than where AM 5.2 applies, demonstrates that each proposed lot is capable of meeting: AM 5.1 The defendable space in accordance with Table 2 Columns A, B or C and Table 6 to Clause 53.02-5. The approved measures in Clause 53.02-4.1 and Clause 53.02-4.3.		
Response	-Defendable space to 22m and based on Tables 2 and Table 6 has been allowed for; -This is met to lot boundaries and within adjoining lots based on lot configuration.		
Has measure been fully met?	Yes X	No	Partially met

Approved measure 5.2			
Requirement	AM 5.2 An application to subdivide land zoned for residential or rural residential purposes must be accompanied by a plan that shows: Each lot satisfies the approved measure in AM 2.1. A building envelope for a single dwelling on each lot that complies with AM 2.2 and provides defendable space in accordance with: – Columns A, B or C of Table 2 to Clause 53.02-5 for a subdivision that creates less than 10 lots. The bushfire attack level that corresponds to the defendable space provided in accordance with Table 2 to Clause 53.02-5 must be noted on the building envelope. -Defendable space for a lot may utilise communal areas, such as roads, where that land can meet the requirements for defendable space. -Vegetation management requirements in accordance with Table 6 to implement and maintain the defendable space required under this approved measure. -Water supply and vehicle access that complies with AM 4.1.		
Response	-Columns A, B, C of Table 2 to Clause 53.02-5 for a subdivision that less than 10 lots used for defendable space calculations. -Defendable space wholly contained within the boundaries of the proposed subdivision. -Defendable space able to be shared between lots within the subdivision (not required).		
Has measure been fully met?	Yes X	No	Partially met

BUSHFIRE MANAGEMENT STATEMENTS (BMS) & BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT & REPORTING

Experienced and qualified fire ecologist, botanist, and landscape assessor



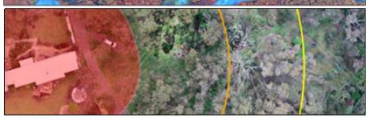
BUSHFIRE ATTACK LEVEL ASSESSMENTS (BALs)

What is a Bushfire Attack Level Assessment (BAL)?

Bushfire Prone Areas are areas that are subject to, or likely to be subject to bushfires.

Specific bushfire construction standards apply in designated bushfire prone areas in Victoria and NSW. These bushfire construction requirements are aimed at improving bushfire protection for residential buildings.

A Bushfire Attack Level (BAL) is a way of measuring the severity of a building's potential exposure to ember attack, radiant heat, and direct flame contact.



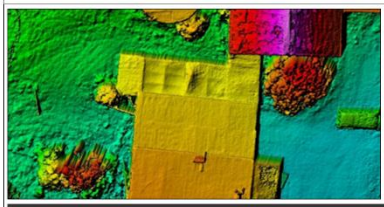
Landtech Consulting

Landtech Consulting provides site-based BAL assessment and reporting using drone and GIS technologies, supported by decades of bushfire and vegetation ecology and assessment experience. Peter Austin has extensive experience and working knowledge of bushfire regulation, planning processes and standards such as AS3959, planning regulations in NSW & Victoria,

Services include:

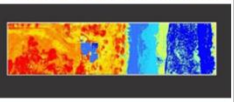
- ⇒ Bushfire Attack Level Assessments
- ⇒ Bushfire Management Statements
- ⇒ Property Management Plans
- ⇒ Vegetation Drone Mapping
- ⇒ Landscape Assessment Planning

Depending on the outcomes of your BAL assessment, building construction standards can be increased to meet the requirements of your assessed BAL. Alternatively, vegetation modification surrounding the allotment/dwelling can be undertaken to reduce the BAL and consequent exposure level during a bushfire.

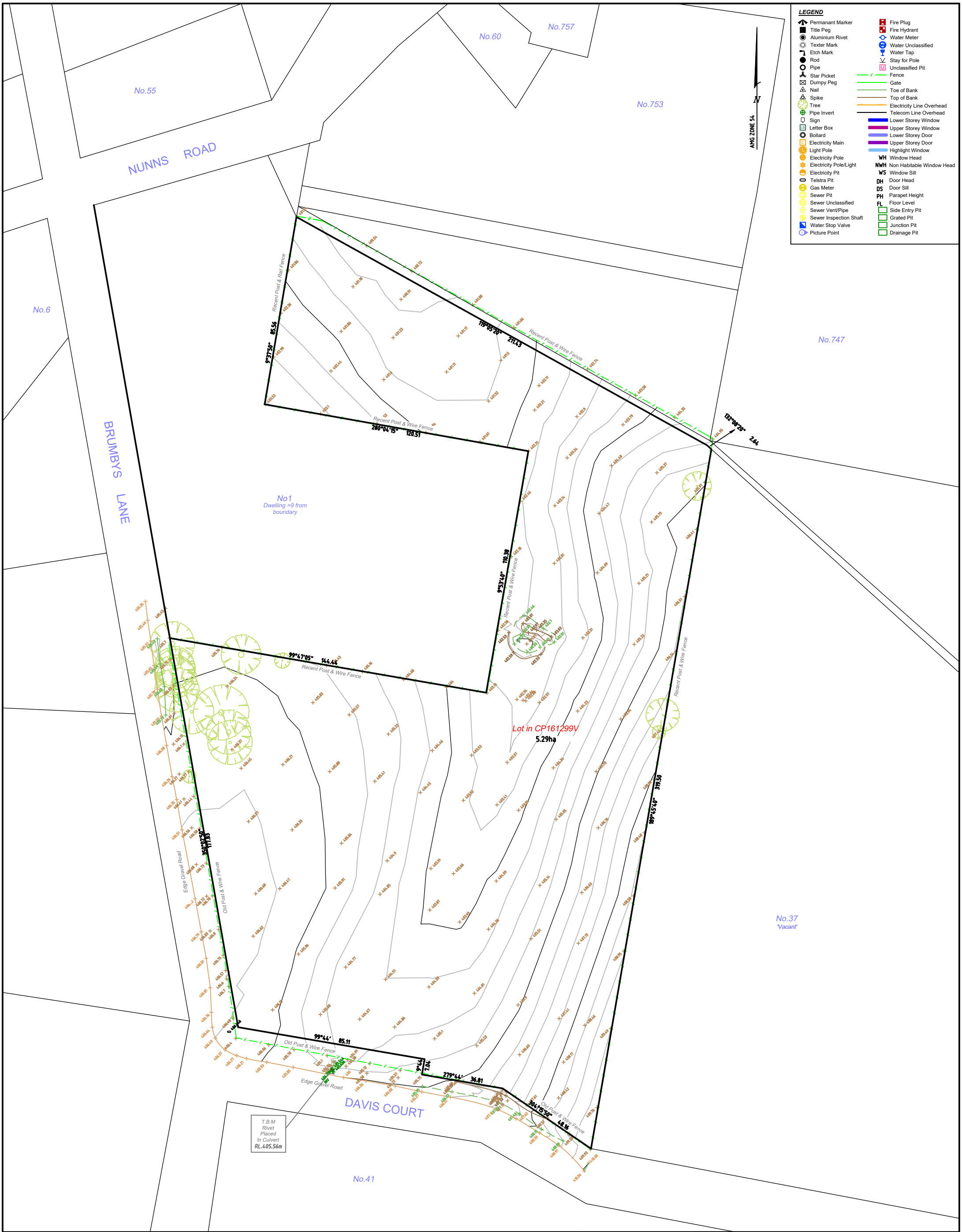


landtech consulting

Land Capability Assessment
Biodiversity Survey
Drone Mapping & Survey
Bushfire Attack Level Assessment (BAL)
GIS Mapping & Analysis



Peter Austin (B.Sc., Grad. Dip Env Health, Dip Hort, Dip VET, Cert IV TAE)
Trading as Landtech Consulting, ABN: 4531 2192 419 Ph. 0408-615677 Email peteraustin.landtech@hotmail.com



CERTIFICATE BY LICENSED SURVEYOR

I, Glenn Graham Smith of Smith Land Surveyors Pty. Ltd. 142a Fyans Street, South Geelong 3220, certify that this plan has been prepared from a survey made under my direction and supervision in accordance with the Surveying Act 2004 and completed on 13/05/2023, that this plan is accurate and correctly represents the adopted boundaries and that the survey accuracy accords with that required by regulation 7(1) of the Surveying (Cadastral Surveys) Regulations 2015.

Date: 11/07/2023

Licensed Surveyor,
Surveying Act 2004.

GENERAL NOTES:

- Please refer to Certificate of Title for any easements or encumberances.
- Where occupation including fences and buildings around the perimeter of a property encroach onto the subject site, the land beyond the occupation may not be recoverable as rights of possession may have passed to adjoining owners. Full title dimensions should not be assumed for design purposes / re-fencing until these issues have been resolved with adjoining landowners.
- Where occupation including fences and buildings around the perimeter of a property encroach onto the neighbouring site, the land beyond the title may not be utilized until a formal application with Land Registry is approved. Until this time you must limit any future building works to the current title position.
- The position of fencing and other occupation in relation to the title boundaries has been exaggerated for the purposes of clarity, and only applies at the natural surface level on the date of the survey and does not show any encroachments that may exist below the natural surface. If no offsets are shown, the fencing is in the correct position.
- Before proceeding with any design, construction or use of the land adjoining neighbours must be consulted to resolve any differences between fencing and the title position shown on this plan.
- Feature and levels shown on this plan are intended to aid in general design works only. Any critical dimensions required should be requested independently of this plan.
- Services that were not visible at the time of survey may not be shown on this plan. Prior to any demolition, excavation, or construction on this site the relevant Authorities should be contacted to ascertain detailed locations of all existing services and the possible locations of future services.
- The title boundaries shown beyond the subject land have been imported from the digital Cadastral Map Base (DCMB) and are approximate only.
- Location of buildings beyond site boundaries is indicative only. Information relating to abutting properties has only been shown where visible or accessible.
- Assume any windows shown are for habitable rooms. A site visit to determine the exact status of each room should be carried out before proceeding.

TITLE INFORMATION

Title Reference: Vol.09647 Fol.570
Last Plan Reference: CP161299V

LAND SUBJECT TO EASEMENT:

-

DATUM:

- Levels are based on A.H.D vide CARNGHAM PM 18 with registered RL.399.146
- Contour interval is 0.5m.
- Refer to frozen layer 'TRIANGLE' for 3D triangles.

Client	JOEL JUHASZ
Project	BRUMBYS LANE SNAKE VALLEY
Details	RE-ESTABLISHMENT & EXISTING CONDITIONS SURVEY
Sheet	1 of 1
Drawn	J.J
Original sheet size	A1
Job No.	2023-0694
Scale	A1 = 1:1500 / A3 = 1:3000

AMENDMENTS

VERSION	DESCRIPTION	SURVEY DATE	SURVEYOR
1	ORIGINAL SURVEY PLAN	13/05/2023	J.J

PLAN OF SUBDIVISION

EDITION 1

PS 917835J

Location of Land

Parish: CARNGHAM

Township: -

Section: 15

Crown Allotment: 30 & 24(PART)

Crown Portion: (PART)

Title References

C/T VOL 9647 FOL 570

Last Plan Reference: LOT IN PLAN OF CONSOLIDATION 161299V

Postal Address: BRUMBYS LANE
(at time of subdivision) SNAKE VALLEY 3351

MGA Co-ordinates: E: 728 730 Zone 55
(of approx centre of land in plan) N: 5 832 630 GDA 2020

Vesting of Roads and/or Reserves

Identifier	Council/Body/Person
NIL	NIL

Notations

Depth Limitations: DOES NOT APPLY

Notations

Planning Permit No. -

Survey: This plan is based on survey.

Staging: This is not a staged subdivision.

This survey has been connected to permanent marks No(s). -
in Proclaimed Survey Area no. -

Easement Information

LEGEND: A - Appurtenant Easement E - Encumbering Easement R - Encumbering Easement (Road)

Easement Reference	Purpose	Width (Metres)	Origin	Land Benefited/In Favour Of

Smith Land Surveyors Pty Ltd
Office - 142a Fyans Street, South Geelong, Vic, 3220
P (03) 5222 1234 F (03) 5223 3141
E survey@smithls.com.au
W www.smithlandsurveyors.com.au
ABN 72 142 046 964

SURVEYORS FILE REF: 2022-0694A

SHEET 1 OF 2

LICENCED SURVEYOR Glenn Graham Smith

VERSION: 1

PLAN OF SUBDIVISION

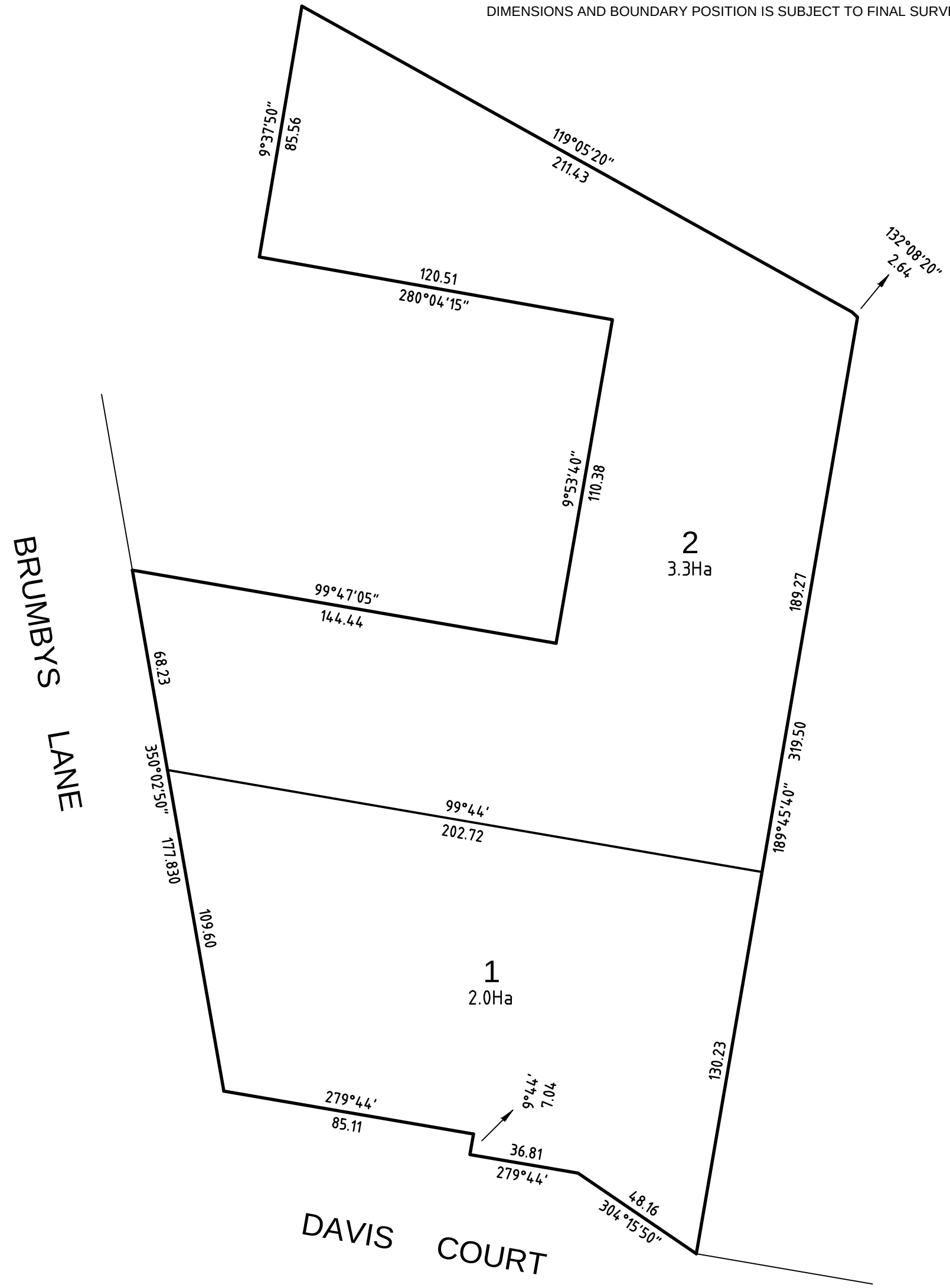
PS 917835J

PRELIMINARY

THIS IS A PRELIMINARY PLAN PREPARED FOR MARKETING PURPOSES ONLY AND IS BASED ON CURRENT ARCHITECTURAL DRAWINGS. DIMENSIONS AND BOUNDARY POSITION IS SUBJECT TO FINAL SURVEY.

N

AMG ZONE 54



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E survey@smithls.com.au
W www.smithlandsurveyors.com.au
ABN 72 142 046 964

SCALE 1:1500	15 0 15 30 45 60 LENGTHS ARE IN METRES	ORIGINAL SHEET SIZE: A3	SHEET 2

LICENCED SURVEYOR ..... Glenn Graham Smith

REFERENCE: 2023-0694POS VERSION: 1

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 09647 FOLIO 570

Security no : 124107467175G
Produced 09/07/2023 07:25 AM

LAND DESCRIPTION

Land in Plan of Consolidation 161299V.
PARENT TITLES :
Volume 01975 Folio 856 Volume 05540 Folio 907
Created by instrument CP161299V 04/12/1985

[redacted]

ENCUMBRANCES, CAVEATS AND NOTICES

MORTGAGE AH618403A 17/11/2010
BANK OF WESTERN AUSTRALIA LTD

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan or imaged folio set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE TP341350F FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: BRUMBYS LANE SNAKE VALLEY VIC 3351

ADMINISTRATIVE NOTICES

NIL

eCT Control 15940N COMMONWEALTH BANK OF AUSTRALIA
Effective from 22/10/2016

DOCUMENT END

TITLE PLAN		EDITION 1	TP 341350F

Location of Land

Parish: CARNGHAM
Township:
Section:
Crown Allotment:
Crown Portion:

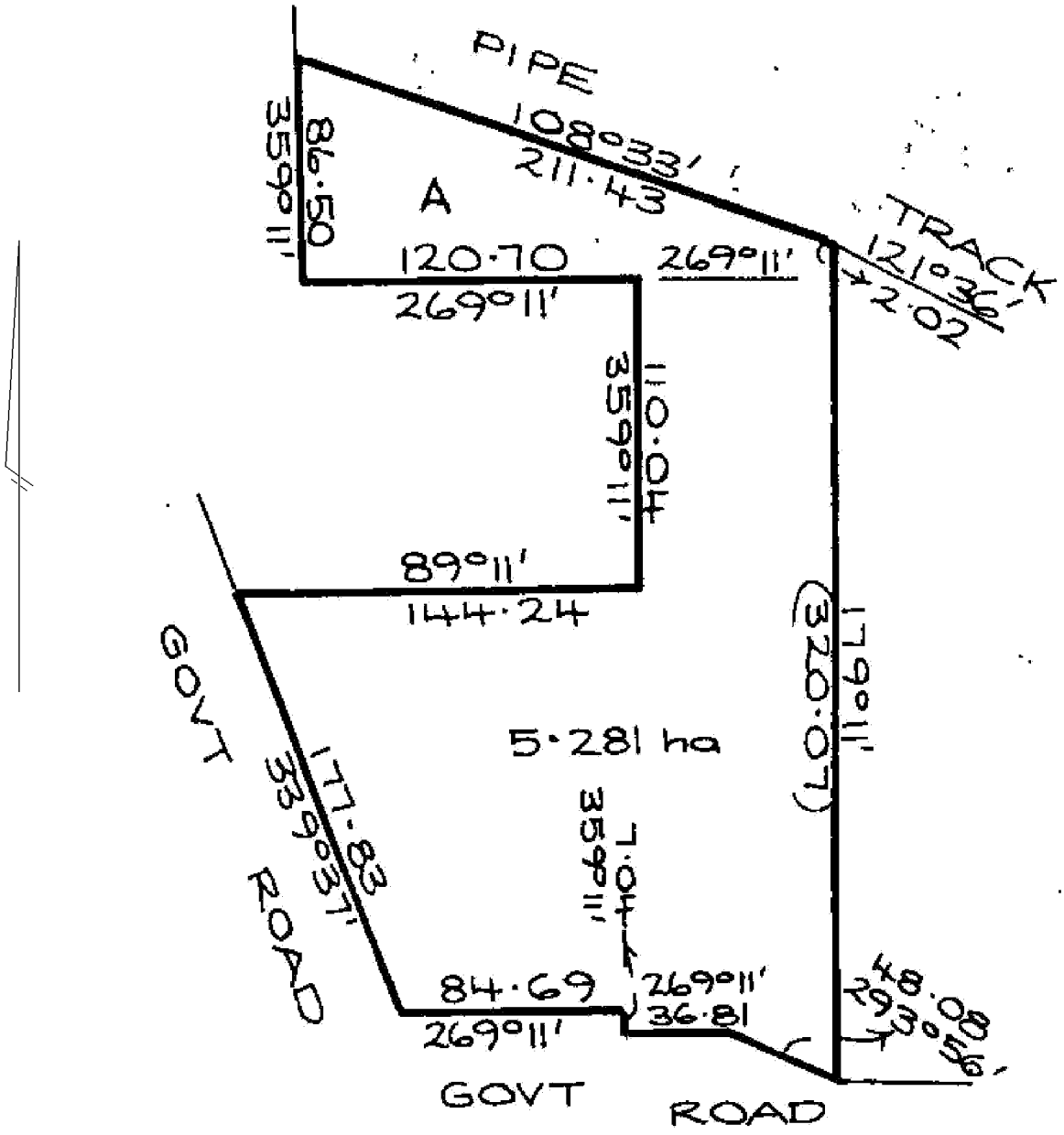
Last Plan Reference: CP 161299V
Derived From: VOL 9647 FOL 570
Depth Limitation: 15.24 m (LAND MARKED 'A')

Notations

ANY REFERENCE TO MAP IN THE TEXT MEANS THE DIAGRAM SHOWN ON THIS TITLE PLAN

Description of Land / Easement Information

THIS PLAN HAS BEEN PREPARED FOR THE LAND REGISTRY, LAND VICTORIA, FOR TITLE DIAGRAM PURPOSES AS PART OF THE LAND TITLES AUTOMATION PROJECT
COMPILED: 24/06/2002
VERIFIED: AP



LENGTHS ARE IN METRES	Metres = 0.3048 x Feet Metres = 0.201168 x Links		Sheet 1 of 1 sheets