Notice of Application for a Planning Permit

Cardinia

The land affected by the application is located at:	L5 LP141494 V9494 F316 170 Nash Road, Bunyip VIC 3815
The application is for a permit to:	Subdivision of land into two (2) lots
A permit is required under the following clauses of the planning scheme:	
35.05-3	Subdivide land
42.01-2	Subdivide land
44.04-3	Subdivide land

APPLICATION DETAILS

The applicant for the permit is:	Nobelius Land Surveyors
Application number:	T240329

You may look at the application and any documents that support the application at the office of the responsible authority:

Cardinia Shire Council, 20 Siding Avenue, Officer 3809.

This can be done during office hours and is free of charge.

Documents can also be viewed on Council's website at cardinia.vic.gov.au/advertisedplans or by scanning the QR code.

HOW CAN I MAKE A SUBMISSION?

This application has not been decided. You can still make a submission before a decision has been made. The Responsible Authority will not decide on the application before:	25 February 2025

WHAT ARE MY OPTIONS?

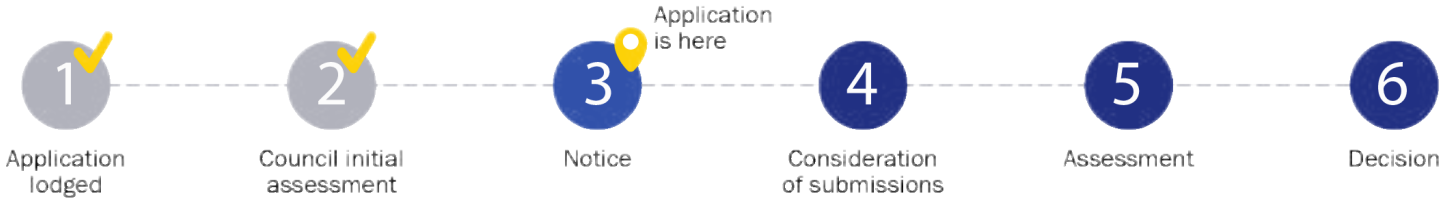
Any person who may be affected by the granting of the permit may object or make other submissions to the responsible authority.

If you object, the Responsible Authority will notify you of the decision when it is issued.

An objection must:

- be made to the Responsible Authority in writing;
- include the reasons for the objection; and
- state how the objector would be affected.

The Responsible Authority must make a copy of every objection available at its office for any person to inspect during office hours free of charge until the end of the period during which an application may be made for review of a decision on the application.



Cardinia

ePlanning

Application Summary

Portal Reference	A324507V

Basic Information

Proposed Use	The Subdivision of the Land Into Two (2) Lots.
Current Use	The land is used for rural residential and equine purposes.
Site Address	170 Nash Road Bunyip 3815

Covenant Disclaimer

Does the proposal breach, in any way, an encumbrance on title such as restrictive covenant, section 173 agreement or other obligation such as an easement or building envelope?	No such encumbrances are breached

☐ Note: During the application process you may be required to provide more information in relation to any encumbrances.

Contacts

Type	Name	Address	Contact Details
Applicant	[redacted] Nobelius Land Surveyors	20 Henry Street Henry Street, Pakenham VIC 3810	W: 03-5941-4112 E: renee@nobelius.com.au
Owner	Kings Computer Consulting Pty Ltd	72 Manoora Road, Marylenol VIC 3812	
Preferred Contact	[redacted] Nobelius Land Surveyors	20 Henry Street Henry Street, Pakenham VIC 3810	W: 03-5941-4112 E: renee@nobelius.com.au

Fees

Regulation	Fee Condition	Amount	Modifier	Payable
9 - Class 18	To subdivide land into two lots	$1,453.40	100%	$1,453.40
		Total		**$1,453.40**

Documents Uploaded

Date	Type	Filename
17-07-2024	Subdivision Plan	Copy of Plan.pdf
17-07-2024	Subdivision Plan	Copy of Title.pdf
17-07-2024	Encumbrance	Copy of Caveat.pdf
17-07-2024	Explanatory Letter	Town Planning Report - 170 Nash Road Ver 1 .pdf
17-07-2024	Explanatory Letter	Cover Letter - 170 Nash Road, Bunyip .pdf
17-07-2024	Additional Document	170 Nash Rd Development Plan Ver 4.pdf
17-07-2024	Additional Document	20240712 -170 Nash Road_SWMS.pdf
17-07-2024	Additional Document	24-01-15NashBunyipv2.pdf
17-07-2024	Additional Document	Plumber Report - Existing Septic System.pdf
17-07-2024	Additional Document	240236 - LCA.pdf

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

Lodged By

Site User	[redacted] Nobelius Land Surveyors	20 Henry Street, Pakenham VIC 3810	W: 03-5941-4112 E: renee@nobelius.com.au
Submission Date	17 July 2024 - 09:12 AM		

Declaration

☑ By ticking this checkbox, [redacted] declare that all the information in this application is true and correct; and the Applicant and/or Owner (if not myself) has been notified of the application.

Civic Centre
20 Siding Avenue, Officer, Victoria

Council's Operations Centre (Depot)
Purton Road, Pakenham, Victoria

Postal Address
Cardinia Shire Council
P.O. Box 7, Pakenham VIC, 3810

Email: mail@cardinia.vic.gov.au

Monday to Friday 8.30am–5pm
Phone: 1300 787 624
After Hours: 1300 787 624
Fax: 03 5941 3784

Cardinia Shire Council

Request to amend a current planning permit application

Cardinia

This form is used to request an amendment to an application for a planning permit that has already been lodged with Council, but which has not yet been decided. This form can be used for amendments made before any notice of the application is given (pursuant to sections 50 / 50A of the *Planning and Environment Act 1987*) or after notice is given (section 57A of the Act).

PERMIT APPLICATION DETAILS

Application No.:	T240329PA
Address of the Land:	170 Nash Road, Bunyip

APPLICANT DETAILS

Name:	[redacted]
Organisation:	Nobelius Land Surveyors
Address:	20 Henry Street, Pakenham VIC 3810
Phone:	03 5941 4112
Email:	renee@nobelius.com.au

AMENDMENT TYPE

Under which section of the Act is this amendment being made? (select one)	
Section 50 – Amendment to application at request of applicant **before** notice:	☐
Section 50A - Amendment to application at request of responsible authority **before** notice:	☑
Section 57A – Amendment to application **after** notice is given:	☐

AMENDMENT DETAILS

What is being amended? (select all that apply)		
What is being applied for ☐	Plans / other documents ☑	Applicant / owner details ☐
Land affected ☐	Other ☐	

Describe the changes. If you need more space, please attach a separate page.
Revision of lot configuration at Council's request and associated revisions to supporting documentation. Lot sizes remain unchanged.

Specify the estimated cost of any development for which the permit is required:		
Not applicable ☐	Unchanged ☑	New amount $

DECLARATION

I declare that all the information in this request is true and correct and the owner (if not myself) has been notified of this request to amend the application.

Name:	[redacted]
Signature:	
Date:	21/11/2024

LODGEMENT

Please submit this form, including all amended plans/documents, to mail@cardinia.vic.gov.au

You can also make amendments to your application via the Cardinia ePlanning Portal at https://eplanning.cardinia.vic.gov.au/

If you have any questions or need help to complete this form, please contact Council's Statutory Planning team on 1300 787 624.

IMPORTANT INFORMATION

It is strongly recommended that before submitting this form, you discuss the proposed amendment with the Council planning officer processing the application.

Please give full details of the nature of the proposed amendments and clearly highlight any changes to plans (where applicable). If you do not provide sufficient details or a full description of all the amendments proposed, the application may be delayed.

No application fee for s50/s50A requests unless the amendment results in changes to the relevant class of permit fee or introduces new classes of permit fees. The fee for a s57A request is 40% of the relevant class of permit fee, plus any other fees if the amendment results in changes to the relevant class (or classes) of permit fee or introduces new classes of permit fees. Refer to the *Planning and Environment (Fees) Regulations 2016* for more information.

The amendment may result in a request for more under section 54 of the Act and/or the application requiring notification (or re-notification). The costs associated with notification must be covered by the applicant.

Council may refuse to amend the application if it considers that the amendment is so substantial that a new application for a permit should be made.

Any material submitted with this request, 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*.

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 09494 FOLIO 316

Security no : 124116644458Y
Produced 15/07/2024 04:31 PM

LAND DESCRIPTION

Lot 5 on Plan of Subdivision 141494.
PARENT TITLE Volume 09443 Folio 458
Created by instrument LP141494 13/12/1982

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
KING'S COMPUTER CONSULTING PTY LTD of 72 MANOORA RD MARYKNOLL 3812
V622591J 04/09/1998

ENCUMBRANCES, CAVEATS AND NOTICES

[redacted]

CAVEAT AP129933M 14/06/2007

[redacted] THE FOLLOWING PARTIES AND DATE.

Lodged by
DOUBLE BAY CONVEYANCING
Notices to
DOUBLE BAY CONVEYANCING of 7 APOLLO COURT FRANKSTON VIC 3199

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 LP141494 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: 170 NASH ROAD BUNYIP VIC 3815

ADMINISTRATIVE NOTICES

NIL

eCT Control 15940N COMMONWEALTH BANK OF AUSTRALIA
Effective from 23/10/2016

DOCUMENT END

Imaged Document Cover Sheet

The document following this cover sheet is an imaged document supplied by LANDATA®, Secure Electronic Registries Victoria.

Document Type	**Plan**
Document Identification	**LP141494**
Number of Pages (excluding this cover sheet)	**1**
Document Assembled	**15/07/2024 16:31**

LP141494
EDITION 1
APPROVED 4 /../62

14 ...

PLAN OF SUBDIVISION OF:
PART OF CROWN
ALLOTMENT 30

PARISH: BUNYIP
COUNTY: MORNINGTON

SCALE 1:2500
LENGTHS ARE IN METRES

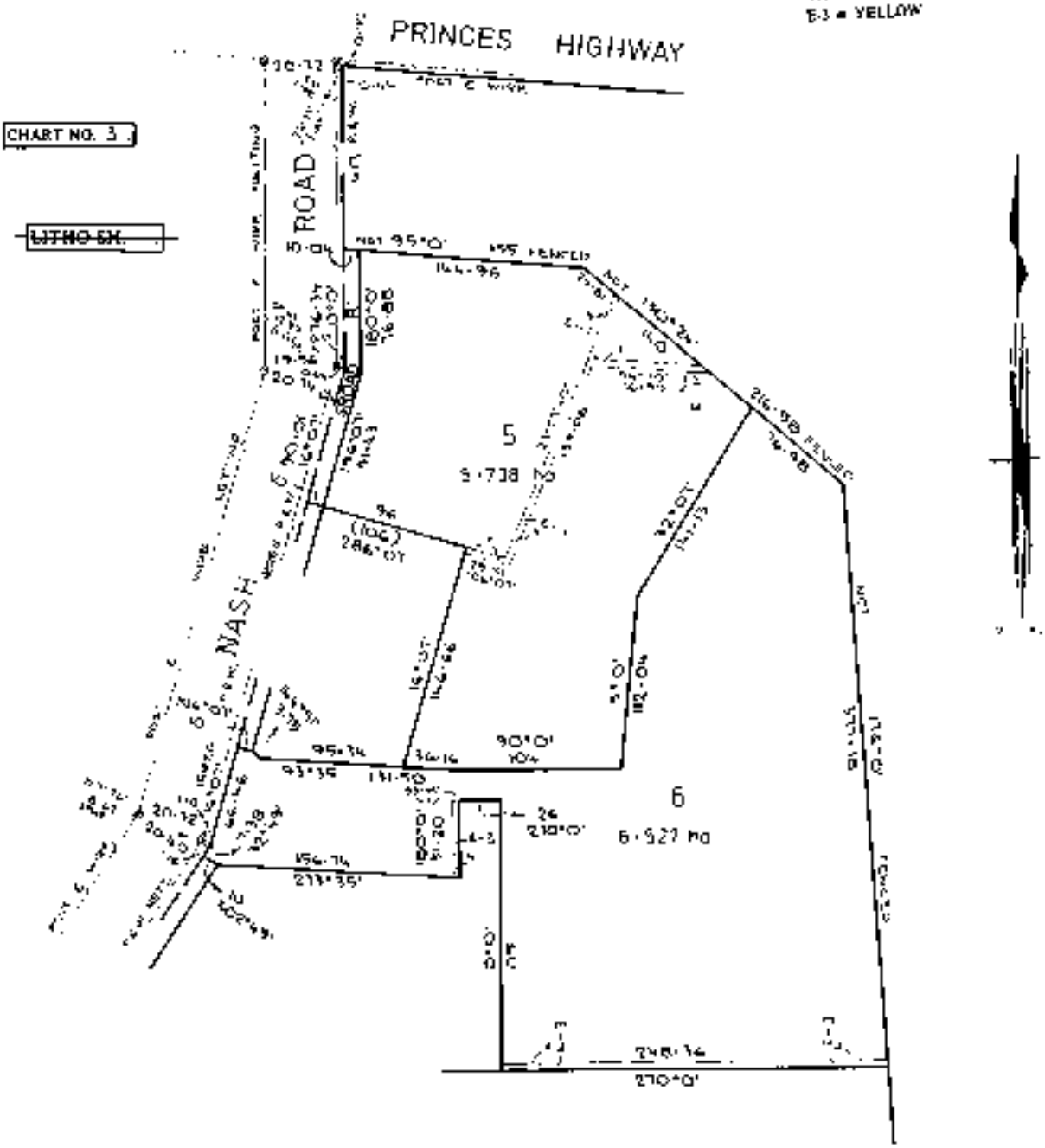
C/T ...

APPROPRIATIONS	ENCUMBRANCES & OTHER NOTATIONS
BROWN CARRIAGEWAY, DRAINAGE & SEWERAGE	YELLOW - DRAINAGE & SEWERAGE EASEMENT VIDE ...
	LOT No. 1 TO 4 (BOTH INCLUSIVE) HAVE BEEN OMITTED FROM THIS PLAN
	BLUE DRAINAGE & SEWERAGE EASEMENT VIDE ...
	BOUNDARIES ARE NOT TO SCALE

COLOUR CONVERSION
E-1 = BLUE
H1 = BROWN
E-3 = YELLOW

CHART NO. 3

LITHO SH.



Imaged Document Cover Sheet

The document following this cover sheet is an imaged document supplied by LANDATA®, Secure Electronic Registries Victoria.

Document Type	**Instrument**
Document Identification	**AF129933M**
Number of Pages (excluding this cover sheet)	**1**
Document Assembled	**15/07/2024 16:31**

CAVEAT

Section 89 Transfer of Land Act 1958

OFFICE OF TITLES J.S. VICTORIA

Lodged by:

Name: DOUBLE BAY CONVEYANCING

Phone:

Address:

Ref:

Customer Code: 12387C

Privacy Collection S
The information from thi
statutory authority and is
maintaining publicly sea
in the Victorian Land Re

AF129933M
14/06/2007 $47.30 89

The caveator claims the estate or interest specified in the land described on the grounds set out and forbids the registration of any person as proprietor of and of any instrument affecting the estate or interest to the extent specified.

Land: *(title, mortgage, charge or lease)*

Certificate of Title Volume 9794 Folio 316

Caveator: *(full name and address)*

[redacted]

Estate or Interest claimed:

An Estate In Fee Simple

Grounds of claim:

[redacted]

Extent of prohibition: *(If not ABSOLUTELY delete and insert desired text)*

ABSOLUTELY

Address in Victoria for service of notice:

Double Bay Conveyancing
7 Apollo Court
Frankston 3199

Dated:

Signature of caveator [redacted] .....

or

Signature of Australian Legal Practitioner within the meaning/under the Legal Profession Act 2004 .....

or

Signature of agent .....

Approval No. 25760510A

C

STAMP DUTY USE ONLY

Page 1 of 1

OFFICE OF TITLES VICTORIA

Anstat Pty Ltd

THE BACK OF THIS FORM MUST NOT BE USED

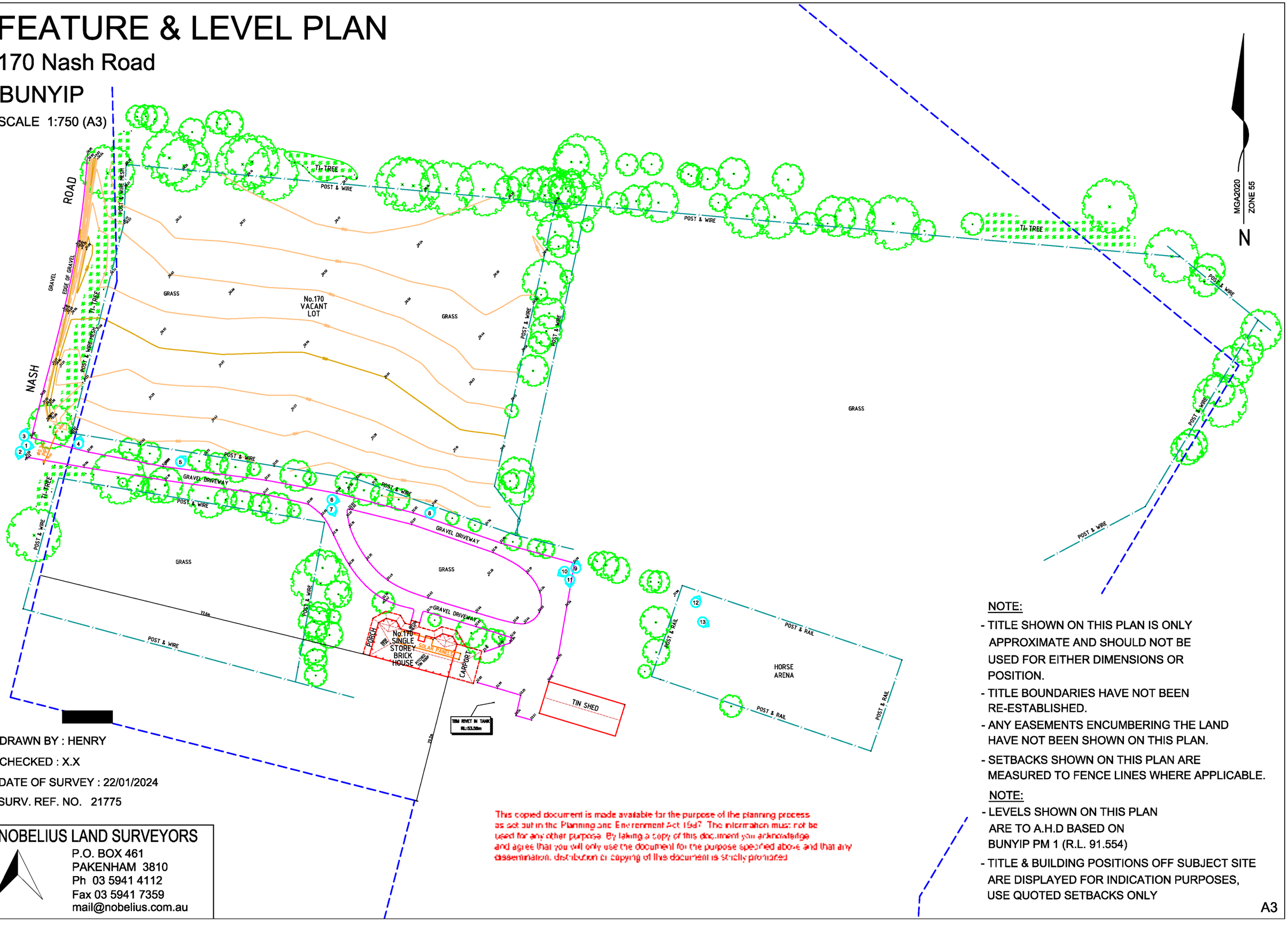
Land Registry, 570 Bourke Street, Melbourne 3000. Phone 03 8636 2010

FEATURE & LEVEL PLAN

170 Nash Road

BUNYIP

SCALE 1:750 (A3)



DRAWN BY : HENRY

CHECKED : X.X

DATE OF SURVEY : 22/01/2024

SURV. REF. NO. 21775

NOBELIUS LAND SURVEYORS

P.O. BOX 461
PAKENHAM 3810
Ph 03 5941 4112
Fax 03 5941 7359
mail@nobelius.com.au

NOTE:

- TITLE SHOWN ON THIS PLAN IS ONLY APPROXIMATE AND SHOULD NOT BE USED FOR EITHER DIMENSIONS OR POSITION.
- TITLE BOUNDARIES HAVE NOT BEEN RE-ESTABLISHED.
- ANY EASEMENTS ENCUMBERING THE LAND HAVE NOT BEEN SHOWN ON THIS PLAN.
- SETBACKS SHOWN ON THIS PLAN ARE MEASURED TO FENCE LINES WHERE APPLICABLE.

NOTE:

- LEVELS SHOWN ON THIS PLAN ARE TO A.H.D BASED ON BUNYIP PM 1 (R.L. 91.554)
- TITLE & BUILDING POSITIONS OFF SUBJECT SITE ARE DISPLAYED FOR INDICATION PURPOSES, USE QUOTED SETBACKS ONLY

A3

DEVELOPMENT PLAN

170 Nash Road

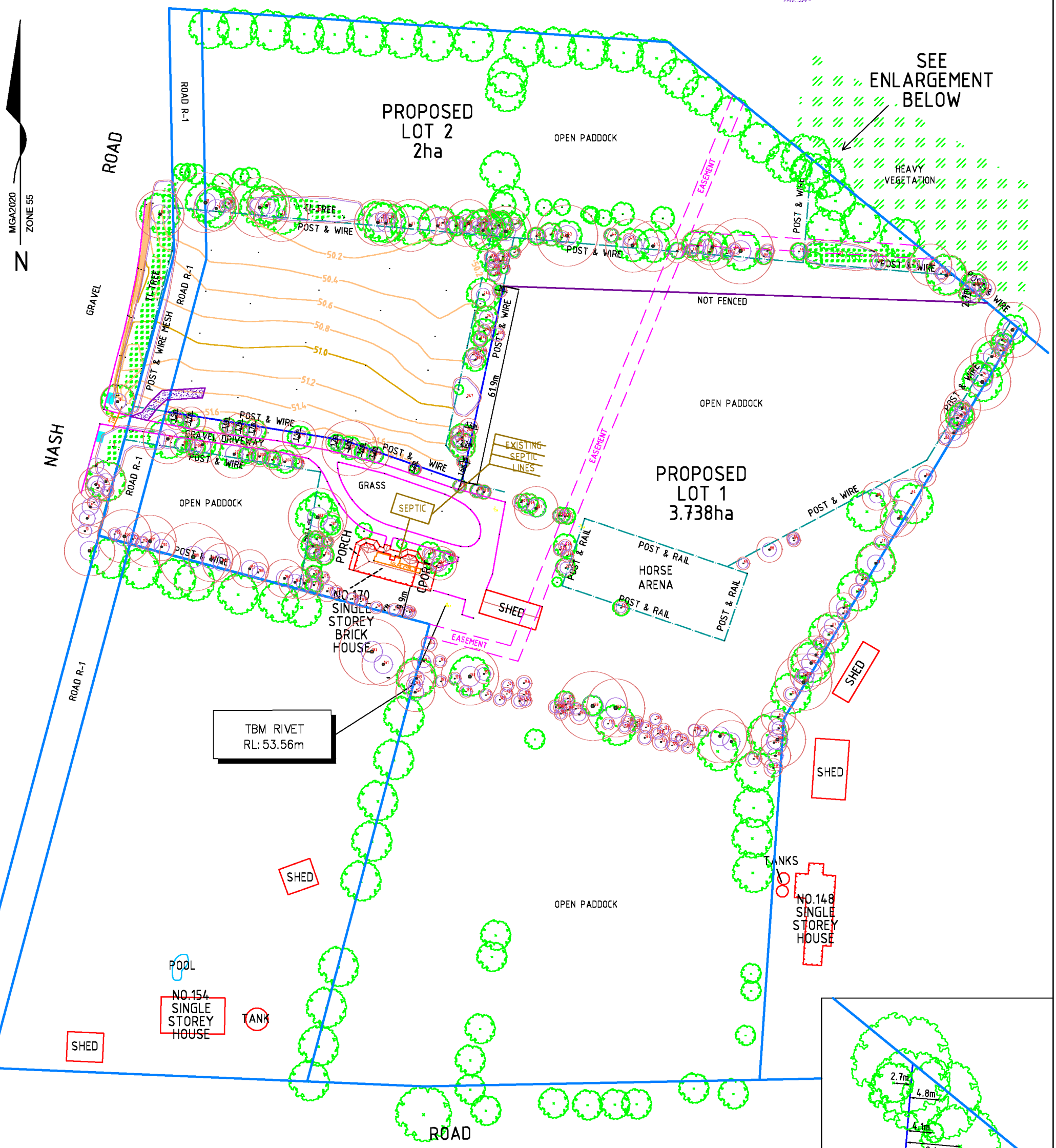
BUNYIP

SCALE 1:1200 (A3)

VERSION 7

LEGEND

- xx - TREE TO BE RETAINED + TREE NUMBER
- TREE PLOTTED FROM AN AERIAL IMAGE
- TREE PROTECTION ZONE
- STRUCTURAL ROOT ZONE
- EXISTING EXTERNAL TITLE BOUNDARY
- PROPOSED LOT BOUNDARIES ALONG AN EXISTING FENCE
- PROPOSED LOT BOUNDARY TO BE FENCED
- BIN COLLECTION AREA
- PROPOSED DRIVEWAY (ALL 3m WIDE)



NOBELIUS LAND SURVEYORS
P.O. BOX 461
PAKENHAM 3810
Ph 03 5941 4112
Fax 03 5941 7359
mail@nobelius.com.au

NOTE:
- LEVELS SHOWN ON THIS PLAN ARE TO A.H.D BASED ON BUNYIP PM 1 (R.L. 91.554)

DRAWN BY : [redacted]
CHECKED : T.F
DATE OF SURVEY : 22/01/2024
SURV. REF. NO. 21775

A3

PLAN OF SUBDIVISION

EDITION 1

PS 925944 H

LOCATION OF LAND

PARISH: Bunyip

TOWNSHIP: ---

SECTION: ---

CROWN ALLOTMENT: 30(Pt)

CROWN PORTION: ---

TITLE REFERENCE: Vol. 9494 Fol. 316

LAST PLAN REFERENCE: Lot 5 on LP 14194

POSTAL ADDRESS: 170 Nash Road, Bunyip 3815
(at time of subdivision)

MGA CO-ORDINATES: E: 388 090 ZONE: 55
(of approx centre of land in plan) N: 5 784 420 GDA 2020

Council Name: Cardinia Shire Council

EXPLANATORY NOTE:
WARNING: This plan is unregistered.
Alterations may be required by Council and the Registrar of Titles prior to Registration, Nobelius Land Surveyors accepts no responsibility whatsoever for any loss or damage suffered.

VESTING OF ROADS AND/OR RESERVES

IDENTIFIER	COUNCIL/BODY/PERSON
NIL	NIL

NOTATIONS

DEPTH LIMITATION: DOES NOT APPLY

SURVEY:
This plan is based on survey.

STAGING:
This is not a staged subdivision.
Planning Permit No.

This survey has been connected to permanent marks No(s). 80

In Proclaimed Survey Area No. 71

NOTATIONS

EASEMENT INFORMATION

LEGEND: A - Appurtenant Easement E - Encumbering Easement R - Encumbering Easement (Road)

Easement Reference	Purpose	Width (Metres)	Origin	Land Benefited/In Favour Of
E-1	Drainage & Sewerage	4	LP 14194	All Lots on LP 14194

NOBELIUS LAND SURVEYORS
P.O. BOX 461
PAKENHAM 3810
Ph 03 5941 4112
mail@nobelius.com.au

SURVEYORS FILE REF: 21775

ORIGINAL SHEET SIZE: A3

SHEET 1 OF 2

LICENSED SURVEYOR: B. S. NOBELIUS

VERSION 2

PS 925944 H

ROAD

NASH

93°51'40"
144.95

10

358°51'40"
76.88

25.83

129°15'40"
(127.68)
140.01

E-1

93°21'40"
76.87

91°59'30"
(149.92)
12.33

2
2ha

91.43
48.93
14°58'40"

99°09'10"
56.21

109°25'50"
38.48

12°06'40"
61.89

42.50

10

96
284°58'40"

21°59'20"
(139.08)

141.13
210°58'40"

29.51
104°58'40"

14°58'40"
(146.66)

1
3.738ha

112.04
183°51'40"

36.16
272°26'40"

104
268°51'40"

MGA2020
ZONE 55

WARNING: This plan is unregistered.
See Sheet 1 for Explanatory Note

NOBELIUS LAND SURVEYORS
P.O. BOX 461
PAKENHAM 3810
Ph 03 5941 4112
mail@nobelius.com.au

SCALE 1:1200	12 0 12 24 36 48 LENGTHS ARE IN METRES	ORIGINAL SHEET SIZE: A3	SHEET 2
LICENSED SURVEYOR: B. S. NOBELIUS VERSION 2			

NOBELIUS
LAND SURVEYORS

10 Henry Street
PO Box 461
Pakenham
VIC 3810

ABN: 25 006 181 344
PHONE: 03 5941 4112
EMAIL: mail@nobelius.com.au
WEB: www.nobelius.com.au

15th December, 2024

[redacted]
Nobelius Land Surveyors
10 Henry Street
Pakenham VIC 3810

Attn [redacted]
Statutory Planning
Cardinia Shire Council

Dear Alicia,

Application No:	**T240329 PA**
Property No:	**4619253400**
Address:	**170 Nash Road, Bunyip VIC 3815 (L5 LP141494 V9494 F316)**
Proposal:	**The subdivision of the land into Two (2) Lots**

Thank you for your email dated 6th December 2024 requesting further information under section 54 of the *Planning and Environment Act 1987*.

We wish to respond as follows:

1. Development Plan

Update the Development Plan to clearly show the following:

- *Proposed location of vehicle access to Lot 2, directly onto Nash Road.*
- *Delineation (i.e. different colours) between existing fences, proposed fences, and the boundaries of the Road R-1 road reserve.*

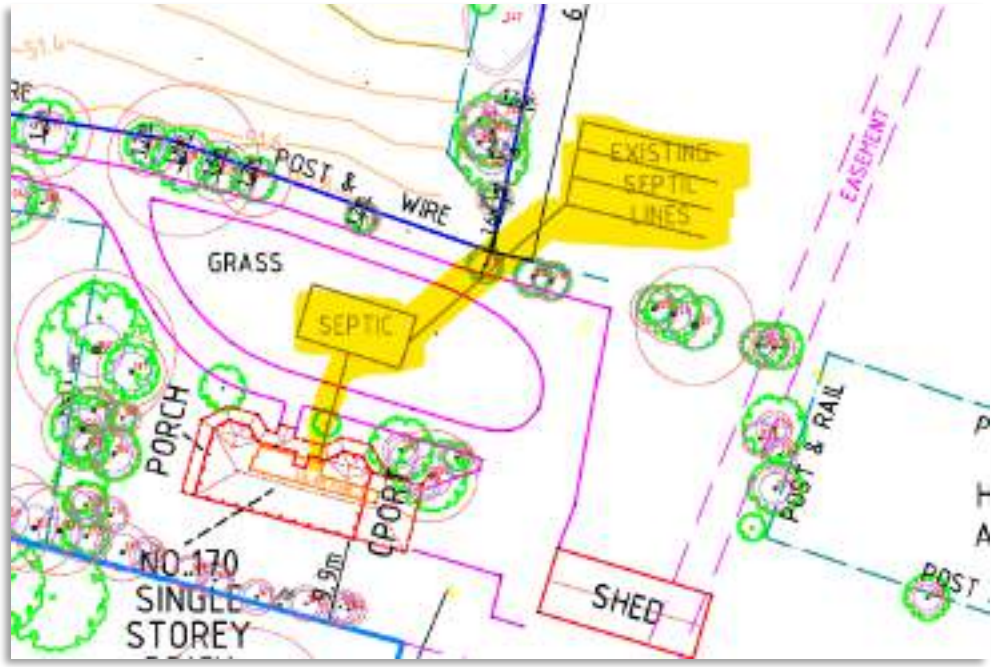
Response The development plan has been updated to show the proposed location of vehicle access to Lot 2, noting the applicant does not wish to create access directly onto Nash Road. The proposed accessway to Lot 2 will branch from the existing crossover to make best use of a cleared area of the road reserve (R-1) as per plans lodged in July 2024. A shared crossover is proposed as this is the most logical and practical outcome in order to avoid impacts to roadside vegetation.

EXTRACT OF CONCEPT PLAN SHOWING PROPOSED ACCESS ARRANGEMENT FOR LOT 2 & POST AND WIRE FENCE (TEAL COLOURED DASHED LINE) & ROAD R-1 RESERVE AND LOT BOUNDARIES (SOLID BLUE LINE) (NLS, DEC 2024)

The development plan has been revised to provide delineation between existing fences and the boundaries of the Road R-1 road reserve. We note that all fence treatments are notated on the plans. Blue lines on the concept plan denote existing lot boundaries hence notations have been used to identify existing fence treatments, including the existing fence along the Road R-1 road reserve.

2.	***Existing septic system*** *Update the Plumbing Report and Feature and Level Plan to describe and show to the location of the existing septic system and effluent lines.*

Response: The Development Plan has been revised as per Council's request and the plumbers report provided to Council previously with all dimensions and setbacks of the existing septic system.



EXTRACT OF CONCEPT PLAN IDENTIFYING SEPTIC SYSTEM AND EFFLUENT LINES (NLS, DEC 2024)

3.	***Revised Plans*** *Update the reports provided with the application material to remove the previous version of the Development Plan and replace with the current version of the Development Plan, including:* • *Land Capability Assessment* • *Stormwater Management Strategy* • *Preliminary Arboricultural Report*

Response: The supporting documents listed above have been updated to reflect the revised common boundary. Please find attached as part of this response.

PRELIMINARY ASSESSMENT COMMENTS

A preliminary assessment of the application has been undertaken and the following comments are provided for your consideration:

Access
The Town Planning Report describes the proposed access to Lot 2 as "via the existing crossover from Nash Road to the west and using the road reserve to ensure no common property is required." Council is not supportive of sharing one vehicle crossover between two lots.

As requested in item 1, the Development Plans should be updated to indicate the location of proposed vehicle access to Lot 2 directly from Nash Road. The proposed vehicle access location should attempt to avoid and minimise impacts to roadside vegetation as far as practicable. If there will be impacts to roadside vegetation to accommodate a new crossover, additional information may be requested.

Response: The development plan has been updated to show the proposed location of vehicle access to Lot 2. We kindly request clarification from Council as to why the shared crossover is not supported.

We contend that the proposed shared crossover is the most logical and practical outcome for this site and responds to comments we received from Council's internal departments regarding the strategic biodiversity value of vegetation within the Nash Road reserve (a copy of this email correspondence is attached for your review).

A google streetview image of the Nash Road frontage and the existing crossover is provided below identifying the patch of roadside vegetation (centre of image) retained under the current design:

NASH ROAD (LEFT), PATCH OF VEGETATION RETAINED UNDER CURRENT DESIGN (CENTRE) AND EXISTING CROSSOVER PROPOSED TO SERVICE BOTH LOTS 1 & 2 (RIGHT) (GOOGLE MAPS, 2024)

It is frustrating that despite the application being lodged in July 2024 that this is the first mention of Council being unsupportive of a shared crossover. The shared crossover wasn't raised as an issue in the initial request for further information or subsequent meeting Ben Nobelius and I had with Tim Heffernan and Evie McGauley Kennedy to discuss the RFI in August 2024. We're not aware of it being raised by any internal departments, nor has it arisen in any phone calls or emails we've had with Council since.

The proposed shared crossover is entirely appropriate for the locality and has been proposed to avoid the unnecessary removal of native vegetation within the road reserve as per the tiered 'avoid, minimise, offset' approach employed by Clause 52.17 Native vegetation.

The proposed access configuration provides practical, safe and efficient access to both lots and aligns with State and Local planning policies that have regard for biodiversity and native vegetation. As such, we'd appreciate clarification from Council as to why a shared crossover is not worthy of support.

Should Council require any further information or wish to discuss, please do not hesitate to contact me on 03 5941 4112 or renee@nobelius.com.au.

Warm Regards,

[redacted]

Town Planner

Nobelius Land Surveyors

NOBELIUS
LAND SURVEYORS

10 Henry Street
PO Box 461
Pakenham
VIC 3810

ABN: 25 006 181 344
PHONE: 03 5941 4112
EMAIL: mail@nobelius.com.au
WEB: www.nobelius.com.au

11th September, 2024

[redacted]

Nobelius Land Surveyors
10 Henry Street
Pakenham VIC 3810

Attn [redacted]
Statutory Planning
Cardinia Shire Council

Dear [redacted]

Application No:	**T240329 PA**
Property No:	**4619253400**
Address:	**170 Nash Road, Bunyip VIC 3815 (L5 LP141494 V9494 F316)**
Proposal:	**The subdivision of the land into Two (2) Lots**

Thank you for your request for further information under section 54 of the *Planning and Environment Act 1987*.

Following on from our meeting with [redacted] on 22 August 2024, we wish to respond as follows:

FURTHER INFORMATION REQUIRED

1. **Amended Plans, as follows:**

   a. **Title plan and proposed subdivision plan show Road Reserve (Road R-1). As this area of land appears to be Council owned, amended plans that clearly show the installation of the fence on the property boundaries of the proposed lots (outside of the road reserve), to ensure that the council land is appropriately managed and ensure retention of vegetation in the road reserve for the future.**

Response: The concept plan identifies the Council owned Road R-1 and notates the existing post and wire fence along the western boundary of the Road R-1. The eastern boundary of the Road R-1 is currently unfenced and this 10m wide strip of land has been managed and maintained by the landowners of 170 Nash Road, Bunyip for at least a decade. A request made by the landowners to purchase this area from Council was declined earlier this year.

An extract of the concept plan has been marked up below to illustrate the 10m wide Road R-1 area (yellow), existing post and wire fence (solid red line) and the boundary proposed to be fenced by Council (dashed red line):

We kindly request that the Road R-1 boundary remain unfenced given the below:

- The grassed Road R-1 area is currently maintained and managed by the landowners of 170 Nash Road via livestock grazing and mowing. Municipal vegetation contained within the Nash Road reserve is protected and separated by an existing post and wire fence along the Road R-1 western boundary. Should the Road R-1 western boundary require fencing, clarification regarding who will assume responsibility for the ongoing maintenance and management of the grass within Road R-1 area would be greatly appreciated noting that the land is within a designated bushfire prone area.
- The construction of a new boundary fence between the Road R-1 and 170 Nash Road will enable native vegetation removal under the 'fences' exemption tabled at 52.17-7. We kindly request clarification as to who will be liable for the offset requirements associated with any consequential loss arising from the fencing of a Council asset.

b. Deletion of Indicative Building Envelope (1294m^2).

Response: Please find attached a revised concept plan as per Item 1b. The Town Planning report and SWMS have been updated accordingly.

2. Completed Plan of Subdivision.

Response: Please find attached a copy of the proposed Plan of Subdivision PS 925944H.

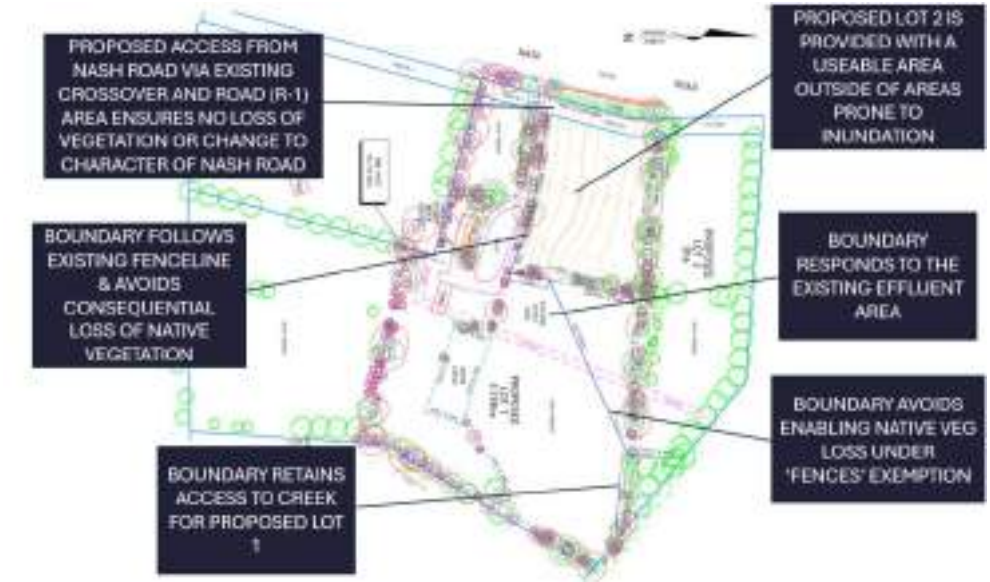
PRELIMINARY ASSESSMENT COMMENTS

1. Council's planning department is not supportive of the proposed subdivision, concluding it as not orderly or in keeping with the subdivisional characteristics within the surrounding area. It is highly recommended that you revise the proposed two lot subdivision, with a layout that is significantly more lineal in shape. There are also concerns the 2 lot subdivision proposal does not adequately respond to the relevant decision guidelines of the Green Wedge A Zone.

Response: The proposed subdivision layout creates two irregular shaped allotments that respond to the key constraints and considerations of the site and are appropriate for the locality when having regard for lot sizes and shape evident within the existing pattern of subdivision. Revising the proposed boundary to a more linear configuration would fail to appropriately respond to the site features.

The proposed common boundary:

- Prioritises the retention of native vegetation;
- Ensures the existing septic system and associated absorption fields are contained entirely with the boundary of proposed Lot 1;
- Will not result in any adverse impacts to the existing rural character or be visually obtrusive from any adjoining land and/or the road reserve;
- Provides proposed Lot 2 with useable area outside of the low-lying areas subject to the LSIO;
- Utilizes the existing accessway from Nash Road to avoid impacts to biodiversity within the road reserve; and
- Is in keeping with lot sizes and shapes observed immediately to the south of the subject site:



The proposed two lot subdivision adequately responds to the relevant decision guidelines of the Green Wedge A Zone:

General issues

- *The Municipal Planning Strategy and the Planning Policy Framework.*
- *The capability of the land to accommodate the proposed use or development, addressing site quality, attributes including soil type, soil fertility, soil structure, soil permeability, aspect, contour, and drainage patterns.*
- *How the use or development relates to agricultural land use, rural diversification and natural resource management.*
- *Whether the site is suitable for the use or development and whether the proposal will have an adverse impact on surrounding land uses.*
- *The need to protect the amenity of existing residents.*
- *The need to minimize adverse impacts on the character and appearance of the area or features of architectural, scientific or cultural heritage significance, or of natural scenic beauty or importance.*

Rural issues

- *The maintenance of agricultural production and the impact on the local economy.*

- *The need to prepare an integrated land management plan.*
- *The impact on the existing and proposed rural infrastructure.*
- *The potential for the future expansion of the use or development and the impact of this on adjoining and nearby agricultural and other land uses.*
- *Protection and retention of land for future sustainable agricultural activities.*

An assessment of the proposal against the MSS and State and Local PPF is provided in the town planning report submitted to Council.

The landowners of 170 Nash Road, Bunyip currently use the land for equestrian purposes, and the proposed subdivision retains the paddocks best suited for this use within proposed Lot 1.

A land capability assessment prepared for the site demonstrates that the land can treat and retain all domestic wastewater on site should a dwelling (section 2 use) be proposed in the future.

The proposed subdivision is not foreseen to result in any amenity impacts to adjoining or nearby land as both lots meet the minimum lot size required by the zone and no major works are required to facilitate the proposal. We note that the 2ha lot size required by the zone suggests that it is anticipated that land in this area will support lifestyle uses and/or small-scale agriculture.

The proposed subdivision of the land will not adversely impact on the character or appearance of the Nash Road GWAZ area, noting that no development is proposed, the common boundary predominately follows existing fence lines, no native vegetation is proposed for removal, and there are no significant works required to facilitate the subdivision. Contiguous lots are predominately small lifestyle lots and any future resubdivision/consolidation of land to increase the agricultural capacity of the subject site is unlikely.

Environmental issues

- *The impact of the use or development on the flora and fauna on the site and its surrounds.*
- *An assessment of the likely environmental impact on the natural physical features and resources of the area and in particular any impact caused by the proposal on soil and water quality and by the emission of effluent, noise, dust and odours.*
- *The need to protect and enhance the biodiversity of the area, including the retention of vegetation and fauna habitat and the revegetation of land including riparian buffers along waterways, gullies, ridge lines, property boundaries and saline recharge and discharge areas.*
- *How the use or development relates to sustainable land management and the need to prepare a sustainable land management plan.*
- *The location of on-site effluent disposal areas to minimize impact of nutrient loads on waterways and native vegetation.*

The retention of native vegetation has been prioritised in the siting of the proposed common boundary fence. Any adverse impacts to soil or water quality are unlikely given no significant works are required to create the proposed lots, and a land capability assessment has not identified any major limitations.

Design and siting issues

- *The need to minimize adverse impacts of the siting, design, height, bulk, colours and materials to be used on major roads, landscape features and vistas.*
- *The location and design of existing and proposed infrastructure services including gas, water, drainage, telecommunications and sewerage facilities which minimize the visual impact on the landscape.*
- *The location and design of existing and proposed infrastructure services including gas, water, drainage, telecommunications and sewerage facilities which minimize the visual impact on the landscape.*
- *The location and design of existing and proposed roads and their impact on the landscape and whether the use or development will require traffic management programs.*

The proposed subdivision layout responds to the key considerations and constraints of the site. The proposed access ensures the retention of native vegetation and seeks to activate a small area of the Road R-1 easement to avoid having to create new access to Nash Road and associated biodiversity impacts.

2. **Please note that in assessing the proposed fence line, there are concerns that consequential loss of vegetation may also come into play/hasn't been accounted for. Clearer plans (as requested in 1a) will assist in determining this.**

Response: As per the response to 1a, the fence proposed by Council to separate the Road R-1 from the subject site is likely to result in the consequential loss of vegetation, including vegetation indigenous to Victoria:

CONSEQUENTIAL LOSS OF VEGETATION					
TREE NO	**SPECIES**	**ORIGIN**	**VALUE**	**DBH (cm)**	**EXEMPTION APPLIES**
15	*Eucalyptus cypellocarpa* Mountain Grey Gum	Indigenous	High	77	Yes. Fences 52.17-7. Offsets req'd.
193	*Eucalyptus spathulata* Swamp Mallet	Aus. Native	None	12.65	Permit required under ESO

VEGETATION REMOVAL POTENTIALLY ENABLED (REQUIRES SETBACK DISTANCES)					
TREE NO	**SPECIES**	**ORIGIN**	**VALUE**	**DBH (cm)**	**EXEMPTION APPLIES**
16	*Eucalyptus cypellocarpa* Mountain Grey Gum	Indigenous	High	58	Potentially 'fences' 52.17-7, offsets req'd
194	*Eucalyptus spathulata* Swamp Mallet	Aus. Native	High	69	Permit required under ESO.
196	*Eucalyptus ovata* Swamp Gum	Indigenous	Med	64	Potentially 'fences'

					52.17-7, offsets req'd
206	*Grevillea robusta* Silky Oak	Aus. Native	Low	29	Permit required under ESO

Vegetation to the north of the subject site along the Road R-1 interface has not been assessed by the arborist as it was considered out of scope in the proposed subdivision layout.

As per our response to 1a, we believe that the request to fence the Road R-1 boundary is an impractical outcome that will enable the consequential loss of vegetation and is likely to result in management/maintenance issues in a bushfire prone area. As such, we kindly request that the Road R-1 eastern boundary remains unfenced.

3. On the basis changes are made, the completion of attached Section 50 form must be provided.

Response: The envelopes have been removed from Proposed Lot 2 at Council's request, and the town planning report and SWMS have been updated accordingly.

Please find attached a completed s50 amendment form to reflect the above.

Should Council require any further information or wish to discuss, please do not hesitate to contact me on 03 5941 4112 or renee@nobelius.com.au.

Warm Regards,

[redacted]

Town Planner

Nobelius Land Surveyors

[redacted]

Hello [redacted]

Thank you for your email dated 14 Nov 24 outlining additional information required to support your assessment of T240329PA, and subsequent email and phone call on 19 Nov 24.

As we understand, Council's view is that the proposed layout does not present as orderly planning and strongly recommend we revise the layout to a more linear configuration. We also understand that Council have concerns regarding the existing fence within the Road Reserve (R-1) area despite there being no planning requirement for a front fence under the Scheme.

It was presented to us that given the RFI is satisfied, this application will be proceeding to advertising at the end of this week (22 Nov 24) despite Council being unlikely to support the layout in its current form. As such, our hand has been somewhat forced to make changes to the layout on the plan by the end of the week under a section 50 amendment to prevent our clients paying fees associated with making changes to the application under a section 57 amendment.

Section 50a amendment
We have discussed the above with our clients and they have agreed to revise the plans to satisfy Council and hopefully proceed to advertising before Christmas. Please find attached the following documents:

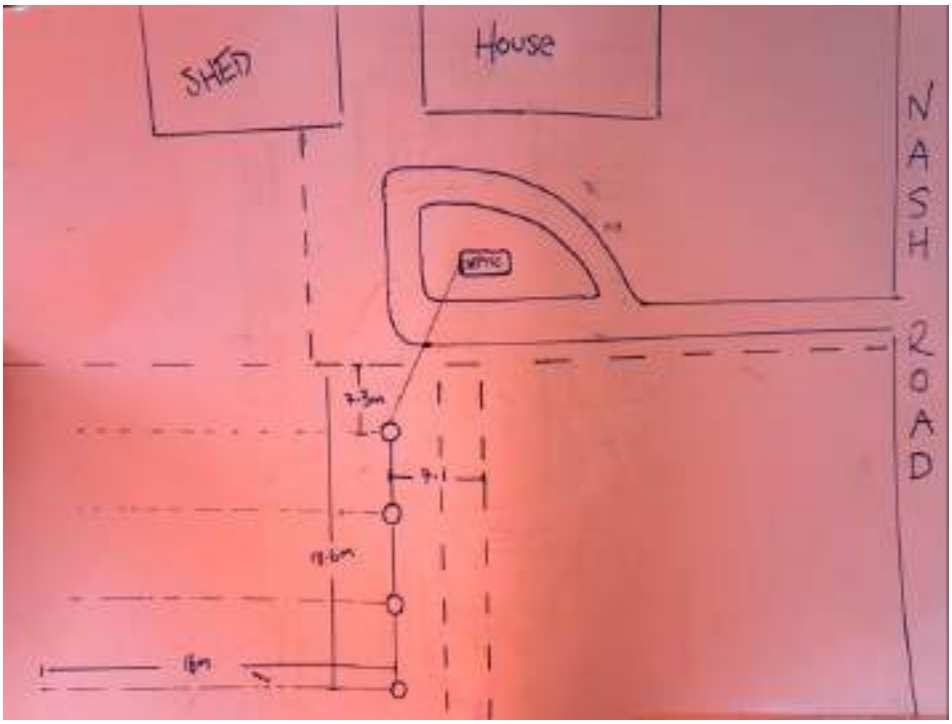
- Completed section 50a amendment form
- Revised development plan and proposed plan of subdivision
- Revised town planning report

The revised boundary continues to avoid vegetation removal and accommodates the existing effluent area, but without a splay, removes the creek frontage that Lot 1 benefitted from in the former layout.

Front fence
In regards to Council's comments re: front fence, we contend that Council can remove/relocate this fence as they see fit given it's within Council's road reserve (R-1). We are conscious however, that it is still unclear on how this strip of land will be managed and we have concerns that should Council's open space team be unable to regularly manage this 10m wide strip of land it will increase bushfire risk in a designated bushfire prone area. In this regard, the current land management scenario is advantageous to Council, noting that adverse possession isn't a relevant consideration should this be allowed to continue.

Should Council seek to impose the requirement for a new front fence via a permit condition for an ILMP, we ask that Council first consider consequential loss associated with vegetation within 1m of a new boundary fence.

Existing effluent area
The effluent absorption trenches will be entirely contained within Proposed Lot 1. Tom Grant Plumbing prepared the below mud map showing the location and setbacks of the absorption trenches and existing septic system.



Council preference for more linear lot configuration
As discussed, the common boundary has been revised to satisfy Council's request for a more linear lot configuration. The lot areas are unchanged by the revised common boundary location.

Acknowledging that we have revised the plans, we kindly request clarification from Council on where in the Scheme a linear lot configuration is specifically required for lots in the GWAZ. It is our understanding that there is no such requirement, and that rather, the subdivision of land in green wedge zones is required to respond to the physical attributes of the land and avoid any detriment to existing or future land use and development.

The former lot layout was entirely appropriate for the zone when having regard to the purposes and relevant decision guidelines, and we believe it also presented a satisfactory planning outcome when having regard for the relevant planning policies and physical attributes of the site. The former layout avoided vegetation loss and created two highly usable lots with a good sense of address that could sustain small-scale agriculture. No further subdivision was made possible as a result of the lot configuration, and the LCA and SWMS addressed the relevant environmental considerations early in the design process. Futhermore, the former lot configuration enabled the landowners to retain frontage to Tea Tree Creek, and avoided $30k (approx) in costs associated with the relocation of the septic system.

Council's request for a more linear configuration on the basis that the proposed layout was not in keeping with the orderly planning of the area is, in our opinion, unfounded. We would contend that the former lot configuration did not impede on the orderly or proper planning of the area, especially given there would be no visual impact associated with the new boundary, the proposed boundary predominately followed existing fence lines, and the lot layout was highly unlikely to result in any detriment to the future use and development of the site or surrounds. Both lots proposed under the former design were in keeping with the existing pattern of subdivision in terms of size and shape, especially the GWAZ lots immediately to the south at 148A, 148B and 148C which are all irregular shaped 2ha allotments with non-linear boundaries.

We are agreeing to revise the boundary, but given we feel the former design aligned with all relevant policy, we would be very keen to better understand Council's preference for the linear boundary and how we can address this preference in future applications we submit to Cardinia for assessment.

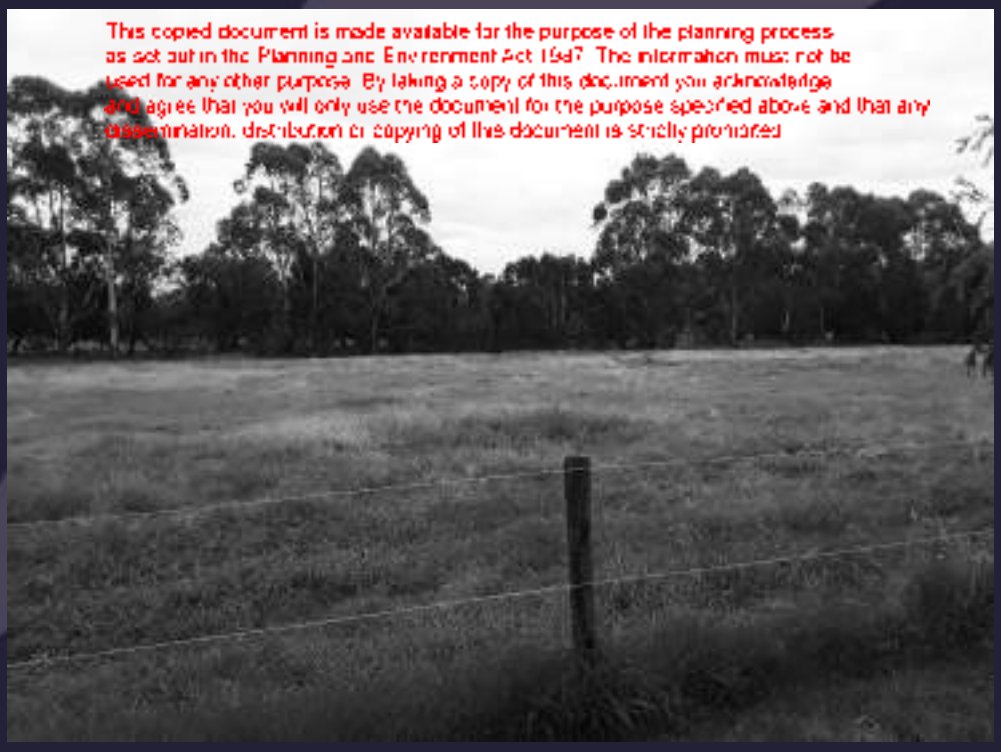
Please feel free to reach out if you require anything further.

Warm Regards,

TOWN PLANNING REPORT

The Subdivision of the Land into Two (2) Lots

at 170 Nash Road, Bunyip VIC 3815



PROPOSED BY
NOBELIUS LAND SURVEYORS
20 Henry Street, Pakenham, VIC 3810
(03) 5941 4112
www.nobelius.com.au

NOBELIUS
LAND SURVEYORS

TABLE OF CONTENTS

1. PRELIMINARY

ADDRESS	170 Nash Road, Bunyip Lot 5 LP141494			
RESPONSIBLE AUTHORITY	Cardinia Shire Council			
ZONE	Green Wedge A Zone - Schedule 2 (GWAZ2)			
OVERLAY	Environmental Significance Overlay - Schedule 1 (ESO1) Land Subject to Inundation (LSIO)			
BUSHFIRE PRONE AREA	Yes			
RESTRICTIONS REGISTERED ON TITLE	☐ None	☒ Yes, list below: Caveat AF129933M		
ENCUMBERING EASEMENTS	☐ None	☒ Yes, list below: E-1 Drainage and sewerage R-1 Carriageway, drainage and sewerage		
RETICULATED SEWER	☒ None	☐ Yes		
PROPOSAL	The Subdivision of the Land Into Two (2) Lots			
PERMIT TRIGGERS	Clause 35.05-3 Clause 42.01 Clause 44.04	(GWAZ) A permit is required to subdivide land (ESO) A permit is required to subdivide land. (LSIO) A permit is required to subdivide land.		
CULTURAL HERITAGE	☐ No	☒ Yes, a CHMP may be required		
		☒ Not Required	☐ Required	
NATIVE VEGETATION	Clause 52.17 applies. ESO1 applies.			
MELB WATER FLOOD LEVEL ADVICE	Pre-development advice from Melbourne Water identifies that the subject site is prone to inundation from Tea Tree Creek. The applicable flood level for the property grades from 51.0m to AHD at the western property boundary down to 50.4m to AHD at the eastern property boundary.			
RELEVANT INCORPORATED DOCUMENTS	Outside of Bunyip Township Strategy boundary Cardinia Western Port Green Wedge Management Plan			
SUBMITTED DOCUMENTS	Current copy of title and plan Copy of AF129933M Feature Survey and Development Plan - *Nobelius Land Surveyors* Proposed Plan of Subdivision PS925944H - *Nobelius Land Surveyors* Land Capability Assessment - *HardCore Geotech* Arboricultural Assessment - *ArbKey* Stormwater Management Strategy - *DPM Consulting* Inspection of existing septic system report - *Grants Plumbing*			
NLS QUALITY SYSTEM	**AUTHOR**	**DATE ISSUED**	**CHECKED BY**	**REVISION**
	RO	21/11/24	JB	3

2. INTRODUCTION

This town planning report has been prepared by Nobelius Land Surveyors on behalf of the landowners of the subject land to seek Council approval to subdivide the land into two (2) lots.

The subject land is Lot 5 LP141494, 170 Nash Road, Bunyip, a GWAZ2 lot of 5.738ha located to the north of the Bunyip township and south of the Princes Highway. The Tea Tree Creek extends through the northern paddocks and native vegetation is present on and adjoining the subject land. The applicable overlays (ESO1 & LSIO) reflect the low lying and environmental qualities of the subject land and wider green wedge area.

It is proposed to subdivide the land into two (2) lots of 3.738ha and 2ha which is consistent with the minimum subdivision area required by the schedule to the zone. Detailed site investigations have informed the proposed subdivision design: An arboricultural assessment has been undertaken of all trees on and adjoining the site and the retention of vegetation has been prioritised within the subdivision layout. The LSIO has been addressed through the preparation of a SWMP to ensure the relevant drainage issues have been identified and responded to within the subdivision layout.

This town planning report aims to demonstrate that the proposed subdivision is an appropriate planning outcome that helps to give effect to the Municipal Planning Strategy, State and Local Planning Policy Framework and the relevant policies, objectives and strategies of the Cardinia Planning Scheme, and warrants Council's full support.

This report should be read in conjunction with the following supporting documents:

- Current copy of title and plan
- Copy of Caveat AF129933M
- Feature Survey and Development Plan - *Nobelius Land Surveyors*
- Land Capability Assessment – *Hardcore Geotech, Feb 2024*
- Arboricultural Assessment - *ArbKey, Feb 2024*
- Stormwater Management Strategy - *DPM Consulting, Jul 2024*
- Inspection of existing septic system report - *Grant Plumbing, Feb 2024*

3. SUBJECT SITE AND SURROUNDING LOCALITY

SITE ANALYSIS

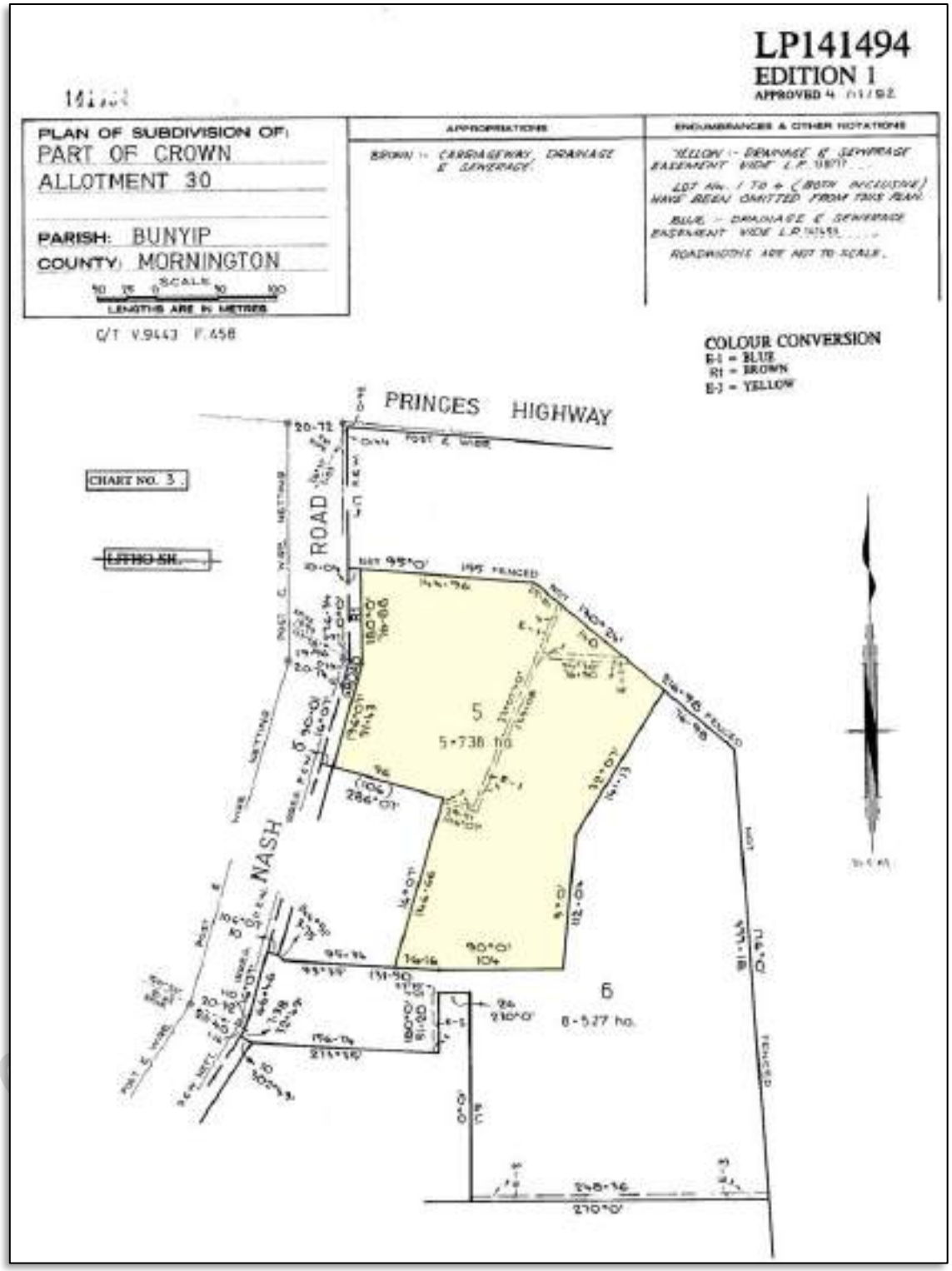
The subject site is formally described as Lot 5 LP141494 Vol 09494 Fol 316, with a street address of 170 Nash Road, Bunyip. The site is an irregular shaped Green Wedge A Zone – Schedule 2 allotment of 5.738ha and is contained within a green wedge cell to the north of the Bunyip township boundary and south of the Princes Highway.

The subject land is developed with a single detached dwelling and associated outbuildings as well as an outdoor equestrian arena. The land is primarily used for equine purposes.

Access to the site is via Nash Road to the west. Tea Tree Creek extends through the northern portion of the site, and vegetation features along both sides of the creek and along the internal and boundary fence lines. A recent aerial image identifying the subject site is provided below:

170 NASH ROAD, BUNYIP (NEARMAP, APR 27, 2024)

A review of the certificate of title identifies that the land is encumbered by a drainage and sewerage easement (E-1) and a 10m (approx.) wide road reserve (R-1) along the site's Nash Road frontage as per the extract of LP141494 provided below:



EXTRACT LP141494 IDENTIFYING THE SUBJECT SITE (LOT 5)

Photographs of the existing site conditions on the following page help to provide further context:

LOOKING NORTH TO FRONT PADDOCK & TEA TREE CREEK

LOOKING SOUTH-EAST TO EXISTING DWELLING

LOOKING EAST EQUESTRIAN ARENA

LOOKING NORTH-EAST TO THE MUNICIPAL NATURE RESERVE

LOOKING SOUTH TO EXISTING SHED

LOOKING EAST ALONG THE DRIVEWAY FROM NASH ROAD

LOOKING NORTH TOWARDS TEA TREE CREEK & THE EXISTING EFFLUENT ABSORPTION FIELD IS CONTAINED IN PADDOCK IN FOREGROUND

LOOKING SOUTH-WEST TOWARDS THE EXISTING DWELLING

SURROUNDS

The subject site is located with a green wedge pocket of land to the north of the Bunyip township boundary and to the south of the Princes Freeway:

LOCALITY MAP IDENTIFYING SUBJECT SITE (LASSI, 2024)

Nash Road is a north-south unsealed road which provides connection between the Bunyip township and the Princes Highway to the north. The road is unsealed with drainage culverts on either side of the road. The road reserve features significant native vegetation and strategically, may form a potential biolink or biodiversity corridor to the nature reserve to the north which has been vested to Council.

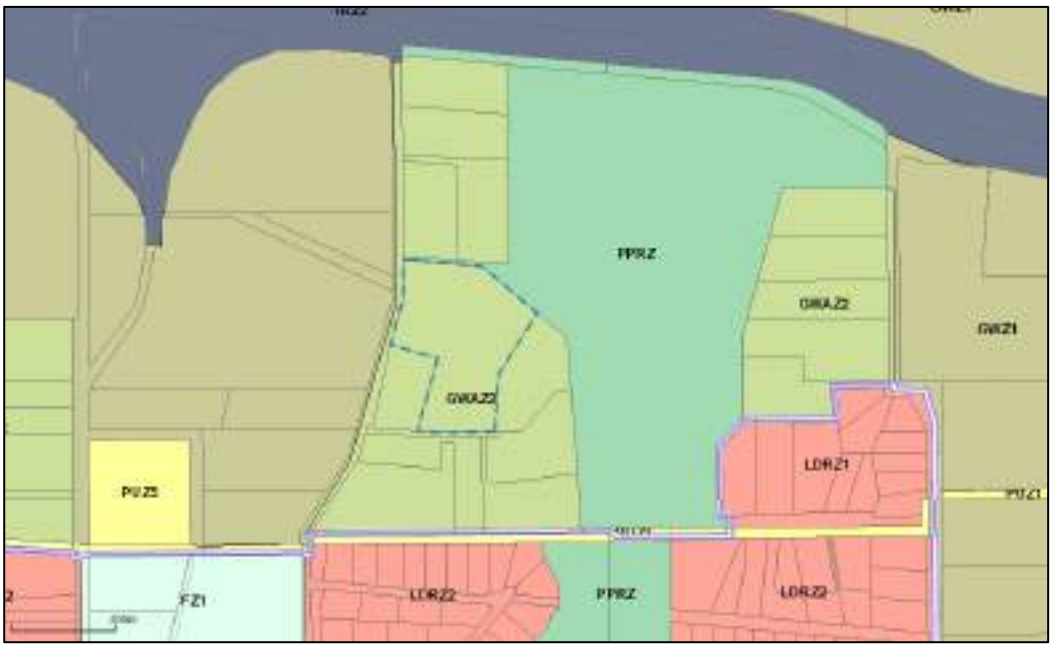
LOOKING NORTH ALONG NASH ROAD TOWARDS THE SUBJECT SITE ENTRANCE (GOOGLE MAPS, 2024)

CROSSOVER AND ENTRANCE TO SUBJECT SITE (GOOGLE MAPS 2024)

LOOKING SOUTH ALONG NASH ROAD TOWARDS BUNYIP (GOOGLE MAPS 2024)

A review of the land surrounding the subject site identifies a mix of zoning, including Green Wedge A, Low Density Residential, Public Parks and Recreation, Public Use, Farming and TRZ2, and this mix is evidenced in the variety of lot sizes and land use and development.

The land immediately adjoining the subject site is summarised in the table below:

NORTH	Abuts two GWAZ2 lots subject to the LSIO: • 180 Nash Road, Bunyip (Lot 3 PS531528) with an area of 2.0ha; and • 190 Nash Road, Bunyip (Lot 4 PS531528) with an area of 2.09ha
EAST	Abuts a 2.14ha GWAZ2 lot subject to the ESO1 and LSIO being 148C Nash Road, Bunyip (Lot 4 PS813045) and a large municipal nature reserve (PPRZ) of 49.69ha being Lot 3 PS522435
SOUTH	Abuts two GWAZ2 lots subject to the ESO1: • 146 Nash Road, Bunyip (Lot 1 PS813045) with an area of 1.96ha • 154 Nash Road, Bunyip (Lot 3 LP141493) with an area of 1.42ha
WEST	Abuts a 13.99ha GWZ1 lot being 165 Nash Road, Bunyip (Lot 3 TP232261) which is subject to both the ESO1 and LSIO
MAPS	 *AERIAL IMAGE OF SUBJECT SITE & IMMEDIATE SURROUNDS (LASSI, 2024)*  *ZONING CONTROLS - SUBJECT SITE & WIDER CONTEXT (VICPLAN, 2024)*

4. THE PROPOSAL

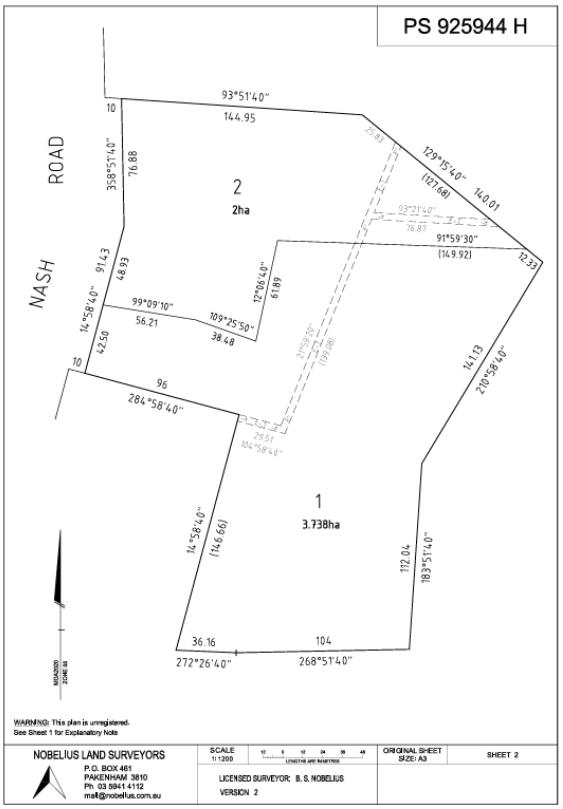
Council approval is sought to subdivide the land into two (2) lots.

- Pursuant to Clause 35.05-3 (Green Wedge A Zone), a permit is required to subdivide land. The schedule to the zone requires a minimum lot size of 2ha.
- Pursuant to Clause 42.01 (Environmental Significance Overlay), a permit is required to subdivide land.
- Pursuant to Clause 44.04 (Land Subject to Inundation Overlay), a permit is required to subdivide land.

LOT PARTICULARS

The proposed lots both achieve frontage to Nash Road and are irregularly shaped in response to the existing conditions. An extract of the concept plan & proposed Plan of Subdivision PS925944H are provided below:

PROPOSED DEVELOPMENT PLAN



PROPOSED PLAN OF SUBDIVISION PS925944H

The proposed lot particulars are detailed below:

LOT NO.	AREA	CONTAINS	ACCESS
1	3.738ha	Existing dwelling, existing septic system and absorption lines, shed and equestrian arena. Proposed Lot 2 will	Via the existing driveway and crossover from Nash Road to the west.

		retain a small section of creek frontage to the north-east of the lot.	
2	2ha	Vacant, will contain the majority of the creek frontage.	Via the existing crossover from Nash Road to the west and using the road reserve to ensure no common property is required.

ENVIRONMENTAL CONSIDERATIONS

LAND CAPABILITY

A Land Capability Assessment (LCA) has been undertaken to inform the suitability of proposed Lot 2 for a potential dwelling in the future (noting that a dwelling is a section 2 use and will require Council approval). The LCA demonstrates that the site can treat and retain all domestic wastewater in accordance with EPA requirements.

A plumber has inspected the existing septic system on the land and confirmed it is in good working order. A copy of the Grants Plumbing report is provided as part of this submission. The concept plan has shown the location of the existing septic system and confirms that it will be entirely contained within proposed Lot 1.

STORMWATER & OVERLAND FLOWS

A Stormwater Management Strategy (SWMS) has been prepared by DPM Consulting in support of the proposed subdivision and delineates the site's internal and external drainage catchments, identifies the flood mitigation measures that need to be put in place, and recognises the key drainage infrastructure required to help meet these objectives. The viability of stormwater quality treatment to meet BPEM objectives has been investigated, and the SWMS provides a stormwater strategy for peak flows generated by a 20% Annual Exceedance Probability (AEP) event and 1% AEP event, the safe conveyance of peak flows downstream to Tea Tree Creek, along with opportunities to optimise the outcomes of the water cycle, conserve water and protect the environment.

Any future dwelling on proposed Lot 2 will need to be set to a level at least 600mm above the maximum flood level for a 1% AEP event, requiring a FFL of 51.5m to AHD.

Attenuation of the post-development peak flows (0.485m3/s) to pre-developed conditions is proposed to be achieved in the future by provision of a 2.5kl rainwater tank for Lot 2.

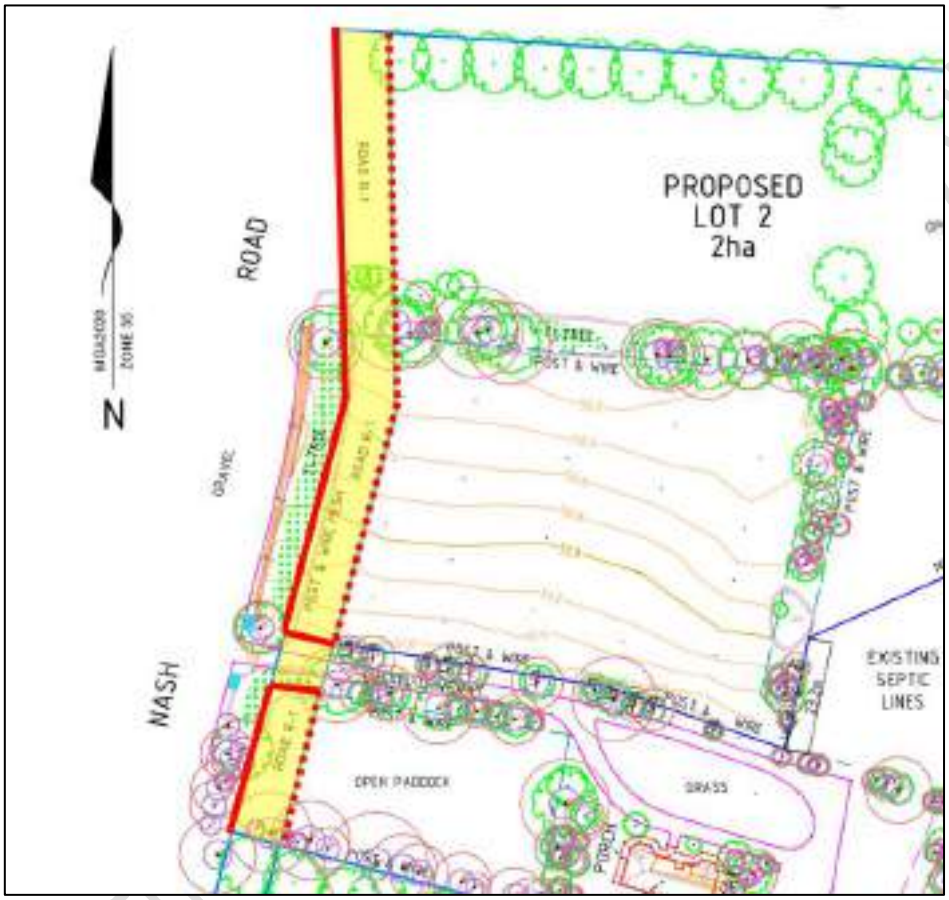
VEGETATION

The vegetation controls of the ESO1 applies. The tiered avoid, minimise and offset requirements of *The Guidelines* must be employed when contemplating the removal of native vegetation on this site as per **Clause 52.17 Native vegetation**. No permit is sought under 52.17 or the ESO1.

All trees on and adjoining the site proximate to the proposed subdivision have been assessed by an arborist early in the design process. Native vegetation (being vegetation indigenous to Victoria) and

vegetation assigned high arboricultural value by the arborist have been prioritised for retention within the proposed subdivision layout. The TPZ and SRZ details and setbacks of any vegetation along the proposed common boundary have been detailed on the Development Plan.

It is proposed that the common boundary between the Road R-1 and the subject site remains unfenced to prevent any consequential loss of vegetation. No changes are proposed to the existing post and wire fence along the Nash Road interface. The image below shows the Road R-1 area (yellow), existing post and wire fence (solid red line) and proposed boundary to remain unfenced (dashed red line):



FENCING OF ROAD R-1 AREA AND VEGETATION (NLS, SEPTEMBER 2024)

TOPOGRAPHY

Topographically, the land is relatively low lying with gradual fall from the south to the north of the site and we anticipate that this will be addressed by adhering to the fill level required by Melbourne Water.

CULTURAL HERITAGE

Part of the subject site is mapped within a 200m buffer associated with a named waterway (Tea Tree Creek) and as such, is considered an area of potential cultural heritage significance:

AREA OF POTENTIAL CULTURAL HERITAGE SIGNIFICANCE (VICPLAN, 2024)

Significant land use change or high impact activities may trigger the requirement for a Cultural Heritage Management Plan (CHMP) to be prepared under the Aboriginal Heritage Regulations 2018. The proposed two lot subdivision is not a high impact activity or significant land use change and no CHMP is required.

BUSHFIRE RISK

The entirety of the subject site is mapped within a designated Bushfire Prone Area. Further information on how the proposal has considered the implications of being mapped within a designated bushfire prone area has been provided in the response to clause 13.02 Bushfire Planning in subsection 7 of this report.

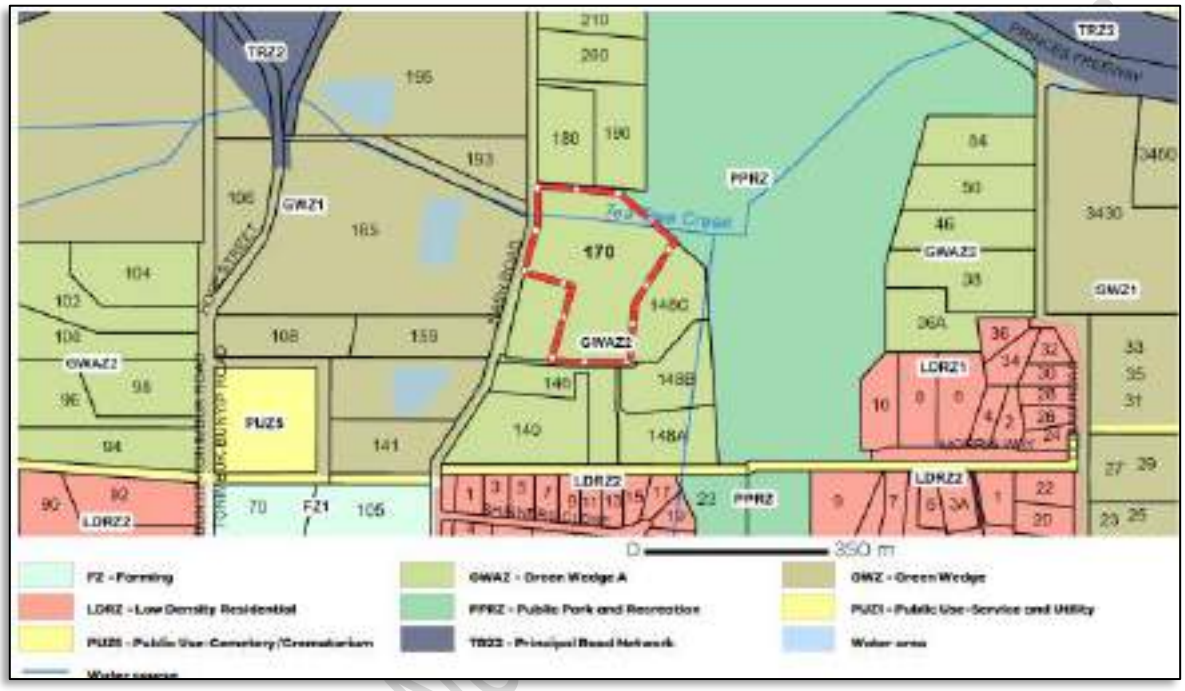
DESIGNATED BUSHFIRE PRONE AREAS (VICPLAN, 2024)

5. RELEVANT PLANNING CONTROLS

The following section addresses the objectives and requirements of the zoning and overlay controls relevant to the subject site identifying how these planning controls relate to the proposal, trigger an assessment and how we have addressed the requirements of planning provisions.

CLAUSE 35.05 GREEN WEDGE A ZONE

The site is mapped within the Green Wedge A Zone – Schedule 2 :



ZONING MAP (VICPLAN)

PURPOSE

Clause 35.05 Green Wedge A Zone seeks:

- *To implement the Municipal Planning Strategy and the Planning Policy Framework.*
- *To provide for the use of land for agriculture.*
- *To protect, conserve and enhance the biodiversity, natural resources, scenic landscapes and heritage values of the area.*
- *To ensure that use and development promotes sustainable land management practices and infrastructure provision.*
- *To protect, conserve and enhance the cultural heritage significance and the character of rural and scenic non-urban landscapes.*
- *To recognise and protect the amenity of existing rural living areas.*

PERMIT REQUIREMENT

A permit is required to subdivide land pursuant to Clause 35.05-3 Subdivision. The minimum subdivision area specified in the schedule to the zone is 2ha.

DECISION GUIDELINES

For this application to subdivide land, the responsible authority is required to consider the following decision guidelines of the GWAZ, as appropriate and in addition with the decision guidelines of Clause 65:

General

- *The Municipal Planning Strategy and the Planning Policy Framework.*
- *Any Regional Catchment Strategy and associated plan applying to the land.*
- *The capability of the land to accommodate the proposed use or development, addressing site quality attributes including soil types, soil fertility, soil structure, soil permeability, aspect, contour and drainage patterns.*
- *How the use or development relates to agricultural land use, rural diversification and natural resource management.*
- *Whether the site is suitable for the use or development and whether the proposal will have an adverse impact on surrounding land uses.*
- *The need to protect the amenity of existing residents.*
- *The need to minimise adverse impacts on the character and appearance of the area or features of architectural, scientific or cultural heritage significance, or of natural scenic beauty or importance.*

Assessment of proposal against general decision guidelines

The proposal is consistent with the Municipal Planning Strategy and the Planning Policy Framework. Detailed site investigations have informed the proposal, including a Land Capability Assessment, Arborist Assessment and Stormwater Management Strategy. The proposed subdivision does not adversely impact on the existing use of the land for equine purposes, surrounding land uses, or the amenity of existing residents. The proposed subdivision will not adversely impact the character of the Nash Road green wedge precinct, or the environmental values associated with vegetation within the road reserve, the adjoining municipal nature reserve, or the tea tree creek environ.

Rural Issues

- *The maintenance of agricultural production and the impact on the local rural economy.*
- *The need to prepare an integrated land management plan.*
- *The impact on the existing and proposed rural infrastructure.*
- *The potential for the future expansion of the use or development and the impact of this on adjoining and nearby agricultural and other land uses.*
- *Protection and retention of land for future sustainable agricultural activities.*

Assessment of proposal against rural issues decision guidelines

The GWAZ requires a minimum lot size of 2ha which is highly suggestive that lifestyle/small-scale agriculture is preferred/anticipated for this area, and the proposed subdivision is consistent with this. The contiguous lots are all small lifestyle lots and any future consolidation to increase the agricultural capacity of the subject site is unlikely. The existing use of the land for equine purposes is unchanged by the proposal. All equine infrastructure (horse yard, shed, shelters) are retained on Lot 2.

Environmental Issues

- *The impact of the use or development on the flora and fauna on the site and its surrounds.*

- *An assessment of the likely environmental impact on the natural physical features and resources of the area and in particular any impact caused by the proposal on soil and water quality and by the emission of effluent, noise, dust and odours.*
- *The need to protect and enhance the biodiversity of the area, including the retention of vegetation and fauna habitat and the revegetation of land including riparian buffers along waterways, gullies, ridge lines, property boundaries and saline recharge and discharge areas.*
- *How the use or development relates to sustainable land management and the need to prepare a sustainable land management plan.*
- *The location of on-site effluent disposal areas to minimise impact of nutrient loads on waterways and native vegetation.*

Assessment of proposal against environmental decision guidelines

The proposed subdivision has been informed by detailed site investigations, including a Land Capability Assessment, Arborist Assessment and Stormwater Management Strategy. When having regard for native vegetation on and adjoining the site, the avoid, minimise and offset approach has been employed and high value and/or indigenous vegetation has been prioritised for retention within the subdivision layout. The SWMS adequately addresses all drainage considerations and measures to ensure the protection of the Tea Tree Creek environment and water quality. The LCA confirms proposed Lot 1 can treat and retain all domestic wastewater on site and satisfy the relevant EPA requirements should a dwelling be proposed in the future. These site investigations ensure that the proposal and any future land use of either lot will not impede the orderly and proper planning of the area.

Design and siting issues

- *The need to minimise adverse impacts of the siting, design, height, bulk, colours and materials to be used on major roads, landscape features or vistas.*
- *The location and design of existing and proposed infrastructure services including gas, water, drainage, telecommunications and sewerage facilities which minimise the visual impact on the landscape.*

Assessment of proposal against the relevant design and siting issues

The proposed subdivision layout has considered the location of the existing effluent area and the land capability of proposed Lot 2. The proposed accessway to each lot represents an appropriate planning outcome when having regard for the retention of native vegetation and the utilisation of the Road R-1 easement to avoid biodiversity impacts associated with creating new access from Nash Road.

It is submitted that the proposal has adequately addressed the relevant considerations and requirements of the Green Wedge A Zone – Schedule 2.

CLAUSE 42.01 ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 1

The land is subject to Clause 42.01 Environmental Significance Overlay – Schedule 1:

ENVIRONMENTAL SIGNIFICANCE OVERLAY – SCHEDULE 1 (VICPLAN)

PURPOSE

The Environmental Significance Overlay seeks:

- *To implement the Municipal Planning Strategy and the Planning Policy Framework.*
- *To identify areas where the development of land may be affected by environmental constraints.*
- *To ensure that development is compatible with identified environmental values.*

ENVIRONMENTAL SIGNIFICANCE AND OBJECTIVES

Schedule 1 to Clause 42.01 applies to the *Northern Hills* and contains the following:

Statement of environmental significance

The hills to the northern part of the municipality (generally to the north of the Princes Highway) is an area with significant landscape and environmental values. The area is characterised by a geology of Devonian Granitic and Sulrian Sediment origin, moderate to steep slopes, and areas of remnant vegetation. These characteristics contribute to environmental values including landscape quality, water quality, and habitat of botanical and zoological significance. These characteristics are also a significant factor in terms of environmental hazards including erosion and fire risk.

The vegetation supports the ecological processes and biodiversity of this area by forming core habitat areas within a complex network of biolink wildlife corridors. Sites containing threatened flora and fauna are defined as being of botanical and zoological significance. Development within and around these sites need to be appropriately managed to ensure the long term protection, enhancement and sustainability of these ecological processes and the maintenance of biodiversity.

Environmental objectives to be achieved

- *To protect and enhance the significant environmental and landscape values in the northern hills area including the retention and enhancement of indigenous vegetation.*
- *To ensure that the siting and design of buildings and works does not adversely impact on environmental values including the diverse and interesting landscape, areas of remnant vegetation, hollow bearing trees, habitat of botanical and zoological significance and water quality and quantity.*
- *To ensure that the siting and design of buildings and works addresses environmental hazards including slope, erosion and fire risk, the protection of view lines and maintenance of vegetation as the predominant feature of the landscape.*
- *To protect and enhance biolinks across the landscape and ensure that vegetation is suitable for maintaining the health of species, communities and ecological processes, including the prevention of the incremental loss of vegetation.*

PERMIT REQUIREMENT

Pursuant to **Clause 42.01-2 Permit requirement,** a permit is required:

- to subdivide land.
- to remove, destroy or lop any vegetation, including dead vegetation unless the overlay or table at 42.01-3 specifically state otherwise, a NVPP under 52.16 applies, or a relevant exemption under 52.12 or 52.17 applies.

Pursuant to the application requirements specified in **Schedule 1 to Clause 42.01**, the details of all vegetation proposed to be removed, destroyed or lopped must be provided as part of the submission, including photographs, arboricultural assessment, location of hollow bearing trees, topographic information, steps taken to avoid and minimise vegetation removal, and whether the removal is required to create defendable space.

DECISION GUIDELINES

Pursuant to **Clause 42.01-5,** the responsible authority must consider the following decision guidelines, as appropriate and in addition to decision guidelines in Clause 65:

- *The Municipal Planning Strategy and Planning Policy Framework.*
- *The statement of environmental significance and the environmental objective contained in a schedule to this overlay.*
- *The need to remove, destroy or lop vegetation to create defendable space to reduce the risk of bushfire to life and property.*
- *Any other matters specified in a schedule to this overlay.*

Schedule 1 to Clause 42.01 also requires the responsible authority to consider, as appropriate:

- *Whether the removal of any vegetation has been avoided and/or minimised.*
- *The Land Capability Study for the Cardinia Shire (February 1997).*
- *The protection and enhancement of the natural environment and character of the area.*

- *The retention, protection and enhancement of remnant vegetation and habitat, and the need to plant vegetation along waterways, gullies, ridgelines and property boundaries.*
- *The impact of any buildings and works on areas of remnant vegetation, and habitat of botanical and zoological significance and threatened species.*
- *The impact of proposed buildings and works on the landscape character of the area, including prominent ridgelines and significant views.*
- *Whether the siting, height, scale, materials, colours and form of the proposed buildings and works have been designed to have the least visual impact on the environment and landscape.*
- *The availability of other alternative sites, alternative building designs or alternative construction practices for the proposed buildings and works that minimise cut and fill and would better meet the environmental objectives of this schedule, having regard to the size and topography of the land, retention of vegetation and the form and nature of the proposed buildings and works.*
- *Measures to address environmental and hazards or constraints including slope, erosion, drainage, salinity and fire.*
- *The protection of waterways and water quality through the appropriate management of effluent disposal, erosion and sediment pollution.*

ASSESSMENT OF PROPOSAL AGAINST THE ESO1 'NORTHERN HILLS':

The proposal is consistent with the objectives of the ESO, and the statement of environmental significance and environmental objectives for the Northern Hills area, as per Schedule 1 to Clause 42.01. A SWMS has been prepared in support of the application to address the sites low lying nature and the relevant drainage considerations and confirms there will be no adverse impacts to water quality and quantity within Tree Tree Creek. The proposed building is not foreseen to detrimentally impact on views to the site or the wider landscape of northern Bunyip. The subject site is not located within a designated area of botanical or zoological significance as per Map 1. An arboricultural assessment of the vegetation on and adjoining the subject land was undertaken early in the design process to ensure that native and high value vegetation was identified and prioritised for retention within the proposed subdivision layout.

No trees are proposed to be removed under the ESO1. The setbacks of all trees along the proposed common boundary have been nominated on the development plans prepared by Nobelius Land Surveyors.

CLAUSE 44.04 LAND SUBJECT TO INUNDATION - SCHEDULE

Clause 44.04 Land Subject to Inundation Overlay – Schedule (LSIO) applies to the subject site and all surrounding land:

LAND SUBJECT TO INUNDATION OVERLAY (VICPLAN)

The LSIO seeks:

- *To implement the Municipal Planning Strategy and the Planning Policy Framework.*
- *To identify flood prone land in a riverine or coastal area affected by the 1 in 100 (1 per cent Annual Exceedance Probability) year flood or any other area determined by the floodplain management authority.*
- *To ensure that development maintains the free passage and temporary storage of floodwaters, minimises flood damage, responds to the flood hazard and local drainage conditions and will not cause any significant rise in flood level or flow velocity.*
- *To minimise the potential flood risk to life, health and safety associated with development.*
- *To reflect a declaration under Division 4 of Part 10 of the Water Act, 1989.*
- *To protect water quality and waterways as natural resources by managing urban stormwater, protecting water supply catchment areas, and managing saline discharges to minimise the risks to the environmental quality of water and groundwater.*
- *To ensure that development maintains or improves river, marine, coastal and wetland health, waterway protection and floodplain health.*

LAND SUBJECT TO INUNDATION OBJECTIVES AND STATEMENT OF RISK
The schedule is silent as to any specific objectives or statement of risk.

PERMIT REQUIREMENT
Pursuant to Cl**ause 44.04-2 Subdivision**, a permit is required to subdivide land.

DECISION GUIDELINES
Pursuant to Clause 44.04-8, the responsible authority must consider the following decision guidelines, as appropriate and in addition to the decision guidelines of Clause 65:

- *The Municipal Planning Strategy and the Planning Policy Framework.*

- *Any local floodplain development plan.*
- *Any comments from the relevant floodplain management authority.*
- *The existing use and development of the land.*
- *Whether the proposed use or development could be located on flood-free land or land with lesser flood hazard outside this overlay.*
- *Alternative design of flood proofing responses.*
- *The susceptibility of the development to flood and flood damage.*
- *The potential flood risk to life, health and safety associated with the development. Flood risk factors to consider include:*
    - *The frequency, duration, extent, depth and velocity of flooding of the site and accessway.*
    - *The flood warning time available.*
    - *Tidal patterns.*
    - *Coastal inundation and erosion.*
    - *The danger to the occupants of the development, other floodplain residents and emergency personnel if the site or accessway is flooded.*
- *The effect of the development on redirecting or obstructing floodwater, stormwater or drainage water and the effect of the development on reducing flood storage and increasing flood levels and flow velocities.*
- *The effect of the development on river, marine and coastal health values including wetlands, natural habitat, stream stability, erosion, environmental flows, water quality, estuaries and sites of scientific significance.*
- *Any other matters specified in a schedule to this overlay.*

No additional decision guidelines are contained in the schedule to Clause 44.04.

ASSESSMENT OF PROPOSAL AGAINST THE LSIO – SCHEDULE

A Stormwater Management Strategy (SWMS) has been prepared by DPM Consulting in support of the proposed subdivision and delineates the site's internal and external drainage catchments, identifies the flood mitigation measures that need to be put in place, and recognises the key drainage infrastructure required to help meet these objectives. The viability of stormwater quality treatment to meet BPEM objectives has been investigated, and the SWMS provides a stormwater strategy for peak flows generated by a 20% Annual Exceedance Probability (AEP) event and 1% AEP event, the safe conveyance of peak flows downstream to Tea Tree Creek, along with opportunities to optimise the outcomes of the water cycle, conserve water and protect the environment.

Any future dwelling on proposed Lot 2 will need to be set to a level at least 600mm above the maximum flood level for a 1% AEP event, requiring a FFL of 51.5m to AHD. Please refer to the SWMP (DPM Consulting, Jul 2024) for further clarification on how the proposed subdivision addresses the requirements of the LSIO.

6. MUNICIPAL PLANNING STRATEGY

CLAUSE 21.01-2 KEY INFLUENCES AND 21.01-3 KEY ISSUES

The Cardinia Shire seeks to be recognised as a unique place of environmental significance where our quality of life and sense of community is balanced by sustainable and sensitive development, population and economic growth. The proposal is sensitive to the key issues facing Cardinia as listed at **Clause 21.01-3**, particularly those that have regard for the environment and settlement and housing. The relevant key issues are listed below:

Environment

- The protection of environmentally significant areas including the northern hills and Western Port coast.
- The protection and management of biodiversity.
- The maintenance and enhancement of existing significant landscapes.
- The protection of life and property in terms of flooding and bushfire.
- The protection and enhancement of areas and places of heritage significance.

Settlement and Housing

- The management of urban growth including urban pressures on the rural hinterland and the Western Port Green Wedge.
- The provision of appropriate rural residential and rural living development.

The proposal does not contravene the strategic vision for Cardinia, as per **Clause 21.01-4:**

'Cardinia Shire will be developed in a planned manner to enable present and future generations to live healthy and productive lives and to enjoy the richness of the diverse and distinctive characteristics of the Shire.'

The subject land is located within a strategic agricultural area with environmental or landscape values in the Cardinia Shire Strategic Framework Plan at **Clause 21.01-5**. The proposal is consistent with this strategic land use and development vision for the area containing the subject site. Detailed site investigations have informed the proposed subdivision layout to ensure that the environmental and landscape qualities have been appropriately responded to within the design. The land will continue to be used for small-scale agriculture.

CARDINIA STRATEGIC FRAMEWORK PLAN CL 21.01-5

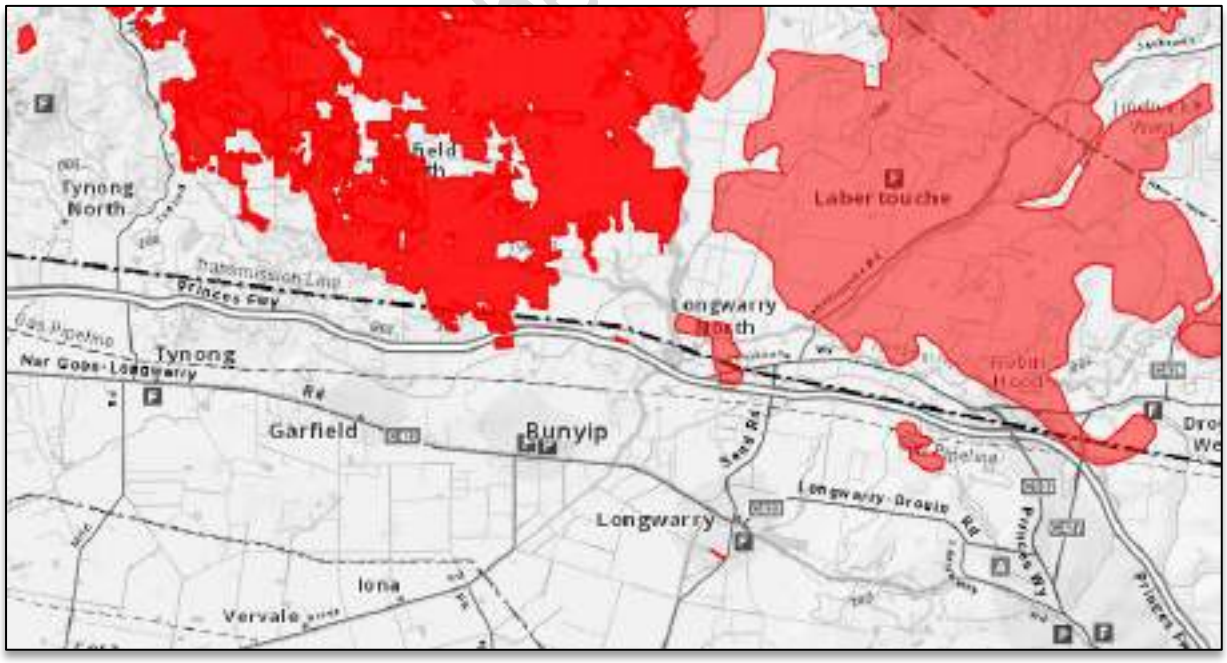
CLAUSE 21.02 ENVIRONMENT

Clause 21.02 Environment describes planning's role in protecting, improving and managing the Shire's environment, natural resources and biodiversity, as well as ensuring risks to life, property and the environment are minimised.

The subject land has frontage to Tea Tree Creek, and the objectives contained at **Clause 21.02-1 Catchment and coastal management** that have regard for the protection and management of water resources are relevant to this proposal. The proposed subdivision appropriately responds to the relevant drainage and waterway protection and management considerations and the implementation of the SWMS (DPM, Jul 2024) will negate potential for any adverse impacts to the operation or health of the waterway system.

The proposal is consistent with **Clause 21.02-2 Landscape** and **Clause 21.02-3 Biodiversity** which both seek to avoid the erosion of the existing biodiversity of the Shire and its significant contribution to the landscape. The subject site features established vegetation, much of which is indigenous to Victoria, and the proposed subdivision layout has sought to minimise the extent of vegetation required to be removed to facilitate the proposal.

Clause 21.02-3 Bushfire Management acknowledges the high risk associated with some of the areas within the shire. Bunyip has modest slope with vegetation coverage akin to grazed paddocks (AS3959-2018) as opposed to the more steeply sloped and densely vegetated areas associated with the Bunyip State Reserve to the north of the Princess Freeway, which has experienced fire damage as a result of the 2009 and 2019 fires (refer below). Locating residential development in existing low risk areas such as Bunyip township meets the primary objective of all planning provisions that seek to mitigate bushfire risk.



BUNYIP HAS TOPOGRAPHIC AND VEGETATION CHARACTERISTICS THAT MAKE IT A LOW RISK AREA AS EVIDENCED BY THE VICTORIAN FIRE RISK MAPPING ABOVE, 2022.

CLAUSE 21.03 SETTLEMENT AND HOUSING

Clause 21.03 Settlement and Housing and more specifically **Clause 21.03-4 Rural Townships** nominates Bunyip as a large rural township, in which the following key issues are relevant:

- *Retaining and enhancing the existing rural township character.*
- *Acknowledging that the capacity for growth varies depending on the environmental and infrastructure capacities of each of the towns.*
- *Designing with regard to the surrounding unique characteristics of the townships.*

The subject land and surrounding green wedge area north of the Bunyip township boundary are outside of the land use and development guidelines provided by the *Bunyip Township Strategy*. The proposed subdivision will integrate with the surrounding subdivision pattern and land use and development typologies. A Land Capability Assessment confirms the subject site has capacity to support an additional onsite wastewater treatment system should approval be sought to use the land for a dwelling in the future. A Stormwater Management Strategy is provided in support of the proposed subdivision and addresses any potential environmental impacts associated with the proposal. The subdivision layout has prioritised the retention of vegetation.

CLAUSE 21.08 LOCAL AREAS - WESTERN PORT REGION

Clause 21.08-2 Bunyip seeks to ensures use and development proposals in Bunyip are generally consistent with the requirements of the *Bunyip Township Strategy, September 2009.* The subject site is located outside of the Township Strategy area and excluded from the Bunyip Strategic Framework Plan at **Clause 21.08-2**.

7. STATE AND LOCAL PLANNING POLICY FRAMEWORK

This part of the report assesses and responds to the legislative and policy requirements for the project outlined in the Cardinia Planning Scheme and in accordance with the Planning and Environment Act 1897. The relevant clauses of the State & Local Planning Policy Framework for subdivisions of the type presented in this report are largely contained in Clauses 11, 12, 13, 14, 15 and 19.

An assessment against the relevant clauses of the Cardinia Planning Scheme has been provided below:

CLAUSE 11 SETTLEMENT

Clause 11.01-1S Settlement, and **11.01-1R Settlement – Metropolitan Melbourne** have regard for the sustainable growth and development of Victoria and the maintenance of a permanent urban growth boundary around Melbourne, and the proposal is supported by the many strategies outlined within these clauses. Of particular relevance are the objective and strategies of **Clause 11.01-1R Green Wedges – Metropolitan Melbourne** which seeks *to protect the green wedges of Metropolitan Melbourne from inappropriate development*. The proposal responds to the key features of the site, wider environmental and landscape values, and the vision for land use and development within the *The Railway Precinct* (Precinct 3) as described in the Cardinia Western Port Green Wedge Management Plan.

CLAUSE 12 ENVIRONMENTAL AND LANDSCAPE VALUES

Clause 12.01 Biodiversity, and **Clause 12.01-1S Protection of biodiversity** have the objective of protecting and enhancing the State's biodiversity and this proposal will not result in any cumulative impacts to important areas of biodiversity or the fragmentation of habitat. The proposed subdivision design has prioritised the retention of native vegetation which is consistent with **Clause 12.01-2S Native vegetation management** and the objective to *ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation.* **Clause 12.05-2S Landscapes** seeks *to protect and enhance significant landscapes and open spaces that contribute to character, identity and sustainable environments.* The proposal aligns with the strategies contained within this clause, particularly the need to *ensure development does not detract from the natural qualities of significant landscape areas* and *ensure important natural features are protected and enhanced.*

CLAUSE 13 ENVIRONMENTAL RISKS AND AMENITY

Clause 13.01-1S Natural hazards and climate change seeks to prioritise risk-based planning to minimise the potential for impacts and natural hazards associated with climate change. The strategy to focus growth and development to low-risk locations is relevant to this proposal which seeks to subdivide land into two lots in a green wedge modified landscape where risks associated with bushfire and flood can be mitigated The subject site is prone to inundation from Tea Tree Creek and pre-development advice has been obtained from Melbourne Water with the applicable flood level, fill pad requirements and FFL for any future dwelling.

Clause 13.02-1S Bushfire Planning relates to land within a designated bushfire prone area, subject to the Bushfire Management Overlay; and/or proposed to be used or developed in a way that may create a bushfire hazard. The subject land is contained entirely within a designated bushfire prone area but is not subject to the intensified bushfire risk associated with the Bushfire Management Overlay. The objective of **Clause 13.02-1S** is *to strengthen the resilience of settlements and communities to bushfire through risk based planning that prioritises the protection of human life* and is achieved through strategies that prioritise 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* with low risk locations being those that area assessed as having a radiant heat flux of less than 12.5 kilowatts/square metre under AS3959-2018 (Construction of Buildings in Bushfire Prone Areas – Standards Australia, 2020); and reducing community vulnerability to bushfire through the consideration of bushfire risk at all stages of the planning process. An assessment of the landscape conditions within 20 kilometres of the site; the local conditions within 1 kilometre of the site; the neighbourhood conditions within 400 metres of the site; and the subject site itself have been considered:

LANDSCAPE CONDITIONS – 20KM RADIUS

The area within a 20km radius of the site features a combination of landscapes consisting of cleared farming and grazing; rural/urban development, urban development and densely forested areas. To the north are the foothills associated with the Dandenong Ranges which exhibit extensive pockets of dense vegetation consistent with the Forest and Woodland classifications of *AS3959-2018 Construction of Buildings in bushfire-prone areas* and steep topography.

The site is surrounded by a patchwork of farming and grazing land interspersed with rural development to the east, south and west. The surrounding road network features principal transport corridors including Princes Freeway (having a west to east orientation), Nar Nar Goon-Longwarry Road (East to west orientation), Bunyip-Modella Road (north to south orientation). The relevance of the road network is that they are most likely those roads that will become the main access points and thoroughfares during an emergency situation.

LOCAL CONDITIONS – 1KM RADIUS

The area within a 1km radius of the subject site features a combination of land use and development consistent with green wedge zone, low density and general residential zones. To the north land subject to the GWAZ2 is accessed via a local road network. Vegetation is generally native trees adjacent to boundaries and within road reserves with a distinct cleared area.

Vegetation is generally subject to the GWZ and the Princes Highway separating the subject site from the Bunyip State Park to the north, which is the direction generally associated with more intense fire conditions and risk. The land is generally employed for rural residential development in both a northerly and easterly direction with general residential zoned land further to the south. Bunyip features gentle topography that flattens out to the south.

NEIGHBOURHOOD CONDITIONS – 400M RADIUS	
Neighbourhood conditions within 400m of the site (please refer to the map below) – The subject site is surrounded by a myriad of various land uses and lot sizes and the Princes Highway corridor to the north. Land immediately to the northeast comprises a municipal asset nature reserve. Rural residential land use and development is observed on all other interfaces.	
Vegetation is contained to roadside reserves and properties and is consistent with modified woodland and excluded vegetation (as per AS3959:2018 Construction of buildings in Bushfire Prone Areas). Access to and from the site is via a crossover to Nash Road to the west.	
SITE CONDITIONS -	
Site conditions (Please refer to the Map right) – The site is relatively flat and the landscape has been modified for grazing, with perimeter vegetation along internal and common boundary fences. The Tea Tree Creek intersects the northern section of the site.	

Access for emergency services to the site, and egress options from the site are consistent with the standards **of Clause 53.02** and the strategies of **Clause 21.02-4 Bushfire management**. Nash Road provides north to south connectivity between the Bunyip township (south) to the Princes Highway (north). The proposed development implies an additional green wedge zoned lot in a location with interconnected road networks and a Low BAL area where the risk of bushfire can be mitigated.

CLAUSE 14 NATURAL RESOURCE MANAGEMENT

Clause 14 relates to planning's role in ensuring natural resource management supports environmental quality, sustainable development and the sustainable use of agricultural land. The subject land has

limited agricultural capacity due to the area of the lot and low potential for expansion and the Green Wedge Zoning more accurately reflects the environmental qualities of the site rather than the productivity of the site. The proposed subdivision is consistent with the objective and strategies of **Clause 14.01-1S Protection of agricultural land** which seeks *to protect the state's agricultural base by preserving productive farmland* and **Clause 14.01-1R Protection of agricultural land – Metropolitan Melbourne** which seeks to prevent any permanent loss of agricultural land in the State's green wedges and peri-urban areas.

The proposal is consistent with State policy relating to the protection and management of water under **Clause 14.02 Water**. The proposal aligns with the objectives and numerous strategies of **Clause 14.02-1S Catchment planning and management**, which seeks to *assist the protection and restoration of catchments, waterways, estuaries, bays, water bodies, groundwater, and the marine environment* and the SWMS prepared in support of this application ensures the proposed subdivision achieves and aligns with the objective and strategies of **Clause 14.02-2S Water quality**.

CLAUSE 15 BUILT ENVIRONMENT AND HERITAGE

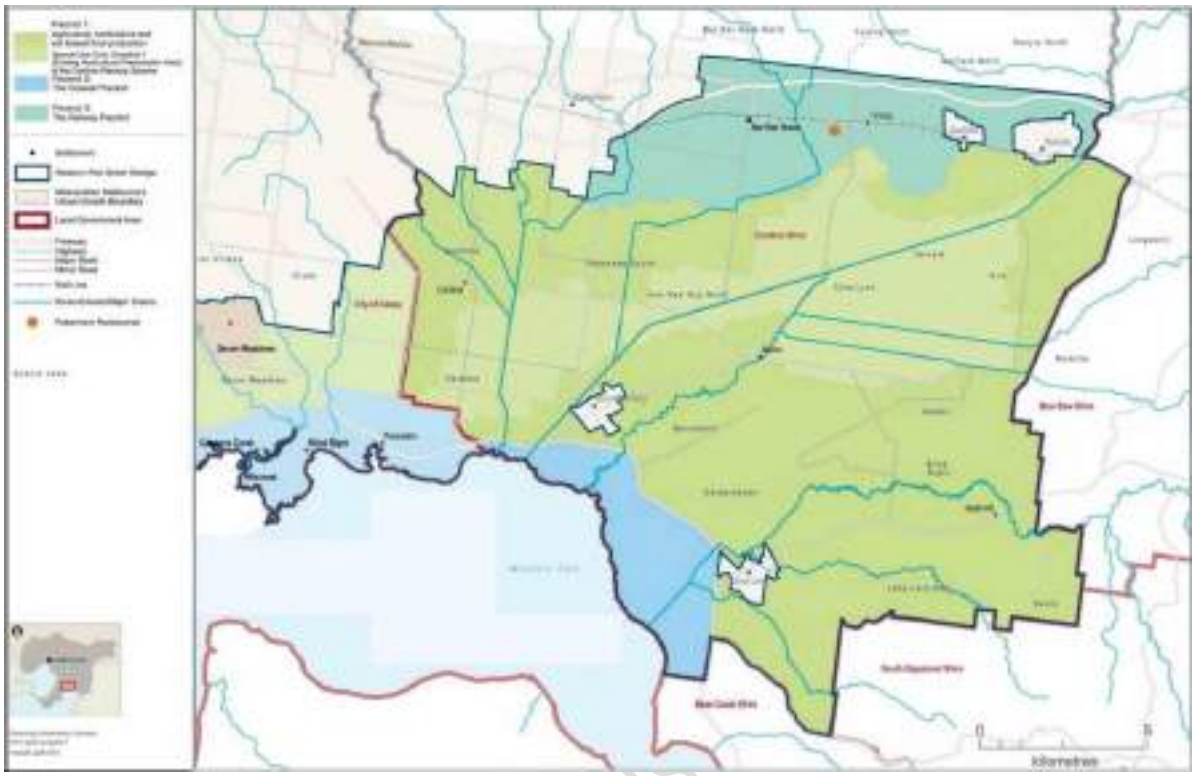
Clause 15 Built Environment and Heritage has the objective to ensure planning delivers high quality built form that is efficient, responds to surrounding character and the environment and associated risks, protects heritage, and provides the functionality required by the community. **Clause 15.01-3S Subdivision design** is relevant to this proposal and has the objective *to ensure the design of subdivisions achieves attractive, safe, accessible, diverse and sustainable neighbourhoods.* The proposed subdivision layout is complementary to and will integrate well with the existing subdivision pattern. A comprehensive site analysis has formed the basis for the proposed design, and the proposed built form is responsive to the key constraints and considerations of the site. The proposed vacant lot is not foreseen to result in any adverse impacts to surrounding land uses and development. **Clause 15.01-5S Neighbourhood character** has the objective to *recognise, support and protect neighbourhood character, cultural identity, and sense of place.* The proposal is consistent with the prevailing neighbourhood character and responds to its context and the features and characteristics of the local environment. **Clause 15.01-6S Design for rural areas** seeks *to ensure development respects valued areas of rural character*, and the proposed subdivision layout is not foreseen to adversely impact on rural character or landscapes.

CLAUSE 19 INFRASTRUCTURE

Clause 19 has regard for the provision of infrastructure. Of particularly relevance are Clauses 19.03-2S Infrastructure design and provision and Clause 19.03-3S Integrated water management which seek to provide timely, efficient and cost-effective development infrastructure that meets the community needs by integrating planning and engineering design of new subdivisions and development. Electricity and telecommunications will be provided to the boundary of the proposed new lot. In the absence of reticulated sewer, a Land Capability Assessment (LCA) has been prepared and confirms that the subject site can treat and retain all domestic wastewater on site.

CLAUSE 22.05 WESTERN PORT GREEN WEDGE POLICY

Clause 22.05 Western Port Green Wedge Policy applies to all land within the Cardinia Shire Council's portion of the Western Port Green Wedge as identified on Map 1 at **Clause 22.05-3**:



MAP 1 AT CLAUSE 22.05-3

The vision for the Cardinia Western Port Green Wedge is:

> *The Cardinia Western Port Green Wedge will be a permanent green and rural area. It will remain an internationally significant biodiversity habitat, while also strengthening its agricultural and horticultural role to become a truly innovative and productive farming district. Agriculture, horticulture and soil based food production for the long term food security of Victoria is at the heart of this vision.*
>
> *Best practice integrated water management will lead to improved water quality and a reduced risk of flooding with improved ecological conditions in Western Port Bay and local biodiversity will be protected, as well habitats for threatened species.*
>
> *The Green Wedge will be home to small, clearly defined settlements that have a strong identity, provide jobs and services for the local community and support the agricultural and horticultural pursuits of the green wedge.*
>
> *The local economy will be driven by its agriculture, horticulture and extractive industry. The Cardinia Western Port Green Wedge provides the opportunity to accommodate a further third airport to serve the long term needs of the South East Melbourne and Gippsland as identified in Plan Melbourne.*
>
> *The Cardinia Western Port Green Wedge will be the permanent edge to Melbourne's southeast.*

The proposal is consistent with the objectives and relevant policies for the Cardinia Western Port Green Wedge. The subject land forms part of *Precinct 3: The Railway Precinct* and the proposal aligns with the precinct vision and relevant future directions/ preferred land uses:

Precinct vision

The railway precinct will provide a sensitive transition from urban townships to green wedge land, assist in protecting land that is of agricultural, landscape, environmental and biodiversity significance and will continue to support the Pakenham Racing Club's Tynong Racecourse. This precinct will seek to ensure that UGBs are defensible in the long term and that there is a clear edge to metropolitan growth.

Any intensification of the development pattern of the townships that exist within the precinct, or expansion of their boundaries must be strategically justified and be proven to not detrimentally impact the surrounding Precinct 1 or the environmentally sensitive environment of the Cardinia Western Port Green Wedge.

Future directions/preferred land uses

Retain the rural character of the precinct.

- *Retain and protect the existing character and the unique identities of the railway towns.*
- *Allow only limited growth for all Green Wedge settlements, where supported by an adopted township strategy and/or policy.*
- *Any expansion of townships will be carefully considered for reasons related to the protection of built character and subdivision patterns, landscape character, servicing constraints, existing agricultural and intensive animal husbandry activities, flood risk, and environmental values.*
- *Protect the values and assets of the green wedge by preventing further encroachment of urban development into the Western Port Green Wedge.*
- *Encourage and support the use of the precinct for agriculture and biodiversity to ensure that land use is compatible with the adjacent Precinct 1.*

8. RELEVANT INCORPORATED DOCUMENTS

The relevant incorporated documents include:

- *Bunyip Township Strategy (2009)* - The subject site is located outside of the Bunyip Township Strategy area.
- The *Cardinia Western Port Green Wedge Management Plan* - Please refer to our response to Clause 22.05 for details on how the proposal responds to its location within the Cardinia Shire's portion of the Western Port Green Wedge.

9. PARTICULAR PROVISIONS

The relevant particular provisions/documents that will be addressed are identified below:

- Clause 51.02 Metropolitan Green Wedge Land: Core Planning Provisions
- Clause 52.17 Native Vegetation

CLAUSE 51.02 METROPOLITAN GREEN WEDGE LAND: CORE PLANNING PROVISIONS

Clause 51.02 Metropolitan Green Wedge Land: Core Planning Provisions is relevant to this application and seeks:

- *To protect metropolitan green wedge land from uses and development that would diminish its agricultural, environmental, cultural heritage, conservation, landscape, natural resource and recreation values.*
- *To protect productive agricultural land from incompatible uses and development.*
- *To ensure that the scale of use is compatible with the non-urban character of metropolitan green wedge land.*
- *To encourage the location of urban activities in urban areas.*
- *To provide transitional arrangements for permit applications made to the responsible authority before 19 May 2004.*
- *To provide deeming provisions for metropolitan green wedge land.*

The proposal is consistent with **Clause 51.02-3 Subdivision**, as the proposed lot sizes achieve the minimum area specified in the schedule to the zone.

CLAUSE 52.17 NATIVE VEGETATION

Clause 52.17 Native vegetation seeks:

- *To ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. This is achieved by applying the following three step approach in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (Department of Environment, Land, Water and Planning, 2017 (The Guidelines)):*
  1. *Avoid the removal, destruction or lopping of native vegetation.*
  2. *Minimise the impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.*
  3. *Provide an offset to compensate for the biodiversity impact if a permit is granted to remove, destroy or lop native vegetation.*
- *To manage the removal, destruction or lopping of native vegetation to minimise land and water degradation.*

Clause 52.17 Native vegetation applies to land with an area of and greater than 0.4ha and prescribes the requirement for a permit to remove, destroy or lop native vegetation, including dead native vegetation (where native vegetation is defined as vegetation indigenous to Victoria).

Pursuant to **Clause 52.17:**

- A permit is required to remove, destroy or lop native vegetation unless the removal is in accordance with an incorporated Native Vegetation Precinct Plan (NVPP) under **Clause 52.16** or an exemption tabled at **Clause 52.17-7** applies.
- A permit may also be required if the responsible authority considers that a proposed use or development is considered likely to involve or result in the consequential loss of native vegetation as a result of issuing a permit or approving a plan.

Under Clause 52.17, vegetation proposed for removal should be avoided, and where it cannot be avoided, should be the minimum extent necessary without undermining the objectives of the proposal. The loss of vegetation as a direct result of the proposal or consequentially lost by exemptions enabled by the proposal have been avoided. The siting of the proposed common boundary predominantly follows an existing internal post and wire fence where vegetation is setback more than 1m. Tree 58 (indigenous) is within 1m of the existing internal fence and the 'fences' exemption tabled at 52.17-7 already applies to this tree. The proposed common boundary that does not follow an existing fence line has been sited in a cleared area of the site.

No native vegetation removal is required to facilitate this proposal and no permit is sought under Clause 52.17.

The details of any indigenous vegetation along the proposed common boundary, permit/offset requirement and any relevant exemptions are tabled overpage (please read in conjunction with the Arboricultural Impact Assessment report):

VEGETATION ALONG PROPOSED COMMON BOUNDARY FENCE: DETAILS/PERMIT/OFFSET REQUIREMENT

Tree No.	Genus species, Common name	Origin	DBH (cm)	Value	**Remove / Retain**	**Permit Requirement**			
						ESO1	52.17	Exemption Applies	Offset Req'd
58	*Allocasuariana littoralis* - Black She-Oak	Indigenous	23.73	Med	**Retain**	☒	☒	'Fences'. The tree is currently located within 1m of an **existing** internal fence.	☐
62	*Eucalyptus cephalocarpa* - Silver-Leaved Stringybark	Indigenous	54	High	**Retain**	☒	☒		☐
64	*Eucalyptus ovata* - Swamp Gum	Indigenous	53	High	**Retain**	☒	☒		☐
68	*Eucalyptus ovata* - Swamp Gum	Indigenous	68	Med	**Retain**	☒	☒		☒
69	*Eucalyptus ovata* - Swamp Gum	Indigenous	71.06	High	**Retain**	☒	☒		☐
71	*Eucalyptus ovata* - Swamp Gum	Indigenous	14	Low	**Retain**	☒	☒		☐
75	*Eucalyptus viminalis* - Manna Gum	Indigenous	73	N/A	**Retain**	☒	☒		☐
78	*Eucalyptus ovata* - Swamp Gum	Indigenous	34	Med	**Retain**	☒	☒		☐
214	*Banksia integrifolia* - Coast Banksia	Indigenous	29	Med	**Retain**	☒	☒		☐
215	*Allocasuarina littoralis* - Black She-oak	Indigenous	34.66	Med	**Retain**	☒	☒		☐
239	*Eucalyptus camaldulensis* – River Red Gum	Indigenous	19	Low	**Retain**	☒	☒		☐
240	*Eucalyptus ovata* – Swamp Gum	Indigenous	31.3	Med	**Retain**	☒	☒		☐
242	*Eucalyptus ovata* – Swamp Gum	Indigenous	29.21	Low	**Retain**	☒	☒		☐
243	*Eucalyptus camaldulensis* – River Red Gum	Indigenous	17	Low	**Retain**	☒	☒		☐
244	*Eucalyptus ovata* – Swamp Gum	Indigenous	11	Low	**Retain**	☒	☒		☐
245	*Acacia melanoxylon* – Blackwood	Indigenous	8.6	Low	**Retain**	☒	☒		☐
251	*Acacia melanoxylon* - Blackwood	Indigenous	13.04	Low	**Retain**	☒	☒		☐
252	*Eucalyptus ovata* - Swamp Gum	Indigenous	32	Med	**Retain**	☒	☒		☐

10. GENERAL PROVISIONS

The relevant general provisions that will be addressed in this section are identified below:

- Clause 65 Decision Guidelines
- Clause 65.01 Approval of an Application or Plan
- Clause 65.02 Approval of an Application to Subdivide Land

CLAUSE 65 DECISION GUIDELINES

Clause 65 states that the Responsible Authority must decide whether the proposal will provide acceptable outcomes in terms of the decision guidelines of this Clause. The decision guidelines of **Clause 65.01** relate to the approval of an application or plan and those contained in **Clause 65.02** to the approval of an application to subdivide land. Both have been taken into account throughout the design process, and an assessment of the development against these guidelines identifies that the proposal is an acceptable planning outcome:

CLAUSE 65.01 APPROVAL OF AN APPLICATION OR PLAN	
DECISION GUIDELINES	**RESPONSE**
The matters set out in Section 60 of the Act.	The land is not identified as being contaminated. The site constraints and considerations of the land have been responded to throughout the design process.
Any significant effects the environment, including the contamination of the land, may have on the use or development.	
The Municipal Planning Strategy and the Planning Policy Framework.	The planning considerations have been adequately addressed within this report in sections 4-6.
The purpose of the zone, overlay or other provision.	
Any matter required to be considered in the zone, overlay or other provision.	
The orderly planning of the area.	
The effect on the environment, human health and amenity of the area.	The proposed development does not pose any foreseeable adverse impacts to the environment, human health or the amenity of the area. Any potential adverse impacts have been identified and responded to throughout the design process. Any approved removal of native vegetation will be offset to ensure no net loss to biodiversity.
The proximity of the land to any public land.	The proposed development does not adversely impact any public land within the vicinity of the site,

	including the municipal asset nature reserve to the north of the subject land.
Factors likely to cause or contribute to land degradation, salinity or reduce water quality.	No foreseeable factors that may cause or contribute to land degradation, salinity or reduced water quality have been identified during the design process. A SWMS has been prepared in support of this application which responds to all drainage and water management and protection considerations.
Whether the proposed development is designed to maintain or improve the quality of stormwater within and exiting the site.	The SWMS has appropriately addressed stormwater detention and confirms attenuation can achieve pre-development flows.
The extent and character of native vegetation and the likelihood of it's destruction.	Native vegetation on and adjoining the site has been assessed by a AQF 5 qualified arborist. The avoid, minimise and offset approach has been employed, as per Clause 52.17. All efforts have been made to ensure that any removal of native vegetation is the minimum extent required without undermining the objective of the proposal.
Whether native vegetation is to be or can be protected, planted or allowed to regenerate.	
The degree of flood, erosion or fire hazard associated with the location of the land and the use, development or management of the land so as to minimise any such hazard.	Pre-development advice has been obtained from Melbourne Water and has informed the SWMS and proposed subdivision. The proposal is not foreseen to contribute to any erosion hazards. The risk of fire can be mitigated to an acceptable level and any future dwelling on proposed Lot 2 will be required to be constructed to the relevant BAL rating.
The adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts.	Loading and unloading facilities are not relevant to this proposal.
The impact the use or development will have on the current and future development and operation of the transport system.	The proposed subdivision does not adversely impact on the current and future development and operation of the transport system.

CLAUSE 65.02 APPROVAL OF AN APPLICATION TO SUBDIVIDE LAND	
DECISION GUIDELINES	**RESPONSE**
The suitability of the land for subdivision.	The subject land provides an excellent opportunity to create an additional lot in a location where impacts to the environment, landscape and native vegetation can be avoided. The majority of adjoining lots cannot be further subdivided and have been improved for rural residential purposes thus making any consolidation with contingent lots to increase agricultural productivity unlikely.
The existing use and possible future development of the land and nearby land.	
The availability of subdivided land in the locality, and the need for the creation of further lots.	

	The proposed subdivision responds to increased demand for land in Bunyip and the Cardinia Shire.
The effect of development on the use or development of other land which has a common means of drainage.	A SWMS has been prepared in support of the proposed subdivision and addresses all relevant drainage and water management and protection measures. Attenuation of the post-developed peak flows (0.485m^3/s) to pre-developed conditions is proposed to be achieved by provision of a 2.5 kl rainwater tank for Lot 2 of the proposed development.
The subdivision pattern having regard to the physical characteristics of the land including existing vegetation.	The proposed subdivision layout has been informed by the existing conditions on the site, including native vegetation.
The density of the proposed development.	The proposed subdivision seeks to create two (2) lots.
The area and dimensions of each lot in the subdivision.	The proposed lot sizes and dimensions are appropriate for the Green Wedge A Zone and will integrate with the existing subdivision pattern.
The layout of roads having regard to their function and relationship to existing roads.	Not applicable.
The movement of pedestrians and vehicles throughout the subdivision and the ease of access to all lots.	The proposed subdivision layout facilitates the safe movement of pedestrians and vehicles.
The provision and location of reserves for public open space and other community facilities.	Not applicable.
The staging of the subdivision.	Not applicable.
The design and siting of buildings having regard to safety and the risk of spread of fire.	The proposal is not foreseen to create an unsafe environment or contribute to any increased risk of spread of fire.
The provision of off-street parking.	Both proposed lots can achieve on-site car parking.
The provision and location of common property.	Not applicable.
The functions of any owners corporation.	Not applicable.
The availability and provision of utility services, including water, sewerage, drainage, electricity, and where the subdivision is not a residential subdivision, gas.	The land can connect to some reticulated services including electricity and telecommunications. Rain water tanks and on-site waste water management systems are proposed. Please refer to the SWMS for further information on the proposed drainage solutions.
If the land is not sewered, and no provision has been made for the land to be sewered, the capacity of the land to treat and retain all sewage and sullage within the boundaries of each lot.	A Land Capability Assessment confirms proposed Lot 2 can treat and retain all domestic wastewater on site should a dwelling be proposed in the future. The existing septic system associated with the existing

	dwelling on the land will be entirely contained within the proposed lot boundary.
Whether, in relation to subdivision plans, native vegetation can be protected through subdivision and siting of open space areas.	No native vegetation is proposed to be removed as part of the subdivision.
The impact the development will have on current and future development and operation of the transport system.	The proposed subdivision will not have any impact on the current and future development and operation of the transport system.

11. CONCLUSION

This town planning report has sought to demonstrate that the proposal is an appropriate planning outcome that helps to give effect to the Municipal Planning Strategy, State and Local Planning Policy Framework and the relevant policies, objectives and strategies of the Cardinia Planning Scheme.

The proposal is appropriate for the Green Wedge A Zone and creates two lots that achieve the minimum lot size required by the zone and will integrate within the existing subdivision pattern in this northern area of Bunyip.

Detailed site investigations have informed the proposed subdivision layout and ensured all relevant land capability, environmental and landscape considerations have been addressed. The proposal is consistent with the planning controls that apply to this site which require the prioritisation of the retention of native vegetation within the proposed subdivision layout and assurance that all feasible opportunities to minimise and avoid impacts to native vegetation have been implemented.

As such, we ask that Council look favourably upon this application.

Report

#62

Grants Plumbing and Drainage Solutions Pty Ltd

365 Seven Mile Road

Nar Nar Goon Victoria 3812

Australia

ABN: 711 6599 5906

Phone: 0437 567 757

Email: tom@grantsplumbing.com.au

Client: Nobelius Land Surveyors

Completed: 20 Feb 2024

Completed by: [redacted]

Job: 170 Nash Rd, Bunyip VIC 3815, Australia

Site Address: 170 Nash Rd
Bunyip VIC 3815
Australia

Copy of Septic Report

System Type

Primary septic with absorption field

Current septic tank

IMG_3189.jpeg

Download File

Current Absorption trench field

IMG_3196.jpeg

Download File

IMG_3195.jpeg

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IMG_3194.jpeg

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IMG_3191.jpeg

Download File

Current sub surface irrigation field

Is the system currently being used

Yes

Is the system operating Correctly

Yes

Is the septic tank in working order

Yes

Additional notes

After further investigation and conversation with the client, we've established the septic system is in complete working order and has had no issues at all in the past. All trenches and pits are clear and all performing correctly. We would however recommend the renewal of the aggregate to optimise the trenches performance due to silt entering current trenches.

[redacted]

Date of report

20th Feb 2024

Time of report

9:30am

HardCore Geotech

Geotechnical Consultancy, Soil testing, Land Capability Assessments

ABN: 47721649405

P.O. Box 32 TYNONG Victoria 3813
Telephone/Fax: (03) 5608-0044 Mobile: 0438-344-645

LAND CAPABILITY ASSESSMENT

Client: [redacted] C/o Nobelius Land Surveyors

Project: No. 170 Nash Road, BUNYIP

Date: 23rd February 2024, revised 4th February, 2025.

Report Number: 240236.1 – LCA

Executive Summary

The proposed development at No. 170 Nash Road, BUNYIP is suitable for on-site effluent disposal.

The site is located in the Cardinia Shire.

The site is covered in natural grasses and has a very gentle slope to the north-west. There are trees across the site ranging in height from small to large, and the recommended Land Application Area (LAA) is open with grass cover. The site contains an existing single storey brick veneer house with four (4) bedrooms, gardens, crushed rock, sheds, and natural grasses. It is proposed that the land will be subdivided into 2 lots, adding another lot to the north side boundary.

The proposal for the new Lot, Lot 2, is that a dwelling with four (4) bedrooms will be constructed that will require an onsite wastewater system.

Testing at the site included soil profile logging and sampling and laboratory testing, and water and nutrient balance modeling. This analysis has revealed that on-site effluent is achievable and sustainable.

The effluent at the site will be treated to a minimum 20-30 standard via secondary treatment, a sand filter or AWTS, and distributed via a pressure compensated irrigation system.

The proposed development at the site will require a system and irrigation area to handle the following effluent loads, based on a water usage rate of 150 liters/person/day, and dependent on the number of bedrooms the dwelling's final design adopts. The site also has areas where the irrigation system can be increased. These loads are detailed in Table 1 below.

Number of bedrooms	Maximum occupancy (persons)	Total effluent load (Liters/day)	Total irrigation area required (m^2)
4	5	750	400
5	6	900	480
6	7	1050	560

Table 1: Total effluent loads and irrigation area required, based on the total number of bedrooms and maximum occupancy the final house design adopts.

Potential surface flows can be managed through the design of the irrigation system having a cut-off drain around the high side. This will remove any surface flows before they reach the Land Application Area.

All requirements of SEPP (Waters of Victoria) can be met if the proposed system is used.

Contents

1. Introduction

Hardcore Geotech Pty Ltd has been contracted to perform a Land Capability Assessment for No. 170 Nash Road, BUNYIP. The current site is approximately 5.738 ha in size, and it is proposed that the site will be subdivided with the existing house to remain on 3.738ha - Lot 1, and a second 2 ha Lot 2, to be created. The allotment falls within the Cardinia Shire.

This report has been completed in order to show that No. 170 Nash Road, BUNYIP can comply with the SEPP (Waters of Victoria) requirements regarding an on – site wastewater system. This LCA looks at the size of the lots and the requirements of the wastewater system that will need to be met so that all effluent is contained on the site. This LCA provides a conceptual design with some recommendations on the management and monitoring of the system. The pressure compensating irrigation lines need to be laid in parallel with the contours of the site as shown on the site plan in this report. The spacing between the irrigation lines must be at least 1000mm.

The site is covered in natural grasses, and there are various trees across the site. The site is typical of the undulating landscape throughout the area. The site contains an existing single storey brick veneer house, gardens, crushed rock, sheds, and natural grasses. The site has no potable water supplies close by that will be affected. The site has a gentle slope falling to the north-west. As the sites elevation is in the middle range area of Bunyip there is a high to moderate risk of seasonal flooding.

The site is subject to moderate to high rainfall and the site will be supplied with mains water. The area has a mean annual rainfall of 1001mm and a mean annual evaporation of 1031mm. These values were obtained from the stations at Drouin Bowling Club – 85023 and Tooradin – 086116, respectively.

It is recommended that the effluent should be treated to at least a secondary level and be distributed on site by a sub-surface pressure compensated irrigation system.

2. Site Features

2.1 Site overview:

The LCA was undertaken by Luke Tymensen from Hardcore Geotech on the 23rd February 2024. The site was analyzed and information was recorded to complete Appendix 1, Land Capability Assessment Table. This table is included later in the report. It was noted that the site will have moderate to high seasonal rainfall, a gentle slope, perched seasonal water table and has a low permeable CLAY soil.

The irrigation system is to be constructed in an area that is covered in natural pasture grasses. The Water balance calculations have been calculated using a value taken from Table 10.6 Scheme for inferring the hydraulic conductivity range of soil horizons, Soil, Their Properties and Management, Third Edition, Peter E.V CHARMAN and Brian W. MURPHY. This gives a range of 0.1mm/h to 2.5mm/h.

The LCA has been worked out assuming that one (1) new dwelling will be constructed on the newly created Lot 2. It has been assumed that the new dwelling will be a four (4) bedroom dwelling, that will be suitable for a maximum occupancy of five (5) respectively. If the floor plan includes a study that could potentially be used as a bedroom, the study must be included in the total number of bedrooms.

The site will be supplied with mains water and it is anticipated that sewer will not be available in the near future due to the low development density in the area and the considerable distance from the existing wastewater services.

The new dwelling on Lot 2 will consist of new appliances that will have a low water rating label, based on the Water Efficiency Labelling and Standards Scheme, (WELS). A design wastewater load of 180L per person per day has been used giving a total daily design load of 1080 litres. This design load was determined using Table 4, EPA Code of Practice 891.4.

2.2 Available land for LAA – For this site size is not a constraining factor. This gives a low to medium rating risk for the secondary treatment system that is recommended within this report.

2.3 Aspect and Exposure – The area allocated for the system faces north-east. This area is located in open areas of Bunyip. The surrounding area is covered in pasture grasses and there are trees across the site. This gives the site moderate sun and wind exposure.

2.4 Slope form and gradient – the area suitable for the LAA has a gentle slope, approximately 2 degrees (approx. 3%) based on the survey completed at the site that is contained in this report, and this will therefore not be a limiting factor as detailed in Table 1.1 of AS/NZS 1547,2012. The pressure compensating subsurface irrigation should also run along the contours as mentioned in Section M9.3 of AS/NZS 1547, 2012.

2.5 Site Drainage - A cutoff drain will be required around the high side of the system. The cutoff drain will prevent overland water flow from entering the system during high rainfall events. The cut off drain needs to be continued past the edge of the LAA until it drains away. A pit and pump may be required to achieve this.

2.6 Landslip – At the time of the investigation no evidence of landslip was seen. The proposed effluent system won't increase the land slip risk in the area proposed for the LAA.

2.7 Erosion Potential – there are no signs of erosion at the site. This is a low risk issue.

2.8 Flood Inundation – as the site elevation is located in the mid areas of BUNYIP, there is a high chance of the site being flooded. Cutoff drains around the high side of the LAA have been directed.

2.9 Distance to surface waters – the area on the site where the irrigation system is to be located is over 30m from any influencing water bodies, and over 200m (as water would run) from any potable reservoir supplies.

2.10 Distance to groundwater bores – there are zero (0) bores on the sites. The LAA needs to be located in an area at least 20m away from any bores and this can be achieved with the chosen LAA location.

2.11 Vegetation – the overall site is covered in pasture grasses and there are a variety of trees across the site. The area for the LAA is covered in pasture grasses. There are no trees on the proposed LAA. This can be seen by looking at the photos from the site.

2.12 Depth to water table / perched water table – no perched water table / groundwater was encountered at the time of the investigation. During the wetter months of the year, a transient water table may occur above the CLAY soils. A cut off drain will be constructed around the high side of the LAA to prevent any surface or subsurface waters entering the LAA.

2.13 Rainfall – the site has a moderate to high annual rainfall of 1001mm (mean). This is a limiting risk at the site that has been managed by using a cut off drain along the high sides of the LAA.

2.14 Pan Evaporation – the site has a moderate to high pan evaporation of 1031mm (mean), and this is a low risk. Evaporation will exceed rainfall at the site for the warmer months of the year from November through to April.

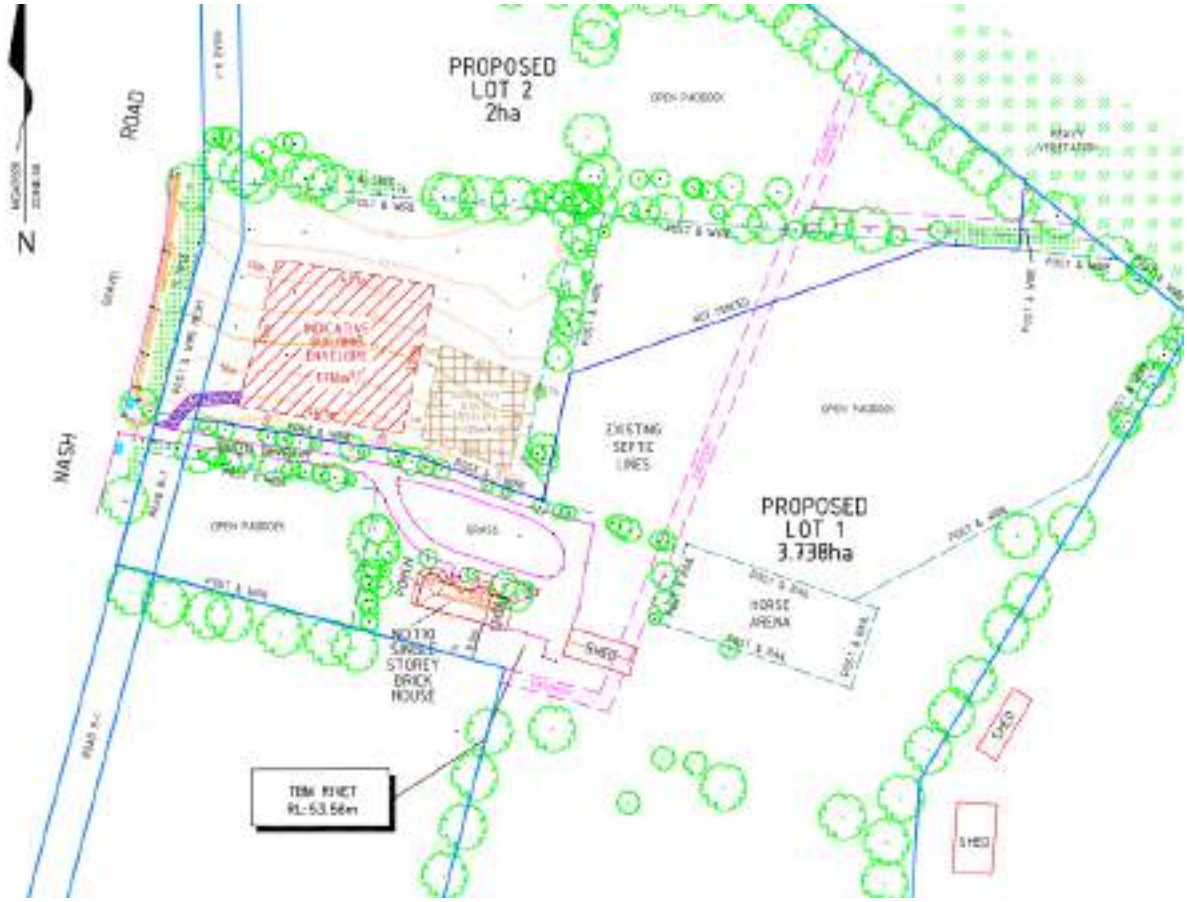
3. Site Plan

3.1 Site Plan Aerial

No 170 Nash Road, BUNYIP

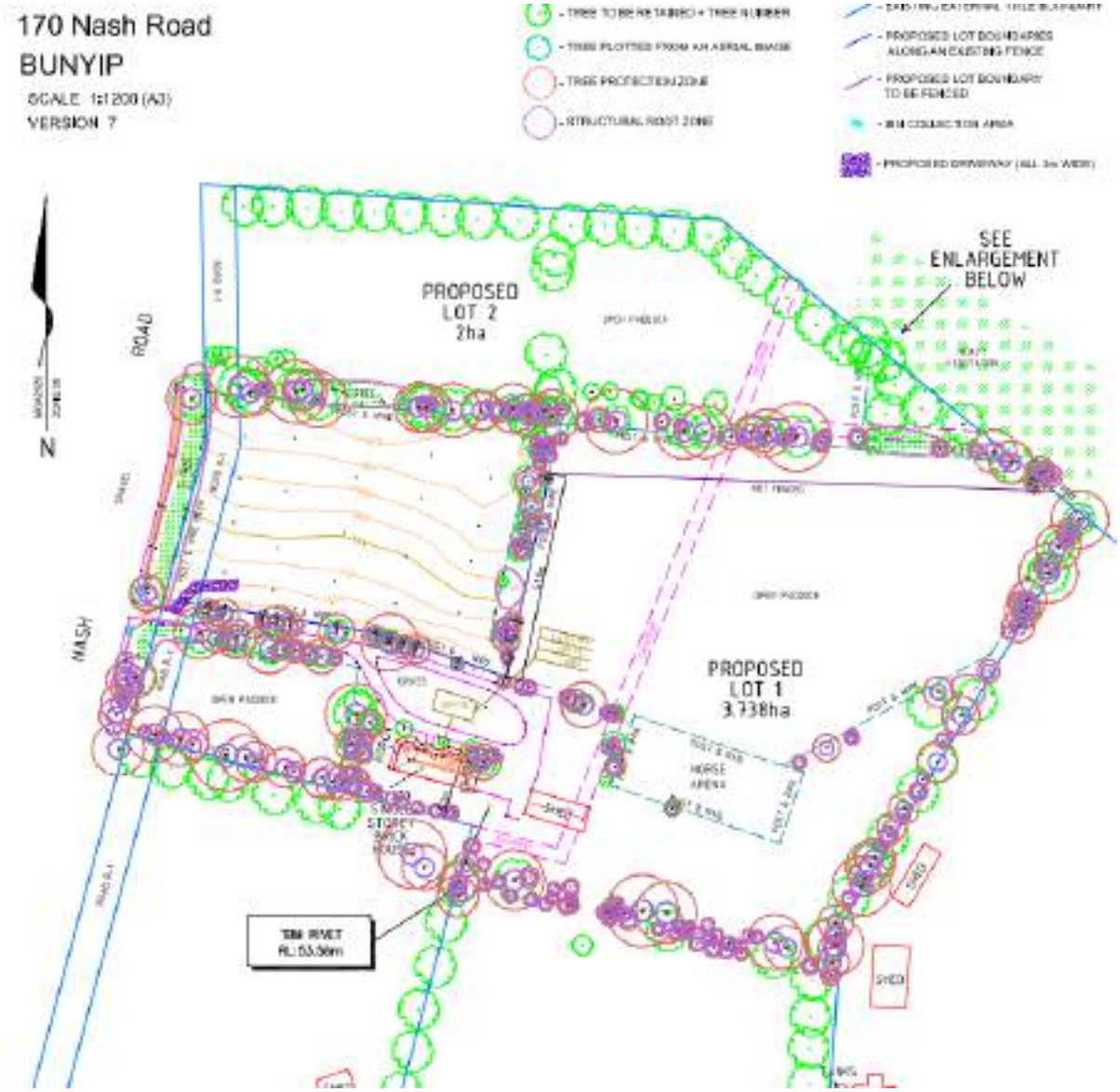
Note: This site plan is not to scale and an indicative guide only.

3.2 Survey Plan with LAA



No 170 Nash Road, BUNYIP with LAA Area and offsets.

3.3 Revised Survey Plan with LAA



No 170 Nash Road, BUNYIP with LAA Area and offsets.

4. Soil Assessment

Two boreholes were completed across the site, including one in an area suitable for the LAA. It shows that the site consists of a brown / grey silty clayey SAND overlying a grey mottled orange / brown silty clayey SAND / silty very sandy CLAY, overlying a grey mottled brown / orange silty sandy CLAY.

Borehole 1

Depth (m)		Description	Strength / Density	Moisture
0.300		Clayey SILT Brown / grey	Medium dense	Dry-moist
2.000		Silty Sandy CLAY Brown / grey / mottled orange Traces of Sand Becoming very moist below 800mm Paler with depth	Firm -stiff	Moist

Borehole 2

Depth (m)		Description	Strength / Density	Moisture
0.500		Silty Clayey SAND Brown / grey Paler with depth	Medium dense	Moist
0.800		Silty Clayey SAND / Silty Very Sandy CLAY Grey mottled orange / brown	Firm / medium dense	Dry-moist
2.000		Silty Sandy CLAY Grey mottled brown / orange Paler with depth Sand lenses at depth.	Stiff	Moist

4.1 Soil Features

Profile Depth – Two boreholes were completed to 2000mm. The profile for the boreholes including in the LAA are shown in the Borehole log examples above.

Depth to water table: No Perched water table was encountered at the time of the investigation. It is possible there may however be a perched water table existing in the wetter months of the year above the CLAY soils. A cut off drain will be constructed around the high side of the LAA to prevent any surface or subsurface waters entering the LAA.

Coarse Fragments – in the soil profile encountered there were approximately 10-20% rock fragments.

Soil Permeability – The soil permeability was determined through references to published soil properties as mentioned in Site Features on page 4.

Limiting Soil Layer – the limiting soil layer at this site is the CLAY soils. These are Category 5/6 as per AS1547-2012.

Design Irrigation Rate: the design irrigation rate for the pressure compensating subsurface irrigation for the site is based on previous experience and reference to published values is 2.0mm/day. This has been incorporated into the Water Balance that has been completed that is contained later in this report.

pH – the pH of the CLAY soils was measured using a Hanna hand held pH/EC meter. The pH was found in a range between 4.2 to 4.7. This indicated a slightly acidic soil.

Electrical Conductivity – the EC of the CLAY soils was measured using a Hanna hand held pH/EC meter. The EC(SE) was found in a range between 0.37 to 1.3. This indicates that the CLAY soils are slightly-saline to very saline. This will have an effect on very sensitive crops and plants to be tolerant to salt.

5. Wastewater Management System

After all of the above information has been processed and analyzed it has been determined that a system using secondary treatment, a sand filter or an AWTS, would be appropriate for the site. This choice will achieve a level of effluent quality that can be distributed on site by a pressure compensating subsurface irrigation system. It is recommended that a secondary treatment system is used as it will reduce the risks at the site to negligible levels. By using a secondary treatment system, the effluent will be treated to a high standard before being allowed to pass through into the natural soils on the site.

The size of the irrigation area required has been calculated using a water balance equation and nutrient balance to ensure that the system can handle the anticipated loads. The worksheet for this water balance equation can be shown in Appendix A and the nutrient balance is also included. The size of the irrigation area has been calculated to be 400 square meters due to hydraulic load, dependent on the number of bedrooms and maximum occupancy adopted for the final house design of the new dwelling. This is detailed in table 2 below. A cut off drain around the high side of the LAA will reduce the risk of a perched water table occurring.

Number of bedrooms	Maximum occupancy (persons)	Total effluent load (Liters/day)	Total irrigation area required (m^2)
4	5	750	400
5	6	900	480
6	7	1050	560

Table 2: Total effluent loads and irrigation area required, based on the total number of bedrooms and maximum occupancy the final house design adopts.

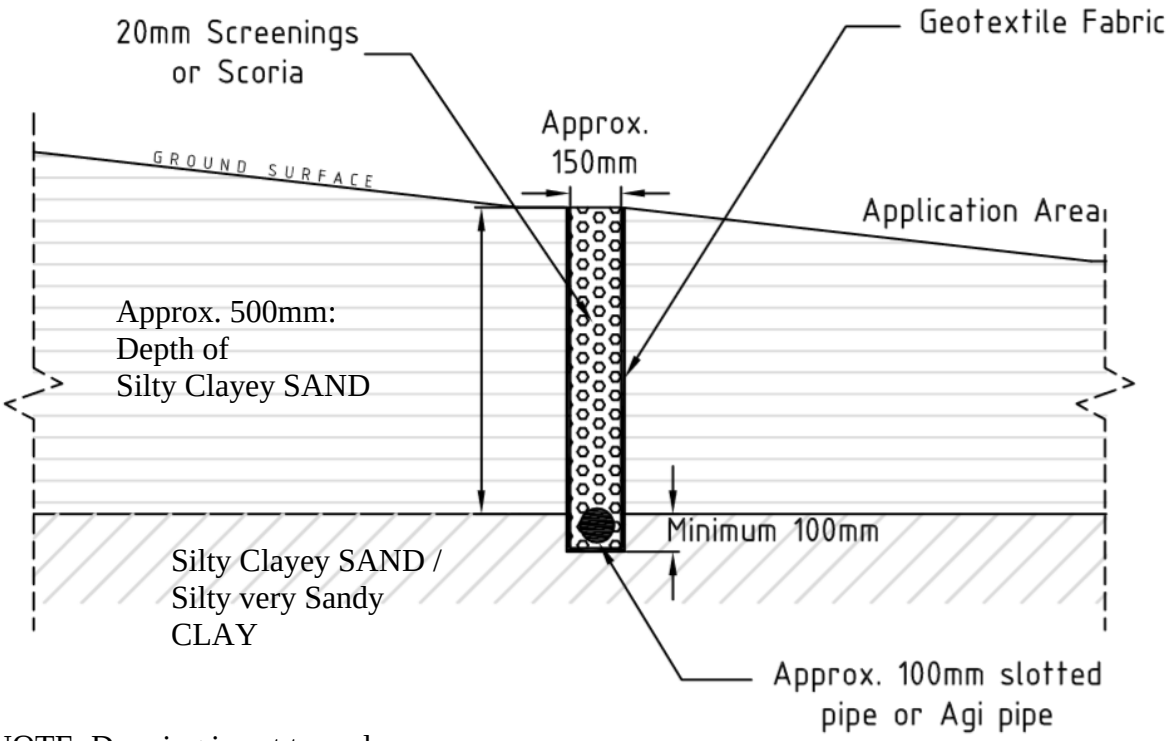
Gypsum should be added to the LAA at a rate of 1kg per square meter and should be spread over the LAA area and then should be worked into the soil by a rotary hoe or some other mechanical means and relevelled prior to the laying of the pressure compensating sub surface irrigation. This will allow the soils to become more permeable.

The area that has been determined to be the most appropriate for the system on the site is shown on the previous site plan. The area that has been selected is in the south end of the proposed additional site / new lot created. This system also allows for the subsurface irrigation to be set up around the site in an area to ensure that as minimal surface runoff as possible will enter the site by the use of a cutoff drain along the higher sides of the LAA. Fencing may need to be provided to stop any livestock access or excess traffic in the area.

As the site has moderate to high rainfall and a heavy clay soil profile it is recommended that a cutoff drain is installed along the high side of the LAA. This is to ensure that no overland water enters the LAA. This cutoff drain should be located 1m from the edge of the LAA and be approximately 150mm wide and at least up to 600mm deep, to a depth 100mm into the clayey SAND / CLAY soils. This drain should have a geotextile placed in it and be backfilled with a socked aggie pipe and covered with screenings or scoria. This will ensure that the LAA only has to cope with the hydraulic loads that have been calculated (i.e. irrigation and incident rainfall). This cut off drain should continue for at least two metres past the lower side of the LAA and then be diverted away from the LAA. For this site the cutoff drain will run across the southern edge of the LAA, and down the east and west edges, as shown on the attached site plan. The drain is to be constructed by a licensed and registered plumber and needs to be graded away from the LAA. Depending on the slope of the site and the soil profile this may require a pit and pump to be installed.

There are a set of minimum setback distances that are contained in the EPA code of practice. These need to be followed along with all local council requirements. Where secondary treatment is used these distances can be reduced by 50%. All of these have been met with the location of the LAA.

6. Cut – Off Drain Cross Section



NOTE: Drawing is not to scale.

Cut-off drain is to be completed along the high sides of the LAA and completed across the site. This will give the drain somewhere to flow to as shown on the site plan of the site. The drain is to be constructed by a licensed and registered plumber and needs to be graded away from the LAA. Depending on the slope of the site and the soil profile this may require a pit and pump to be installed.

7. Monitoring, Operation and Maintenance

In order for the system to operate effectively the resident must ensure that the following requirements for the treatment system are followed.

- Water usage at the site should be kept to a minimum. AAA rated water fixtures and appliances are required. This will reduce the effluent load on the system.

- To reduce the amount of fats and oils that enter the system

- Use cleaning products that are suitable for sand filters

- Have the system regularly inspected by a suitable qualified contractor to ensure that the system is treating the effluent to at least 20/30.

In order for the system to operate effectively the resident must ensure that the following requirements for the irrigation system are followed.

- Regularly mow the irrigation area to encourage further growth. This will encourage the uptake of nutrients from the system
- You are required to harvest the grass (i.e. cut and cart)

In order for the system to work effectively and to maintain the reduced risk at the site it is recommended that the mandatory testing and reporting as described in the Code of Practice – Onsite Wastewater Management, EPA Publication 891.4, include an annual (post spring) and post periods of heavy and/or prolonged rainfall, report on the functioning and integrity of the distribution system and on the functioning and integrity of the cut-off drains, outfall areas and soil media. The effluent areas should be regularly inspected for excessively wet areas and vegetation integrity.

8. Conclusions

After the site has been visited and all of the information has been processed, our assessment has shown that at least one sustainable and suitable on-site effluent disposal method is appropriate for the site. It is recommended that a secondary treatment facility can be used at the site to handle the effluent for the sites.

It is recommended that subsurface irrigation is used at the site and that the effluent is distributed over an area calculated by the water balance to be 400 square meters, depending on the number of bedrooms the final house design adopts. Drawn on the previous site plan is an LAA of 620 square meters.

A cut off drain around the high side of the irrigation area will be required to limit any surface water that may flow on to the area and impede the permeability of the soils and to remove the risk of a perched water table ingress during the wetter months of the year. All water saving appliances are required in the construction of the new residence and that all water saving practices are used by the occupiers. It is recommended that all maintenance requirements for the system as provided by the supplier are met in order that the system runs efficiently and according to design.

9. Limits of Investigations and Recommendations.

9.1 Soil layers as outlined in the soil investigation borelogs will vary in depth and colour over the proposed area.

9.2 If at any time during the construction period the soil profile or moisture conditions encountered does not match what was found during the site investigation then this company needs to be contacted for further advice.

9.3 The recommendations contained within this report have been determined from the information gained during the site investigation and the information supplied to this company from the client prior to the site visit and report. It is expected that this information is correct and that the client has investigated all history of the site and passed it on to this company. Therefore this company will reserve the right to make amendments to this report upon receiving any additional information that may change the recommendations given. This company will not be held responsible for any financial losses that may occur from the amended report.

9.4 This report must be reproduced in full and is subject to the normal laws of copyright. The right to withdraw this report and any recommendations is reserved. Hardcore Geotech Pty Ltd retains ownership of this report until the account is paid in full. If the client refuses to pay then Hardcore Geotech Pty Ltd reserves the right to disclaim any recommendations made.

BE (Civil) Hons
PE0002775
Hardcore Geotech Pty Ltd

10. Other Information

The following table contains a list of plants, grasses and trees that will help with the transpiration in the effluent site.

Plants and grasses

Botanical Names	Common Names
Lolium / Trifolium	Rye / Clover
Phragmites australis	
Canna x Generalis	Canna Lily
	Calla Lily
	Ginger Lily
Acacia howittii	Sticky Wattle
Callistemon citrinus	Crimson Bottlebrush
Callistemon macropunctatus	Scarlet Bottlebrush
Leptospermum lanigerum	Wooley Tea-Tree
Malaeleuca decussata	Cross Honey Murtle
Malaeleuca ericifolia	Swamp Paperback
Malaeleuca halmaturorum	Salt Paperback
Tamarix juniperina	Flowering Tamarisk
Eleocharis acuta	Cannas
	Common Spike-Rush
	Buffalo / kikuyu
	Geranium
	Hydrangeas
	Tall wheat grass
	Strawberry Clover
	White Clover
	Perennial Rye
	Bougainvillea

Trees

Eucalyptus Camaldulensis	River Red Gum
Eucalyotus Citriodora	Lemon Scented Gum
Fraxinus Raywoodi	Claret Ash
Eucalyptus Cladocalyx	Sugar Gum
Platanus – all species	Plan Tree
Populus nigra etc	Poplar
Salix banylonica	Weeping Willow
Acacia longiflora	Swallow Wattle
Callistemon viminalis	Weeping Bottlebrush
Callistemon lilacinus	Lilac Bottlebrush
Eucalyptus pressiana	Bell-fruit Mallee
Viminaria juncea	Native Broom

11. Sources of Information

The information contained in this report was gathered from a variety of sources as listed below.

1) *SEPPs (Waters of Victoria)*

2) *"Disposal systems for effluent from domestic premises", Australian Standard AS/NZS 1547 – 2012*

3) *Code of Practice – Onsite Wastewater Management, Environmental Protection Agency, Publication No: 891.4*

4) *Model Land Capability Assessment Report, MAV and DSE, February 2014*

12. Site Photos

Borehole 1

Borehole 2-LCA











Appendix A - Water/Nitrogen Balance

Hardcore Geotech Pty Ltd

HARDCORE 01

WATER/NITROGEN BALANCE (20/30 irrigation): With no wet month storage.

Rainfall Data: Drouin Bowling Club - Station No: 085023 / Evaporation Data: Tooradin - Station No: 086116

Location: No 170 Nash Road, BUNYIP- 4BR

Date: 23rd February 2024

Client: Nobelius Land Surveyors

ITEM			#	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Days in month:			D	31	28	31	30	31	30	31	31	30	31	30	31	365
Evaporation (Mean)		mm	A	167	129	115	75	47	33	31	47	60	81	108	140	1031
Rainfall (mean)		mm	B1	61	55	68	83	92	86	87	95	100	105	89	80	1001
Effective rainfall		mm	B2	55	50	61	75	83	77	78	86	90	95	80	72	902
Peak seepage Loss[1]		mm	B3	124	112	124	120	124	120	124	124	120	124	120	124	1460
Evapotranspiration(IXA)		mm	C1	117	90	80	45	23	15	12	21	33	52	76	98	663
Waste Loading(C1+B3-B2)		mm	C2	186	152	143	90	64	58	58	59	63	82	115	150	1220
Net evaporation from lagoons (10(0.8A-B1xlagoon area(ha)))		L	NL	0	0	0	0	0	0	0	0	0	0	0	0	0
Volume of Wastew ater		L	E	23250	21000	23250	22500	23250	22500	23250	23250	22500	23250	22500	23250	273750
Total Irrigation Water(E-NL)/G		mm	F	58	53	58	56	58	56	58	58	56	58	56	58	684
Irrigation Area(E/C2)annual.		m^2	G													**400**
Surcharge		mm	H	-128	-100	-85	-34	-6	-1	0	-1	-7	-24	-59	-91	0
Actual seepage loss		mm	J	-4	12	39	86	118	119	124	123	113	100	61	33	928
Direct Crop Coefficient:			I	0.7	0.7	0.7	0.6	0.5	0.45	0.4	0.45	0.55	0.65	0.7	0.7	Pasture:
Rainfall Retained:	90	%	K	1. Seepage loss (peak) equals deep seepage plus lateral flow : 5mm (<12% ksat)												
Lagoon Area:	0	ha	L	CROP FACTOR												
Wastew ater(Irrigation):	750	L	M	0.7	0.7	0.7	0.6	0.5	0.45	0.4	0.45	0.55	0.65	0.7	0.7	Pasture:
Seepage Loss (Peak):	4	mm	N	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Shade:
Irrig'n Area(No storage):	**400**	m^2	P2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	Buffalo:
Application Rate:	**1.9**	mm	Q	1	1	1	1	1	1	1	1	1	1	1	1	Woodlot
Nitrogen in Effluent:	30	mg/L	R	NITROGEN UPTAKE:												
Denitrification Rate:	20	%	S	Species:	Kg/ha.yr	pH	Species:	Kg/ha.yr	pH	Species:	Kg/ha.yr	pH				
Plant Uptake:	220	kg/ha/yr	T	Ryegrass	200	5.6-8.5	Bent grass	170	5.6-6.9	Grapes	200	6.1-7.9				
Average daily seepage:	2.5	mm	U	Eucalyptus	90	5.6-6.9	Couch grass	280	6.1-6.9	Lemons	90	6.1-6.9				
Annual N load:	6.57	kg/yr	V	Lucerne	220	6.1-7.9	Clover	180	6.1-6.9	C cunn'a	220	6.1-7.9				
Area for N uptake:	**299**	m^2	W	Tall fescue	150-320	6.1-6.9	Buffalo (soft)	150-320	5.5-7.5	P radiata	150	5.6-6.9				
Application Rate:	2.5	mm	X	Rye/clover	220		Sorghum	90	5.6-6.9	Poplars	115	5.6-8.5				

Figure 1 (above): Water/Nitrogen Balance for a four (4) bedroom, five (5) person maximum occupancy house design.

Hardcore Geotech Pty Ltd

HARDCORE 01

WATER/NITROGEN BALANCE (20/30 irrigation): With no wet month storage.

Rainfall Data: Drouin Bowling Club - Station No: 085023 / Evaporation Data: Tooradin - Station No: 086116

Location: No 170 Nash Road, BUNYIP- 5BR

Date: 23rd Febuary

Client: Nobelius Land Surveyors

ITEM			#	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Days in month:			D	31	28	31	30	31	30	31	31	30	31	30	31	365
Evaporation (Mean)		mm	A	167	129	115	75	47	33	31	47	60	81	108	140	1031
Rainfall (mean)		mm	B1	61	55	68	83	92	86	87	95	100	105	89	80	1001
Effective rainfall		mm	B2	55	50	61	75	83	77	78	86	90	95	80	72	902
Peak seepage Loss[1]		mm	B3	124	112	124	120	124	120	124	124	120	124	120	124	1460
Evapotranspiration(IXA)		mm	C1	117	90	80	45	23	15	12	21	33	52	76	98	663
Waste Loading(C1+B3-B2)		mm	C2	186	152	143	90	64	58	58	59	63	82	115	150	1220
Net evaporation from lagoons (10(0.8A-B1xlagoon area(ha)))		L	NL	0	0	0	0	0	0	0	0	0	0	0	0	0
Volume of Wastew ater		L	E	27900	25200	27900	27000	27900	27000	27900	27900	27000	27900	27000	27900	328500
Total Irrigation Water(E-NL)/G		mm	F	58	53	58	56	58	56	58	58	56	58	56	58	684
Irrigation Area(E/C2)annual.		m^2	G													**480**
Surcharge		mm	H	-128	-100	-85	-34	-6	-1	0	-1	-7	-24	-59	-91	0
Actual seepage loss		mm	J	-4	12	39	86	118	119	124	123	113	100	61	33	928
Direct Crop Coefficient:			I	0.7	0.7	0.7	0.6	0.5	0.45	0.4	0.45	0.55	0.65	0.7	0.7	Pasture:
Rainfall Retained:	90	%	K	1. Seepage loss (peak) equals deep seepage plus lateral flow : 5mm (<12% ksat)												
Lagoon Area:	0	ha	L	CROP FACTOR												
Wastew ater(Irrigation):	900	L	M	0.7	0.7	0.7	0.6	0.5	0.45	0.4	0.45	0.55	0.65	0.7	0.7	Pasture:
Seepage Loss (Peak):	4	mm	N	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Shade:
Irrig'n Area(No storage):	**480**	m^2	P2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	Buffalo:
Application Rate:	**1.9**	mm	Q	1	1	1	1	1	1	1	1	1	1	1	1	Woodlot
Nitrogen in Effluent:	30	mg/L	R	NITROGEN UPTAKE:												
Denitrification Rate:	20	%	S	Species:	Kg/ha.yr	pH	Species:	Kg/ha.yr	pH	Species:	Kg/ha.yr	pH				
Plant Uptake:	220	kg/ha/yr	T	Ryegrass	200	5.6-8.5	Bent grass	170	5.6-6.9	Grapes	200	6.1-7.9				
Average daily seepage:	2.5	mm	U	Eucalyptus	90	5.6-6.9	Couch grass	280	6.1-6.9	Lemons	90	6.1-6.9				
Annual N load:	7.88	kg/yr	V	Lucerne	220	6.1-7.9	Clover	180	6.1-6.9	C cunn'a	220	6.1-7.9				
Area for N uptake:	**358**	m^2	W	Tall fescue	150-320	6.1-6.9	Buffalo (soft)	150-320	5.5-7.5	P radiata	150	5.6-6.9				
Application Rate:	2.5	mm	X	Rye/clover	220		Sorghum	90	5.6-6.9	Poplars	115	5.6-8.5				

Figure 2 (above): Water/Nitrogen Balance for a five (5) bedroom, six (6) person maximum occupancy house design.

Hardcore Geotech Pty Ltd

HARDCORE 01

WATER/NITROGEN BALANCE (20/30 irrigation): With no wet month storage.

Rainfall Data: Drouin Bowling Club - Station No: 085023 / Evaporation Data: Tooradin - Station No: 086116

Location: No 170 Nash Road, BUNYIP- 6BR

Date: 23rd Febuary

Client: Ben Nobelius

ITEM			#	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Days in month:			D	31	28	31	30	31	30	31	31	30	31	30	31	365
Evaporation (Mean)		mm	A	167	129	115	75	47	33	31	47	60	81	108	140	1031
Rainfall (mean)		mm	B1	61	55	68	83	92	86	87	95	100	105	89	80	1001
Effective rainfall		mm	B2	55	50	61	75	83	77	78	86	90	95	80	72	902
Peak seepage Loss[1]		mm	B3	124	112	124	120	124	120	124	124	120	124	120	124	1460
Evapotranspiration(IXA)		mm	C1	117	90	80	45	23	15	12	21	33	52	76	98	663
Waste Loading(C1+B3-B2)		mm	C2	186	152	143	90	64	58	58	59	63	82	115	150	1220
Net evaporation from lagoons (10(0.8A-B1xlagoon area(ha)))		L	NL	0	0	0	0	0	0	0	0	0	0	0	0	0
Volume of Wastew ater		L	E	32550	29400	32550	31500	32550	31500	32550	32550	31500	32550	31500	32550	383250
Total Irrigation Water(E-NL)/G		mm	F	58	53	58	56	58	56	58	58	56	58	56	58	684
Irrigation Area(E/C2)annual.		m^2	G													**560**
Surcharge		mm	H	-128	-100	-85	-34	-6	-1	0	-1	-7	-24	-59	-91	0
Actual seepage loss		mm	J	-4	12	39	86	118	119	124	123	113	100	61	33	928
Direct Crop Coefficient:			I	0.7	0.7	0.7	0.6	0.5	0.45	0.4	0.45	0.55	0.65	0.7	0.7	Pasture:
Rainfall Retained:	90	%	K	1. Seepage loss (peak) equals deep seepage plus lateral flow : 5mm (<12% ksat)												
Lagoon Area:	0	ha	L	CROP FACTOR												
Wastew ater(Irrigation):	1050	L	M	0.7	0.7	0.7	0.6	0.5	0.45	0.4	0.45	0.55	0.65	0.7	0.7	Pasture:
Seepage Loss (Peak):	4	mm	N	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Shade:
Irrig'n Area(No storage):	**560**	m^2	P2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	Buffalo:
Application Rate:	**1.9**	mm	Q	1	1	1	1	1	1	1	1	1	1	1	1	Woodlot
Nitrogen in Effluent:	30	mg/L	R	NITROGEN UPTAKE:												
Denitrification Rate:	20	%	S	Species:	Kg/ha.yr	pH	Species:	Kg/ha.yr	pH	Species:	Kg/ha.yr	pH				
Plant Uptake:	220	kg/ha/yr	T	Ryegrass	200	5.6-8.5	Bent grass	170	5.6-6.9	Grapes	200	6.1-7.9				
Average daily seepage:	2.5	mm	U	Eucalyptus	90	5.6-6.9	Couch grass	280	6.1-6.9	Lemons	90	6.1-6.9				
Annual N load:	9.20	kg/yr	V	Lucerne	220	6.1-7.9	Clover	180	6.1-6.9	C cunn'a	220	6.1-7.9				
Area for N uptake:	**418**	m^2	W	Tall fescue	150-320	6.1-6.9	Buffalo (soft)	150-320	5.5-7.5	P radiata	150	5.6-6.9				
Application Rate:	2.5	mm	X	Rye/clover	220		Sorghum	90	5.6-6.9	Poplars	115	5.6-8.5				

Figure 3 (above): Water/Nitrogen Balance for a six (6) bedroom, seven (7) person maximum occupancy house design.

Appendix B - Land Capability Assessment

The following table is a Land Capability Assessment that can be used for assessing a site for onsite domestic wastewater management.

APPENDIX B					
LAND CAPABILITY ASSESSMENT TABLE					
Site Address: No. 170 Nash Road, BUNYIP			Job No. 240236		
LAND FEATURE	LAND CAPABILITY RISK RATING				COMMENTS
	LOW	MEDIUM	HIGH	LIMITING	
Available land for LAA	Exceeds LAA and duplicate LAA requirements	Meets LAA and duplicate LAA requirements	Meets LAA and partial duplicate LAA requirements	Insufficient LAA area	Plenty of land available for use, and future expansion if required
Aspect	North, north-east and north-west	East, west, south-east, south-west	South	South, full shade	North-west facing
Exposure	Full sun and/or high wind or minimal shading	Dappled light (partial shade)	Limited light, little wind or heavily shaded all day	perpetual shade	Site has moderate exposure, with some tree coverage
Site Drainage (run off/run-on)	Very slow to slow	Moderate	Rapid	Very rapid or depressed	Site has a gentle to moderate slope
Slope gradient (%)	0-2	3-15	16-25	25+ or locally depressed	Slope is approximately 3%
Slope form	Convex or divergent side slopes	straight sided slopes	Concave or convergent side slopes	Locally depressed	Slope is fairly uniform
Trenches and beds	<5%	5% to 10%	10% to 15%	>15%	Not suitable for the site conditions
Subsurface irrigation	<10%	10% to 30%	30% to 40%	>40%	Low
Landslip	Potential	Potential	Potential	Existing	No signs of landslip at the site
Erosion potential	Low	Moderate	High	No practical amelioration	Non-dispersive soils
Flood/ Inundation	Never		<1% AEP	>1% AEP	Site is located in the mid areas of Bunyip. Cut off drains along the high sides have been directed to prevent overland flow entering the LAA
Distance to non-potable surface waters (m)	Buffer distance complies with code requirements (>30m)		Buffer distance does not comply with code requirements	Reduced buffer distance not acceptable	LAA meets requirements
Distance to potable surface waters (m)	Buffer distance complies with code requirements (>100m for watercways, >300m for reservoirs)		Buffer distance does not comply with code requirements	Reduced buffer distance not acceptable	LAA meets requirements
Distance to groundwater bores (m)	No bores on site or within significant distance (>30m)	Buffer distance complies with code	Buffer distance does not comply with code requirements	No suitable treatment methods	There are no bores on the site
Vegetation	Plentiful / healthy vegetation	Moderate vegetation	Sparse or no vegetation	Propagation not possible	Moderate cover of grass pasture with trees across the site
Trafficking	None to low	Moderate	High	Excessive	Provide fencing to stop any live stock access
Depth to water table (potential/perched) (m)	>2	2 to 1.5	<1.5	surface	Cut off drain around the lower sides of the LAA will prevent overland flow entering the LAA
Depth to water table (seasonal perched) (m)	>1.5	<1.5	0.5 to 1.5	surface	Cut off drain around the lower sides of the LAA will prevent overland flow entering the LAA
Rainfall (5th Decile)	<600	600-750	750-1000	>1000	Drouin - Station No. 085023
Pan Evaporation (mean) (mm)	<1250	1000-1250	750-1000	<750	Tooradin - Station No. 085116
SOIL PROFILE CHARACTERISTICS					
Structure	High or moderately structured	Weakly Structured	Structureless, massive or hardpan		
Fill materials	Nil or imposed good quality topsoil	Mapped variable depth and quality materials	Variable quality and/or uncontrolled filling	Uncontrolled poor quality/unsuitable filling	The front yard has been filled but there are areas to the west of the existing house that would be suitable
Thickness: (m)					
Trenches and beds	< 1.4		<1.4	<1.2	Not suitable for the site conditions
Subsurface irrigation	1.5+	1.2 to 1.5	0.75	<0.75	
Permeability (limiting Ksat(m) (m/day)	0.15-0.30	0.03-0.15, 0.3-0.6	0.01-0.03, 0.6-3.0	<0.0, <0.03	
Permeability (buffer evaluation) (m/day)	<0.3	0.3-3	6 to 5	>5	
Stoniness	< 10	10 to 20	>20		Approx. 10-20% rock fragments
Emerson number	4, 5, 6, 8	7	2, 3	1.0	Not dispersive
Dispersion Index	0	1 to 6	6 to 15	>15	Not dispersive
Reaction Trend (pH)	5.5-8	4.5-5.5	<4.5, >8		pH measured between 4.2 to 4.7 - Acid soils needs lime fertiliser
E.C. (dS/m)	<.8	0.8-2	>2	>2	Measured between 0.37 to 1.32 - soils are slightly saline to very saline
Sodicity (ESP) (%)	<6	6 to 8	>8	>16	Not measured however inferred as 6-8 due to pH and emerson
Cation Exchange Capacity (cmol/kg)	>15	8 to 15	<8		Heavy Clay 20-30 as per published values
Free Swell	<30	30 to 80	80 to 120	>120	Free Swells BH1 30MM - BH2 40MM

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170 Nash Rd, Bunyip

Stormwater Management Strategy

Prepared by: DPM Consulting Group

For: Nobelius Land Surveyors

Design Development
Project Management
Civil Engineering
Urban Development
Storm Water Management
Construction Management

DPM REF: 3277/M/C

13th of December 2024

Disclaimer:

The information provided in this report should be considered as "Preliminary" and used for planning purposes. The information is subject to variation following further advice and confirmation from respective authorities. It should be noted that the information contained in this report is derived from generally reliable sources; however, it is subject to variation after detailed planning, survey, design and formal liaison with the relevant authorities. It should also be noted that the development of other properties in the surrounding area may also have an impact on the development of the property.

This report has been produced by the office of DPM Consulting Group:-

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Reference Plans/Documents:

Date	Plan Reference
22.01.2024	Development Plan-Version 7– NOBELOIUS LAND SURVEYORS-SUR.REF.NO.21775

Contents

i. Figures

ii. Tables

1.0 Introduction

1.1 Background

1.1.1. DPM Consulting Group (DPM) have been engaged by Nobelius Land Surveyors (the client) to prepare a Stormwater Management Strategy (SWMS) for the proposed development located at 170, Nash Road, Bunyip.

1.2 Objectives

1.2.1. The purpose of this document is to set out a high-level stormwater management strategy for the subject development site, which will entail:

- Delineating the site's internal and external drainage catchments.
- Identifying the flood mitigation measures that need to be put in place;
- Recognising the key drainage infrastructure required to help meet these objectives.

1.2.2. The Stormwater Management Strategy will investigate the viability of stormwater quality treatment to Best Practice Environmental Management (BPEM) objectives.

1.2.3. Additionally, this report aims to develop a strategy to identify, prioritise and investigate Integrated Water Management (IWM) opportunities in accordance with the Integrated Water Management Framework for Victoria and the Integrated Water Management Plan (2014) prepared by Cardinia Shire Council.

1.2.4. The objectives of this document are as follows:

- Providing a stormwater strategy for the peak flows generated by a 20% Annual Exceedance Probability (AEP) event and a 1% AEP event;
- Promoting the safe conveyance of the peak flows downstream to Tea Tree Creek;
- Identifying and leveraging opportunities to optimise the outcomes of the water cycle;
- Pursue new approaches which contribute to conserve water resources as well as protecting the environment.

1.3 Stormwater Management Strategy

1.3.1. DPM have prepared a SWMS for the proposed residential development based on the latest approach to urban stormwater management.

1.3.2. This is based on retention and conveyance of stormwater runoff to meet multi-purpose design objectives, that enhance liveability of urban areas, mitigate flood nuisance and avoid damage to property and loss of life.

1.3.3. This SWMS incorporates two classes of stormwater management infrastructure in accordance with the latest Australian Rainfall & Runoff 2019 (AR&R19): conveyance systems and volume management.

Conveyance Systems

1.3.4. "Conveyance systems allow runoff to be conveyed through urban areas and provide connections through the catchment.

1.3.5. This SWMS also incorporates the traditional approach to stormwater management which involves a minor and major event management philosophy.

1.3.6. Minor flows up to the 20% Annual Exceedance Probability (AEP) will be conveyed in an underground pipe network to their ultimate discharge point.

1.3.7. Major flows up to the 1% AEP, meeting specific safety requirements, can flow in an overland flow path, along road reserves to their ultimate discharge point. Both the Minor and Major drainage strategies for the site have been discussed in this SWMS.

Volume Management

1.3.8. Volume management includes measures and solutions which can store runoff for a period of time, promote infiltration and potentially stored harvested stormwater for beneficial uses.

1.3.9. Volume management is a key element of stormwater management and flood control which has a fundamental importance in achieving a range of hydrological and water quality objectives within these facilities.

1.3.10. Additionally, DPM's SWMS aims to achieve the water quality targets in accordance with the Best Practice Environmental Management Guidelines (BPEMG) which requires the treatment of stormwater runoff to achieve 80% reduction in Total Suspended Solids (TSS), 45% reduction in Total Phosphorous (TP) and 45% reduction in Total Nitrogen (TN).

1.3.11. As part of the Victoria Planning Provision Clause 56.07, developers are required to minimise stormwater quality and quantity related impacts. Typically, these pollutant targets are achieved through the implementation of WSUD practices, such as wetlands and bio-retention systems.

1.3.12. DPM also intends for these stormwater management assets to be multi-functional, whereby rather than just serving as a treatment mechanism for stormwater, their presence will provide public amenity, an opportunity for communities to engage with their environment and beautification of the site's existing natural features.

1.4 Integrated Water Management

1.4.1. Urban stormwater runoff and associated stormwater responses are part of the urban water cycle, which includes not only stormwater quality and quantity, but also water supply, sewerage, urban form and waterway.

1.4.2. Urban runoff design and investigation techniques can be used to achieve better economic, social and environmental outcomes.

1.4.3. Urban runoff management is successfully achieved when it is integrated with the complete management of the urban cycle.

1.4.4. In accordance with the Integrated Water Management Plan prepared by Cardinia Shire Council, DPM aim to realise integrated opportunities through collaboration and communication with relevant stakeholders in order to identify, coordinate and priorities areas that would most benefit from IWM applications.

Figure 1 – Drivers for Council's IWMP

1.4.5. DPM understand the importance of creating greater value to the community by focusing on improving and enhancing the water cycle planning and management within the Cardinia Shire Council.

1.4.6. DPM continuously thrive to seek opportunities and foster innovation to provide efficient and successful economic and liveability outcomes, pursuing new approaches which would contribute to conserve water resources as well as protecting the environment.

1.4.7. It is understood that the overall objective of IWMP published by the Cardinia Shire Council is to deliver a framework that will guide Council towards a more sustainable integrated approach to water management to reduce reliance on potable water and enhance ecological health of receiving waterways (Westernport Bay).

1.4.8. In addition, to achieve the overall aim of the council's IWMP the six main IWMP's objectives with respect to Stormwater, Potable Water, Alternative Water Sources, Groundwater, Wastewater and Waterways was understood.

1.4.9. This SWMS will aim to address the Cardinia Shire City Council's IWMP's main objectives with regards to Stormwater and Waterways

2.0 Property Description

2.1 Property location

2.1.1. The proposed development site is located at 170 Nash Road, Bunyip VIC approximately 95 km Southeast of Melbourne's CBD.

2.1.2. The site consists of undeveloped Greenfield land, two existing dwelling and a total area of approximately 5.738ha (see Figure 2).

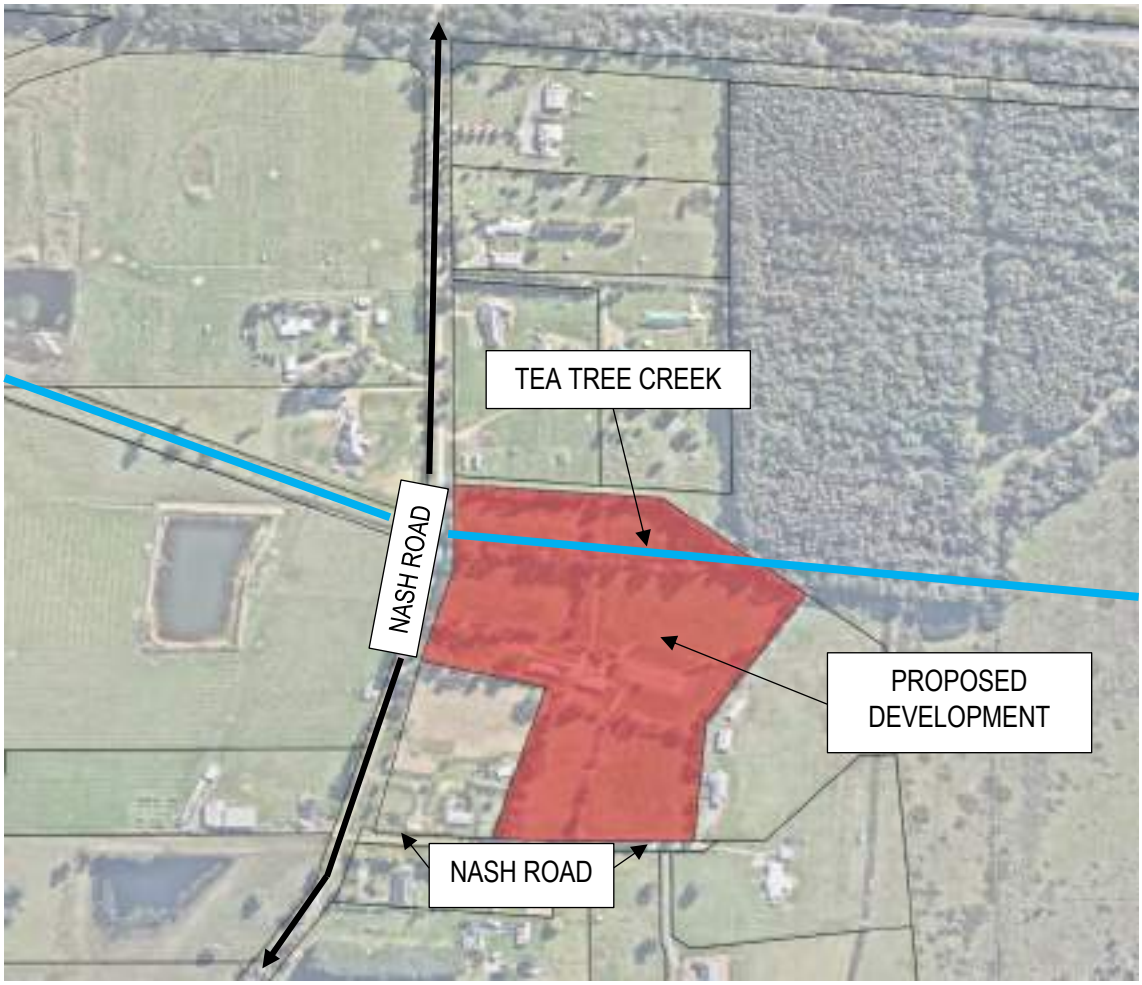

Figure 2 – Locality plan of the proposed development (NearMap,2024)

2.1.3. The site is within the municipality of Cardinia Shire Council.

2.2 Site Description

2.2.1. Table 1 below summarises the general site characteristics.

Table 1 Site Summary

Gross Area		The total site area is 5.738ha approximately
Existing Lots		The existing site is a greenfield with existing development at the centre of the site.
Topography		The site has a slope of 1 in 29 approximately across land from southwestern boundary of the site to the northern boundary of the site. The highest elevation of the site is found to be at 63.17m at the southwestern boundary and the lowest elevation of 50 m at the northern boundary.
Boundaries	North	Greenfield
	East	Greenfield
	West	Nash Road
	South	Nash Road / greenfield with existing development
Access		Nash Road

2.2.2. The project consists of a proposed to two subdivisions, proposed Lot 1 and Lot 2.

2.2.3. It is noted that proposed development does not include any dwelling at Lot 1. Lot 1 will include the existing dwelling after the proposed subdivision.

2.2.4. Access to the site is permanently provided from Nash Road from the west and south to the site (see Figure 3).

Figure 3 – Development context plan

2.3 Existing Topography

2.3.1. The site generally features good fall gravitating south to north direction. Figure 4 shows the three-dimension view of the topography of the site.

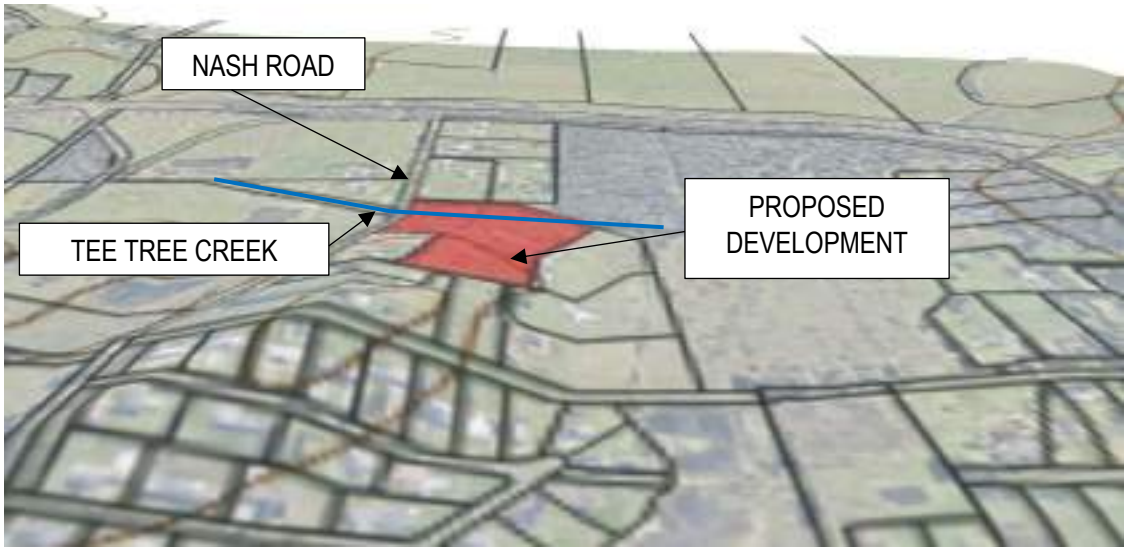

Figure 4 - Three-dimension view of the topography of the site and surrounding

2.3.2. The existing land is undeveloped Greenfield with an existing dwelling located at southwest of the subject site.

2.4 Existing Constraints

2.4.1 The proposed development does not present significant constraints which might limit the serviceability of the site.

2.4.2 Based on the Before You Dig information, there are no drainage assets servicing the subject site in the existing condition.

2.4.3 Any runoff from the site and its external catchments currently discharges to Tee Tree Creek at north of the subject site.

2.4.4 It is noted that the subject site is a Land Subject to Inundation Overlay (LSIO). Figure 5 shows the 1 % AEP flood inundation map within the subject site.

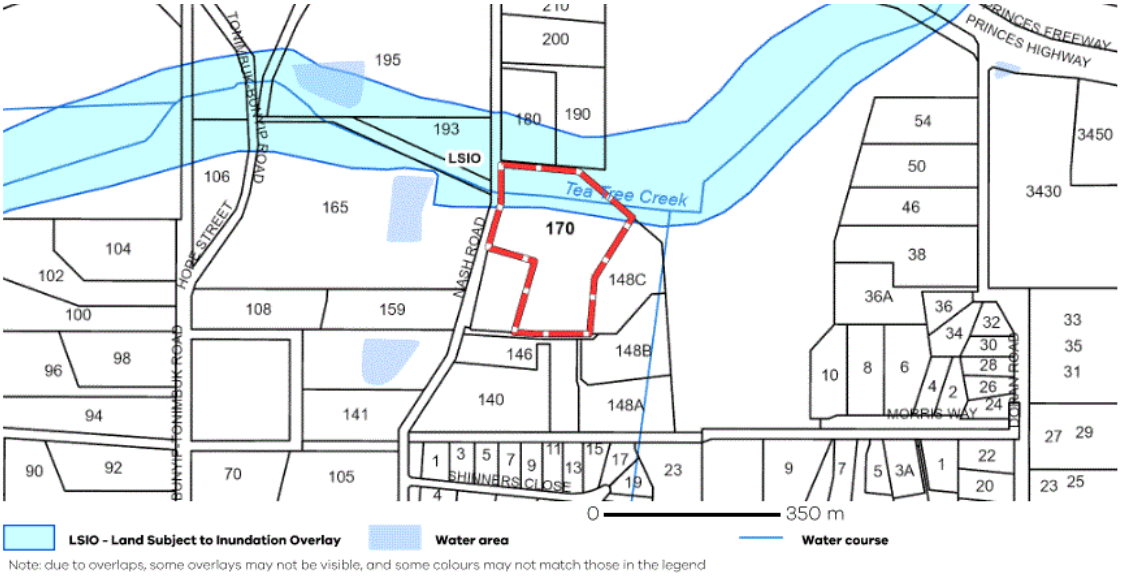

Figure 5 – Flood inundation map within the subject site (VicPlan-2024)

2.4.5 The Finished Floor Levels (FFL) of the proposed dwelling within the development will need to be set to a level at least 600 mm above the maximum flood level for a 1% AEP event.

3.0 Drainage Strategy

3.1 Background

3.1.1. The proposed development falls under the municipality of Cardinia Shire Council and Melbourne Water Catchment Management Authority.

3.1.2. DPM have received a pre-development advice from Melbourne Water for flood and drainage conditions. Appendix D includes the pre-development advice.

3.1.3. Based on the pre-development advice, the applicable 1% AEP flood level at the proposed indicative building envelope is 50.90 meters to AHD.

3.1.4. It is noted that the subject site is within the Land Subject to Inundation Overlay (LSIO) under the Cardinia Planning Scheme. Therefore, the development must be constructed at minimum 600 mm above the applicable flood level.

3.1.5. The Finished Floor Levels (FFL) for the development will be set at 51.50 metres to AHD (50.90+0.6).

3.1.6. It is noted that the Tea Tree Creek runs through the subject site which is a Priority Waterway under the Healthy Waterway Strategy. Therefore, a minimum setback of 20 metres from the top bank of the waterway is required for any civil works.

3.2 Hydrological Modelling

Design Flows

3.1.1. In accordance with the Australian Rainfall and Runoff 2019 (AR&R19), the calculation of the peak flows for catchments reasonably small (area smaller than 10 ha) can be undertaken with the use of the rational method.

3.1.2. No external catchments have been considered in the calculation of the peak flows.

3.1.3. The time of concentration has been calculated by using an average of a range of methods for flow length estimate, Bransby Williams and Pillgrim & McDermott.

3.1.4. The flow length estimate uses a constant velocity of 2.5 m/s to calculate the time of concentration for a 20% AEP event.

3.1.5. The flow length estimate uses a constant velocity of 1.5 m/s to calculate the time of concentration for a 1% AEP event.

3.1.6. The pre- and post-development flow originated by the proposed development site have been included in Table 2.

Table 2 Peak flows at the outfall of the proposed development

Flow Type:	Symbol	Storm Duration	Peak Flow Rate [m³/s]
Pre-developed Maximum Flow	1% AEP	12 minutes	0.447
Developed Major Flow	1% AEP	12 minutes	0.477
Developed Minor Flow	20% AEP	9 minutes	0.227

3.1.7. The flows in Table 2 have been calculated in line with the Cardinia Shire Council Planning Scheme and using the Rational Method, considered appropriate for a small catchment, as noted at 3.1.1

3.1.8. Further details of the flow calculation are attached in Appendix E – Drainage Computation.

3.3 Flow Attenuation

3.5.1. Due to the relatively small and uniform catchment, as previously stated, the Rational Method is considered an acceptable flow calculation method for both predeveloped flows and developed flows.

3.5.2. Boyd's Method (Boyd et al. 1994) and the modified rational method have been used to estimate the required storage for attenuation purposes at the downstream end of the site.

3.5.3. Boyd's method estimates the storage using the rational method calculated peak flow rate.

3.5.4. The modified rational method uses longer duration storms that produce smaller flow rates to verify that the storage capacity of the retarding basin is not exceeded.

3.5.5. However, due to the small difference between pre and post developed flow, longer durations storms (longer than 10 minutes) will result in post-developed flows smaller than pre-developed flow.

3.5.6. Therefore, as shown in Figure 6 the attenuation calculation has been only undertaken for the storm with 10-minute duration.

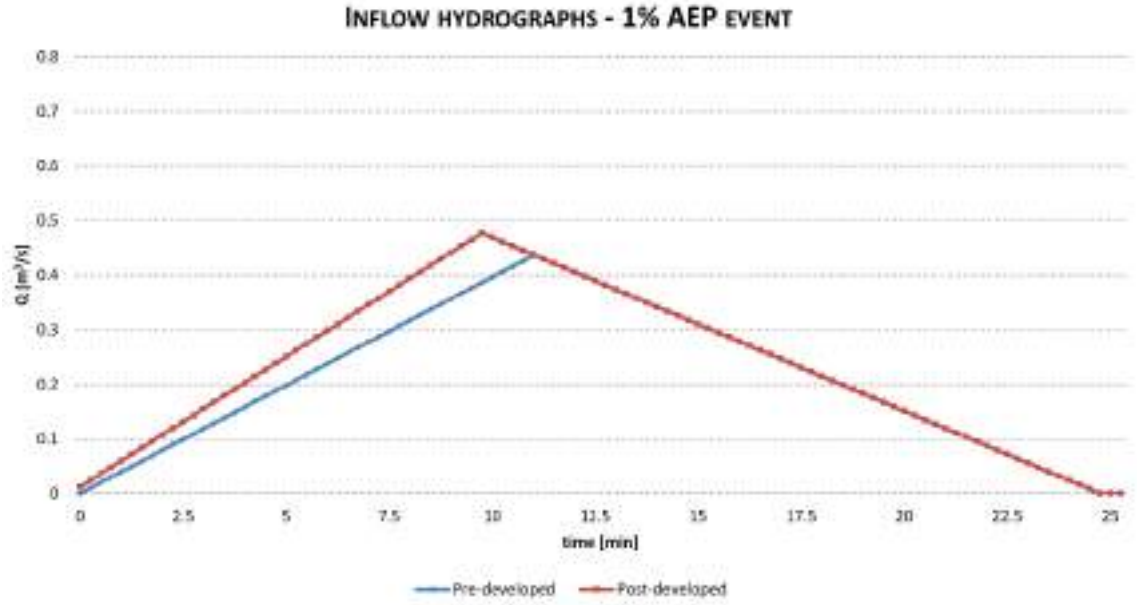

Figure 6 - Inflow hydrographs for a 10-minute storm duration

3.5.7. Table 3 outlines the storage volume required based on the different durations of the storm event.

Table 3 Summary of the results: storage required for different storm events

Storm Duration [min]	Q_{100} [m^3/s]	Storage required [m^3]
10 minutes	0.468	27

3.5.8. The critical AEP 1% storm that maximises the volume of the detention system is the 10-minute duration storm that produces a peak flow of 0.468 m^3/s and requires an attenuation storage of approximately 27 m^3.

3.5.9. The provision of approximately 27 m^3 of storage will be required for the ultimate attenuation of the post-developed flows to pre-developed condition to avoid any potential flood impact.

3.5.10. It is noted that the size of the attenuation can be provided by a rainwater tank to be installed for Lot 2 proposed dwelling.

3.5.11. Due to the small volume of the attenuation required for the proposed development, both minor flows and overland flows can be conveyed to Tee Tree Creek.

4.0 Integrated Water Management

4.1 Introduction

4.1.1. DPM have investigated the possibility to deliver innovative solutions within the proposed development to contribute and align with the objectives of Cardinia Shire City Council's 2018-2028 Integrated Water Management Plan.

4.1.2. For a development of this size, identifying opportunities that target for fit-for-purpose water usage, cooler greener microclimates and improved water quality for cleaner and healthy waterways would be well suited. The Developer is open to exploring opportunities that help achieve this with Council.

4.1.3. As mentioned within section 1.3.11, as part of the Victoria Planning Provision Clause 56.07, developers are required to achieve the water quality stormwater quality targets of

- 80% Total Suspended Solids (TSS) load reduction
- 45% Total Phosphorous (TP) load reduction
- 45% Total Nitrogen (TN) load reduction
- 75% Gross Pollutants (AKA Litter) reduction

4.1.4. Further discussion with Council and the Melbourne Water will need to be entertained to understand the feasibility of the integrated water management solutions proposed and the advantageous impact on the future drainage scheme assets downstream.

4.2 Stormwater Treatment

4.2.1. It should be noted the stormwater quality assets is only proposed for Lot 2 of the proposed development since Lot 1 will not have any additional dwelling and will remain in the existing condition after subdivision.

4.2.2. Provision of a 2.5 kl rainwater tank and a 20 m^2 bioretention (raingarden) is proposed for the Lot 2 of the development.

4.2.3. DPM have prepared a MUSIC model of the proposed development to evaluate the treatment train effectiveness of the temporary retarding basin (see Figure 7).

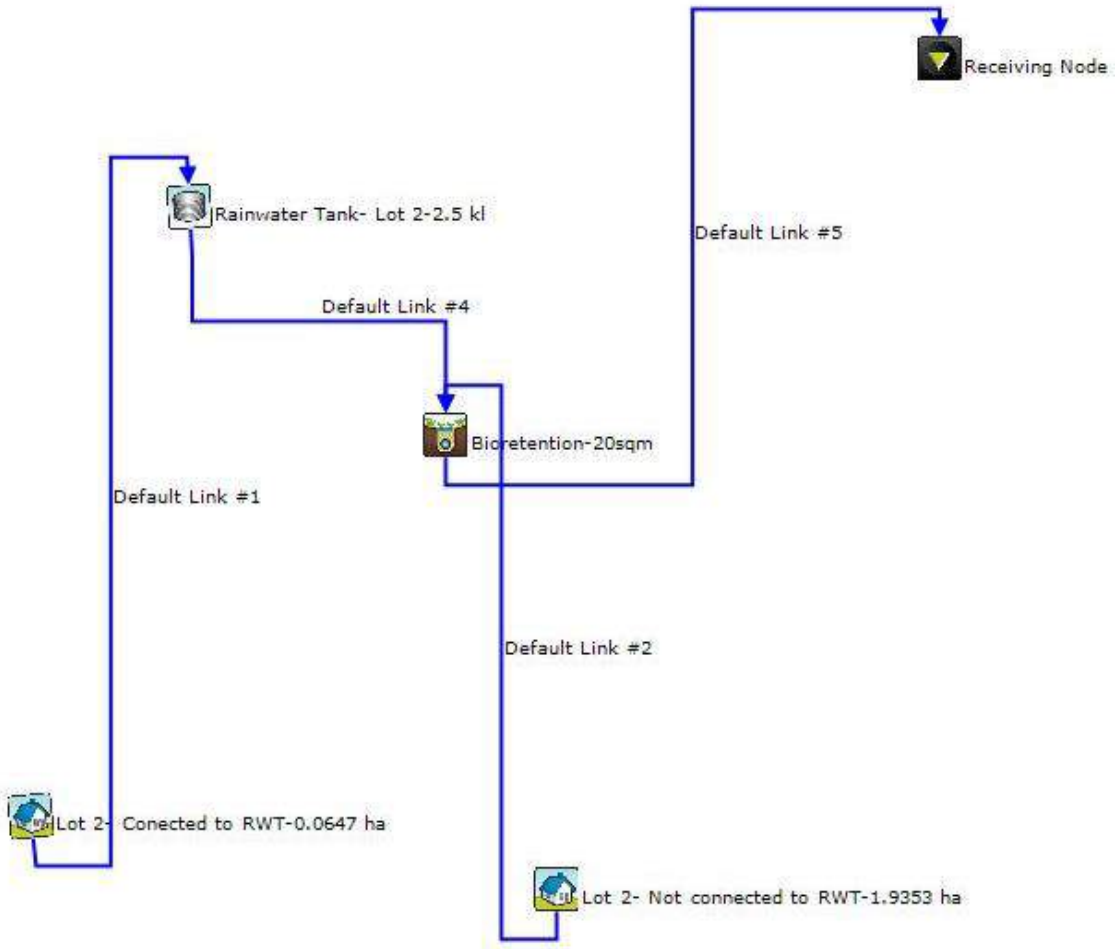

Figure 7– Music Model Proposed for the Development

4.2.4. The provision of the temporary retarding basin achieves the following results:

Table 4 Summary of the MUSIC results

	Proposed Development	BPEMG
TSS reduction [%]	80.97	80%
TP reduction [%]	49.46	45%
TN reduction [%]	57.64	45%

4.2.5. The results outlined in the above Table 4, highlight that the proposed stormwater water quality treatment assets achieve the Best Practice Environmental Management (BPEM) targets.

5.0 Overland Flow Passage

5.1.1. The overland flow paths of the proposed development have been analysed based on the existing contours levels.

5.1.2. Figure 8 shows the main overland flow paths within the proposed development.

Figure 8 – Overland Flow path of the proposed development

5.1.3. As highlighted in Figure 8, the overland flow originated from the proposed development is conveyed to Tee Tree Creek

5.1.4. The final outfall of the proposed development is represented by Tee Tree Creek to the north of the site.

5.1.5. Further investigation will need to be undertaken during detail design to confirm the overland flow paths to achieve the Melbourne Water floodway safety criteria.

5.1.6. Figure 9 highlights the flow from the catchment contributing to the overland flow at Section A.

6.0 Conclusion

6.1.1. DPM Consulting Group have completed a Stormwater Management Strategy for the proposed development at 170 Nash Rd, Bunyip, and have confirmed via assessment of the site's topography and subdivisional layout that the proposed development can achieve the key objectives required by the City Cardinia Shire Council and the Melbourne Water.

6.1.2. Based on the pre-development advice from Melbourne Water, the applicable 1% AEP flood level at the proposed indicative building envelope is 50.9 metres to AHD.

3.1.9. It is noted that the subject site is a Land Subject to Inundation Overlay (LSIO). Therefore, the Finished Floor Levels (FFL) of the proposed dwelling within the development will need to be set to a level at least 600 mm above the maximum flood level for a 1% AEP event. Therefore, the FFL for the proposed building will be 51.5 metres to AHD.

6.1.3. Attenuation of the post-developed peak flows (0.468 m^3/s) to pre-developed conditions is proposed to be achieved by provision of a 2.5 kl rainwater tank for Lot 2 of the proposed development.

6.1.4. Stormwater Quality modelling using MUSIC has demonstrated that the proposed stormwater quality treatment assets meet the BPEMG of Victoria Planning Provision Clause 56.07.

6.1.5. The Development proponent aims to achieve the objectives with respect to the Stormwater and constructed Waterways (Objectives 1) of Cardinia Shire City Council's IWMP.

All further enquiries can be made directly to:-

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Water Resources Engineer
B. Sc. Civil Eng.
DPM Consulting Group
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22 Business Park Drive, Notting Hill Victoria 3168 Australia

Bibliography

Babister, M., Trim, A., Testoni, I. & Retallick, M. 2016. The Australian Rainfall & Runoff Datahub, 37th Hydrology and Water Resources Symposium Queenstown NZ

Melton City Council, Integrated Water Management Plan

The State of Victoria Department of Environment, Land, Water and Planning 2017 Integrated Water Management Framework for Victoria

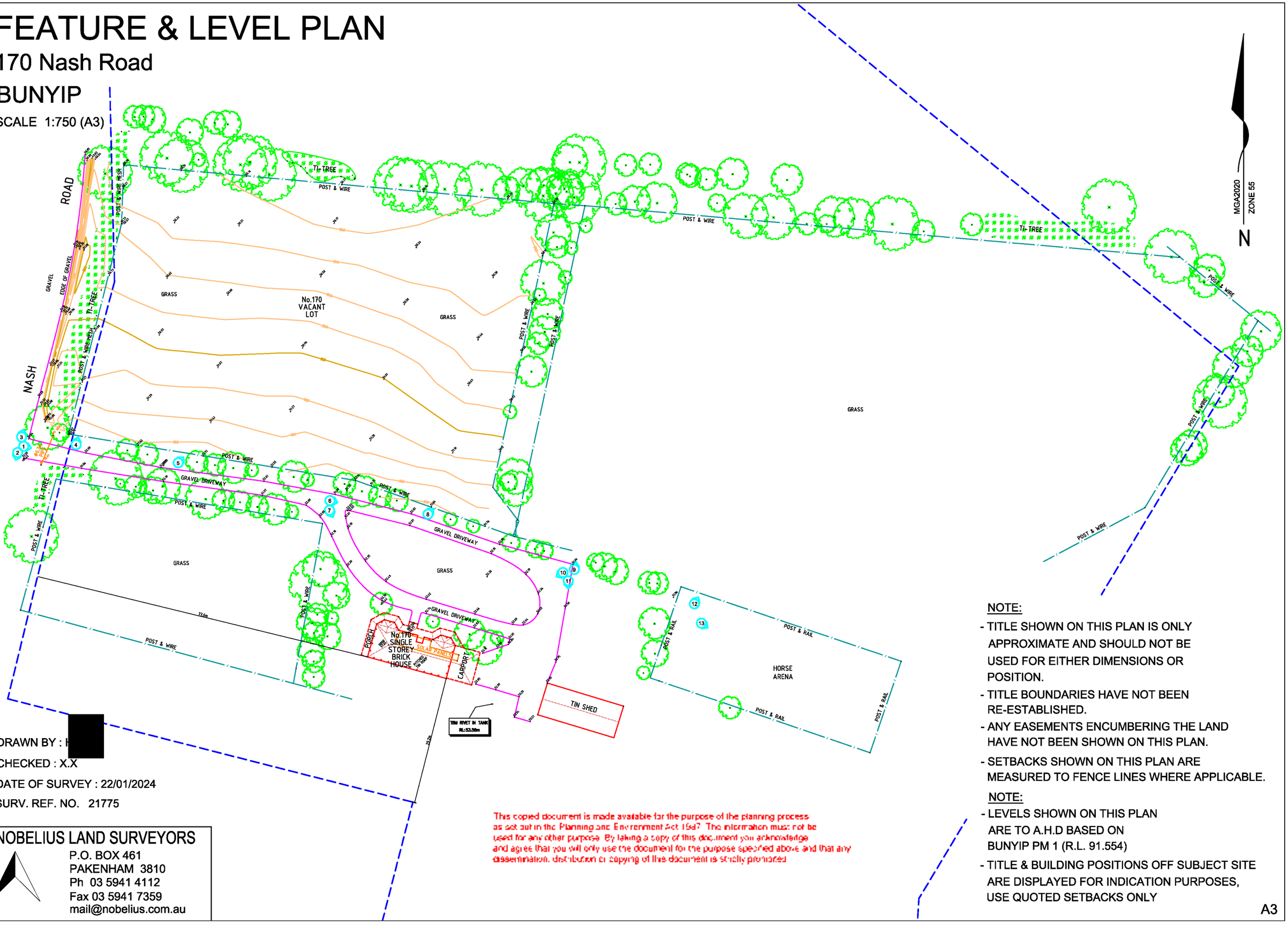
Appendix A - Existing Site Survey

FEATURE & LEVEL PLAN

170 Nash Road

BUNYIP

SCALE 1:750 (A3)



DRAWN BY : [redacted]

CHECKED : X.X

DATE OF SURVEY : 22/01/2024

SURV. REF. NO. 21775

NOBELIUS LAND SURVEYORS

P.O. BOX 461
PAKENHAM 3810
Ph 03 5941 4112
Fax 03 5941 7359
mail@nobelius.com.au

NOTE:

- TITLE SHOWN ON THIS PLAN IS ONLY APPROXIMATE AND SHOULD NOT BE USED FOR EITHER DIMENSIONS OR POSITION.
- TITLE BOUNDARIES HAVE NOT BEEN RE-ESTABLISHED.
- ANY EASEMENTS ENCUMBERING THE LAND HAVE NOT BEEN SHOWN ON THIS PLAN.
- SETBACKS SHOWN ON THIS PLAN ARE MEASURED TO FENCE LINES WHERE APPLICABLE.

NOTE:

- LEVELS SHOWN ON THIS PLAN ARE TO A.H.D BASED ON BUNYIP PM 1 (R.L. 91.554)
- TITLE & BUILDING POSITIONS OFF SUBJECT SITE ARE DISPLAYED FOR INDICATION PURPOSES, USE QUOTED SETBACKS ONLY

A3

Appendix B – Development Concept Layout Plan

DEVELOPMENT PLAN

170 Nash Road

BUNYIP

SCALE 1:1200 (A3)

VERSION 7

LEGEND

- xx - TREE TO BE RETAINED + TREE NUMBER
- - TREE PLOTTED FROM AN AERIAL IMAGE
- - TREE PROTECTION ZONE
- - STRUCTURAL ROOT ZONE
- - EXISTING EXTERNAL TITLE BOUNDARY
- - PROPOSED LOT BOUNDARIES ALONG AN EXISTING FENCE
- - PROPOSED LOT BOUNDARY TO BE FENCED
- - BIN COLLECTION AREA
- - PROPOSED DRIVEWAY (ALL 3m WIDE)

MGA2020 ZONE 55

N

ROAD

ROAD R-1

PROPOSED LOT 2 2ha

OPEN PADDOCK

SEE ENLARGEMENT BELOW

HEAVY VEGETATION

EASEMENT

TI-TREE

POST & WIRE

50.2

50.4

50.6

50.8

51.0

51.2

51.4

51.6

NOT FENCED

61.9m

GRAVEL

POST & WIRE MESH

GRAVEL DRIVEWAY

NASH

EXISTING SEPTIC LINES

GRASS

SEPTIC

PORCH

NO.170 SINGLE STOREY BRICK HOUSE

9.9m

SHED

TBM RIVET RL: 53.56m

PROPOSED LOT 1 3.738ha

POST & RAIL

HORSE ARENA

OPEN PADDOCK

TANKS

NO.148 SINGLE STOREY HOUSE

POOL

NO.154 SINGLE STOREY HOUSE

TANK

ROAD

NOBELIUS LAND SURVEYORS
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Ph 03 5941 4112
Fax 03 5941 7359
mail@nobelius.com.au

NOTE:
- LEVELS SHOWN ON THIS PLAN ARE TO A.H.D BASED ON BUNYIP PM 1 (R.L. 91.554)

DRAWN BY : [redacted]

CHECKED : T.F

DATE OF SURVEY : 22/01/2024

SURV. REF. NO. 21775

A3

ENLARGEMENT

2.7m
4.8m
4.1m
8.4m
6.5m
1.5m
3.3m

Appendix C – Drainage Computation

	pipe
v [m/s]	2.5
$^{1}I_{10}$ [mm/hr]	
C_{10}'	

170 NASH ROAD,BUNYIP - PRE-DEVELOPED CATCHMENT - FLOW CALCULATIONS

Catchment	Area [ha]	L [m]	$H_{UP-STREAM}$ [m]	$H_{DOWN-STREAM}$ [m]	S [m/km]	S [%]	Flow-length Tc [min]	Pilgrim & McDermott Tc [min]	Bransby Williams Tc [min]	Average Tc [min]	Pipe Tc [min]	Φ	C_5	C_{100}	I_5 [mm/hr]	I_{100} [mm/hr]	Q_{100} [m^3/s]	Q_5 [m^3/s]	Q_{GAP} [m^3/s]
Proposed Site	5.738	317.5	64.063	50	44.29	4.43%	12.29	10.46	15.39	12.71	9.12	0.106	0.199	0.252	66.8	111	0.446	0.212	0.233

Location

Duration	Annual Exceedance Probability (AEP) 63.2%	50%#	20%*	10%	5%	2%	1%
1 min	84.7	96.0	132	158	184	219	247
2 min	74.9	84.3	114	135	155	176	193
3 min	66.6	75.2	102	121	139	160	176
4 min	60.3	68.1	93.1	110	127	148	165
5 min	55.3	62.5	85.8	102	118	139	155
8 min	45.0	51.0	70.5	84.2	98.1	117	133
9 min	42.5	48.3	66.8	79.9	93.2	112	127
10 min	40.4	45.9	63.6	76.0	88.7	107	121
12 min	36.9	41.9	58.1	69.5	81.3	97.9	111
15 min	32.8	37.3	51.7	62.0	72.5	87.3	99.2
20 min	28.1	31.9	44.2	52.9	61.9	74.4	84.4
25 min	24.8	28.1	38.9	46.6	54.4	65.2	73.8
30 min	22.3	25.3	34.9	41.8	48.7	58.2	65.7
45 min	17.6	19.9	27.3	32.5	37.7	44.7	50.2
1 hour	14.8	16.7	22.8	27.1	31.3	36.9	41.2
1.5 hour	11.5	13.0	17.6	20.8	23.9	28.0	31.2
2 hour	9.66	10.8	14.6	17.2	19.8	23.1	25.7
3 hour	7.50	8.40	11.2	13.2	15.1	17.7	19.7
4.5 hour	5.80	6.48	8.64	10.1	11.6	13.7	15.3
6 hour	4.83	5.38	7.17	8.42	9.68	11.5	12.9
9 hour	3.71	4.14	5.52	6.50	7.52	8.99	10.2
12 hour	3.07	3.42	4.58	5.41	6.30	7.60	8.66
18 hour	2.34	2.61	3.51	4.18	4.91	5.99	6.88
24 hour	1.92	2.14	2.89	3.48	4.11	5.03	5.81
30 hour	1.65	1.83	2.49	3.00	3.57	4.38	5.07
36 hour	1.45	1.61	2.19	2.66	3.17	3.90	4.51
48 hour	1.18	1.31	1.79	2.18	2.62	3.20	3.70
72 hour	0.882	0.977	1.33	1.62	1.95	2.37	2.73
96 hour	0.716	0.789	1.06	1.29	1.55	1.87	2.14
120 hour	0.608	0.668	0.888	1.07	1.27	1.53	1.75
144 hour	0.532	0.583	0.764	0.905	1.07	1.29	1.47
168 hour	0.476	0.520	0.670	0.782	0.921	1.11	1.26

Duration	Annual Exceedance Probability (AEP) 63.2%	50%#	20%*	10%	5%	2%	1%
1 min	1.41	1.60	2.21	2.64	3.07	3.66	4.12
2 min	2.50	2.81	3.81	4.51	5.15	5.88	6.42
3 min	3.33	3.76	5.11	6.05	6.94	8.00	8.80
4 min	4.02	4.54	6.21	7.36	8.48	9.90	11.0
5 min	4.61	5.21	7.15	8.50	9.84	11.6	12.9
8 min	6.00	6.80	9.40	11.2	13.1	15.6	17.7
9 min	6.38	7.24	10.0	12.0	14.0	16.8	19.0
10 min	6.73	7.65	10.6	12.7	14.8	17.8	20.2
12 min	7.37	8.37	11.6	13.9	16.3	19.6	22.2
15 min	8.20	9.32	12.9	15.5	18.1	21.8	24.8
20 min	9.36	10.6	14.7	17.6	20.6	24.8	28.1
25 min	10.3	11.7	16.2	19.4	22.7	27.2	30.7
30 min	11.2	12.6	17.5	20.9	24.4	29.1	32.9
45 min	13.2	14.9	20.5	24.4	28.3	33.5	37.6
1 hour	14.8	16.7	22.8	27.1	31.3	36.9	41.2
1.5 hour	17.3	19.5	26.4	31.2	35.9	42.0	46.8
2 hour	19.3	21.7	29.2	34.5	39.6	46.2	51.3
3 hour	22.5	25.2	33.7	39.6	45.4	53.1	59.0
4.5 hour	26.1	29.2	38.9	45.6	52.3	61.5	68.8
6 hour	29.0	32.3	43.0	50.5	58.1	68.7	77.2
9 hour	33.4	37.2	49.7	58.5	67.6	80.9	91.7
12 hour	36.8	41.0	54.9	65.0	75.6	91.1	104
18 hour	42.1	46.9	63.1	75.3	88.4	108	124
24 hour	46.1	51.3	69.4	83.4	98.7	121	140
30 hour	49.4	55.0	74.6	90.1	107	131	152
36 hour	52.2	58.0	78.9	95.7	114	140	162
48 hour	56.7	63.0	85.9	105	126	154	178
72 hour	63.5	70.3	95.5	117	140	171	196
96 hour	68.7	75.8	102	124	149	179	205
120 hour	72.9	80.2	107	128	153	184	210
144 hour	76.7	84.0	110	130	155	186	212
168 hour	80.0	87.4	113	131	155	186	212

	pipe
v [m/s]	1.5	2.5
$^{1}I_{10}$ [mm/hr]	27.1	
C_{10}'	0.12793	

170 NASH ROAD,BUNYIP - POST-DEVELOPED CATCHMENT - FLOW CALCULATIONS

Catchment	Area [ha]	L [m]	$H_{UP-STREAM}$ [m]	$H_{DOWN-STREAM}$ [m]	S [m/km]	S [%]	Flow-length Tc [min]	Pillgrim & McDermott Tc [min]	Bransby Williams Tc [min]	Average Tc [min]	Pipe Tc [min]	Φ	C_{10}	C_{100}	I_{20} [mm/hr]	I_{100} [mm/hr]	Q_{100} [m^3/s]	Q_{20} [m^3/s]	Q_{RAP} [m^3/s]
Proposed Site	5.738	317.5	64.063	50	44.29	4.43%	10.53		15.39	12.96	9.12	0.125	0.213	0.269	66.8	111	0.477	0.227	0.250

If I consider a trapeizoidal shape of the hydrograph with a different storm event duration

Option	0	1	2	3	4
Peak flow	10.00	10.00	10.00	10.00	10.00
Storm duration [min]	10.00	15.00	20.00	35.00	40.00
I_{100} [mm/hr]		99.20	84.40	59.40	54.30
Q_{100} [m^3/s]	0.477	0.426	0.363	0.255	0.233
Detention Volume [m^3]	27	136	129	93	87

Location

Latitude:

Longitude:

	Annual Exceedance Probability (AEP)						
Duration	63.2%	50%#	20%^	10%	5%	2%	1%
1 min	84.7	96.0	132	158	184	219	247
2 min	74.9	84.3	114	135	155	176	193
3 min	66.6	75.2	102	121	139	160	176
4 min	60.3	68.1	93.1	110	127	148	165
5 min	55.3	62.5	85.8	102	118	139	155
10 min	40.4	45.9	63.6	76.0	88.7	107	121
15 min	32.8	37.3	51.7	62.0	72.5	87.3	99.2
20 min	28.1	31.9	44.2	52.9	61.9	74.4	84.4
25 min	24.8	28.1	38.9	46.6	54.4	65.2	73.8
30 min	22.3	25.3	34.9	41.8	48.7	58.2	65.7
45 min	17.6	19.9	27.3	32.5	37.7	44.7	50.2
1 hour	14.8	16.7	22.8	27.1	31.3	36.9	41.2
1.5 hour	11.5	13.0	17.6	20.8	23.9	28.0	31.2
2 hour	9.66	10.8	14.6	17.2	19.8	23.1	25.7
3 hour	7.50	8.40	11.2	13.2	15.1	17.7	19.7
4.5 hour	5.80	6.48	8.64	10.1	11.6	13.7	15.3
6 hour	4.83	5.38	7.17	8.42	9.68	11.5	12.9
9 hour	3.71	4.14	5.52	6.50	7.52	8.99	10.2
12 hour	3.07	3.42	4.58	5.41	6.30	7.60	8.66
18 hour	2.34	2.61	3.51	4.18	4.91	5.99	6.88
24 hour	1.92	2.14	2.89	3.48	4.11	5.03	5.81
30 hour	1.65	1.83	2.49	3.00	3.57	4.38	5.07
36 hour	1.45	1.61	2.19	2.66	3.17	3.90	4.51
48 hour	1.18	1.31	1.79	2.18	2.62	3.20	3.70
72 hour	0.882	0.977	1.33	1.62	1.95	2.37	2.73

	Annual Exceedance Probability (AEP)						
Duration	63.2%	50%#	20%^	10%	5%	2%	1%
1 min	1.41	1.60	2.21	2.64	3.07	3.66	4.12
2 min	2.50	2.81	3.81	4.51	5.15	5.88	6.42
3 min	3.33	3.76	5.11	6.05	6.94	8.00	8.80
4 min	4.02	4.54	6.21	7.36	8.48	9.90	11.0
5 min	4.61	5.21	7.15	8.50	9.84	11.6	12.9
10 min	6.73	7.65	10.6	12.7	14.8	17.8	20.2
15 min	8.20	9.32	12.9	15.5	18.1	21.8	24.8
20 min	9.36	10.6	14.7	17.6	20.6	24.8	28.1
25 min	10.3	11.7	16.2	19.4	22.7	27.2	30.7
30 min	11.2	12.6	17.5	20.9	24.4	29.1	32.9
45 min	13.2	14.9	20.5	24.4	28.3	33.5	37.6
1 hour	14.8	16.7	22.8	27.1	31.3	36.9	41.2
1.5 hour	17.3	19.5	26.4	31.2	35.9	42.0	46.8
2 hour	19.3	21.7	29.2	34.5	39.6	46.2	51.3
3 hour	22.5	25.2	33.7	39.6	45.4	53.1	59.0
4.5 hour	26.1	29.2	38.9	45.6	52.3	61.5	68.8
6 hour	29.0	32.3	43.0	50.5	58.1	68.7	77.2
9 hour	33.4	37.2	49.7	58.5	67.6	80.9	91.7
12 hour	36.8	41.0	54.9	65.0	75.6	91.1	104
18 hour	42.1	46.9	63.1	75.3	88.4	108	124
24 hour	46.1	51.3	69.4	83.4	98.7	121	140
30 hour	49.4	55.0	74.8	90.1	107	131	152
36 hour	52.2	58.0	78.9	95.7	114	140	162
48 hour	56.7	63.0	85.9	105	126	154	178
72 hour	63.5	70.3	95.5	117	140	171	196

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Detention Volume - sizing - 1% AEP storm event

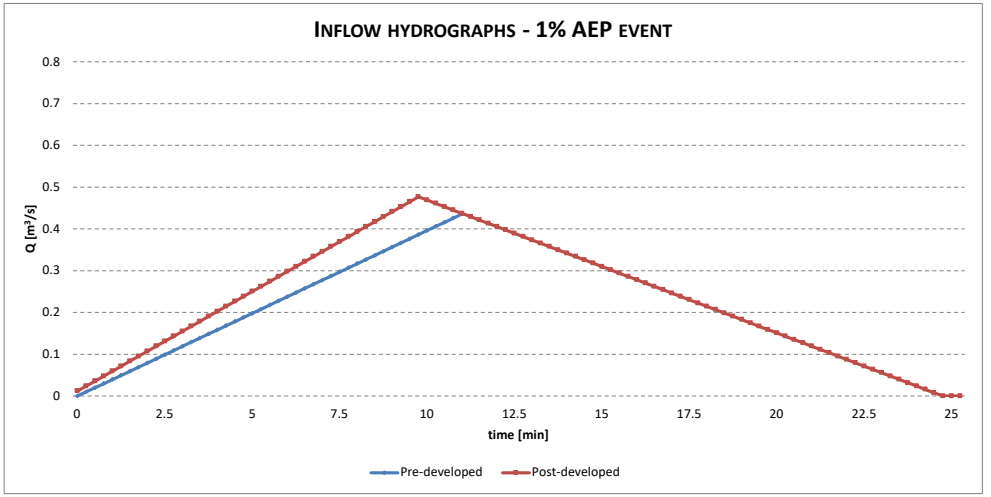
Pre-developed			
t [sec]	t [min]	Q [m^3/s]	V [m^3]
0	0	0	0
15	0.25	0.009905	0.14857
30	0.5	0.019809	0.445709
45	0.75	0.029714	0.891419
60	1	0.039619	1.485698
75	1.25	0.049523	2.228547
90	1.5	0.059428	3.119965
105	1.75	0.069333	4.159954
120	2	0.079237	5.348512
135	2.25	0.089142	6.68564
150	2.5	0.099047	8.171338
165	2.75	0.108951	9.805606
180	3	0.118856	11.58844
195	3.25	0.12876	13.51985
210	3.5	0.138665	15.59983
225	3.75	0.14857	17.82837
240	4	0.158474	20.20549
255	4.25	0.168379	22.73118
270	4.5	0.178284	25.40543
285	4.75	0.188188	28.22826
300	5	0.198093	31.19965
315	5.25	0.207998	34.31962
330	5.5	0.217902	37.58815
345	5.75	0.227807	41.00526
360	6	0.237712	44.57093
375	6.25	0.247616	48.28518
390	6.5	0.257521	52.14799
405	6.75	0.267426	56.15938
420	7	0.27733	60.31933
435	7.25	0.287235	64.62786
450	7.5	0.29714	69.08495
465	7.75	0.307044	73.69061
480	8	0.316949	78.44485
495	8.25	0.326854	83.34765
510	8.5	0.336758	88.39902
525	8.75	0.346663	93.59896
540	9	0.356567	98.94748
555	9.25	0.366472	104.4446
570	9.5	0.376377	110.0902
585	9.75	0.386281	115.8844
600	10	0.396186	121.8272
615	10.25	0.406091	127.9186
630	10.5	0.415995	134.1585
645	10.75	0.4259	140.547
660	11	0.435805	147.0841

Post-developed			
t [sec]	t [min]	Q [m^3/s]	V [m^3]
0	0	0	0
15	0.25	0.011922	0.178829
30	0.5	0.023844	0.536488
45	0.75	0.035766	1.072976
60	1	0.047688	1.788293
75	1.25	0.05961	2.682439
90	1.5	0.071532	3.755415
105	1.75	0.083454	5.00722
120	2	0.095376	6.437855
135	2.25	0.107298	8.047318
150	2.5	0.11922	9.835611
165	2.75	0.131141	11.80273
180	3	0.143063	13.94869
195	3.25	0.154985	16.27347
210	3.5	0.166907	18.77708
225	3.75	0.178829	21.45952
240	4	0.190751	24.32078
255	4.25	0.202673	27.36088
270	4.5	0.214595	30.57981
285	4.75	0.226517	33.97757
300	5	0.238439	37.55415
315	5.25	0.250361	41.30957
330	5.5	0.262283	45.24381
345	5.75	0.274205	49.35689
360	6	0.286127	53.64879
375	6.25	0.298049	58.11952
390	6.5	0.309971	62.76908
405	6.75	0.321893	67.59747
420	7	0.333815	72.6047
435	7.25	0.345737	77.79074
450	7.5	0.357659	83.15562
465	7.75	0.369581	88.69933
480	8	0.381503	94.42187
495	8.25	0.393424	100.3232
510	8.5	0.405346	106.4034
525	8.75	0.417268	112.6625
540	9	0.42919	119.1003
555	9.25	0.441112	125.717
570	9.5	0.453034	132.5125
585	9.75	0.464956	139.4869
600	10	0.476878	146.64
615	10.25	0.46893	153.674
630	10.5	0.460982	160.5887
645	10.75	0.453034	167.3842
660	11	0.445086	174.0605
675	11.25	0.437138	180.6176
690	11.5	0.42919	187.0554
705	11.75	0.421242	193.3741
720	12	0.413294	199.5735
735	12.25	0.405346	205.6537
750	12.5	0.397398	211.6147
765	12.75	0.38945	217.4564
780	13	0.381503	223.179
795	13.25	0.373555	228.7823
810	13.5	0.365607	234.2664
825	13.75	0.357659	239.6313
840	14	0.349711	244.8769
855	14.25	0.341763	250.0034

Detention tank
V [m^3]
0
0.030
0.091
0.182
0.303
0.454
0.635
0.847
1.089
1.362
1.664
1.997
2.360
2.754
3.177
3.631
4.115
4.630
5.174
5.749
6.354
6.990
7.656
8.352
9.078
9.834
10.621
11.438
12.285
13.163
14.071
15.009
15.977
16.976
18.004
19.063
20.153
21.272
22.422
23.602
24.813
25.755
26.430
26.837
26.976

			Δt [sec]	15	
Q_{100} [m^3/s]	0.446	Pre-developed	Q_{100} [m^3/s]	0.477	Developed
Tc [min]	11.25	peak flow	Tc [min]	10.00	peak flow
Tc [sec]	675		Tc [sec]	600	
	0.00066			0.000795	
T [min]	25	end simulation	T [min]	25	end simulation
T [sec]	1500		T [sec]	1500	
	0.00054			0.00053	

Detention volume [m^3] 27



870	14.5	0.333815	255.0106
885	14.75	0.325867	259.8986
900	15	0.317919	264.6674
915	15.25	0.309971	269.3169
930	15.5	0.302023	273.8473
945	15.75	0.294075	278.2584
960	16	0.286127	282.5503
975	16.25	0.278179	286.723
990	16.5	0.270231	290.7764
1005	16.75	0.262283	294.7107
1020	17	0.254335	298.5257
1035	17.25	0.246387	302.2215
1050	17.5	0.238439	305.7981
1065	17.75	0.230491	309.2555
1080	18	0.222543	312.5936
1095	18.25	0.214595	315.8125
1110	18.5	0.206647	318.9122
1125	18.75	0.198699	321.8927
1140	19	0.190751	324.754
1155	19.25	0.182803	327.4961
1170	19.5	0.174855	330.1189
1185	19.75	0.166907	332.6225
1200	20	0.158959	335.0069
1215	20.25	0.151011	337.2721
1230	20.5	0.143063	339.418
1245	20.75	0.135115	341.4447
1260	21	0.127168	343.3523
1275	21.25	0.11922	345.1405
1290	21.5	0.111272	346.8096
1305	21.75	0.103324	348.3595
1320	22	0.095376	349.7901
1335	22.25	0.087428	351.1015
1350	22.5	0.07948	352.2937
1365	22.75	0.071532	353.3667
1380	23	0.063584	354.3205
1395	23.25	0.055636	355.155
1410	23.5	0.047688	355.8703
1425	23.75	0.03974	356.4664
1440	24	0.031792	356.9433
1455	24.25	0.023844	357.3009
1470	24.5	0.015896	357.5394
1485	24.75	0.007948	357.6586
1500	25	0	357.6586
1515	25.25	0	357.6586
1530	25.5	0	357.6586
1545	25.75	0	357.6586
1560	26	0	357.6586
1575	26.25	0	357.6586
1590	26.5	0	357.6586
1605	26.75	0	357.6586
1620	27	0	357.6586
1635	27.25	0	357.6586
1650	27.5	0	357.6586
1665	27.75	0	357.6586
1680	28	0	357.6586
1695	28.25	0	357.6586
1710	28.5	0	357.6586
1725	28.75	0	357.6586
1740	29	0	357.6586
1755	29.25	0	357.6586
1770	29.5	0	357.6586
1785	29.75	0	357.6586
1800	30	0	357.6586
1815	30.25	0	357.6586

1830	30.5	0	357.6586
1845	30.75	0	357.6586
1860	31	0	357.6586
1875	31.25	0	357.6586
1890	31.5	0	357.6586
1905	31.75	0	357.6586
1920	32	0	357.6586
1935	32.25	0	357.6586
1950	32.5	0	357.6586
1965	32.75	0	357.6586
1980	33	0	357.6586
1995	33.25	0	357.6586
2010	33.5	0	357.6586
2025	33.75	0	357.6586
2040	34	0	357.6586
2055	34.25	0	357.6586
2070	34.5	0	357.6586
2085	34.75	0	357.6586
2100	35	0	357.6586
2115	35.25	0	357.6586
2130	35.5	0	357.6586
2145	35.75	0	357.6586
2160	36	0	357.6586
2175	36.25	0	357.6586
2190	36.5	0	357.6586
2205	36.75	0	357.6586
2220	37	0	357.6586
2235	37.25	0	357.6586
2250	37.5	0	357.6586
2265	37.75	0	357.6586
2280	38	0	357.6586
2295	38.25	0	357.6586
2310	38.5	0	357.6586
2325	38.75	0	357.6586
2340	39	0	357.6586
2355	39.25	0	357.6586
2370	39.5	0	357.6586
2385	39.75	0	357.6586
2400	40	0	357.6586
2415	40.25	0	357.6586
2430	40.5	0	357.6586
2445	40.75	0	357.6586
2460	41	0	357.6586
2475	41.25	0	357.6586
2490	41.5	0	357.6586
2505	41.75	0	357.6586
2520	42	0	357.6586
2535	42.25	0	357.6586
2550	42.5	0	357.6586
2565	42.75	0	357.6586
2580	43	0	357.6586
2595	43.25	0	357.6586
2610	43.5	0	357.6586
2625	43.75	0	357.6586
2640	44	0	357.6586
2655	44.25	0	357.6586
2670	44.5	0	357.6586
2685	44.75	0	357.6586
2700	45	0	357.6586
2715	45.25	0	357.6586
2730	45.5	0	357.6586
2745	45.75	0	357.6586
2760	46	0	357.6586
2775	46.25	0	357.6586

2790	46.5	0	357.6586
2805	46.75	0	357.6586
2820	47	0	357.6586
2835	47.25	0	357.6586
2850	47.5	0	357.6586
2865	47.75	0	357.6586
2880	48	0	357.6586
2895	48.25	0	357.6586
2910	48.5	0	357.6586
2925	48.75	0	357.6586
2940	49	0	357.6586
2955	49.25	0	357.6586
2970	49.5	0	357.6586
2985	49.75	0	357.6586
3000	50	0	357.6586
3015	50.25	0	357.6586
3030	50.5	0	357.6586

Appendix D – Pre-development Advice from Melbourne Water

25 June 2024

[redacted]
DPM Consulting Group
22 Business Drive Park
Notting Hill VIC 3168

Dear [redacted]

Proposal: Pre-development advice - One additional dwelling and two (2) lot subdivision
Site location: 170 NASH ROAD BUNYIP 3815

Melbourne Water reference:MWA-1332974
Date referred: 31/05/2024

Thank you for your application for pre-development information for the property listed above.

Melbourne Water provides the following high level, preliminary information to assist you in understanding the impacts that flooding and associated infrastructure or waterway assets may have on the potential to develop a property, and to inform your design response. Melbourne Water recommends that independent expert advice from a planning consultant or hydraulic engineer is sought in relation to the proposal, prior to submitting a planning or building permit application to the Responsible Authority.

Flood Level Information	The property is subject to flooding from the Tea Tree Creek. The applicable flood level for the property grades from 51.0 metres to Australian Height Datum (AHD) at the western property boundary down to 50.4 metres to AHD at the eastern property boundary, based on a rainfall event which has a 1% Annual Exceedance Probability (AEP), that is, a 1% probability of being equalled or exceeded in any one year. The applicable 1% AEP flood level at the proposed indicative building envelope is 50.90 metres to AHD.
Requirements	Melbourne Water assesses development applications in

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for Development in Flood Prone Areas	accordance with the Guidelines for Development in Flood Affected Areas (DELWP, 2019). These Guidelines describe four key objectives that need to be complied with when designing a development proposal. These include safety, flood damage, offsite impacts and waterway and floodplain protection. Development in or adjacent to a floodplain may only be acceptable where the development is protected from flooding (floor levels are constructed to the identified Nominal Flood Protection Level, there is safe access to and around the development (in considering site specific flood depths and velocities), development does not interfere with the passage and storage of floodwaters, and development does not impact the environmental values of waterways and floodplains. The property is within the Land Subject to Inundation Overlay (LSIO) under the Cardinia Planning Scheme. This can be verified on the VicPlan website. Refer to the relevant Planning Scheme and applicable Planning Policy Framework provisions relating to floodplains, coastal inundation, waterways, erosion and drainage for policy guidelines. Development in areas affected by flooding must consider the following: • Development must not obstruct the passage of flood flows; • Development must not reduce floodplain storage as this may cause flood levels and velocities to increase and adversely impact surrounding properties. • Imported fill must be kept to a minimum and used only for sub floor areas of buildings. • New fencing and decking must be of an open and unenclosed style of construction (fencing with 50% openings) to allow for the passage of flood flows.

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	Freeboard is the difference between the floor level of a building and the 1% AEP flood level. Freeboard requirements are designed to ensure that valuable buildings, their contents and the people in them are safely above the 1% AEP flood level. The development must be constructed with finished floor levels set no lower than 600mm above the applicable flood level. Garages must be constructed with finished floor levels set no lower than the applicable flood level.
Asset Information	Buildings and works should be located sufficiently away from a water supply, sewerage or drainage asset to ensure that the asset is not impacted and enable the asset to be adequately serviced. Formal approval is required from Melbourne Water to undertake buildings and works over or near a Melbourne Water asset. A separate application is required to be submitted to Melbourne Water for approval of any new or modified stormwater connection to Melbourne Water's drains or watercourses. Applications for these types of activities can be made directly to Melbourne Water via our website.
Waterway Information	The Tea Tree Creek runs through the subject property and is a designated waterway under the Water Act 1989. Melbourne Water's Healthy Waterways Strategy 2018 describes the waterway catchment context, waterway management objectives and the multiple values waterways support. All new development should preserve, and if possible enhance, the social and environmental values and benefits of floodplains and waterways and should be sensitively designed and sited to maintain and enhance environm ental assets, significant views and landscapes along and adjacent to river corridors, waterways, lakes and

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wetlands.

Refer to Melbourne Water's Waterway Corridors Guidelines for general waterway setback guidance, and to the relevant Planning Scheme and applicable Planning Policy Framework provisions relating to waterways for policy guidelines.

Any future plans must detail the waterway centreline and top of bank of the Tea Tree Creek. Plans are to include distances marked from the indicative Building Envelope to the top of bank, distance from indicative Waste Envelope to Top of bank and any other proposed built form.

Tea Tree Creek is a Priority Waterway under the Healthy Waterway Strategy 2018 and as such the vegetation along this waterway is important to waterway health. Any civil works, built form or ground disturbing activities must be excluded from a 20m setback buffer from the top of bank of the waterway. This includes any built form, to protect the vegetation which will in turn protect the waterway from erosion into the future.

If the Tea Tree Creek is the legal point of discharge as directed by council a separate application will need to be made to Melbourne Water for the storm water connection for the propose house.

The setback distance of the proposed onsite wastewater system to Tea Tree creek must be consistent with the minimum setback distances within Table 5 of the EPA 891.4: Code of practice – onsite wastewater management . These setback distances are 60m for primary sewage and graywater systems and 30m for secondary sewage and/or advanced greywater systems. Any reductions to the minimum setback referred in Table 5 in regards to Surface Waters (up-slope of) must be referred to Melbourne Water for review and approval prior to issuing

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	of the relevant permit. Prior to commencement of any works, a Site Environmental Management Plan (SEMP) must be submitted to Melbourne Water for review and approval. The SEMP must address the following: • Sediment and silt management controls • Vegetation management techniques • Access tracks • Spoil stockpiling • Machinery/Plant locations • Exclusion fencing round native vegetation/habitat An easement for the waterway may be required at subdivision stage.

Any plans that may have been submitted with your application have not been assessed for compliance and the information provided above does not constitute approval. Melbourne Water may not support development that does not satisfy the criteria within the relevant guidelines and planning provisions.

Melbourne Water will formally review, assess and respond to your complete application at planning or building permit stage, and as such recommends that the Responsible Authority's pre-application service is also used to understand the risks associated with any proposal as a whole.

This information provided above is preliminary in nature and forms no contractual agreement between your company and Melbourne Water. Melbourne Water reserves the right to alter any or all of this information at any time.

For general development enquiries contact our Customer Service Centre on 131 722.

Regards,

[redacted]

[redacted]
Statutory Referral Permit Services

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Preliminary Arboricultural Assessment

Location:

Specified area of 170 Nash Road, Bunyip

Report Commissioned by:

Nobelius Land Surveyors

Author:

[redacted]

Grad. Cert. Arb.

Arbkey ref: 24-01-15NashBunyipv3.docx

Date submitted: December 13, 2024

Table of Contents

1 Introduction

Arbkey has been engaged by Nobelius Land Surveyors to provide a Preliminary Arboricultural Assessment for trees potentially affected by an in-planning development within a specified area of 170 Nash Road, Bunyip. For the report arbkey has:

- Identified and assessed the trees, providing their location, species, dimensions, useful life expectancy and health and structural condition.
- Allocated each tree an arboricultural value, indicating its merit for retention in the landscape throughout nearby disturbance.
- Calculated the size of the Tree Protection Zone (TPZ) in accordance with Australian Standard 4970, Protection of Trees on Development Sites.
- Provided recommendations to protect any trees through adjacent developments.

2 Site Details

The subject site is a mixed-use property featuring a house building, sheds, and animal holding/grazing yards (Figure 1). Canopy trees are a significant feature of the site and usually border the animal holding areas at the site. The central section of the site is the subject of this report. Development of the site is in the early planning phases

Figure 1: Subject site – Typical landscape.

2.1 Planning and Policy Context

The subject site is located within Green Wedge A Zone – Schedule 2 of the Cardinia Planning Scheme (DEECA 2024). The vegetation protection related planning or policy controls for the site and how they affect the assessed trees has been provided in Table 1.

Table 1: Vegetation controls at site

Planning/Policy Control	Applied to site?	Overview of control
Environmental Significance Overlay (ESO)	Yes (ESO1)	A permit is required to remove, destroy, or lop any vegetation, including dead vegetation. A list of exemptions applies
52.17 Native Vegetation	Yes	A permit is required to remove non planted, locally indigenous vegetation.

Trees within 10m of an existing dwelling, or 1m of an existing fence, constructed prior to September 2009 are exempt from planning scheme controls due to the site's location within a Bushfire Prone Area (DEECA 2024).

Due to their ownership, any trees within adjacent third-party owned property must remain viable throughout works at the subject site unless under agreement with the tree's respective owner. Modification of trees in adjacent property may also be subject to permit approval.

2.2 Site Map

A site map detailing existing conditions and tree locations has been provided in Appendix 1: Site Map

3 Methodology

On the 8 February 2024, [redacted] undertook inspection of trees greater than 3m in height located at, or with tree protection zones (AS4970 2009) likely to intersect a specified area of, 170 Nash Road, Bunyip. The following information was collected for the trees:

- Tree Species
- Tree Location
- Height (m)
- Crown Spread (m)
- Diameter at Breast Height (DBH) at 1.4m (cm)
- Diameter at Base (DAB) at just above the root flare (cm)
- Health
- Structure
- Significance
- Photographs of tree

Only a ground based visual inspection was undertaken of all trees according to the principles of Visual Tree Assessment and tree hazard assessment described in Harris, Clark and Matheny (1999) and Mattheck and Breloer (1994).

Large areas of Swamp Paperbark (*Melaleuca ericifolia*) were plotted as groups and a TPZ and SRZ established around the group extent.

Tree location has been derived using a feature survey provided by the client or if not present aligned using an RTK corrected GNSS receiver.

Height was measured on site using an impulse laser accurate to +/- 30cm. Crown spread values or drawings are indicative of crown size only, not shape or form.

A diameter tape was used to measure DBH. To prevent trespass, DBH has been estimated on adjacent sites.

Health, Structure and Significance are qualitative values derived from visual indicators and the authors experience and qualifications.

Full data collection definitions are available in Appendix 6: Data Definitions.

3.1 Documents Reviewed

Table 2: Documents reviewed to assist in the compilation of this report

Document Name	DWG/Document #	Author	Document Description	Date compiled/drawn
170 Nash Rd Development Plan Ver 7	21775	Nobelius Land Surveyors	Site Survey	22 Jan 2024

4 Observations

4.1 Tree Details

257 trees were assessed, 238 on the site itself and 19 within adjacent third-party managed property (Table 3). Full details of the assessed trees have been provided in Appendix 2: Tree Details.

Table 3: Count of assessed species and their respective species origin

Genus Species	Common Name	Species Origin	Count of Trees	Tree IDs
Eucalyptus ovata	Swamp Gum	Indigenous	23	14, 64, 68, 69, 71, 78, 85, 88, 102, 154, 156, 157, 159, 178, 182, 187, 196, 199, 234, 240, 242, 244, 252
Allocasuarina littoralis	Black She-oak	Indigenous	22	17, 18, 25, 26, 29, 31, 33, 34, 36, 40, 41, 42, 44, 45, 49, 53, 54, 56, 58, 60, 61, 215
Eucalyptus cypellocarpa	Mountain Grey Gum	Indigenous	21	15, 16, 19, 20, 21, 23, 24, 27, 28, 30, 32, 35, 37, 38, 43, 46, 47, 52, 55, 100, 101
Eucalyptus cephalocarpa	Silver-leaved Stringybark	Indigenous	17	2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 48, 50, 51, 62, 94, 134, 135
Melaleuca ericifolia	Swamp Paperbark	Australian Native	13	1, 13, 22, 59, 84, 89, 122, 137, 138, 220, 232, 235, 247
Eucalyptus cinerea	Mealy Stringybark	Australian Native	12	73, 79, 91, 97, 109, 113, 158, 184, 188, 191, 230, 241
Melaleuca linariifolia	Snow in Summer	Australian Native	11	95, 103, 174, 197, 201, 204, 207, 209, 213, 225, 231
Callistemon viminalis	Weeping Bottle Brush	Australian Native	9	140, 164, 165, 180, 208, 216, 255, 256, 257
Eucalyptus camaldulensis	River Red Gum	Indigenous	9	65, 92, 93, 104, 132, 161, 162, 239, 243
Eucalyptus kitsoniana	Gippsland Mallee	Australian Native	8	82, 83, 96, 105, 115, 116, 205, 217
Acacia melanoxylon	Blackwood	Indigenous	7	66, 67, 86, 87, 236, 245, 251
Callistemon salignus	Willow Bottle Brush	Australian Native	7	72, 123, 143, 150, 169, 170, 171
Eucalyptus mannifera	Brittle Gum	Australian Native	7	80, 81, 121, 128, 141, 146, 249
Acacia floribunda	Catkin Wattle	Australian Native	6	144, 155, 166, 167, 168, 172
Eucalyptus robusta	Swamp Mahogany	Australian Native	6	98, 106, 108, 114, 183, 192
Melaleuca armillaris	Giant Honey Myrtle	Australian Native	6	119, 124, 181, 211, 219, 228
Melaleuca styphelioides	Prickly Paperbark	Australian Native	6	63, 77, 129, 136, 177, 226
Callistemon citrinus	Crimson Bottle Brush	Australian Native	5	117, 130, 139, 149, 253
Eucalyptus grandis	Flooded Gum	Australian Native	5	151, 233, 246, 248, 250
Grevillea robusta	Silky Oak	Australian Native	5	198, 203, 206, 210, 212
Acacia baileyana	Cootamundra Wattle	Australian Native	4	221, 222, 223, 224
Bursaria spinosa	Sweet Bursaria	Indigenous	4	125, 126, 127, 131
Eucalyptus globulus	Blue Gum	Australian Native	4	152, 190, 227, 237
Eucalyptus viminalis	Manna Gum	Indigenous	4	75, 110, 133, 189
Eucalyptus cladocalyx	Sugar Gum	Australian Native	3	163, 218, 229
Eucalyptus nicholii	Narrow-leaved Black Peppermint	Australian Native	3	70, 74, 76
Eucalyptus scoparia	Wallangarra Gum	Australian Native	3	118, 200, 238
Eucalyptus spathulata	Swamp Mallet	Australian Native	3	193, 194, 195
Mixed Species			24	-

4.1.1 Health and Structure

Each tree was attributed a health and a structure rating as indication of its respective vigour and stability/form. Most of the assessed trees have full canopies and only minor structural defects. Accordingly, most were attributed health ratings of 'Good' and structure ratings of 'Fair'. (Table 4 and Table 5)

Table 4: Overview of assessed health

Health	Count of Trees	Tree IDs
Good	169	1, 13, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 49, 51, 53, 54, 55, 59, 60, 62, 63, 66, 69, 70, 71, 72, 74, 76, 77, 79, 84, 85, 86, 87, 89, 90, 91, 92, 93, 95, 97, 99, 100, 101, 102, 103, 106, 107, 108, 109, 110, 112, 113, 114, 117, 118, 119, 121, 122, 123, 124, 128, 129, 130, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 143, 144, 146, 149, 151, 152, 153, 155, 156, 157, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 176, 177, 179, 180, 182, 183, 186, 188, 189, 191, 197, 198, 200, 201, 203, 204, 207, 208, 209, 210, 212, 213, 220, 221, 222, 223, 224, 225, 226, 232, 233, 234, 235, 236, 237, 238, 239, 243, 244, 245, 246, 247, 248, 250, 251, 253, 254, 255, 256, 257
Fair	75	3, 4, 5, 6, 8, 9, 11, 12, 14, 18, 30, 48, 50, 52, 56, 57, 58, 61, 64, 65, 67, 68, 73, 78, 80, 83, 88, 94, 96, 98, 104, 105, 111, 116, 120, 125, 126, 127, 131, 142, 145, 147, 148, 150, 154, 158, 159, 160, 175, 178, 181, 184, 185, 187, 190, 192, 194, 196, 199, 206, 211, 214, 215, 216, 217, 218, 219, 228, 229, 230, 231, 240, 241, 249, 252
Poor	11	7, 75, 81, 82, 115, 193, 195, 202, 205, 227, 242
Dead	2	2, 10

Table 5: Overview of assessed structure

Structure	Count of Trees	Tree IDs
Good	57	12, 15, 16, 19, 20, 21, 23, 27, 28, 30, 32, 34, 35, 39, 44, 49, 50, 52, 64, 65, 76, 78, 86, 87, 90, 93, 100, 101, 129, 130, 132, 135, 136, 143, 148, 151, 152, 153, 156, 161, 189, 194, 198, 203, 206, 210, 212, 214, 224, 233, 236, 237, 243, 244, 246, 248, 252
Fair	178	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 17, 22, 24, 25, 26, 29, 31, 33, 36, 38, 40, 41, 42, 43, 45, 46, 47, 48, 51, 53, 54, 55, 56, 57, 59, 61, 62, 63, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 77, 79, 80, 83, 84, 85, 88, 89, 91, 92, 95, 97, 98, 99, 102, 103, 104, 105, 107, 108, 109, 110, 111, 112, 113, 114, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 131, 133, 134, 137, 138, 139, 140, 141, 142, 144, 145, 146, 149, 154, 155, 157, 159, 160, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 176, 177, 178, 179, 180, 181, 182, 183, 184, 186, 187, 188, 190, 191, 192, 196, 197, 199, 200, 201, 202, 204, 207, 208, 209, 213, 215, 216, 218, 219, 220, 221, 222, 223, 225, 226, 227, 228, 229, 232, 234, 235, 238, 239, 240, 241, 242, 245, 247, 249, 250, 251, 253, 254, 255, 256, 257
Poor	22	18, 37, 58, 60, 81, 82, 94, 96, 106, 115, 147, 150, 158, 175, 185, 193, 195, 205, 211, 217, 230, 231

4.1.2 Useful Life Expectancy

ULE (Useful Life Expectancy) indicates the anticipated remaining years of lifespan of the tree in its existing surroundings. The tree's lifespan is the time that it will continue to provide amenity value without undue risk or hazard and with a reasonable amount of maintenance. Most of the assessed trees were attributed remaining ULEs of greater than 15 years (Table 6).

Table 6: Overview of ULE

ULE (years)	Count of Trees	Tree IDs
0	5	2, 10, 75, 115, 193
<5	7	60, 81, 82, 94, 195, 205, 211
5 to 15	80	1, 3, 5, 6, 7, 11, 13, 18, 22, 40, 57, 58, 59, 72, 77, 84, 88, 89, 96, 98, 106, 116, 117, 119, 122, 124, 125, 126, 127, 131, 137, 138, 142, 144, 145, 147, 149, 150, 155, 158, 160, 164, 165, 166, 167, 168, 172, 175, 176, 178, 179, 181, 184, 185, 190, 192, 202, 208, 216, 217, 218, 219, 220, 221, 222, 223, 224, 227, 228, 229, 230, 231, 232, 235, 242, 247, 253, 255, 256, 257
15 to 40	100	4, 8, 9, 12, 14, 17, 25, 26, 29, 31, 33, 34, 36, 37, 39, 41, 42, 44, 45, 48, 49, 51, 53, 54, 56, 61, 63, 64, 66, 67, 68, 70, 71, 73, 74, 78, 79, 80, 83, 85, 95, 97, 99, 103, 105, 108, 109, 111, 114, 120, 123, 129, 130, 133, 136, 139, 140, 143, 151, 154, 157, 159, 163, 169, 170, 171, 174, 177, 180, 182, 183, 186, 187, 188, 196, 197, 198, 199, 200, 201, 203, 204, 206, 207, 209, 210, 212, 213, 214, 215, 226, 234, 240, 241, 245, 249, 250, 251, 252, 254
>40	65	15, 16, 19, 20, 21, 23, 24, 27, 28, 30, 32, 35, 38, 43, 46, 47, 50, 52, 55, 62, 65, 69, 76, 86, 87, 90, 91, 92, 93, 100, 101, 102, 104, 107, 110, 112, 113, 118, 121, 128, 132, 134, 135, 141, 146, 148, 152, 153, 156, 161, 162, 173, 189, 191, 194, 225, 233, 236, 237, 238, 239, 243, 244, 246, 248

5 Discussion

5.1 Arboricultural Value

All the assessed trees have been attributed an arboricultural value (Table 7). Arboricultural value is a calculated rating indicating the arboricultural merit of the tree for retention through any nearby disturbance. It is a qualitative combination of the trees ULE and significance values. Trees of higher arboricultural value should be prioritised for retention through works that may impact trees. Conversely, trees of low or no arboricultural value can often be removed to facilitate a development with little or no effect on wider landscape value.

Trees attributed an arboricultural value of 'Third Party Ownership' are located on adjacent land to the assessment. It is assumed that the owner of the tree attributes it a 'High' arboricultural value and requires its retention in the landscape.

Table 7: Overview of arboricultural value

Arboricultural Value	Count	Tree IDs
High	34	15, 16, 19, 20, 21, 23, 24, 27, 28, 32, 35, 38, 43, 46, 47, 50, 52, 55, 62, 64, 69, 90, 100, 101, 102, 104, 132, 133, 152, 182, 187, 188, 189, 194
Medium	73	25, 26, 29, 30, 31, 33, 34, 36, 37, 40, 41, 42, 44, 48, 51, 53, 56, 58, 68, 70, 73, 74, 76, 78, 79, 80, 83, 85, 88, 91, 92, 93, 95, 97, 106, 107, 108, 109, 110, 111, 112, 113, 114, 134, 135, 146, 157, 159, 171, 173, 178, 183, 184, 186, 190, 191, 196, 199, 200, 202, 204, 207, 210, 212, 213, 214, 215, 227, 233, 240, 250, 252, 254
Low	122	17, 18, 22, 39, 45, 49, 54, 57, 59, 60, 61, 63, 71, 72, 77, 84, 86, 87, 89, 96, 98, 99, 103, 105, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 147, 148, 149, 150, 151, 153, 154, 155, 156, 158, 160, 163, 164, 165, 166, 167, 168, 169, 170, 172, 174, 175, 176, 177, 179, 180, 181, 185, 192, 197, 198, 201, 203, 206, 208, 209, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 228, 229, 230, 231, 232, 234, 235, 236, 237, 238, 239, 241, 242, 243, 244, 245, 246, 247, 248, 249, 251, 253, 255, 256, 257
None	9	75, 81, 82, 94, 115, 193, 195, 205, 211
Third Party Ownership	19	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 65, 66, 67, 161, 162

Figure 2: Tree 23, *Eucalyptus cypellocarpa* (Mountain Grey Gum), attributed an arboricultural value of 'High'.

5.2 Tree Protection Zone (TPZ) and Structural Root Zone (SRZ)

AS4970 (2009) specifies areas drawn radially from each tree's stem which indicate the area required for its stability (SRZ) and viability (TPZ) throughout nearby disturbance such as development. Further information on TPZs and SRZs has provided in Appendix 7: Tree Protection Zones and Encroachment

5.2.1 TPZ and SRZ details

TPZ and SRZ details for all trees has been supplied in Appendix 3: TPZ and SRZ details.

5.2.2 TPZ and SRZ Map

Maps detailing the TPZ and SRZ have been provided in Appendix 4: TPZ and SRZ Map.

6 Conclusions and Recommendations

Development of the site at 170 Nash Road, Bunyip is currently in the early design phases. Arbkey has been engaged to assess the trees at or adjacent to the site. 257 trees were assessed, 238 on the site and 19 within adjacent property. Detailed assessments have been provided for each tree. Additionally, the tree protection zone (TPZ) and structural root zone (SRZ) has been calculated for each tree as per AS4970 (2009). It is recommended that:

- The design team is made fully aware of the location, arboricultural value and planning/policy context of the trees including all appropriate tree protection measures, prior to finalising the design process. Particularly the Tree Protection Zone (TPZ) guidelines, dimensions, and requirements.
- Trees of higher arboricultural value are prioritised for retention throughout the design process.
- The proposed design ensures that the impact to the canopy and root systems of all trees to be retained, including those within adjacent property, is kept to a minimum and does not encroach on the tree's Tree Protection Zone (TPZ). If it is impossible to keep construction out of the TPZ then encroachment should not exceed 10% of a tree's respective TPZ area.
    - Where TPZ are encroached, the lost area must be compensated elsewhere in an area contiguous to the remaining TPZ.
    - If encroachment cannot be minimised to less than 10% of a tree's respective TPZ area; tree sensitive construction methods such as at-grade construction or pier, cantilevered or screw pile footings should be considered to minimise below and above ground TPZ disturbance.
    - Site factors, such as existing hard stand or root inhibitive soil conditions, may increase the encroachment tolerance of adjacent trees. These factors should be considered during the design phases of the development.
- If, throughout the design process, the TPZ of trees will be impacted during the actual development:
    - Prior to construction commencement, an Arboricultural Impact Assessment and Tree Management Plan should be prepared by a suitably qualified arborist. This would assess the impact of the final design and provide recommendations to protect any trees to be retained on the site throughout the development.

7 References

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AS 4970, 2009, Australian Standard, Protection of Trees on Development Sites, Standards Australia

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8 Appendix 1: Site Map

Figure 3: Site Map – Existing Conditions

9 Appendix 2: Tree Details

Table 8: Details of assessed trees

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
1	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	5	2	12	15	Good	Fair	Mature	5 to 15	Third Party Ownership	Copse of melaleuca ericifolia	Yes	
2	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	7	2	41	45	Dead	Fair	Over-mature	0	Third Party Ownership		Yes	Yes
3	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	7	5	50.91	53	Fair	Fair	Mature	5 to 15	Third Party Ownership		Yes	Yes
4	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	6	7	45	54	Fair	Fair	Mature	15 to 40	Third Party Ownership		Yes	Yes
5	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	5	5	32	35	Fair	Fair	Mature	5 to 15	Third Party Ownership		Yes	Yes
6	*Prunus cerasifera*	Cherry Plum	Exotic	4	3	11.92	16	Fair	Fair	Mature	5 to 15	Third Party Ownership			
7	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	4	3	18	20	Poor	Fair	Semi-mature	5 to 15	Third Party Ownership	Suppressed by adjacent trees	Yes	Yes
8	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	10	7	46	54	Fair	Fair	Mature	15 to 40	Third Party Ownership		Yes	Yes
9	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	9	5	41	48	Fair	Fair	Mature	15 to 40	Third Party Ownership		Yes	Yes
10	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	5	2	28	34	Dead	Fair	Over-mature	0	Third Party Ownership		Yes	Yes
11	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	10	7	65	74	Fair	Fair	Mature	5 to 15	Third Party Ownership		Yes	Yes
12	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	9	7	45	55	Fair	Good	Mature	15 to 40	Third Party Ownership		Yes	Yes
13	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	5	2	15	18	Good	Fair	Mature	5 to 15	Third Party Ownership	Copse along fence in road reserve	Yes	
14	*Eucalyptus ovata*	Swamp Gum	Indigenous	13	9	62	72	Fair	Fair	Mature	15 to 40	Third Party Ownership		Yes	Yes
15	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	19	15	77	86	Good	Good	Mature	>40	High		Yes	Yes
16	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	20	12	58	65	Good	Good	Mature	>40	High		Yes	Yes
17	*Allocasuarina littoralis*	Black She-oak	Indigenous	4	2	8	12	Good	Fair	Semi-mature	15 to 40	Low		Yes	Yes
18	*Allocasuarina littoralis*	Black She-oak	Indigenous	3	4	14	16	Fair	Poor	Semi-mature	5 to 15	Low		Yes	Yes

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
19	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	16	10	77	85	Good	Good	Mature	>40	High		Yes	Yes
20	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	15	8	50	58	Good	Good	Mature	>40	High		Yes	Yes
21	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	17	11	69	7	Good	Good	Mature	>40	High		Yes	Yes
22	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	6	1	12	15	Good	Fair	Mature	5 to 15	Low	Copse of melaleuca stems	Yes	
23	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	16	12	60	70	Good	Good	Mature	>40	High		Yes	Yes
24	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	16	9	59	60	Good	Fair	Mature	>40	High		Yes	Yes
25	*Allocasuarina littoralis*	Black She-oak	Indigenous	3	3	13	16	Good	Fair	Semi-mature	15 to 40	Medium		Yes	Yes
26	*Allocasuarina littoralis*	Black She-oak	Indigenous	5	3	15	18	Good	Fair	Mature	15 to 40	Medium		Yes	Yes
27	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	17	12	67	74	Good	Good	Mature	>40	High		Yes	Yes
28	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	17	10	47	58	Good	Good	Mature	>40	High		Yes	Yes
29	*Allocasuarina littoralis*	Black She-oak	Indigenous	4	4	17	22	Good	Fair	Mature	15 to 40	Medium		Yes	Yes
30	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	15	5	27	34	Fair	Good	Semi-mature	>40	Medium		Yes	Yes
31	*Allocasuarina littoralis*	Black She-oak	Indigenous	4	4	16	18	Good	Fair	Mature	15 to 40	Medium		Yes	Yes
32	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	16	8	61	72	Good	Good	Mature	>40	High		Yes	Yes
33	*Allocasuarina littoralis*	Black She-oak	Indigenous	6	5	18	15	Good	Fair	Mature	15 to 40	Medium		Yes	Yes
34	*Allocasuarina littoralis*	Black She-oak	Indigenous	8	5	16	21	Good	Good	Mature	15 to 40	Medium		Yes	Yes
35	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	17	10	54	65	Good	Good	Mature	>40	High		Yes	Yes
36	*Allocasuarina littoralis*	Black She-oak	Indigenous	6	5	20.52	23	Good	Fair	Mature	15 to 40	Medium		Yes	Yes
37	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	10	7	37.59	44	Good	Poor	Mature	15 to 40	Medium		Yes	Yes
38	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	15	9	65	74	Good	Fair	Mature	>40	High		Yes	Yes
39	*Acacia dealbata*	Silver Wattle	Indigenous	5	3	8	11	Good	Good	Immature	15 to 40	Low		Yes	Yes

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
40	*Allocasuarina littoralis*	Black She-oak	Indigenous	7	4	24.27	29	Good	Fair	Mature	5 to 15	Medium		Yes	Yes
41	*Allocasuarina littoralis*	Black She-oak	Indigenous	8	6	28.02	32	Good	Fair	Mature	15 to 40	Medium		Yes	Yes
42	*Allocasuarina littoralis*	Black She-oak	Indigenous	5	3	18.03	19	Good	Fair	Semi-mature	15 to 40	Medium		Yes	Yes
43	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	17	12	79	85	Good	Fair	Mature	>40	High		Yes	Yes
44	*Allocasuarina littoralis*	Black She-oak	Indigenous	7	5	20	30	Good	Good	Mature	15 to 40	Medium		Yes	Yes
45	*Allocasuarina littoralis*	Black She-oak	Indigenous	5	2	13	16	Good	Fair	Semi-mature	15 to 40	Low		Yes	Yes
46	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	15	9	69	78	Good	Fair	Mature	>40	High	Cavity on stem	Yes	Yes
47	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	17	12	65.19	72	Good	Fair	Mature	>40	High	Included bark stems	Yes	Yes
48	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	6	5	31	37	Fair	Fair	Mature	15 to 40	Medium		Yes	Yes
49	*Allocasuarina littoralis*	Black She-oak	Indigenous	5	3	13	16	Good	Good	Semi-mature	15 to 40	Low		Yes	Yes
50	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	9	7	42	50	Fair	Good	Mature	>40	High		Yes	Yes
51	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	7	5	34	37	Good	Fair	Mature	15 to 40	Medium		Yes	Yes
52	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	15	9	59	70	Fair	Good	Mature	>40	High		Yes	Yes
53	*Allocasuarina littoralis*	Black She-oak	Indigenous	5	4	13.45	18	Good	Fair	Mature	15 to 40	Medium		Yes	Yes
54	*Allocasuarina littoralis*	Black She-oak	Indigenous	3	3	13	15	Good	Fair	Semi-mature	15 to 40	Low		Yes	Yes
55	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	18	13	85	92	Good	Fair	Mature	>40	High	Included bark stems	Yes	Yes
56	*Allocasuarina littoralis*	Black She-oak	Indigenous	6	5	21.95	23	Fair	Fair	Mature	15 to 40	Medium		Yes	Yes
57	*Acacia decurrens*	Green Wattle	Australian Native	7	5	18	23	Fair	Fair	Mature	5 to 15	Low			
58	*Allocasuarina littoralis*	Black She-oak	Indigenous	5	5	23.73	24	Fair	Poor	Mature	5 to 15	Medium	Has previously fallen over	Yes	Yes
59	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	5	2	8	10	Good	Fair	Mature	5 to 15	Low	Copse against fence	Yes	

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
60	*Allocasuarina littoralis*	Black She-oak	Indigenous	6	6	22	27	Good	Poor	Mature	<5	Low	Has recently fallen over onto fence. Assessed from distance	Yes	Yes
61	*Allocasuarina littoralis*	Black She-oak	Indigenous	5	8	17.69	20	Fair	Fair	Semi-mature	15 to 40	Low		Yes	Yes
62	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	11	9	54	60	Good	Fair	Mature	>40	High		Yes	Yes
63	*Melaleuca styphelioides*	Prickly Paperbark	Australian Native	5	4	14.14	18	Good	Fair	Semi-mature	15 to 40	Low		Yes	
64	*Eucalyptus ovata*	Swamp Gum	Indigenous	14	11	53	67	Fair	Good	Mature	15 to 40	High		Yes	Yes
65	*Eucalyptus camaldulensis*	River Red Gum	Indigenous	14	6	37	43	Fair	Good	Semi-mature	>40	Third Party Ownership		Yes	Yes
66	*Acacia melanoxylon*	Blackwood	Indigenous	13	6	25	34	Good	Fair	Mature	15 to 40	Third Party Ownership		Yes	Yes
67	*Acacia melanoxylon*	Blackwood	Indigenous	6	6	26.4	30	Fair	Fair	Mature	15 to 40	Third Party Ownership		Yes	Yes
68	*Eucalyptus ovata*	Swamp Gum	Indigenous	10	6	28	34	Fair	Fair	Mature	15 to 40	Medium		Yes	Yes
69	*Eucalyptus ovata*	Swamp Gum	Indigenous	14	13	71.06	80	Good	Fair	Mature	>40	High		Yes	Yes
70	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	Australian Native	8	5	28	32	Good	Fair	Mature	15 to 40	Medium		Yes	
71	*Eucalyptus ovata*	Swamp Gum	Indigenous	8	3	14	18	Good	Fair	Semi-mature	15 to 40	Low		Yes	Yes
72	*Callistemon salignus*	Willow Bottle Brush	Australian Native	4	3	10	15	Good	Fair	Semi-mature	5 to 15	Low		Yes	
73	*Eucalyptus cinerea*	Mealy Stringybark	Australian Native	13	8	55	58	Fair	Fair	Mature	15 to 40	Medium		Yes	
74	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	Australian Native	11	5	31	35	Good	Fair	Mature	15 to 40	Medium		Yes	
75	*Eucalyptus viminalis*	Manna Gum	Indigenous	13	10	73	80	Poor	Fair	Over-mature	0	None	Pretty much dead	Yes	Yes
76	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	Australian Native	11	8	47	53	Good	Good	Mature	>40	Medium		Yes	
77	*Melaleuca styphelioides*	Prickly Paperbark	Australian Native	3	2	10	14	Good	Fair	Immature	5 to 15	Low	Growing from base of peppermint	Yes	

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
78	*Eucalyptus ovata*	Swamp Gum	Indigenous	14	5	34	40	Fair	Good	Mature	15 to 40	Medium		Yes	Yes
79	*Eucalyptus cinerea*	Mealy Stringybark	Australian Native	11	10	44	48	Good	Fair	Mature	15 to 40	Medium		Yes	
80	*Eucalyptus mannifera*	Brittle Gum	Australian Native	10	6	25	30	Fair	Fair	Mature	15 to 40	Medium		Yes	
81	*Eucalyptus mannifera*	Brittle Gum	Australian Native	11	0	39	47	Poor	Poor	Over-mature	<5	None		Yes	
82	*Eucalyptus kitsoniana*	Gippsland Mallee	Australian Native	4	3	10.49	13	Poor	Poor	Semi-mature	<5	None		Yes	
83	*Eucalyptus kitsoniana*	Gippsland Mallee	Australian Native	5	6	27.4	32	Fair	Fair	Mature	15 to 40	Medium		Yes	
84	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	5	2	8	11	Good	Fair	Mature	5 to 15	Low	Copse of melaleuca	Yes	
85	*Eucalyptus ovata*	Swamp Gum	Indigenous	8	7	36.88	38	Good	Fair	Mature	15 to 40	Medium		Yes	Yes
86	*Acacia melanoxylon*	Blackwood	Indigenous	6	3	16	19	Good	Good	Semi-mature	>40	Low		Yes	Yes
87	*Acacia melanoxylon*	Blackwood	Indigenous	4	3	14	16	Good	Good	Semi-mature	>40	Low		Yes	Yes
88	*Eucalyptus ovata*	Swamp Gum	Indigenous	6	7	32.65	36	Fair	Fair	Mature	5 to 15	Medium	Canopy dying back	Yes	Yes
89	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	4	3	12.73	13	Good	Fair	Semi-mature	5 to 15	Low		Yes	
90	*Eucalyptus tereticornis*	Forest Red Gum	Indigenous	14	8	47	55	Good	Good	Mature	>40	High	Assessed from distance. No access..no buds visible. ID uncertain	Yes	Yes
91	*Eucalyptus cinerea*	Mealy Stringybark	Australian Native	6	4	19	23	Good	Fair	Semi-mature	>40	Medium		Yes	
92	*Eucalyptus camaldulensis*	River Red Gum	Indigenous	14	10	48	55	Good	Fair	Mature	>40	Medium		Yes	Yes
93	*Eucalyptus camaldulensis*	River Red Gum	Indigenous	7	5	16	25	Good	Good	Semi-mature	>40	Medium		Yes	Yes
94	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	7	5	22	26	Fair	Poor	Mature	<5	None	Top previously snapped out	Yes	Yes
95	*Melaleuca linariifolia*	Snow in Summer	Australian Native	5	8	38.08	40	Good	Fair	Mature	15 to 40	Medium		Yes	
96	*Eucalyptus kitsoniana*	Gippsland Mallee	Australian Native	7	3	16.28	23	Fair	Poor	Mature	5 to 15	Low		Yes	
97	*Eucalyptus cinerea*	Mealy Stringybark	Australian Native	8	7	36	40	Good	Fair	Mature	15 to 40	Medium		Yes	

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
98	*Eucalyptus robusta*	Swamp Mahogany	Australian Native	4	5	24.02	25	Fair	Fair	Semi-mature	5 to 15	Low		Yes	
99	*Acacia dealbata*	Silver Wattle	Indigenous	5	4	15	18	Good	Fair	Semi-mature	15 to 40	Low		Yes	Yes
100	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	14	8	49	57	Good	Good	Mature	>40	High		Yes	Yes
101	*Eucalyptus cypellocarpa*	Mountain Grey Gum	Indigenous	17	10	60	74	Good	Good	Mature	>40	High		Yes	Yes
102	*Eucalyptus ovata*	Swamp Gum	Indigenous	14	11	41	47	Good	Fair	Mature	>40	High		Yes	Yes
103	*Melaleuca linariifolia*	Snow in Summer	Australian Native	4	3	17.52	21	Good	Fair	Semi-mature	15 to 40	Low		Yes	
104	*Eucalyptus camaldulensis*	River Red Gum	Indigenous	13	12	72.95	79	Fair	Fair	Mature	>40	High		Yes	Yes
105	*Eucalyptus kitsoniana*	Gippsland Mallee	Australian Native	5	5	19.03	22	Fair	Fair	Semi-mature	15 to 40	Low		Yes	
106	*Eucalyptus robusta*	Swamp Mahogany	Australian Native	10	8	43.78	44	Good	Poor	Mature	5 to 15	Medium	Has partially fallen over at some point. Shooting up all over the place	Yes	
107	*Eucalyptus radiata*	Narrow-leaved Peppermint	Indigenous	10	7	26	32	Good	Fair	Mature	>40	Medium		Yes	Yes
108	*Eucalyptus robusta*	Swamp Mahogany	Australian Native	13	13	72	85	Good	Fair	Mature	15 to 40	Medium	Weedy species	Yes	
109	*Eucalyptus cinerea*	Mealy Stringybark	Australian Native	8	7	33	41	Good	Fair	Mature	15 to 40	Medium	Suppressed by adjacent swamp mahogany	Yes	
110	*Eucalyptus viminalis*	Manna Gum	Indigenous	9	9	39	45	Good	Fair	Mature	>40	Medium		Yes	Yes
111	*Eucalyptus sideroxylon*	Red Ironbark	Australian Native	8	6	24	28	Fair	Fair	Semi-mature	15 to 40	Medium		Yes	
112	*Eucalyptus globoidea*	White Stringybark	Australian Native	8	4	21.26	23	Good	Fair	Semi-mature	>40	Medium		Yes	
113	*Eucalyptus cinerea*	Mealy Stringybark	Australian Native	11	7	54	60	Good	Fair	Mature	>40	Medium		Yes	
114	*Eucalyptus robusta*	Swamp Mahogany	Australian Native	14	14	68.86	75	Good	Fair	Mature	15 to 40	Medium		Yes	
115	*Eucalyptus kitsoniana*	Gippsland Mallee	Australian Native	6	2	11.4	16	Poor	Poor	Mature	0	None		Yes	
116	*Eucalyptus kitsoniana*	Gippsland Mallee	Australian Native	5	5	14.59	24	Fair	Fair	Mature	5 to 15	Low		Yes	

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
117	*Callistemon citrinus*	Crimson Bottle Brush	Australian Native	4	2	12.12	15	Good	Fair	Mature	5 to 15	Low		Yes	
118	*Eucalyptus scoparia*	Wallangarra Gum	Australian Native	6	4	18	22	Good	Fair	Semi-mature	>40	Low		Yes	
119	*Melaleuca armillaris*	Giant Honey Myrtle	Australian Native	4	4	11.58	14	Good	Fair	Semi-mature	5 to 15	Low			
120	*Eucalyptus leucoxylon*	Yellow Gum	Australian Native	6	3	17.49	18	Fair	Fair	Semi-mature	15 to 40	Low		Yes	
121	*Eucalyptus mannifera*	Brittle Gum	Australian Native	5	6	22	27	Good	Fair	Semi-mature	>40	Low		Yes	
122	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	3	2	9.17	12	Good	Fair	Mature	5 to 15	Low		Yes	
123	*Callistemon salignus*	Willow Bottle Brush	Australian Native	3	2	9.27	12	Good	Fair	Semi-mature	15 to 40	Low		Yes	
124	*Melaleuca armillaris*	Giant Honey Myrtle	Australian Native	4	3	13.19	16	Good	Fair	Semi-mature	5 to 15	Low			
125	*Bursaria spinosa*	Sweet Bursaria	Indigenous	4	3	10	12	Fair	Fair	Mature	5 to 15	Low		Yes	Yes
126	*Bursaria spinosa*	Sweet Bursaria	Indigenous	4	3	9	10	Fair	Fair	Mature	5 to 15	Low		Yes	Yes
127	*Bursaria spinosa*	Sweet Bursaria	Indigenous	4	3	9	12	Fair	Fair	Mature	5 to 15	Low		Yes	Yes
128	*Eucalyptus mannifera*	Brittle Gum	Australian Native	5	6	19	24	Good	Fair	Semi-mature	>40	Low		Yes	
129	*Melaleuca styphelioides*	Prickly Paperbark	Australian Native	3	1	8	7	Good	Good	Immature	15 to 40	Low		Yes	
130	*Callistemon citrinus*	Crimson Bottle Brush	Australian Native	3	1	5	7	Good	Good	Semi-mature	15 to 40	Low		Yes	
131	*Bursaria spinosa*	Sweet Bursaria	Indigenous	3	3	7	9	Fair	Fair	Mature	5 to 15	Low		Yes	Yes
132	*Eucalyptus camaldulensis*	River Red Gum	Indigenous	14	12	75	89	Good	Good	Mature	>40	High		Yes	Yes
133	*Eucalyptus viminalis*	Manna Gum	Indigenous	15	12	89	95	Good	Fair	Mature	15 to 40	High	Decay at base	Yes	Yes
134	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	5	6	25.5	31	Good	Fair	Semi-mature	>40	Medium		Yes	Yes
135	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	Indigenous	6	3	15	19	Good	Good	Semi-mature	>40	Medium		Yes	Yes
136	*Melaleuca styphelioides*	Prickly Paperbark	Australian Native	6	2	8	11	Good	Good	Semi-mature	15 to 40	Low		Yes	
137	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	5	2	13	15	Good	Fair	Immature	5 to 15	Low		Yes	

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
138	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	4	2	11.83	14	Good	Fair	Semi-mature	5 to 15	Low		Yes	
139	*Callistemon citrinus*	Crimson Bottle Brush	Australian Native	4	2	7	9	Good	Fair	Immature	15 to 40	Low		Yes	
140	*Callistemon viminalis*	Weeping Bottle Brush	Australian Native	4	1	7	9	Good	Fair	Immature	15 to 40	Low		Yes	
141	*Eucalyptus mannifera*	Brittle Gum	Australian Native	6	4	19	23	Good	Fair	Semi-mature	>40	Low		Yes	
142	*Hakea salicifolia*	Willow Hakea	Australian Native	3	2	9	11	Fair	Fair	Mature	5 to 15	Low		Yes	
143	*Callistemon salignus*	Willow Bottle Brush	Australian Native	4	1	7	9	Good	Good	Immature	15 to 40	Low		Yes	
144	*Acacia floribunda*	Catkin Wattle	Australian Native	4	5	20.57	21	Good	Fair	Mature	5 to 15	Low			
145	*Callistemon citrinus cv*	Crimson Bottlebrush	Australian Native	3	2	8.49	9	Fair	Fair	Semi-mature	5 to 15	Low		Yes	
146	*Eucalyptus mannifera*	Brittle Gum	Australian Native	5	5	20.25	23	Good	Fair	Semi-mature	>40	Medium		Yes	
147	*Pomaderris aspera*	Hazel Pomederrris	Indigenous	3	1	5	7	Fair	Poor	Semi-mature	5 to 15	Low		Yes	Yes
148	*Eucalyptus leucoxylon*	Yellow Gum	Australian Native	3	1	4	6	Fair	Good	Immature	>40	Low		Yes	
149	*Callistemon citrinus*	Crimson Bottle Brush	Australian Native	3	1	8	10	Good	Fair	Semi-mature	5 to 15	Low		Yes	
150	*Callistemon salignus*	Willow Bottle Brush	Australian Native	3	3	13.08	18	Fair	Poor	Immature	5 to 15	Low		Yes	
151	*Eucalyptus grandis*	Flooded Gum	Australian Native	10	6	25	30	Good	Good	Semi-mature	15 to 40	Low		Yes	
152	*Eucalyptus globulus*	Blue Gum	Australian Native	16	8	74	85	Good	Good	Mature	>40	High	No fruit or floral buds . Unsure of subspecies	Yes	
153	*Banksia integrifolia*	Coast Banksia	Indigenous	5	1	6	8	Good	Good	Immature	>40	Low		Yes	Yes
154	*Eucalyptus ovata*	Swamp Gum	Indigenous	4	3	9	13	Fair	Fair	Immature	15 to 40	Low		Yes	Yes
155	*Acacia floribunda*	Catkin Wattle	Australian Native	4	2	9.22	13	Good	Fair	Semi-mature	5 to 15	Low			
156	*Eucalyptus ovata*	Swamp Gum	Indigenous	6	2	10	13	Good	Good	Semi-mature	>40	Low		Yes	Yes
157	*Eucalyptus ovata*	Swamp Gum	Indigenous	15	9	50	58	Good	Fair	Mature	15 to 40	Medium		Yes	Yes

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
158	*Eucalyptus cinerea*	Mealy Stringybark	Australian Native	4	5	20.62	23	Fair	Poor	Mature	5 to 15	Low		Yes	
159	*Eucalyptus ovata*	Swamp Gum	Indigenous	14	10	46.51	46	Fair	Fair	Mature	15 to 40	Medium		Yes	Yes
160	*Acacia howittii*	Sticky Wattle	Australian Native	4	6	30.59	31	Fair	Fair	Mature	5 to 15	Low		Yes	
161	*Eucalyptus camaldulensis*	River Red Gum	Indigenous	13	9	55	70	Good	Good	Mature	>40	Third Party Ownership		Yes	Yes
162	*Eucalyptus camaldulensis*	River Red Gum	Indigenous	14	15	85	95	Good	Fair	Mature	>40	Third Party Ownership		Yes	Yes
163	*Eucalyptus cladocalyx*	Sugar Gum	Australian Native	4	6	20.52	21	Good	Fair	Semi-mature	15 to 40	Low		Yes	
164	*Callistemon viminalis*	Weeping Bottle Brush	Australian Native	3	3	15.72	16	Good	Fair	Mature	5 to 15	Low		Yes	
165	*Callistemon viminalis*	Weeping Bottle Brush	Australian Native	3	3	11.58	12	Good	Fair	Mature	5 to 15	Low		Yes	
166	*Acacia floribunda*	Catkin Wattle	Australian Native	3	4	16.12	16	Good	Fair	Mature	5 to 15	Low			
167	*Acacia floribunda*	Catkin Wattle	Australian Native	4	3	16.12	16	Good	Fair	Mature	5 to 15	Low			
168	*Acacia floribunda*	Catkin Wattle	Australian Native	3	4	16.12	18	Good	Fair	Mature	5 to 15	Low			
169	*Callistemon salignus*	Willow Bottle Brush	Australian Native	5	3	15.78	21	Good	Fair	Semi-mature	15 to 40	Low		Yes	
170	*Callistemon salignus*	Willow Bottle Brush	Australian Native	4	3	10	14	Good	Fair	Semi-mature	15 to 40	Low		Yes	
171	*Callistemon salignus*	Willow Bottle Brush	Australian Native	6	5	27.11	33	Good	Fair	Mature	15 to 40	Medium		Yes	
172	*Acacia floribunda*	Catkin Wattle	Australian Native	4	6	25.04	25	Good	Fair	Mature	5 to 15	Low			
173	*Eucalyptus sideroxylon*	Red Ironbark	Australian Native	15	7	42	50	Good	Fair	Mature	>40	Medium		Yes	
174	*Melaleuca linariifolia*	Snow in Summer	Australian Native	4	3	18.38	18	Good	Fair	Semi-mature	15 to 40	Low		Yes	
175	*Acacia iteaphylla*	Gawler Range Wattle	Australian Native	4	8	13.93	19	Fair	Poor	Mature	5 to 15	Low		Yes	
176	*Hakea salicifolia*	Willow Hakea	Australian Native	5	5	22.45	32	Good	Fair	Mature	5 to 15	Low		Yes	
177	*Melaleuca styphelioides*	Prickly Paperbark	Australian Native	5	3	16.76	17	Good	Fair	Semi-mature	15 to 40	Low		Yes	
178	*Eucalyptus ovata*	Swamp Gum	Indigenous	9	6	38.42	43	Fair	Fair	Mature	5 to 15	Medium		Yes	Yes

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
179	*Hakea drupacea*	Sweet Hakea	Australian Native	5	5	21.95	23	Good	Fair	Mature	5 to 15	Low		Yes	
180	*Callistemon viminalis*	Weeping Bottle Brush	Australian Native	4	2	9.22	11	Good	Fair	Semi-mature	15 to 40	Low		Yes	
181	*Melaleuca armillaris*	Giant Honey Myrtle	Australian Native	6	5	32.45	36	Fair	Fair	Mature	5 to 15	Low			
182	*Eucalyptus ovata*	Swamp Gum	Indigenous	15	12	75.56	84	Good	Fair	Mature	15 to 40	High		Yes	Yes
183	*Eucalyptus robusta*	Swamp Mahogany	Australian Native	11	10	42	50	Good	Fair	Mature	15 to 40	Medium		Yes	
184	*Eucalyptus cinerea*	Mealy Stringybark	Australian Native	7	7	49.12	54	Fair	Fair	Mature	5 to 15	Medium		Yes	
185	*Eucalyptus sp.*	Gum	Australian Native	5	5	25.65	27	Fair	Poor	Mature	5 to 15	Low	Unsure of ID . Check species. Perhaps a very stressed bog mallee	Yes	
186	*Eucalyptus botryoides*	Southern Mahogany	Australian Native	14	10	49.2	54	Good	Fair	Mature	15 to 40	Medium		Yes	
187	*Eucalyptus ovata*	Swamp Gum	Indigenous	14	12	49	58	Fair	Fair	Mature	15 to 40	High		Yes	Yes
188	*Eucalyptus cinerea*	Mealy Stringybark	Australian Native	16	11	57	69	Good	Fair	Mature	15 to 40	High		Yes	
189	*Eucalyptus viminalis*	Manna Gum	Indigenous	17	16	88	99	Good	Good	Mature	>40	High		Yes	Yes
190	*Eucalyptus globulus*	Blue Gum	Australian Native	11	5	36	44	Fair	Fair	Mature	5 to 15	Medium		Yes	
191	*Eucalyptus cinerea*	Mealy Stringybark	Australian Native	14	13	67	76	Good	Fair	Mature	>40	Medium		Yes	
192	*Eucalyptus robusta*	Swamp Mahogany	Australian Native	4	4	15.56	20	Fair	Fair	Semi-mature	5 to 15	Low		Yes	
193	*Eucalyptus spathulata*	Swamp Mallet	Australian Native	4	2	12.65	13	Poor	Poor	Semi-mature	0	None		Yes	
194	*Eucalyptus spathulata*	Swamp Mallet	Australian Native	17	15	69	81	Fair	Good	Mature	>40	High		Yes	
195	*Eucalyptus spathulata*	Swamp Mallet	Australian Native	3	2	7	13	Poor	Poor	Semi-mature	<5	None		Yes	
196	*Eucalyptus ovata*	Swamp Gum	Indigenous	11	9	64	74	Fair	Fair	Mature	15 to 40	Medium		Yes	Yes
197	*Melaleuca linariifolia*	Snow in Summer	Australian Native	5	4	32.56	32	Good	Fair	Semi-mature	15 to 40	Low		Yes	
198	*Grevillea robusta*	Silky Oak	Australian Native	9	4	20	24	Good	Good	Semi-mature	15 to 40	Low		Yes	

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
199	*Eucalyptus ovata*	Swamp Gum	Indigenous	10	8	47	54	Fair	Fair	Mature	15 to 40	Medium		Yes	Yes
200	*Eucalyptus scoparia*	Wallangarra Gum	Australian Native	10	11	61.72	62	Good	Fair	Mature	15 to 40	Medium		Yes	
201	*Melaleuca linariifolia*	Snow in Summer	Australian Native	5	4	25.94	30	Good	Fair	Semi-mature	15 to 40	Low		Yes	
202	*Banksia marginata*	Silver Banksia	Indigenous	7	5	26.93	36	Poor	Fair	Mature	5 to 15	Medium		Yes	Yes
203	*Grevillea robusta*	Silky Oak	Australian Native	9	5	26	32	Good	Good	Semi-mature	15 to 40	Low		Yes	
204	*Melaleuca linariifolia*	Snow in Summer	Australian Native	6	6	43	47	Good	Fair	Mature	15 to 40	Medium		Yes	
205	*Eucalyptus kitsoniana*	Gippsland Mallee	Australian Native	4	2	8.25	12	Poor	Poor	Semi-mature	<5	None		Yes	
206	*Grevillea robusta*	Silky Oak	Australian Native	8	6	29	35	Fair	Good	Mature	15 to 40	Low		Yes	
207	*Melaleuca linariifolia*	Snow in Summer	Australian Native	7	5	37	38	Good	Fair	Mature	15 to 40	Medium		Yes	
208	*Callistemon viminalis*	Weeping Bottle Brush	Australian Native	3	5	20.27	21	Good	Fair	Mature	5 to 15	Low		Yes	
209	*Melaleuca linariifolia*	Snow in Summer	Australian Native	6	4	41	41	Good	Fair	Semi-mature	15 to 40	Low		Yes	
210	*Grevillea robusta*	Silky Oak	Australian Native	9	5	31	37	Good	Good	Mature	15 to 40	Medium		Yes	
211	*Melaleuca armillaris*	Giant Honey Myrtle	Australian Native	6	9	43.31	50	Fair	Poor	Mature	<5	None			
212	*Grevillea robusta*	Silky Oak	Australian Native	9	5	28	31	Good	Good	Mature	15 to 40	Medium		Yes	
213	*Melaleuca linariifolia*	Snow in Summer	Australian Native	7	6	71.2	75	Good	Fair	Mature	15 to 40	Medium		Yes	
214	*Banksia integrifolia*	Coast Banksia	Indigenous	8	4	29	33	Fair	Good	Mature	15 to 40	Medium		Yes	Yes
215	*Allocasuarina littoralis*	Black She-oak	Indigenous	7	6	34.66	37	Fair	Fair	Mature	15 to 40	Medium		Yes	Yes
216	*Callistemon viminalis*	Weeping Bottle Brush	Australian Native	3	4	17.03	23	Fair	Fair	Mature	5 to 15	Low		Yes	
217	*Eucalyptus kitsoniana*	Gippsland Mallee	Australian Native	4	3	12.88	14	Fair	Poor	Mature	5 to 15	Low		Yes	
218	*Eucalyptus cladocalyx*	Sugar Gum	Australian Native	4	4	19.1	22	Fair	Fair	Semi-mature	5 to 15	Low		Yes	
219	*Melaleuca armillaris*	Giant Honey Myrtle	Australian Native	5	4	18.89	25	Fair	Fair	Mature	5 to 15	Low			

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
220	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	5	2	12	15	Good	Fair	Mature	5 to 15	Low	Small copse adjacent to fence	Yes	
221	*Acacia baileyana*	Cootamundra Wattle	Australian Native	5	5	21.26	22	Good	Fair	Mature	5 to 15	Low			
222	*Acacia baileyana*	Cootamundra Wattle	Australian Native	4	3	12	14	Good	Fair	Semi-mature	5 to 15	Low			
223	*Acacia baileyana*	Cootamundra Wattle	Australian Native	5	4	16	20	Good	Fair	Mature	5 to 15	Low			
224	*Acacia baileyana*	Cootamundra Wattle	Australian Native	4	3	9	13	Good	Good	Semi-mature	5 to 15	Low			
225	*Melaleuca linariifolia*	Snow in Summer	Australian Native	3	3	19.1	20	Good	Fair	Semi-mature	>40	Low		Yes	
226	*Melaleuca styphelioides*	Prickly Paperbark	Australian Native	4	4	17.49	20	Good	Fair	Semi-mature	15 to 40	Low		Yes	
227	*Eucalyptus globulus*	Blue Gum	Australian Native	9	8	56	65	Poor	Fair	Mature	5 to 15	Medium		Yes	
228	*Melaleuca armillaris*	Giant Honey Myrtle	Australian Native	5	6	27.5	28	Fair	Fair	Semi-mature	5 to 15	Low			
229	*Eucalyptus cladocalyx*	Sugar Gum	Australian Native	5	4	22	30	Fair	Fair	Semi-mature	5 to 15	Low		Yes	
230	*Eucalyptus cinerea*	Mealy Stringybark	Australian Native	5	4	19.03	27	Fair	Poor	Semi-mature	5 to 15	Low	Previously windthrown	Yes	
231	*Melaleuca linariifolia*	Snow in Summer	Australian Native	4	2	12.57	16	Fair	Poor	Semi-mature	5 to 15	Low		Yes	
232	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	4	2	11	13	Good	Fair	Mature	5 to 15	Low		Yes	
233	*Eucalyptus grandis*	Flooded Gum	Australian Native	11	4	20	27	Good	Good	Semi-mature	>40	Medium		Yes	
234	*Eucalyptus ovata*	Swamp Gum	Indigenous	7	3	16	20	Good	Fair	Semi-mature	15 to 40	Low		Yes	Yes
235	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	5	2	9.9	12	Good	Fair	Mature	5 to 15	Low		Yes	
236	*Acacia melanoxylon*	Blackwood	Indigenous	6	3	14	17	Good	Good	Semi-mature	>40	Low		Yes	Yes
237	*Eucalyptus globulus*	Blue Gum	Australian Native	8	4	15	19	Good	Good	Semi-mature	>40	Low		Yes	
238	*Eucalyptus scoparia*	Wallangarra Gum	Australian Native	3	3	14	16	Good	Fair	Semi-mature	>40	Low		Yes	
239	*Eucalyptus camaldulensis*	River Red Gum	Indigenous	4	4	19	24	Good	Fair	Semi-mature	>40	Low		Yes	Yes
240	*Eucalyptus ovata*	Swamp Gum	Indigenous	10	6	31.3	33	Fair	Fair	Mature	15 to 40	Medium		Yes	Yes

Tree ID	*Genus Species*	Common Name	Species Origin	Height (m)	Crown Spread (m)	Total DBH (cm)	DAB (cm)	Health	Structure	Maturity	ULE (years)	Arboricultural Value	Notes	ESO1	52.17
241	*Eucalyptus cinerea*	Mealy Stringybark	Australian Native	6	7	29.21	34	Fair	Fair	Semi-mature	15 to 40	Low		Yes	
242	*Eucalyptus ovata*	Swamp Gum	Indigenous	6	4	15	18	Poor	Fair	Semi-mature	5 to 15	Low		Yes	Yes
243	*Eucalyptus camaldulensis*	River Red Gum	Indigenous	4	4	17	21	Good	Good	Semi-mature	>40	Low		Yes	Yes
244	*Eucalyptus ovata*	Swamp Gum	Indigenous	5	3	11	14	Good	Good	Immature	>40	Low		Yes	Yes
245	*Acacia melanoxylon*	Blackwood	Indigenous	4	3	8.6	10	Good	Fair	Semi-mature	15 to 40	Low		Yes	Yes
246	*Eucalyptus grandis*	Flooded Gum	Australian Native	7	5	20	24	Good	Good	Semi-mature	>40	Low		Yes	
247	*Melaleuca ericifolia*	Swamp Paperbark	Australian Native	3	2	5	7	Good	Fair	Semi-mature	5 to 15	Low	Copse of many stems	Yes	
248	*Eucalyptus grandis*	Flooded Gum	Australian Native	9	5	24	20	Good	Good	Semi-mature	>40	Low		Yes	
249	*Eucalyptus mannifera*	Brittle Gum	Australian Native	4	2	10	14	Fair	Fair	Semi-mature	15 to 40	Low		Yes	
250	*Eucalyptus grandis*	Flooded Gum	Australian Native	10	7	30.02	34	Good	Fair	Mature	15 to 40	Medium		Yes	
251	*Acacia melanoxylon*	Blackwood	Indigenous	5	3	13.04	16	Good	Fair	Semi-mature	15 to 40	Low		Yes	Yes
252	*Eucalyptus ovata*	Swamp Gum	Indigenous	8	4	32	34	Fair	Good	Mature	15 to 40	Medium		Yes	Yes
253	*Callistemon citrinus*	Crimson Bottle Brush	Australian Native	3	2	6.93	8	Good	Fair	Semi-mature	5 to 15	Low		Yes	
254	*Banksia marginata*	Silver Banksia	Indigenous	7	5	43.43	44	Good	Fair	Mature	15 to 40	Medium			
255	*Callistemon viminalis*	Weeping Bottle Brush	Australian Native	4	3	12.12	17	Good	Fair	Mature	5 to 15	Low			
256	*Callistemon viminalis*	Weeping Bottle Brush	Australian Native	3	2	7	13	Good	Fair	Mature	5 to 15	Low			
257	*Callistemon viminalis*	Weeping Bottle Brush	Australian Native	4	3	13	16	Good	Fair	Mature	5 to 15	Low			

10 Appendix 3: TPZ and SRZ details

Table 9: TPZ and SRZ details of assessed trees (AS4970 2009)

Tree ID	*Genus Species*	Common Name	SRZ radius (m) AS4970	TPZ radius (m) AS4970	TPZ Area AS 4970 (m2)
1	*Melaleuca ericifolia*	Swamp Paperbark	1.5	2	12.566
2	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.37	2.37	17.646
3	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.53	6.11	117.282
4	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.55	5.4	91.609
5	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.13	3.84	46.325
6	*Prunus cerasifera*	Cherry Plum	1.53	2	12.566
7	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	1.68	2.16	14.657
8	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.55	5.52	95.726
9	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.43	4.92	76.047
10	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.1	2.1	13.854
11	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.92	7.8	191.134
12	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.57	5.4	91.609
13	*Melaleuca ericifolia*	Swamp Paperbark	1.61	2	12.566
14	*Eucalyptus ovata*	Swamp Gum	2.88	7.44	173.898
15	*Eucalyptus cypellocarpa*	Mountain Grey Gum	3.11	9.24	268.222
16	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.76	6.96	152.184
17	*Allocasuarina littoralis*	Black She-oak	1.5	2	12.566
18	*Allocasuarina littoralis*	Black She-oak	1.53	2	12.566
19	*Eucalyptus cypellocarpa*	Mountain Grey Gum	3.09	9.24	268.222
20	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.63	6	113.097
21	*Eucalyptus cypellocarpa*	Mountain Grey Gum	1.5	8.28	215.383
22	*Melaleuca ericifolia*	Swamp Paperbark	1.5	2	12.566
23	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.85	7.2	162.86
24	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.67	7.08	157.477
25	*Allocasuarina littoralis*	Black She-oak	1.53	2	12.566
26	*Allocasuarina littoralis*	Black She-oak	1.61	2	12.566
27	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.92	8.04	203.078
28	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.63	5.64	99.933
29	*Allocasuarina littoralis*	Black She-oak	1.75	2.04	13.074
30	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.1	3.24	32.979
31	*Allocasuarina littoralis*	Black She-oak	1.61	2	12.566
32	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.88	7.32	168.334
33	*Allocasuarina littoralis*	Black She-oak	1.5	2.16	14.657
34	*Allocasuarina littoralis*	Black She-oak	1.72	2	12.566
35	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.76	6.48	131.917
36	*Allocasuarina littoralis*	Black She-oak	1.79	2.46	19.012
37	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.34	4.51	63.9
38	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.92	7.8	191.134

Tree ID	*Genus Species*	Common Name	SRZ radius (m) AS4970	TPZ radius (m) AS4970	TPZ Area AS 4970 (m2)
39	*Acacia dealbata*	Silver Wattle	1.5	2	12.566
40	*Allocasuarina littoralis*	Black She-oak	1.97	2.91	26.603
41	*Allocasuarina littoralis*	Black She-oak	2.05	3.36	35.467
42	*Allocasuarina littoralis*	Black She-oak	1.65	2.16	14.657
43	*Eucalyptus cypellocarpa*	Mountain Grey Gum	3.09	9.48	282.336
44	*Allocasuarina littoralis*	Black She-oak	2	2.4	18.096
45	*Allocasuarina littoralis*	Black She-oak	1.53	2	12.566
46	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.98	8.28	215.383
47	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.88	7.82	192.116
48	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.18	3.72	43.475
49	*Allocasuarina littoralis*	Black She-oak	1.53	2	12.566
50	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.47	5.04	79.801
51	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.18	4.08	52.296
52	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.85	7.08	157.477
53	*Allocasuarina littoralis*	Black She-oak	1.61	2	12.566
54	*Allocasuarina littoralis*	Black She-oak	1.5	2	12.566
55	*Eucalyptus cypellocarpa*	Mountain Grey Gum	3.2	10.2	326.851
56	*Allocasuarina littoralis*	Black She-oak	1.79	2.63	21.73
57	*Acacia decurrens*	Green Wattle	1.79	2.16	14.657
58	*Allocasuarina littoralis*	Black She-oak	1.82	2.85	25.518
59	*Melaleuca ericifolia*	Swamp Paperbark	1.5	2	12.566
60	*Allocasuarina littoralis*	Black She-oak	1.91	2.64	21.896
61	*Allocasuarina littoralis*	Black She-oak	1.68	2.12	14.12
62	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.67	6.48	131.917
63	*Melaleuca styphelioides*	Prickly Paperbark	1.61	2	12.566
64	*Eucalyptus ovata*	Swamp Gum	2.8	6.36	127.076
65	*Eucalyptus camaldulensis*	River Red Gum	2.32	4.44	61.932
66	*Acacia melanoxylon*	Blackwood	2.1	3	28.274
67	*Acacia melanoxylon*	Blackwood	2	3.17	31.57
68	*Eucalyptus ovata*	Swamp Gum	2.1	3.36	35.467
69	*Eucalyptus ovata*	Swamp Gum	3.01	8.53	228.585
70	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	2.05	3.36	35.467
71	*Eucalyptus ovata*	Swamp Gum	1.61	2	12.566
72	*Callistemon salignus*	Willow Bottle Brush	1.5	2	12.566
73	*Eucalyptus cinerea*	Mealy Stringybark	2.63	6.6	136.848
74	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	2.13	3.72	43.475
75	*Eucalyptus viminalis*	Manna Gum	3.01	8.76	241.078
76	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	2.53	5.64	99.933
77	*Melaleuca styphelioides*	Prickly Paperbark	1.5	2	12.566
78	*Eucalyptus ovata*	Swamp Gum	2.25	4.08	52.296
79	*Eucalyptus cinerea*	Mealy Stringybark	2.43	5.28	87.583
80	*Eucalyptus mannifera*	Brittle Gum	2	3	28.274
81	*Eucalyptus mannifera*	Brittle Gum	2.41	4.68	68.808
82	*Eucalyptus kitsoniana*	Gippsland Mallee	1.5	2	12.566
83	*Eucalyptus kitsoniana*	Gippsland Mallee	2.05	3.29	34.005
84	*Melaleuca ericifolia*	Swamp Paperbark	1.5	2	12.566
85	*Eucalyptus ovata*	Swamp Gum	2.2	4.43	61.653
86	*Acacia melanoxylon*	Blackwood	1.65	2	12.566
87	*Acacia melanoxylon*	Blackwood	1.53	2	12.566
88	*Eucalyptus ovata*	Swamp Gum	2.15	3.92	48.275
89	*Melaleuca ericifolia*	Swamp Paperbark	1.5	2	12.566
90	*Eucalyptus tereticornis*	Forest Red Gum	2.57	5.64	99.933

Tree ID	*Genus Species*	Common Name	SRZ radius (m) AS4970	TPZ radius (m) AS4970	TPZ Area AS 4970 (m2)
91	*Eucalyptus cinerea*	Mealy Stringybark	1.79	2.28	16.331
92	*Eucalyptus camaldulensis*	River Red Gum	2.57	5.76	104.231
93	*Eucalyptus camaldulensis*	River Red Gum	1.85	2	12.566
94	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	1.88	2.64	21.896
95	*Melaleuca linariifolia*	Snow in Summer	2.25	4.57	65.612
96	*Eucalyptus kitsoniana*	Gippsland Mallee	1.79	2	12.566
97	*Eucalyptus cinerea*	Mealy Stringybark	2.25	4.32	58.63
98	*Eucalyptus robusta*	Swamp Mahogany	1.85	2.88	26.058
99	*Acacia dealbata*	Silver Wattle	1.61	2	12.566
100	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.61	5.88	108.619
101	*Eucalyptus cypellocarpa*	Mountain Grey Gum	2.92	7.2	162.86
102	*Eucalyptus ovata*	Swamp Gum	2.41	4.92	76.047
103	*Melaleuca linariifolia*	Snow in Summer	1.72	2.1	13.854
104	*Eucalyptus camaldulensis*	River Red Gum	3	8.75	240.528
105	*Eucalyptus kitsoniana*	Gippsland Mallee	1.75	2.28	16.331
106	*Eucalyptus robusta*	Swamp Mahogany	2.34	5.25	86.59
107	*Eucalyptus radiata*	Narrow-leaved Peppermint	2.05	3.12	30.582
108	*Eucalyptus robusta*	Swamp Mahogany	3.09	8.64	234.519
109	*Eucalyptus cinerea*	Mealy Stringybark	2.28	3.96	49.265
110	*Eucalyptus viminalis*	Manna Gum	2.37	4.68	68.808
111	*Eucalyptus sideroxylon*	Red Ironbark	1.94	2.88	26.058
112	*Eucalyptus globoidea*	White Stringybark	1.79	2.55	20.428
113	*Eucalyptus cinerea*	Mealy Stringybark	2.67	6.48	131.917
114	*Eucalyptus robusta*	Swamp Mahogany	2.93	8.26	214.343
115	*Eucalyptus kitsoniana*	Gippsland Mallee	1.53	2	12.566
116	*Eucalyptus kitsoniana*	Gippsland Mallee	1.82	2	12.566
117	*Callistemon citrinus*	Crimson Bottle Brush	1.5	2	12.566
118	*Eucalyptus scoparia*	Wallangarra Gum	1.75	2.16	14.657
119	*Melaleuca armillaris*	Giant Honey Myrtle	1.5	2	12.566
120	*Eucalyptus leucoxylon*	Yellow Gum	1.61	2.1	13.854
121	*Eucalyptus mannifera*	Brittle Gum	1.91	2.64	21.896
122	*Melaleuca ericifolia*	Swamp Paperbark	1.5	2	12.566
123	*Callistemon salignus*	Willow Bottle Brush	1.5	2	12.566
124	*Melaleuca armillaris*	Giant Honey Myrtle	1.53	2	12.566
125	*Bursaria spinosa*	Sweet Bursaria	1.5	2	12.566
126	*Bursaria spinosa*	Sweet Bursaria	1.5	2	12.566
127	*Bursaria spinosa*	Sweet Bursaria	1.5	2	12.566
128	*Eucalyptus mannifera*	Brittle Gum	1.82	2.28	16.331
129	*Melaleuca styphelioides*	Prickly Paperbark	1.5	2	12.566
130	*Callistemon citrinus*	Crimson Bottle Brush	1.5	2	12.566
131	*Bursaria spinosa*	Sweet Bursaria	1.5	2	12.566
132	*Eucalyptus camaldulensis*	River Red Gum	3.15	9	254.469
133	*Eucalyptus viminalis*	Manna Gum	3.24	10.68	358.338
134	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	2.02	3.06	29.417
135	*Eucalyptus cephalocarpa*	Silver-leaved Stringybark	1.65	2	12.566
136	*Melaleuca styphelioides*	Prickly Paperbark	1.5	2	12.566
137	*Melaleuca ericifolia*	Swamp Paperbark	1.5	2	12.566
138	*Melaleuca ericifolia*	Swamp Paperbark	1.5	2	12.566
139	*Callistemon citrinus*	Crimson Bottle Brush	1.5	2	12.566
140	*Callistemon viminalis*	Weeping Bottle Brush	1.5	2	12.566
141	*Eucalyptus mannifera*	Brittle Gum	1.79	2.28	16.331
142	*Hakea salicifolia*	Willow Hakea	1.5	2	12.566
143	*Callistemon salignus*	Willow Bottle Brush	1.5	2	12.566
144	*Acacia floribunda*	Catkin Wattle	1.72	2.47	19.167
145	*Callistemon citrinus cv*	Crimson Bottlebrush	1.5	2	12.566
146	*Eucalyptus mannifera*	Brittle Gum	1.79	2.43	18.551

Tree ID	*Genus Species*	Common Name	SRZ radius (m) AS4970	TPZ radius (m) AS4970	TPZ Area AS 4970 (m2)
147	*Pomaderris aspera*	Hazel Pomederrris	1.5	2	12.566
148	*Eucalyptus leucoxylon*	Yellow Gum	1.5	2	12.566
149	*Callistemon citrinus*	Crimson Bottle Brush	1.5	2	12.566
150	*Callistemon salignus*	Willow Bottle Brush	1.61	2	12.566
151	*Eucalyptus grandis*	Flooded Gum	2	3	28.274
152	*Eucalyptus globulus*	Blue Gum	3.09	8.88	247.728
153	*Banksia integrifolia*	Coast Banksia	1.5	2	12.566
154	*Eucalyptus ovata*	Swamp Gum	1.5	2	12.566
155	*Acacia floribunda*	Catkin Wattle	1.5	2	12.566
156	*Eucalyptus ovata*	Swamp Gum	1.5	2	12.566
157	*Eucalyptus ovata*	Swamp Gum	2.63	6	113.097
158	*Eucalyptus cinerea*	Mealy Stringybark	1.79	2.47	19.167
159	*Eucalyptus ovata*	Swamp Gum	2.39	5.58	97.818
160	*Acacia howittii*	Sticky Wattle	2.02	3.67	42.314
161	*Eucalyptus camaldulensis*	River Red Gum	2.85	6.6	136.848
162	*Eucalyptus camaldulensis*	River Red Gum	3.24	10.2	326.851
163	*Eucalyptus cladocalyx*	Sugar Gum	1.72	2.46	19.012
164	*Callistemon viminalis*	Weeping Bottle Brush	1.53	2	12.566
165	*Callistemon viminalis*	Weeping Bottle Brush	1.5	2	12.566
166	*Acacia floribunda*	Catkin Wattle	1.53	2	12.566
167	*Acacia floribunda*	Catkin Wattle	1.53	2	12.566
168	*Acacia floribunda*	Catkin Wattle	1.61	2	12.566
169	*Callistemon salignus*	Willow Bottle Brush	1.72	2	12.566
170	*Callistemon salignus*	Willow Bottle Brush	1.5	2	12.566
171	*Callistemon salignus*	Willow Bottle Brush	2.08	3.25	33.183
172	*Acacia floribunda*	Catkin Wattle	1.85	3	28.274
173	*Eucalyptus sideroxylon*	Red Ironbark	2.47	5.04	79.801
174	*Melaleuca linariifolia*	Snow in Summer	1.61	2.21	15.344
175	*Acacia iteaphylla*	Gawler Range Wattle	1.65	2	12.566
176	*Hakea salicifolia*	Willow Hakea	2.05	2.69	22.733
177	*Melaleuca styphelioides*	Prickly Paperbark	1.57	2.01	12.692
178	*Eucalyptus ovata*	Swamp Gum	2.32	4.61	66.765
179	*Hakea drupacea*	Sweet Hakea	1.79	2.63	21.73
180	*Callistemon viminalis*	Weeping Bottle Brush	1.5	2	12.566
181	*Melaleuca armillaris*	Giant Honey Myrtle	2.15	3.89	47.539
182	*Eucalyptus ovata*	Swamp Gum	3.08	9.07	258.443
183	*Eucalyptus robusta*	Swamp Mahogany	2.47	5.04	79.801
184	*Eucalyptus cinerea*	Mealy Stringybark	2.55	5.89	108.988
185	*Eucalyptus sp.*	Gum	1.91	3.08	29.802
186	*Eucalyptus botryoides*	Southern Mahogany	2.55	5.9	109.359
187	*Eucalyptus ovata*	Swamp Gum	2.63	5.88	108.619
188	*Eucalyptus cinerea*	Mealy Stringybark	2.83	6.84	146.981
189	*Eucalyptus viminalis*	Manna Gum	3.3	10.56	350.33
190	*Eucalyptus globulus*	Blue Gum	2.34	4.32	58.63
191	*Eucalyptus cinerea*	Mealy Stringybark	2.95	8.04	203.078
192	*Eucalyptus robusta*	Swamp Mahogany	1.68	2	12.566
193	*Eucalyptus spathulata*	Swamp Mallet	1.5	2	12.566
194	*Eucalyptus spathulata*	Swamp Mallet	3.03	8.28	215.383
195	*Eucalyptus spathulata*	Swamp Mallet	1.5	2	12.566
196	*Eucalyptus ovata*	Swamp Gum	2.92	7.68	185.299
197	*Melaleuca linariifolia*	Snow in Summer	2.05	3.91	48.029
198	*Grevillea robusta*	Silky Oak	1.82	2.4	18.096
199	*Eucalyptus ovata*	Swamp Gum	2.55	5.64	99.933
200	*Eucalyptus scoparia*	Wallangarra Gum	2.71	7.41	172.499
201	*Melaleuca linariifolia*	Snow in Summer	2	3.11	30.386
202	*Banksia marginata*	Silver Banksia	2.15	3.23	32.776
203	*Grevillea robusta*	Silky Oak	2.05	3.12	30.582
204	*Melaleuca linariifolia*	Snow in Summer	2.41	5.16	83.647
205	*Eucalyptus kitsoniana*	Gippsland Mallee	1.5	2	12.566
206	*Grevillea robusta*	Silky Oak	2.13	3.48	38.046
207	*Melaleuca linariifolia*	Snow in Summer	2.2	4.44	61.932
208	*Callistemon viminalis*	Weeping Bottle Brush	1.72	2.43	18.551
209	*Melaleuca linariifolia*	Snow in Summer	2.28	4.92	76.047
210	*Grevillea robusta*	Silky Oak	2.18	3.72	43.475

Tree ID	*Genus Species*	Common Name	SRZ radius (m) AS4970	TPZ radius (m) AS4970	TPZ Area AS 4970 (m2)
211	*Melaleuca armillaris*	Giant Honey Myrtle	2.47	5.2	84.949
212	*Grevillea robusta*	Silky Oak	2.02	3.36	35.467
213	*Melaleuca linariifolia*	Snow in Summer	2.93	8.54	229.121
214	*Banksia integrifolia*	Coast Banksia	2.08	3.48	38.046
215	*Allocasuarina littoralis*	Black She-oak	2.18	4.16	54.367
216	*Callistemon viminalis*	Weeping Bottle Brush	1.79	2.04	13.074
217	*Eucalyptus kitsoniana*	Gippsland Mallee	1.5	2	12.566
218	*Eucalyptus cladocalyx*	Sugar Gum	1.75	2.29	16.475
219	*Melaleuca armillaris*	Giant Honey Myrtle	1.85	2.27	16.188
220	*Melaleuca ericifolia*	Swamp Paperbark	1.5	2	12.566
221	*Acacia baileyana*	Cootamundra Wattle	1.75	2.55	20.428
222	*Acacia baileyana*	Cootamundra Wattle	1.5	2	12.566
223	*Acacia baileyana*	Cootamundra Wattle	1.68	2	12.566
224	*Acacia baileyana*	Cootamundra Wattle	1.5	2	12.566
225	*Melaleuca linariifolia*	Snow in Summer	1.68	2.29	16.475
226	*Melaleuca styphelioides*	Prickly Paperbark	1.68	2.1	13.854
227	*Eucalyptus globulus*	Blue Gum	2.76	6.72	141.869
228	*Melaleuca armillaris*	Giant Honey Myrtle	1.94	3.3	34.212
229	*Eucalyptus cladocalyx*	Sugar Gum	2	2.64	21.896
230	*Eucalyptus cinerea*	Mealy Stringybark	1.91	2.28	16.331
231	*Melaleuca linariifolia*	Snow in Summer	1.53	2	12.566
232	*Melaleuca ericifolia*	Swamp Paperbark	1.5	2	12.566
233	*Eucalyptus grandis*	Flooded Gum	1.91	2.4	18.096
234	*Eucalyptus ovata*	Swamp Gum	1.68	2	12.566
235	*Melaleuca ericifolia*	Swamp Paperbark	1.5	2	12.566
236	*Acacia melanoxylon*	Blackwood	1.57	2	12.566
237	*Eucalyptus globulus*	Blue Gum	1.65	2	12.566
238	*Eucalyptus scoparia*	Wallangarra Gum	1.53	2	12.566
239	*Eucalyptus camaldulensis*	River Red Gum	1.82	2.28	16.331
240	*Eucalyptus ovata*	Swamp Gum	2.08	3.76	44.415
241	*Eucalyptus cinerea*	Mealy Stringybark	2.1	3.51	38.705
242	*Eucalyptus ovata*	Swamp Gum	1.61	2	12.566
243	*Eucalyptus camaldulensis*	River Red Gum	1.72	2.04	13.074
244	*Eucalyptus ovata*	Swamp Gum	1.5	2	12.566
245	*Acacia melanoxylon*	Blackwood	1.5	2	12.566
246	*Eucalyptus grandis*	Flooded Gum	1.82	2.4	18.096
247	*Melaleuca ericifolia*	Swamp Paperbark	1.5	2	12.566
248	*Eucalyptus grandis*	Flooded Gum	1.68	2.88	26.058
249	*Eucalyptus mannifera*	Brittle Gum	1.5	2	12.566
250	*Eucalyptus grandis*	Flooded Gum	2.1	3.6	40.715
251	*Acacia melanoxylon*	Blackwood	1.53	2	12.566
252	*Eucalyptus ovata*	Swamp Gum	2.1	3.84	46.325
253	*Callistemon citrinus*	Crimson Bottle Brush	1.5	2	12.566
254	*Banksia marginata*	Silver Banksia	2.34	5.21	85.276
255	*Callistemon viminalis*	Weeping Bottle Brush	1.57	2	12.566
256	*Callistemon viminalis*	Weeping Bottle Brush	1.5	2	12.566
257	*Callistemon viminalis*	Weeping Bottle Brush	1.53	2	12.566

11 Appendix 4: TPZ and SRZ Map

Figure 4: TPZ and SRZ Map

12 Appendix 5: Tree Photos

Tree ID: 5

Tree ID: 6

Tree ID: 7

Tree ID: 8

Tree ID: 13

Tree ID: 14

Tree ID: 15

Tree ID: 16

Tree ID: 41

Tree ID: 42

Tree ID: 43

Tree ID: 44

Tree ID: 61

Tree ID: 62

Tree ID: 63

Tree ID: 64

Tree ID: 65

Tree ID: 66

Tree ID: 67

Tree ID: 68

Tree ID: 77

Tree ID: 78

Tree ID: 79

Tree ID: 80

Tree ID: 101

Tree ID: 102

Tree ID: 103

Tree ID: 104

Tree ID: 132

Tree ID: 133

Tree ID: 134

Tree ID: 135

Tree ID: 160

Tree ID: 161

Tree ID: 162

Tree ID: 163

Tree ID: 181

Tree ID: 182

Tree ID: 183

Tree ID: 184

Tree ID: 193

Tree ID: 194

Tree ID: 195

Tree ID: 196

Tree ID: 205

Tree ID: 206

Tree ID: 207

Tree ID: 208

Tree ID: Z21

Tree ID: Z22

Tree ID: Z23

Tree ID: Z24

Tree ID: 257

13 Appendix 6: Data Definitions

DBH (Diameter at Breast Height) is measured at 1.4 m above ground level or calculated from the total stem area if the tree was multi-stemmed at 1.4m above ground level in accordance with AS 4970 (2009).

DAB (Diameter at Base) is measured just above the root collar of a tree in accordance with AS 4970 (2009)

Health summarises qualitative observations of canopy density, overall vigour and vitality made in the field:

- Good - Canopy is visually dense with less than 10% dieback and shows no, or only very minor nutrient deficiencies, pest and disease presence or stress–induced epicormic growth.
- Fair - Canopy is of average density, consists of between 10-30% dieback and shows a minor, or occasionally moderate, level of nutrient deficiency, pest and disease presence or stress-induced epicormic growth.
- Poor - Canopy is visually sparse, consists of more than 30% dieback and typically has significant nutrient deficiency, pest and disease presence or stress induced epicormic growth.
- Dead – No indication the tree is alive

Structure summarises qualitative observations of tree structure and stability made in the field:

- Good - The tree's form is optimal for the species. Typically trees of 'Good' structure have no or only very minor trunk leans or canopy asymmetry. These trees have parts that are not structurally compromised by decay, cracks, or other structural faults. Structural failure of these trees is only likely only under strong and unusual weather events
- Fair - The tree's structure includes minor structural defects that do not typically fail in light or moderate weather events. Typically trees of 'Fair' structure have minor trunk leans or slightly asymmetric canopies. These trees are likely to have parts that are partly compromised by decay or structural defects such as included bark.
- Poor - The tree's structure includes major structural defects. Failure of these trees is considered possible under light or moderate weather events. Typically trees of 'Poor' structure have major trunk leans or heavily asymmetric canopies. These trees are likely to have parts that are heavily compromised by decay or structural defects such as included bark.

Maturity summarises the life stage of the tree.

- Juvenile – The tree is in approximately the first 10% of its expected lifespan in its current environment
- Semi-mature – Tree is 10%-20% through its expected lifespan in its current environment and has not yet reached its mature dimensions.
- Mature – The tree is through 20%-90% of its expected lifespan in its current environment.
- Over-mature – The tree is through approximately 90% of its expected lifespan in its current environment

ULE (Useful Life Expectancy) indicates the anticipated remaining years of lifespan of the tree in its existing surroundings. The tree's lifespan is the time that it will continue to provide amenity value without undue risk or hazard and with a reasonable amount of maintenance.

Significance indicates the importance a tree may have on a respective site. The following descriptors are used to derive this value (adapted from IACA 2010):

High -

- Tree is good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant specimen or is rare or uncommon in the local area or of botanical interest or substantial age
- The tree is listed as a heritage item or threatened species or listed on a municipal significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions due to its size and scale. The tree makes a positive contribution to the local amenity.
- The tree supports social or cultural sentiments or spiritual associations or has commemorative values
- The tree is appropriate to the site conditions

Medium -

- The tree is in fair condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous taxa or a common species within the area.
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from a public space. The tree provides a moderate contribution to the amenity and character of the local area
- The tree is often partially restricted by above or below ground influences and/or resources.

Low –

- The is in fair condition and good or low vigour
- The tree has form atypical of the species.
- The tree is not visible or is partly visible from surrounding properties due to obstructions.
- The tree provides a minor contribution or has a negative impact on landscape amenity or character of the local area.
- The tree is a juvenile specimen that can easily be replaced.
- The trees growth is severely restricted by above or below ground influences and/or resources.
- The tree has a feature that has potential to become structurally unsound.
- The tree is a listed as a noxious or environmental weed under state, federal or municipal policy

Dead/Irreversible Decline -

- The tree is structurally unsound or unstable
- The tree is dead or in irreversible decline

Third Party Ownership

- The tree is located on adjoining land to the assessment.

A tree is to meet several or all the criteria in a category to be classified in that group

Arboricultural Value is a calculated value indicating the merit of the tree for retention through any nearby developments. It is a qualitative combination of the trees ULE and Significance Values (Table 10).

Table 10: Matrix for the calculation of Arboricultural Value

		Significance Value				
		High	**Medium**	**Low**	**Dead/Irreversible Decline**	**Third Party Ownership**
ULE	**>40 years**	High	Medium	Low	Low	Third Party Ownership
	15-40 years	High	Medium	Low	Low	Third Party Ownership
	5-15 years	High	Medium	Low	None	Third Party Ownership
	<5 years	Medium	Low	None	None	Third Party Ownership
	0 years	Low	None	None	None	Third Party Ownership

- High –Trees attributed a 'High' arboricultural value are generally of strong visual amenity and significant in the landscape. The utmost level of consideration should be given for the retention of these trees throughout development activities and/or nearby disturbance
- Medium – Trees attributed a 'Medium' arboricultural value are of moderate amenity value and have been attributed some value in the landscape. Trees attributed a 'Medium' arboricultural value should be retained and designed around during developments or nearby disturbance. If retention is not possible for these trees, removal and replacement can be often considered as an acceptable compromise.
- Low – Trees attributed a Low arboricultural value are of poor arboricultural merit. Removal and replacement is an acceptable compromise if designing around these trees is not possible.
- None – Trees attributed an arboricultural value of none have no arboricultural merit. Removal is usually acceptable or required for these trees.
- Third Party Ownership – The tree is located on adjacent land to the assessment. It is assumed that the owner of the tree attributes it a High arboricultural value and requires its retention in the landscape.

14 Appendix 7: Tree Protection Zones and Encroachment

14.1 Structural Root Zones (SRZ)

SRZs are an indication of the area surrounding the base of a tree that is required for its stability. AS 4970 (2009) provides a method to calculate the SRZ of trees: The SRZ is calculated as

$$(DAB \times 50)^{0.42} \times 0.64$$

For grass like trees such as palms or tree ferns; SRZs are not calculated.

14.2 Tree Protection Zone (TPZ)

A Tree Protection Zone (TPZ) is considered one of the most effective ways to ensure the retention of trees throughout development. The aim of a TPZ is to secure the space around the tree so that no above or below ground activities or developments can affect the integrity of the tree's root system or above ground parts.

AS 4970 (2009) provides a method for calculating the standard area of TPZ's. For all broadleaf trees, the radius of the TPZ is calculated as:

12 * DBH

For grass like trees such as palms or tree ferns; TPZs are calculated as:

Radius of extent of canopy + 1m,

Dead trees are attributed a TPZ of the same size as their SRZ as only their stability can now be protected and not their vigour

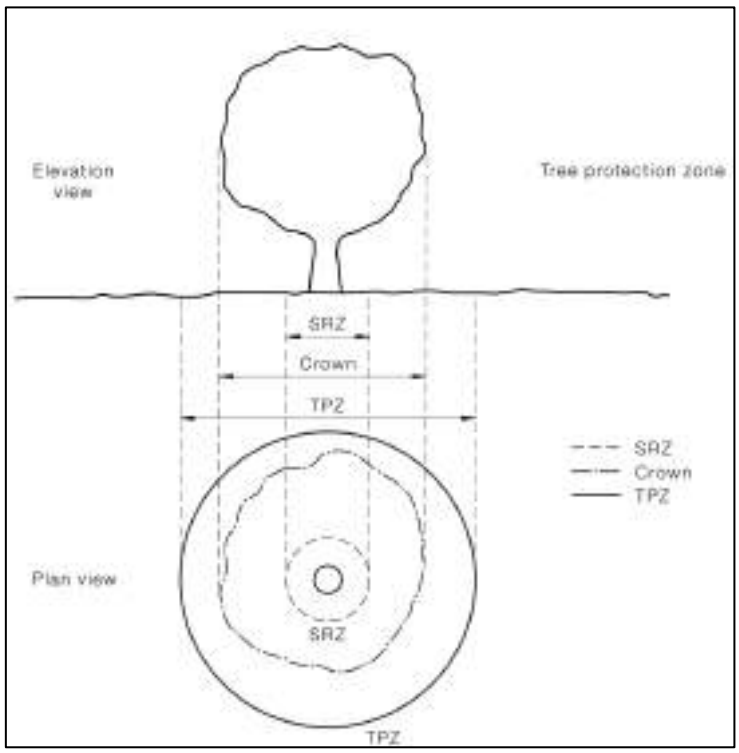

Figure 5: Diagram of TPZ and SRZ (AS 4970 2009)

14.2.1 TPZ Encroachment:

AS 4970 (2009) allows the extents of 'calculated' TPZs to be varied, under certain conditions, to allow varying levels encroachment into TPZs. Encroachment is the term given to the level of impact of the footprint of a disturbance (such as a development or construction activity) on the calculated TPZ of a tree. Two levels of encroachment are classified within AS 4970:

14.2.1.1 Minor Encroachment

Where encroachment of a respective TPZ is limited to less than 10% of a TPZs area it is termed 'Minor Encroachment'. Minor encroachment and corresponding variations to a TPZ **is** considered acceptable while the lost area is compensated elsewhere while still being contiguous with the TPZ.

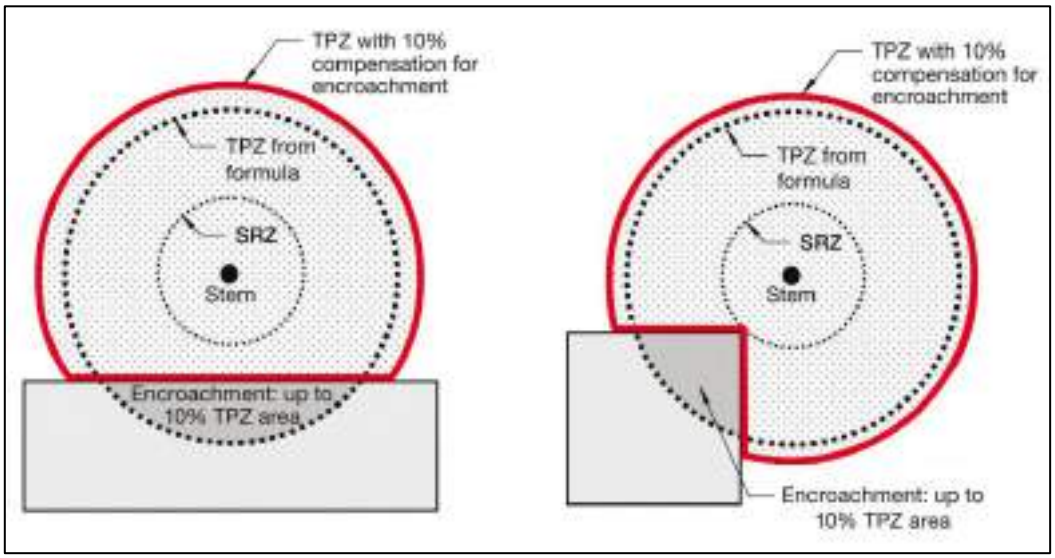

Figure 6: Examples of Minor TPZ encroachment and contiguous TPZ compensation (AS 4970 2009)

14.2.1.2 Major Encroachment

Where encroachment of the standard TPZ exceeds 10% of a TPZ it is termed 'Major Encroachment'. Major encroachment and corresponding variations to a TPZ **can** be considered acceptable providing the following conditions are met:

- The project arborist demonstrates the tree will remain viable through the encroachment.
- The lost area is compensated elsewhere while still being contiguous with the TPZ.

Regardless of encroachment, final TPZs and tree protection requirements should be clear to all parties during the entire construction process. Ideally all tree protection requirements should be outlined within a Tree Protection Management Plan (TPMP), prepared by a suitably qualified arborist, prior to the commencement of any construction activities

14.2.2 Tree Protection Fencing

Tree protection fencing should be installed around the final area of the TPZs of trees to be retained. Fencing should always be installed before the commencement of any construction activities and secured for the life of the construction. TPZ fencing should consist of chain mesh fencing of a minimum of 1.8m in height connected by temporary concrete footings. Where applicable, a finer mesh such as shade cloth should be applied to prevent airborne contaminants entering the TPZ. Warning signs should be erected at regular intervals along the entire length of any TPZ fencing.

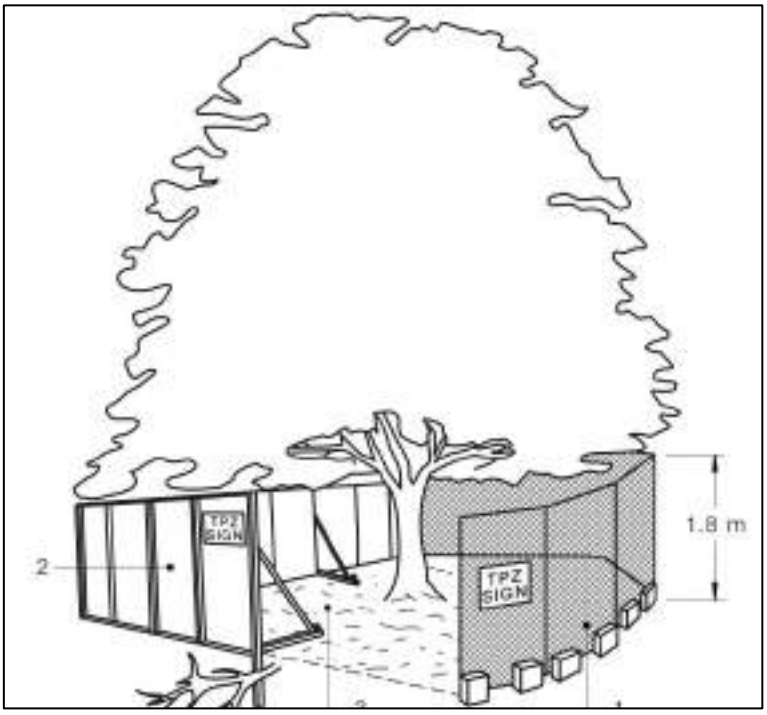

Figure 7: Examples of TPZ fencing (AS 4970 2009)

If the installation of tree protection fencing is not possible; alternative methods for protection of above and below grounds tree parts such a ground protection and physical barriers can be considered at the discretion of the project arborist.

14.2.2.1 General Tree Protection Guidelines

The following recommendations have been provided to as best practice guidelines to the establishment of a TPZ during the length of construction activities.

Exclude the following from taking place within any TPZ (adapted from AS 4970-2009):

- built structures or hard landscape features (i.e. paving, retaining walls)
- materials storage (i.e. equipment, fuel, building waste or rubble)
- soil disturbance (i.e. stripping or grade changes)
- excavation works including soil cultivation (specifically surface-dug trenches for underground utilities)
- placement of fill
- lighting of fires
- preparation of chemicals, including preparation of cement products
- pedestrian or vehicular access (i.e. pathways).