Application for a Planning Permit

Lodgement Date:	23 November 2024
Application Number:	PLA0245/24
Lodgement Method:	Online
Original Permit Number:	Not Applicable

- Original Permit Number only relates to Amendment Applications
- All information in this form was submitted by the Applicant at the time of Lodgement.

The Land

Property Address*	34 Simper Court DROUIN VIC 3818
Land Legal Description*	V 9473 F 810 Lot 13 LP 136189 Drouin West Parish
Other Related Property	
Other Related Land	V 9473 F 810 Lot 13 LP 136189 Drouin West Parish

The Proposal

Category*	Subdivision of 3 or more Lots
Proposal*	Subdivision of the land into ten lots, remove an E3 drainage easement and replace it with a drainage easement
Estimated Cost*	$199000.00

Application Information

Pre-Application Meeting*	Yes
Existing Land Use*	Residential / Accommodation
Encumbrances on Title*	Yes

Applicant and Owner Details

Applicant Details*

Surname/Company:	
First Name:	
Postal Address:	
Mobile Phone:	

Work Phone:	

Agent/Contact Details

Surname/Company:	
First Name:	
Postal Address:	
Mobile Phone:	
Work Phone:	

Owner Details*

Surname/Company:	
Surname/Company:	

Attachment Details

COVER LETTER - 34 Simpler Court (DOC-24-121635)
34 Simper Crt Drouin FL Plan (DOC-24-121636)
34 Simper Crt Development Plan Ver 3 (DOC-24-121637)
Title dated 21 November 2024 (DOC-24-121638)
Plan of Subdivision dated 21 November 2024 (DOC-24-121639)
24037_34SimperCrtDrouin_SWMP_R02a (DOC-24-121640)
240806 - LCA - revised (DOC-24-121641)
GGE and WBC Assessment 34 Simper Court Drouin Oct 2024-Final Report (DOC-24-121642)
Report_66 (DOC-24-121643)
20240303 - 34 Simper Court Drouin (DOC-24-121644)
20240303 - 34 Simper Court Drouin[1] (DOC-24-121645)

Applicant Declaration

I understand and declare that:

- I am the Applicant;
- all information provided within this application is true and correct; and
- the property/land owner (if not myself) has been notified of the application.

*I agree to the declaration terms**	Yes

The personal information requested on this form is being collected to enable council to consider the permit application. Council will use this information for this purpose or one closely related and may disclose this information to third parties for the purpose of their consideration and review of the application.
These third parties generally include, but are not limited to:
Transport Infrastructure Agencies such as VicRoads and VLine
Energy/Utilities Providers
Catchment Management Authorities and Water Corporations

The specific referral bodies will be dependent on factors such as the proposed activities and the location of the applicable property. Applicants are encouraged to familiarise themselves with potential referral bodies.
Any material submitted with this application, including plans and personal information, will be made available for public viewing, including electronically, and copies may be made for interested parties for the purpose of enabling consideration and review of the application as part of a planning process specified in the Planning and Environment Act 1987.
All information collected and held by Council is managed in accordance with Councils Privacy Policy which is available on our website. If you choose not to supply the requested information it may impair the ability of Council to consider your application or prevent Council from communicating with you in relation to your application.
If you have any concerns or require access to the information held by Council, please contact us on 5624 2411.

Application to Amend a Planning Application S50/S57A

Section 1: PERMIT DETAILS

Planning Application No:	PLA0245/24
Address:	34 Simper Court, Drouin 3818

Section 2: PERMIT APPLICANT

Name:	
Business:	
Postal Address:	
Telephone No. (H)	
Email Address:	

Section 3: OWNER DETAILS (If different to the Applicant)

Name(s):	
Postal Address:	
Telephone No. (H)	
Email Address:	

Section 4: AMENDMENT CATEGORY Please tick ✓

Section 50 – Amendment to the application at request of the applicant **before** notice	☑
Section 57A – Amendment to the application **after** notice of application is given (please note, this will incur a fee)	☐

AMENDMENT DETAILS List the changes being applied for and highlight changes on corresponding plans if applicable. A copy of the plans must be submitted with this application. If you need more space, please attach these details separately.

Development Plan (Version 5) shows a revised Habitable Building Envelope and Waste envelope configuration; The ownership of the parcel has changed and a new Title is provided.

Section 5: DEVELOPMENT COST

State the estimated total cost of the proposed development, including amendment.	☑ Unchanged from initial application Or total cost $	
Does the amendment proposal introduce any additional Permit Triggers? (eg: creation of easement, parking reduction) If yes, an additional application fee may be required.		☐ Yes ☑ No

Section 6: DECLARATION This form must be signed. **PLEASE COMPLETE **EITHER** box A or B

A. I declare that I am the Applicant and Owner of this land and that all information given is true and correct.	Owner/ Applicant signature:	Date: 20/5/2025
B. I/We the Applicant declare that I/We have notified the owner about this application and that all information given is true and correct.	Applicant Signature:	Date: 20/5/2025

PLEASE FORWARD THIS APPLICATION TO

E-mail:	planning@bawbawshire.vic.gov.au	**Mail:**	Planning Department, Baw Baw Shire Council PO Box 304 Warragul VIC 3820
Phone:	5624 2411		
In Person:	Customer Service Centre: 33 Young Street Drouin		

The personal information requested on this form is being collected to enable council to consider the permit application. Council will use this information for this purpose or one closely related and may disclose this information to third parties for the purpose of their consideration and review of the application.

These third parties generally include, but are not limited to:

- Transport Infrastructure Agencies such as VicRoads and VLine
- Energy/Utilities Providers
- Catchment Management Authorities and Water Corporations

The specific referral bodies will be dependent on factors such as the proposed activities and the location of the applicable property. Applicants are encouraged to familiarise themselves with potential referral bodies.

Any material submitted with this application, including plans and personal information, will be made available for public viewing, including electronically, and copies may be made for interested parties for the purpose of enabling consideration and review of the application as part of a planning process specified in the Planning and Environment Act 1987.

All information collected and held by Council is managed in accordance with Councils Privacy Policy which is available on our website. If you choose not to supply the requested information it may impair the ability of Council to consider your application or prevent Council from communicating with you in relation to your application.

If you have any concerns or require access to the information held by Council, please contact us on 5624 2411.

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

VOLUME 09473 FOLIO 810

Security no : 124120034959W
Produced 21/11/2024 02:34 PM

LAND DESCRIPTION

Lot 13 on Plan of Subdivision 136189.
PARENT TITLE Volume 09390 Folio 845
Created by instrument LP136189 26/07/1982

REGISTERED PROPRIETOR

Estate Fee Simple
Joint Proprietors

3

ENCUMBRANCES, CAVEATS AND NOTICES

COVENANT N143840S 18/11/1987

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 LP136189 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: 34 SIMPER COURT DROUIN VIC 3818

DOCUMENT END

LP136189

EDITION 1

APPROVED 10/6/82

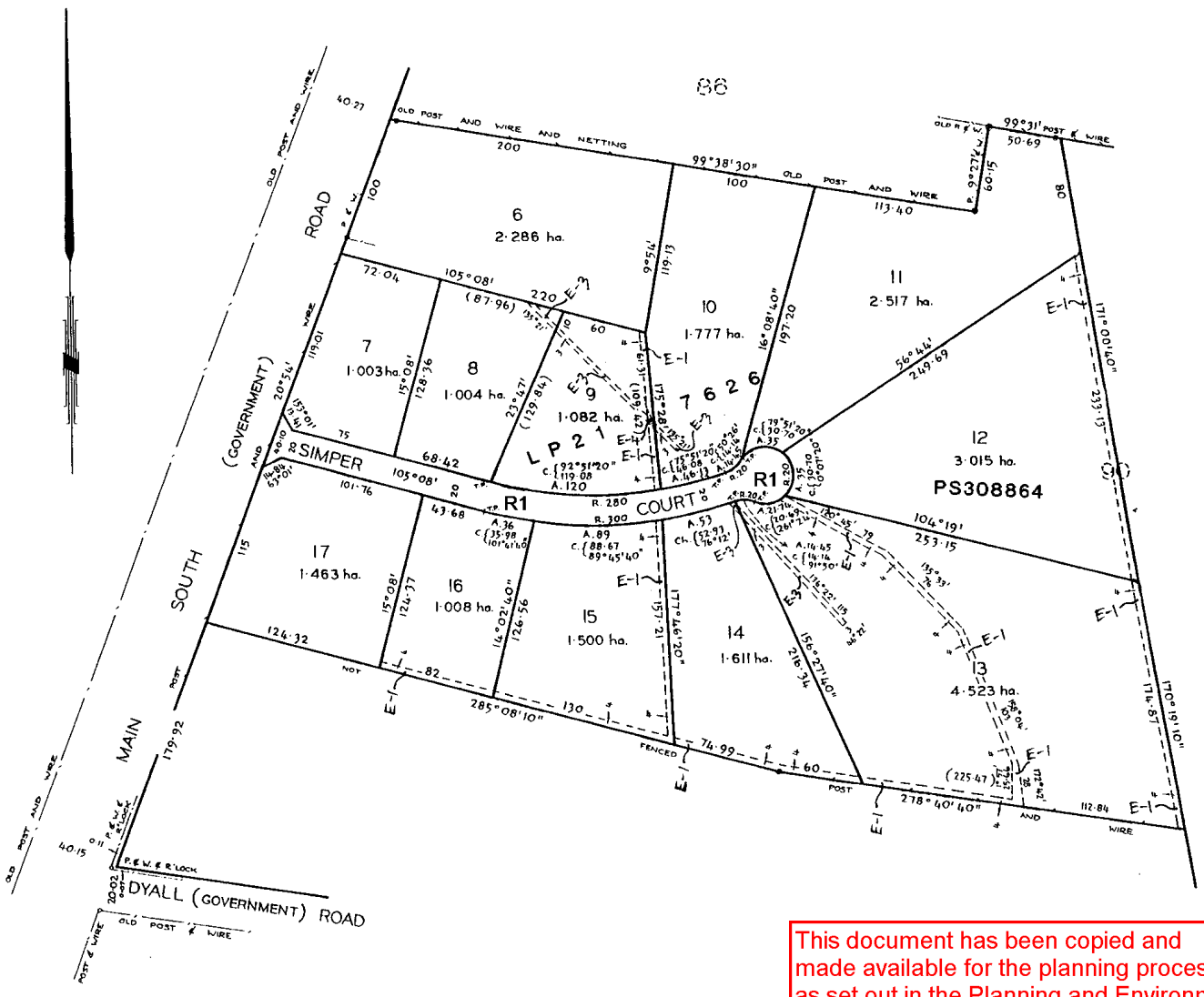
PLAN OF SUBDIVISION OF
PART OF CROWN ALLOTMENT 90
PARISH OF DROUIN WEST
COUNTY OF BULN BULN
SCALE 40 20 0 40 80
LENGTHS ARE IN METRES

APPROPRIATIONS	NOTATIONS
BLUE AND BLUE HATCHED - DRAINAGE. PURPLE AND BLUE HATCHED - WATER SUPPLY PURPOSES. BROWN - WAY AND DRAINAGE.	FOR REFERENCE MARKS SEE FIELDNOTES. ROADWIDTHS ARE NOT TO SCALE.

VOL. 9390 FOL. 845

LITHO SH. 2.

COLOUR CONVERSION
E-1 = BLUE
R1 = BROWN
E-3 = PURPLE
E-4 = BLUE HATCHED



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	**N143840S**
Number of Pages (excluding this cover sheet)	**4**
Document Assembled	**01/04/2025 13:34**

Lodged at the Titles Office by

Titles Office Use Only

181187 1020 45 56 N143840S

Code 1194B

VICTORIA **TRANSFER OF LAND**

Subject to the encumbrances affecting the land including any created by dealings lodged for registration prior to the lodging of this instrument the transferor for the consideration expressed at the request and by the direction of the directing party (if any) transfers to the transferee the estate and the interest specified in the land described together with any easement hereby created and subject to any easement hereby reserved or restrictive covenant herein contained or covenant created pursuant to statute and included herein. (Notes 1-4)

Land (Note 5)

Certificate of Title Volume 9473 Folio 810

STAMP DUTY VICTORIA
2222TRANS#95799 S.D.V. 44 16NOV87
RECEIPT# 835 11A $000001,243.00

Consideration (Note 6)

$56,500.00

Transferor (Note 7)

Transferee (Note 8)

Estate and Interest (Note 9)

All its estate and interest in fee simple.

COL
DUTY: $1243
STATUS: D

Comptroller of Stamps Use Only

Directing Party (Note 10)

Creation (or Reservation) of Easement and/or Covenant (Notes 11-12)

See over.

T2

Office Use Only

OFFICE OF TITLES VICTORIA

Memorandum of the within instrument has been entered in the Register Book.

OFFICE OF TITLES F. P. VICTORIA

Approval No. T2/1

~~The Transferees and their heirs, executors, administrators~~ and successors in title shall not erect or place upon or suffer to be erected or placed upon the subject land any residence and garage which has been removed from another property or erect any residence and garage (excluding normal farm outbuildings) of less than 112 square metres in area or a residence and garage in which second hand materials have been utilised and such residence and garage shall be constructed of brick, stone or masonry with a tile, ~~shingle or colour bond iron roof.~~

And we the said for themselves their heirs executors administrators and transferees the registered proprietors for the time being of the said land hereby transferred and of every part thereof do hereby and as separate covenants Covenant with the said Allan Ernest Fielden his successors assigns and transferees and other the registered proprietor or proprietors for the time being of the land comprised in the said Plan of Subdivision and every part or parts thereof (other than the land hereby transferred) That we shall not erect or place upon or suffer to be erected or placed upon the subject land any residence and garage (excluding normal farm outbuildings) of less than 112 square metres in area or a residence and garage in which second hand materials have been utilised and such residence and garage shall be constructed of brick stone or masonry with a tile, shingle or colour bond iron roof.

Dated this 13th day ~~XXX~~ of November 1987 (Note 13)

Execution and Attestation (Note 14)

SIGNED by the Transferor)
)
in the presence of:)

SIGNED by the Transferees)
)
in the presence of:)

NOTES

1. This form must be used for any transfer by the registered proprietor—
   (a) of other than the whole of an estate and interest in fee simple
   (b) by direction
   (c) in which an easement is created or reserved
   (d) which contains a restrictive covenant or a covenant created pursuant to statute.
2. Transfers may be lodged as an original only and must be typed or completed in ink.
3. All signatures must be in ink.
4. If there is insufficient space in any panel to accommodate the required information use an annexure sheet (Eorm A1) or (if there is space available) enter the information under the appropriate heading after any creation or reservation of easement or covenant. Insert only the words "See Annexure A" (or as the case may be) or "See overleaf" in the panel as appropriate.

   Multiple annexures may appear on the same annexure sheet but each must be correctly headed.

   All annexure sheets should be properly identified and signed by the parties and securely attached to the instrument.
5. Volume and folio references must be given. If the whole of the land in a title is to be transferred no other description should be used. If the transfer affects part only of the land in a title the lot and plan number or Crown description should also be given. Any necessary diagram should be endorsed hereon or on an annexure sheet (Form A1).
6. Set out the amount (in figures) or the nature of the consideration. If the transfer is by direction show the various considerations
   e.g. $ ..... paid by B to A
   $ ..... paid by C to B

   In a transfer on sale of land subject to a mortgage it should be clearly shown whether or not the amount owing under the mortgage is included in the consideration e.g. $ ..... which includes the amount owing under mortgage No. ..... .
7. Insert full name. Address is not required.
8. Insert full name and address. If two or more transferees state whether as joint tenants or tenants in common. If tenants in common specify shares.
9. Set out "All my estate and interest in the fee simple" (or other as the case may be).
10. If the transfer is by direction give the full name of any directing party and show the various considerations under the consideration heading.
11. Set out any easement being created or reserved and define the dominant and servient tenements.
12. Set out full details of any covenant and define the covenantee and the land to bear the burden and to take the benefit of the covenant.
13. The transfer must be dated.
14. If an executing party is a natural person execution should read "Signed by the transferor (transferee, directing party) in the presence of ....." . The witness must be an independent person. If an executing party is a body corporate execution should conform to any prescribed formalities relating to the affixing of the common seal.

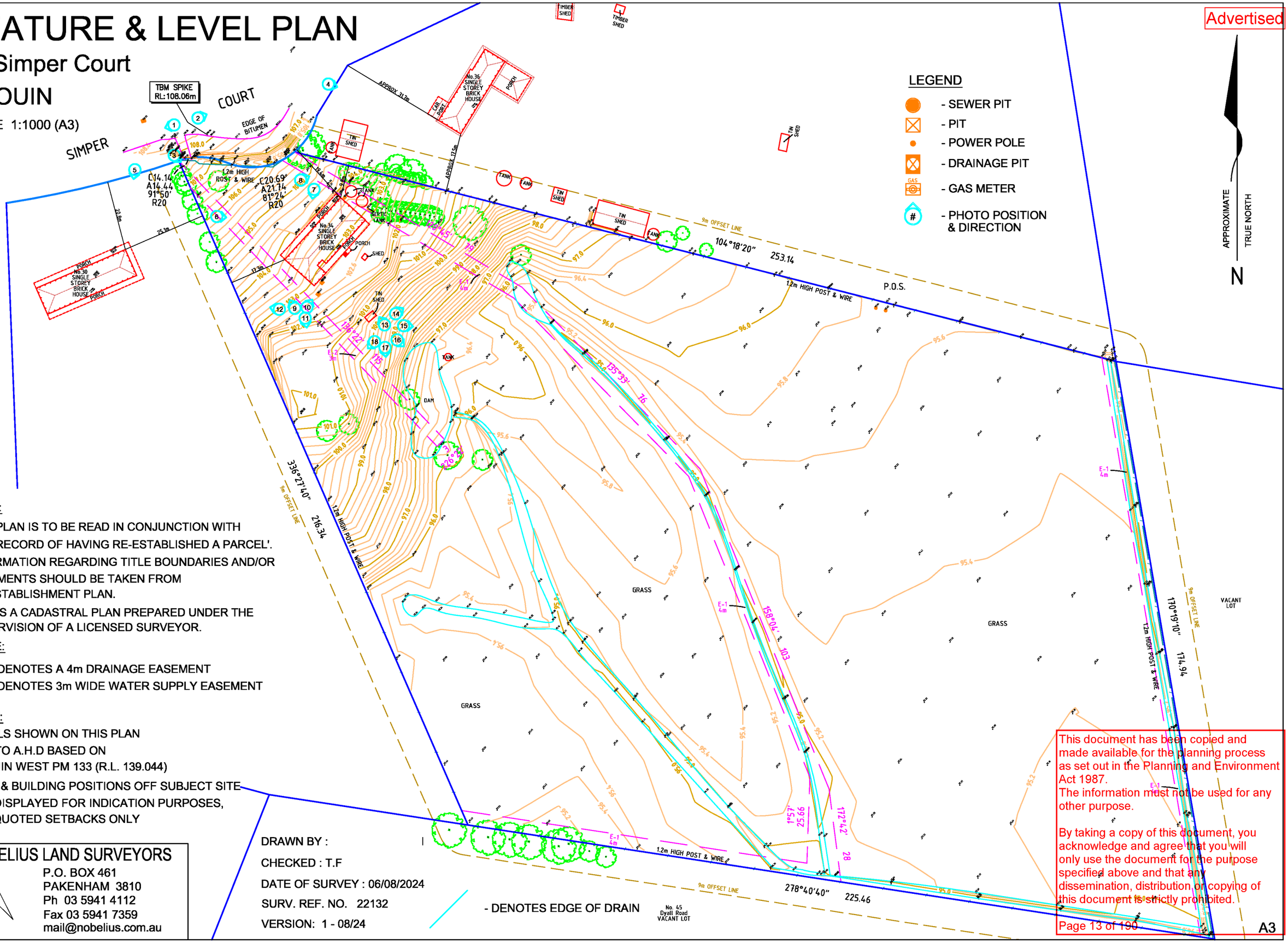
Harston, Partridge & Co. Pty. Ltd., Printers, Melbourne Telephone 428 1541

FEATURE & LEVEL PLAN

34 Simper Court

DROUIN

SCALE 1:1000 (A3)



NOTE:

- THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE 'RECORD OF HAVING RE-ESTABLISHED A PARCEL'. INFORMATION REGARDING TITLE BOUNDARIES AND/OR EASEMENTS SHOULD BE TAKEN FROM RE-ESTABLISHMENT PLAN.
- THIS IS A CADASTRAL PLAN PREPARED UNDER THE SUPERVISION OF A LICENSED SURVEYOR.

NOTE:

- E-1 - DENOTES A 4m DRAINAGE EASEMENT
- E-2 - DENOTES 3m WIDE WATER SUPPLY EASEMENT

NOTE:

- LEVELS SHOWN ON THIS PLAN ARE TO A.H.D BASED ON DROUIN WEST PM 133 (R.L. 139.044)
- TITLE & BUILDING POSITIONS OFF SUBJECT SITE ARE DISPLAYED FOR INDICATION PURPOSES, USE QUOTED SETBACKS ONLY

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

DRAWN BY :

CHECKED : T.F

DATE OF SURVEY : 06/08/2024

SURV. REF. NO. 22132

VERSION: 1 - 08/24

- DENOTES EDGE OF DRAIN

A3

DEVELOPMENT PLAN

34 Simper Court

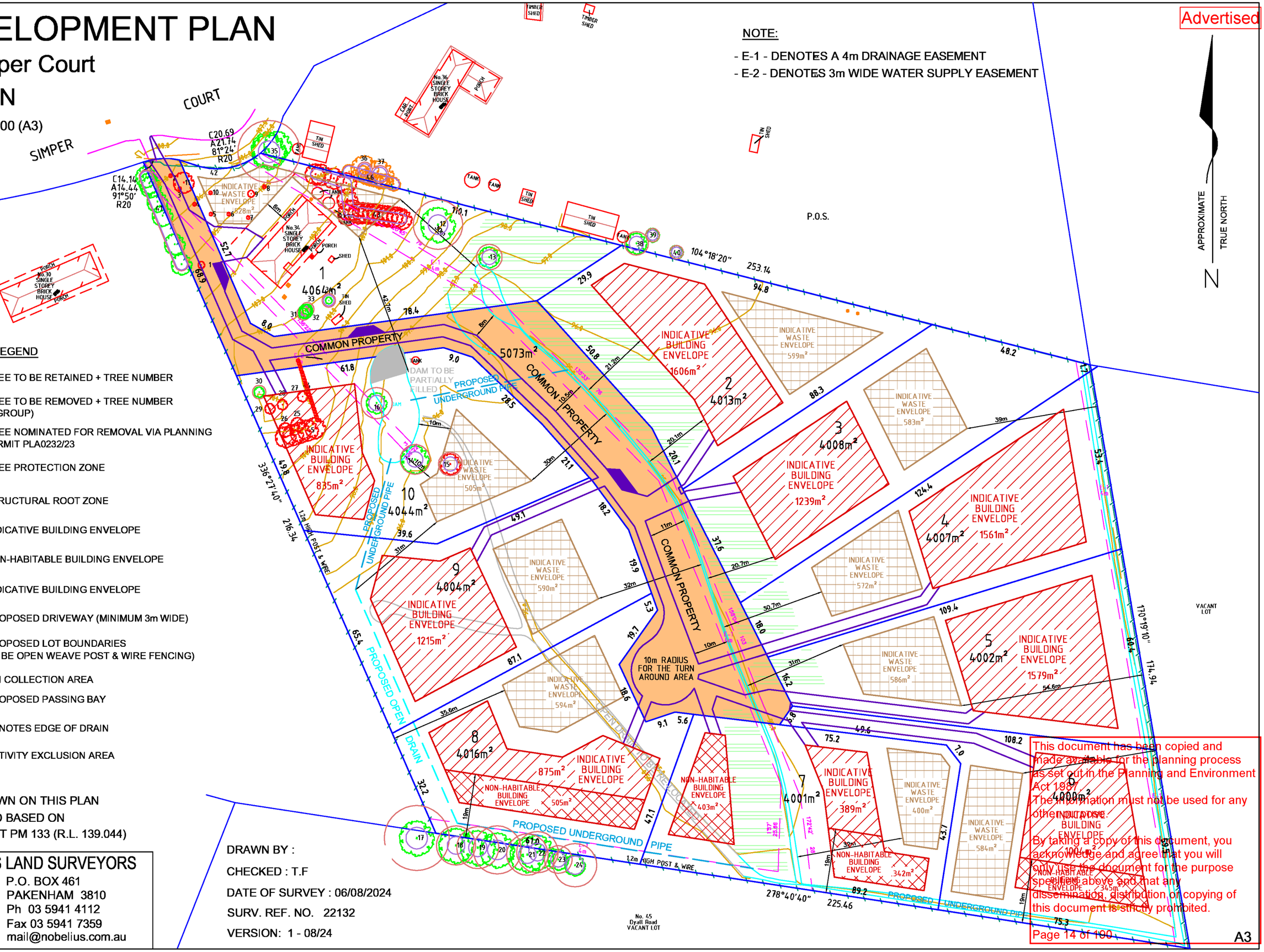
DROUIN

SCALE 1:1000 (A3)

VERSION: 5

NOTE:

- E-1 - DENOTES A 4m DRAINAGE EASEMENT
- E-2 - DENOTES 3m WIDE WATER SUPPLY EASEMENT



LEGEND

- xx - TREE TO BE RETAINED + TREE NUMBER
- xx - TREE TO BE REMOVED + TREE NUMBER (1 GROUP)
- TREE NOMINATED FOR REMOVAL VIA PLANNING PERMIT PLA0232/23
- TREE PROTECTION ZONE
- STRUCTURAL ROOT ZONE
- INDICATIVE BUILDING ENVELOPE
- NON-HABITABLE BUILDING ENVELOPE
- INDICATIVE BUILDING ENVELOPE
- PROPOSED DRIVEWAY (MINIMUM 3m WIDE)
- PROPOSED LOT BOUNDARIES (TO BE OPEN WEAVE POST & WIRE FENCING)
- BIN COLLECTION AREA
- PROPOSED PASSING BAY
- DENOTES EDGE OF DRAIN
- ACTIVITY EXCLUSION AREA

NOTE:

- LEVELS SHOWN ON THIS PLAN ARE TO A.H.D BASED ON DROUIN WEST PM 133 (R.L. 139.044)

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

DRAWN BY :

CHECKED : T.F

DATE OF SURVEY : 06/08/2024

SURV. REF. NO. 22132

VERSION: 1 - 08/24

A3

TOWN PLANNING REPORT

THE SUBDIVISION OF THE LAND INTO TEN (10) LOTS, REMOVAL OF THE E3 EASEMENT (DRAINAGE) AND CREATION OF AN EASEMENT (FOR THE PURPOSE OF DRAINAGE).

AT LOT 13 PS136189, 34 SIMPER COURT, DROUIN VIC 3818

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	Lot 13 PS136189, 34 Simper Court, Drouin 3818
AREA	4.523 hectares 45,230m^2
RESPONSIBLE AUTHORITY	Baw Baw Council
ZONE	Low Density Residential Zone
OVERLAY	Development Contributions Plan Overlay - Schedule 1 (DCPO1)
BUSHFIRE PRONE AREA	Yes
CULTURAL HERITAGE	Not applicable
EASEMENTS, RESTRICTIONS, ENCUMBRANCES	E1 Drainage Easement E3 Water Supply Covenant N143840S (dated 18/11/1987) - Transfer of Land with a restriction of development of less than 112m^2 or a dwelling or garage that employs second materials other than brick, stone or masonry and shingle or colorbond roof.
PROPOSAL	The subdivision of the land into ten (10) lots, the removal of the E3 easement (Drainage) and the creation of an easement (Drainage).
PERMIT TRIGGERS	• Pursuant to Clause 32.03-3 (LDRZ) a permit is required to subdivide land. • Pursuant to Clause 52.02 (Easements, restrictions and reserves) a permit is required to remove the E3 easement and create a drainage easement. Pursuant to clause 45.06-1 a permit granted to subdivide land must be consistent with the provisions of the relevant Development Contribution Plan (DCPO1) and include any conditions required to give effect to any contributions or levies imposed.
RELEVANT PLANNING CONTROLS AND INCORPORATED DOCUMENTS	Clause 11 Settlement Clause 13 Environmental Risks & Amenity Clause 15 Built Environment & Heritage Clause 16 Housing Clause 19 Infrastructure Clause 32.03 Low Density Residential Zone Clause 45.06 Development Contribution Plan overlay Clause 52.02 Easement, restrictions and reserves Clause 52.17 Native vegetation Clause 53.01 Public Open Space Contribution Clause 56 Residential Subdivision Clause 65.02 Approval of an application to subdivide land
SUBMITTED DOCUMENTS	Current copy of title and plan Town Planning Report prepared by *Nobelius Land Surveyors* Site Analysis Plan prepared by *Nobelius Land Surveyors* Proposed Plan of Subdivision prepared by *Nobelius Land Surveyors* Arboricultural Impact Assessment prepared by *Ajarboriculture* Stormwater management Plan by *Afflux Consulting* Plumbing Report (existing septic) by *Grants Plumbing*. Ecological Report by *Invert-Eco*.

	Land Capability Assessment by *Hardcore Geotech*.			
NLS QUALITY SYSTEM	**AUTHOR**	**DATE ISSUED**	**CHECKED BY**	**REVISION**
	JB	1/5/2025	RO	2

2. INTRODUCTION

This town planning report has been prepared by Nobelius Land Surveyors on behalf of the landowner to support an application for the subdivision of the land into ten (10) lots and the removal and creation of easements at 34 Simper Court, Drouin.

The subject site is located in an establishing urban area of Drouin and is contained within the Low Density Residential Zone. The site is constrained in terms of services and features drainage with ecological value that has been considered and incorporated into the design. The site provides an excellent opportunity for ecologically sustainable infill development within an existing residential neighbourhood.

The purpose of this report is to assess the proposal against the relevant provisions of the Baw Baw Planning Scheme and State and Local planning policies. The report will demonstrate that the proposal is entirely appropriate to be granted a planning permit and warrants Council's full support on the grounds that the proposal:

- Is consistent with Baw Baw's vision for established urban areas within the Shire;
- Is consistent with the State and Local Planning Policy Framework, particularly the policies that have regard for the better utilisation of existing residential land;
- Is consistent with the purposes of the Low Density Residential Zone;
- Is consistent with the relevant objectives and standards of Clause 56 (ResCode); and
- Responds to the existing subdivision pattern and neighbourhood character of the wider area and will satisfactorily integrate with the surrounding lot sizes and land uses.

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

- Current copy of title and plan;
- Site Analysis and Development Plan prepared by Nobelius Land Surveyors;
- Arboricultural assessment by AJarboriculture;
- An Ecological Assessment;
- A Land Capability Assessment by Hardcore Geotech; and
- A Stormwater Assessment by Afflux Consulting.

3. SUBJECT SITE AND SURROUNDING LOCALITY

SITE ANALYSIS

The land is formally described as Lot 13 Plan of subdivision 136189, 34 Simper Court, Drouin, contained within Volume 09390 and Folio 845. The land is located on the southeastern extent of the court bowl, with street frontage to Simper Court to the northwest of the site for a distance of 21.74m (arc). The site has a total area of 45,230m^2.

The site is developed with one single storey dwelling of brick veneer construction, with a hipped roof. The dwelling features three bedrooms with car parking spaces provided via an attached garage to the west of the dwelling. Access is via a single width crossover from Simper Court and a gravel driveway. The dwelling has a front setback of 19.7 metres. Vegetation on the site is predominately comprised of low-mid level ornamental species contained within a garden setting in the northern portion of the site with native trees located adjacent to the southern (rear) boundary. The remainder of the land is lawned.

The existing septic associated with the dwelling has been inspected by licenced plumber *Grants Plumbing* (Licence No. 101968) and found the Primary septic and absorption field was operating at a less than optimal capacity and required replacement.

A review of the Certificate of Title indicates that the maximum depth of the site measures 253 metres. The site is encumbered by an E-1 drainage easement that measures 4 metres in width located both centrally on the lot and adjacent to the eastern boundary. An E3 easement is located in the western portion of the lot and has the purpose of Water Supply.

Covenant N143840S dated 18/11/1987 has regard to the Transfer of Land and contains a covenant on the owner of the land to employ only new materials for the erection of any residence or outbuilding erected on the land. Additionally, the residence must have a minimum floor area of no less than 112 square metres. There are no additional caveats or restrictions under Section 173 of the *Planning and Environment Act, 1987* or *Subdivision Act, 1989* recorded on the title.

A copy of the Certificate of Title has been provided as part of this submission.

An aerial image of the site is provided below:

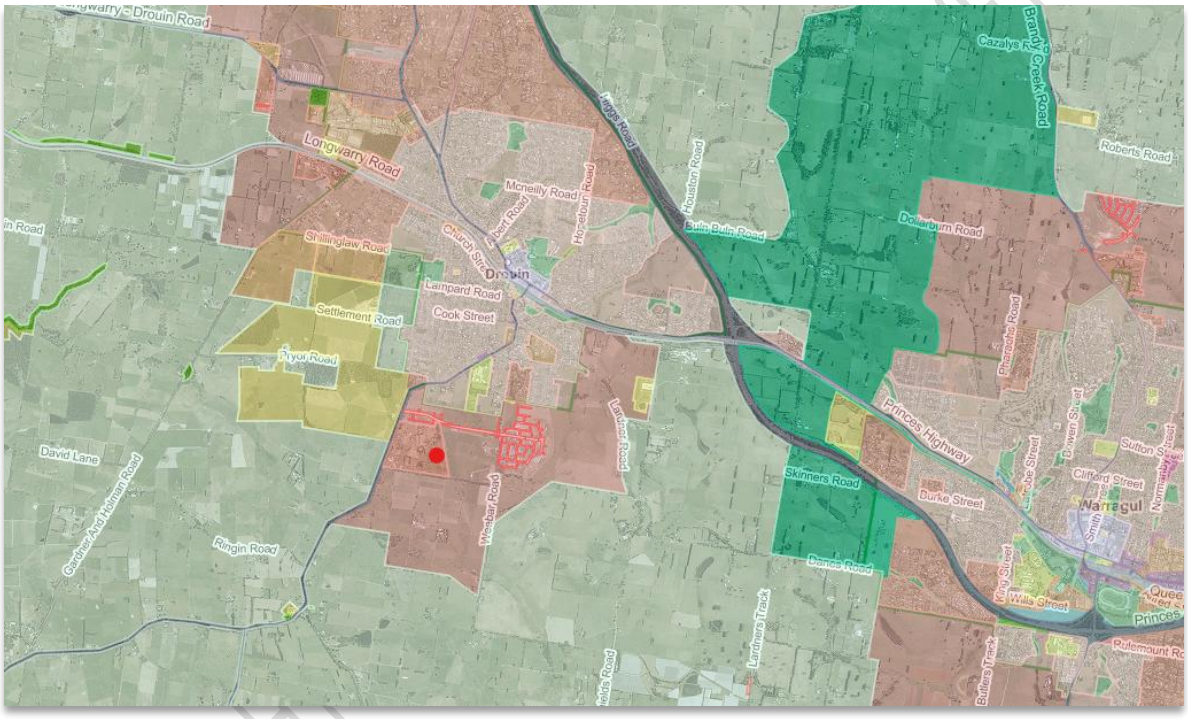
34 SIMPER COURT, DROUIN (IMAGE COURTESY OF LASSI, 2022)

PERMIT HISTORY

- Previous planning permit PLA0316/18 was issued for Multi-lot Subdivision in Stages anmd Associated Works on 4 June 2020 for for the subject site, 34 Simper Court, 36 Simper Court and 45 Dyall Road, all Drouin 3818.

SURROUNDS

Simper Court is a residential court in Drouin that connects to Main South Road to the west, a Transport Zone 2 road that provides south to north thoroughfare. The subject site is located beyond the Drouin Township boundary with the land to the north and east subject to the Urban Growth Zone and significant associated residential development. Simper Court is contained within a Low Density Residential Zone that is an island amongst Public Use Zone to the northwest and the Farm Zone to the west. Please refer below to the subject site in context with surrounding zones.



LOCALITY MAP (LASSI, 2024)

Surrounding lots subject to the Low Density Residential Zone feature areas of between 0.41 hectares (the minimum lot area in the LDRZ) and 2.5 hectares and developed with single detached dwellings, which are predominately of brick construction with minimum setbacks from the road reserve of 20 metres. The landscape features a combination of remnant native vegetation dispersed amongst planted garden species, contributing to a semi-rural, open character.

The land immediately adjoining the subject site has been summarised below:

EAST		• The land directly to the east is subject to the Urban Growth Zone Schedule 2 and pending residential development.
NORTH	 	• Abutting the northern boundary of the subject lot are parcels measuring >4000sqm and featuring detached dwellings, open paddocks and introduced garden species. • To the north of Simper Court is new residential development within Ferntree Ridge Estate, which is subject to the Urban Growth Zone Schedule 2.
SOUTH	 	• Abutting the southern boundary of the subject site are larger lots (>4,000sqm) featuring detached dwellings and rural landscaping. • Further south (south of Dyall Road) is Farm zoned land engaged in agricultural pursuits.
WEST		• To the west of the subject site, addressing Simper Court are large lots that have recently been subdivided to minimum lot sizes within the LDRZ (4,000sqm). The existing dwellings feature generous setbacks and open landscaping.

A regional Bus runs between Drouin Railway Station and Poowong Post Office provides public transport options in a northerly and southerly direction. The Drouin Railway Station and activity centre are less than 3.5km to the north of the site.

ENVIRONMENTAL CONSIDERATIONS

TOPOGRAPHY

The high point of the land is located in the west adjacent to Simper Court and falls to the southeast. The land falls 12 vertical metres over a horizontal plane measuring 353 metres. Topographically, the site does not pose constraints to subdivision.

WATERWAYS

There are two waterways on the site; one is centrally located tributary to King Parrot Creek that has a north-south orientation and is an identified waterway (as per the blue line in the aerial below). The other is an open drain located to the west of the above-mentioned waterway, identified in the aerial below by the forked drainage line between the western title boundary and the identified waterway.

ECOLOGY

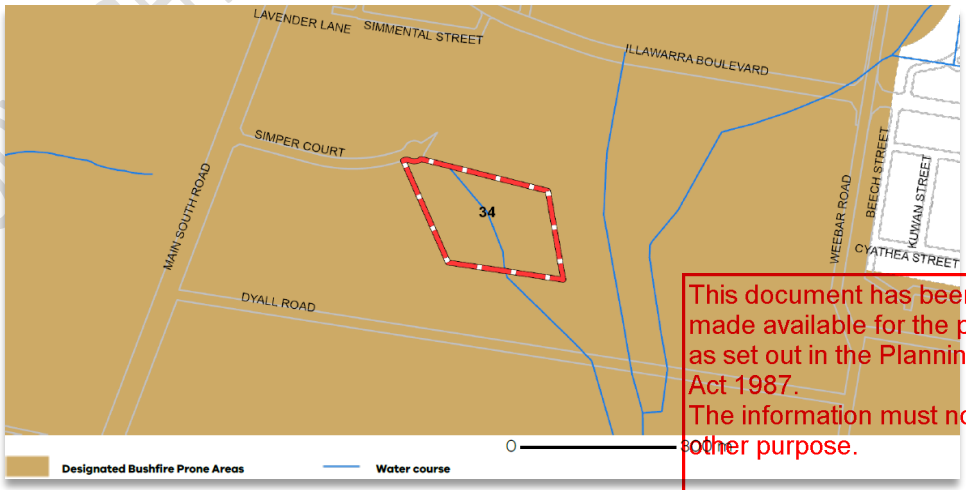
A survey in 2019 of the site recorded the presence of the Warragul Burrowing Crayfish (WBC) with a relatively low density of 21 chimneys found on the subject site (Van Praagh, 2019). Below is a map comparing the recording of chimneys found in 2019 (yellow stars) and those found in August 2024 (green dots) evidencing a wider distribution of WBC. Most chimneys were found within 5 metres of the centrally located waterway, with drier soils further from the waterway less likely to support crayfish. The open drain to the west of the waterway was found to support two chimneys.

CULTURAL HERITAGE

The entirety of the subject site is mapped outside the area of cultural heritage sensitivity.

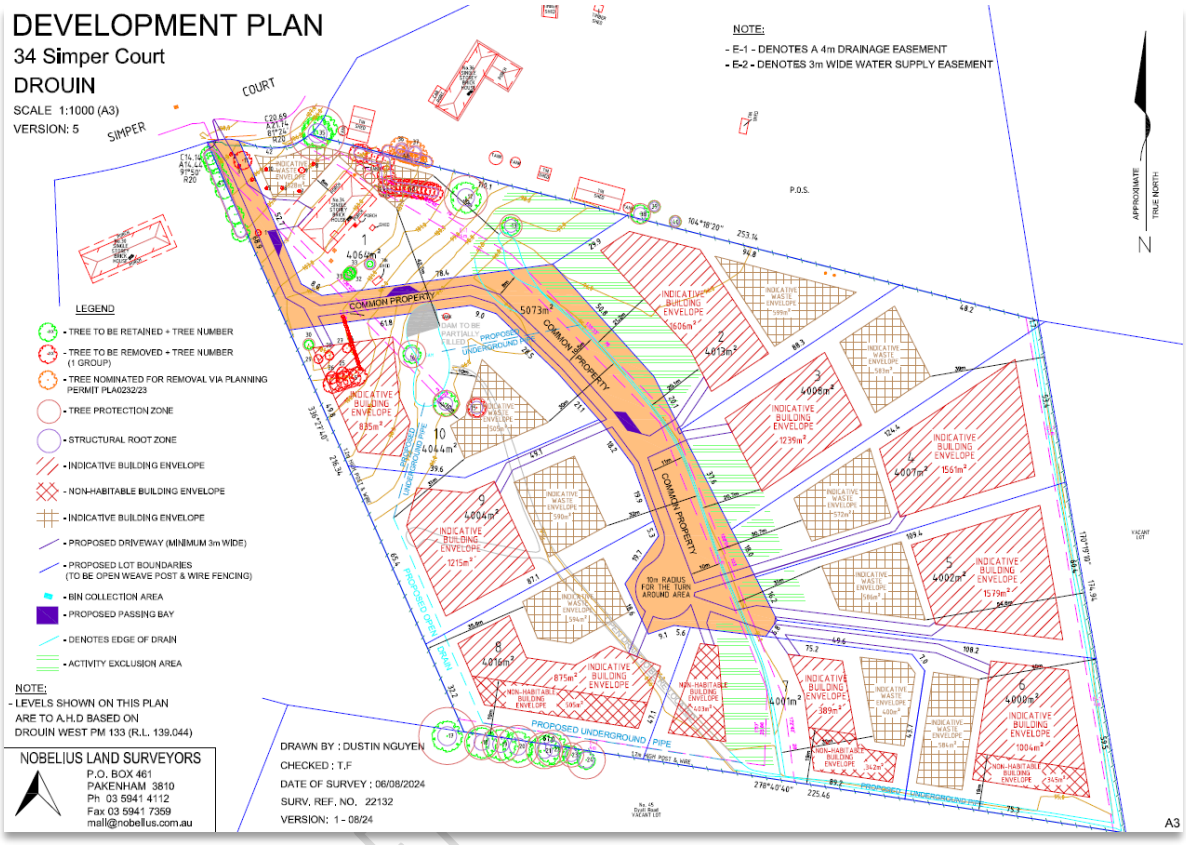
BUSHFIRE CONSIDERATIONS

The subject site is within a designated bushfire prone area. A response to Clause 13.02 is provided in Section 7 of this Town Planning report.



4. THE PROPOSAL

The applicant seeks approval for the subdivision of the land into ten (10) lots, removal and creation of easements at 34 Simper Court, Drouin. The Development Plan V5 below provided by *Nobelius Land Surveyors* shows the proposed subdivision, common property access, drainage and lot configuration, which is further detailed below.



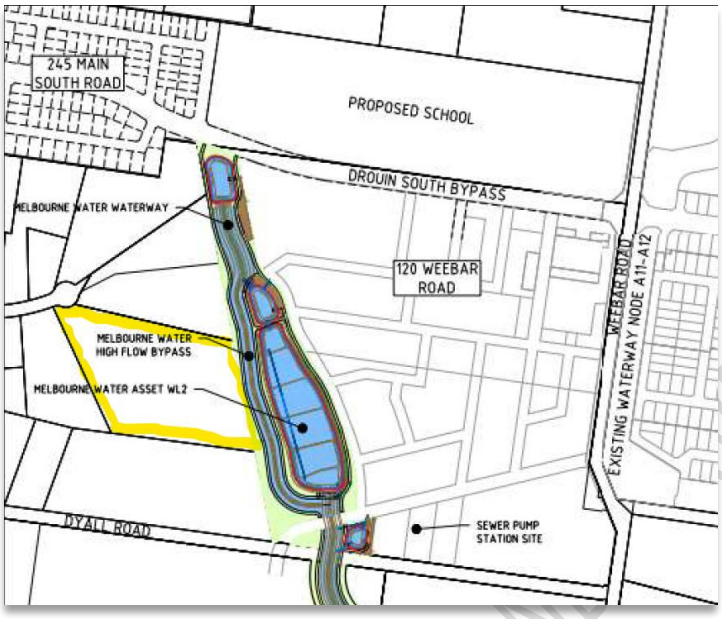
LOT CONFIGURATION & DESIGN

Each of the ten lots will have a minimum lot area of 4,000m^2 (ranging between 4,001m^2 to 4,064m^2) and feature habitable building envelope and a waste envelope that is set back from the identified waterways by the recommended 30 metre distance.

CFA RECOMMENDATIONS

While CFA referral has recommended a 19 metre setback of Building Envelopes from the title boundaries (dated 20 December 2024), we contend that the land to the west is subject to a subdivision application (PLA…) and will be considered excludable vegetation given the reduced size of the lots and area subject to development and the removal of 'paddock-type grasses'. Additionally, the land to the east is subject to the Urban Growth Zone with the land adjacent to the lot designated as the Melbourne Water managed waterway and drainage, King Parrot Creek Drainage Scheme wetland and retarding basin, which will also be considered excludable. Please refer below to the King parrot Creek DS by *TaylorMiller Consulting*, 2020. The fact this land will be employed as drainage and retarding basin suggests it can be considered excluded land on the basis of the moisture content of the vegetation, as is consistent with Clause 2.2.3.2, *AS3959:2018 Construction of Buildings in bushfire prone areas*.

The recommended 19 metre setback of building envelopes from the southern boundary has been applied as there is no assurance that this adjoining lot, 45 Dyall Road, will be maintained in a Low Threat state, as per the requirements of Table 2, Clause 52.03-5.

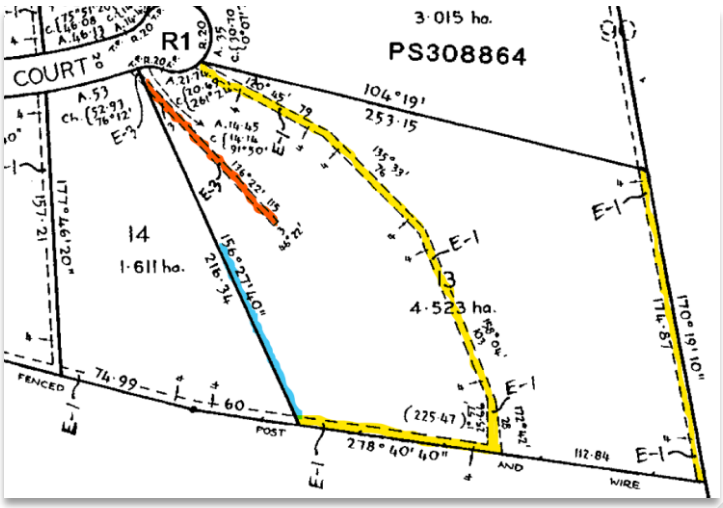


COMMON PROPERTY

Each of the ten lots will have access provided via Common Property, which varies in width to accommodate the access, passing bays and the existing E-1 easement that has the purpose of drainage. The easement also aligns with the identified waterway, which is being preserved in the easement. The accessway is designed with a minimum setback from the waterway of between 8 to 11 metres. The common property area between the accessway and either side of the waterway will feature a vegetation buffer and will be planted with native species including rushes and sedges, as per the recommendations of the ecology assessment to stabilise soils, reduce erosion and enhance waterway quality (Invert-Eco, 2024).

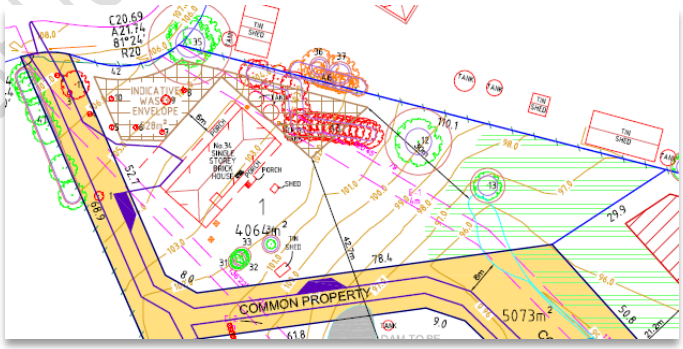
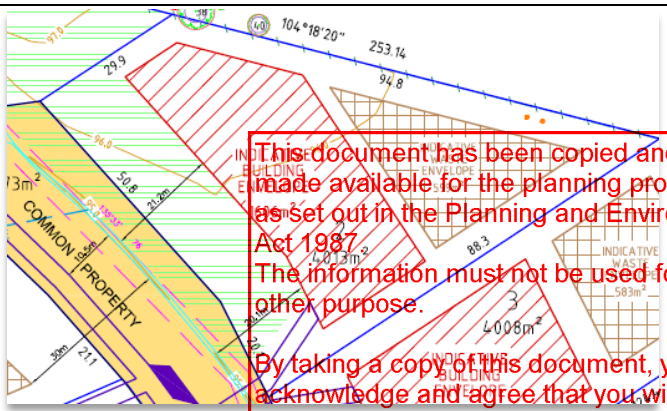
EASEMENTS & WATERWAYS

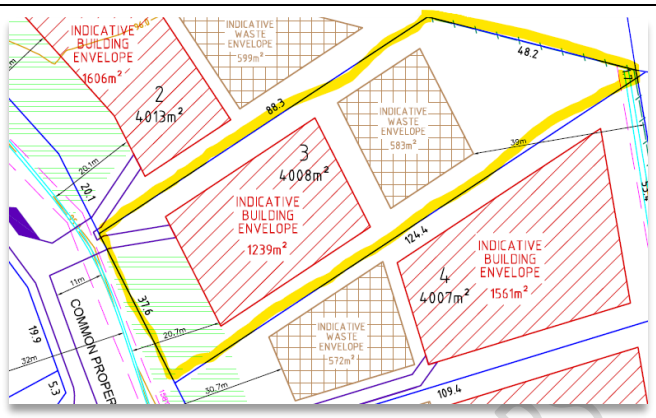
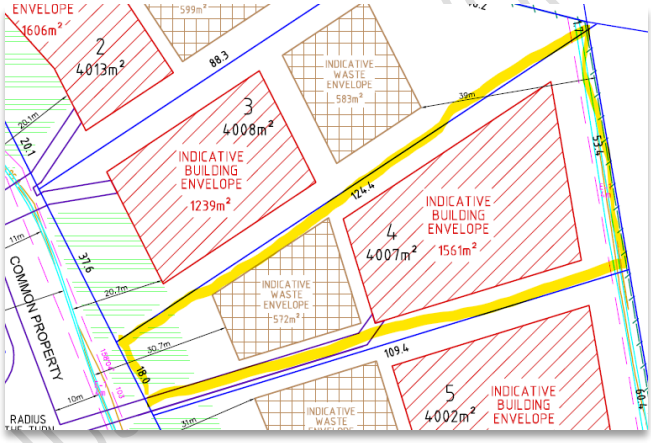
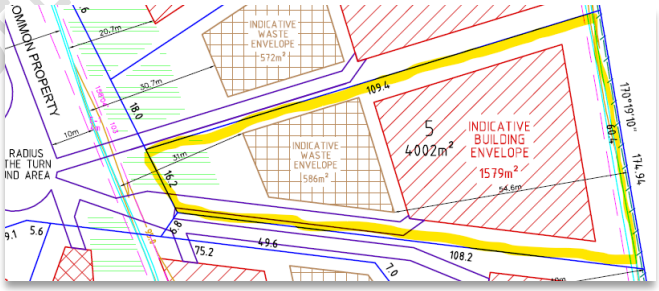
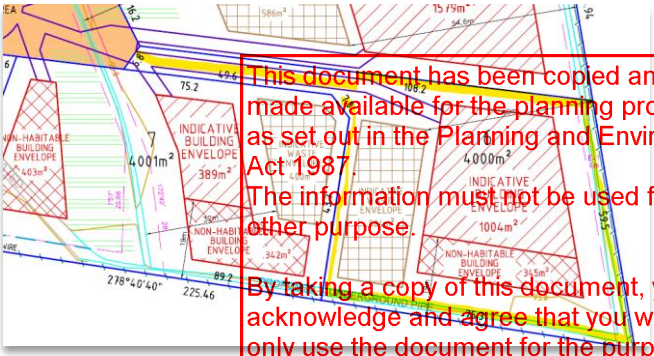
The existing E1 easements that have the purpose of drainage will be retained and protected, as shown highlighted (yellow) in the existing Plan of Subdivision, below. The E3 easement (highlighted as orange below) will be removed as this easement does not serve an ongoing purpose of water supply. Historically, this easement identified water supply from a spring further to the northwest however, this spring no longer provides water to the subject site.

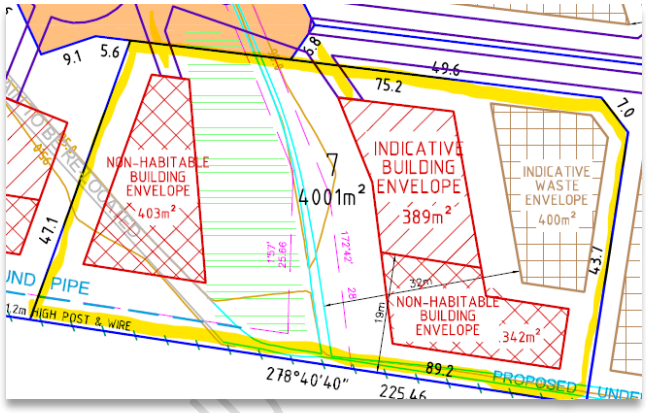
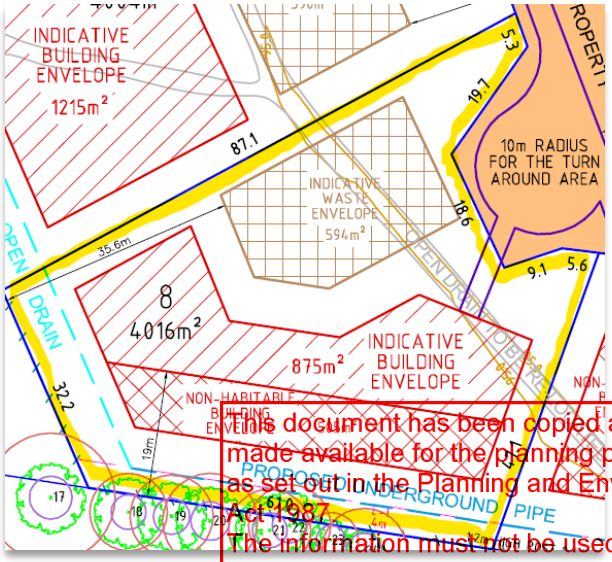


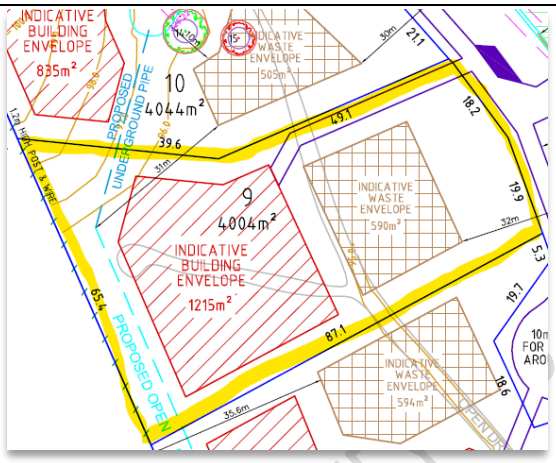
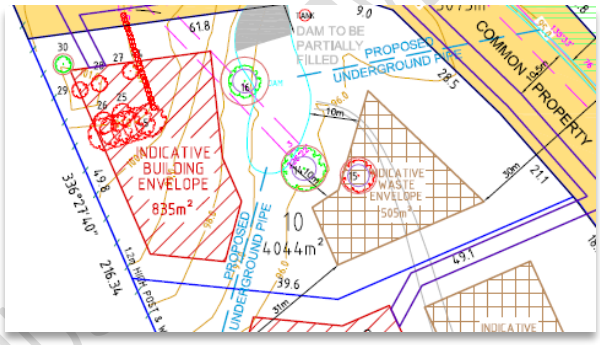
The open drain that is located to the west of the waterway will undergo modification. The dam at the head of the open drain will be partially filled at the northern most portion to accommodate for the common property and access. The balance of the dam will be retained with an underground pipe draining to the existing waterway to the east with another underground pipe providing drainage to the realigned open drain adjacent to the western boundary (as indicated by the blue highlight above). This will drain into a piped section adjacent to the southern boundary, within the existing E1 easement.

A breakdown of each lot and the proposed access is provided below.

Lot 1	Lot 1 is located in the northern most portion of the site and addresses Simper Court. It is proposed to measure 4,064m^2 and contains the existing dwelling and sheds. The septic system that services the existing dwelling will be replaced with a system located to the northeast (side) and northwest (front) of the dwelling. Existing access conditions from Simper Court will remain unaltered.	
Lot 2	Lot 2 has a proposed lot size that measures 4,013m^2 and is located to the southeast of Lot 1. The lot is accessed via the Common Property. The indicative building envelope measures 1,606m^2 and is set back a minimum of 20m from the waterway. The waste envelope measures 599m^2.	

Lot 3	Lot 3 has a proposed lot size of 4,008m^2 and is located to the southeast of Lot 2. The lot is accessed via the Common Property. The indicative building envelope measures 1,239m^2 and is set back a minimum of 20m from the waterway. The waste envelope measures 583m^2.	
Lot 4	Lot 4 has a proposed lot size of 4,007m^2 and is located to the south of Lot 3. The lot is accessed via the Common Property. The indicative building envelope measures 1,561m^2 and is located in the eastern most portion of the site, away from the waterway. The waste envelope measures 572m^2 and is setback 30m from the main waterway, separated by a vegetated buffer.	
Lot 5	Lot 5 has a proposed lot size of 4,002m^2 and is located to the south of Lot 4. The lot is accessed via the Common Property. The indicative building envelope measures 1,579m^2 and is located in the eastern most portion of the site, away from the waterway. The waste envelope measures 586m^2 and is setback 31m from the main waterway, separated by a vegetated buffer.	
Lot 6	Lot 6 has a proposed lot size of 4,000m^2 and is located in the southeastern corner of the subject site. The lot is accessed via the Common Property. The indicative building envelope measures 1,349m^2 and is located in the eastern most portion of the site, away from the waterway. The waste envelope measures 584m^2 and is	

	setback 40m from the E1 easement adjacent to the eastern boundary. The Building envelope is setback 19m from the southern boundary, as per CFA recommendations.	
Lot 7	Lot 7 has a proposed lot size of 4,001m^2 and is located adjacent to the southern boundary of the subject site. The lot is accessed via the Common Property. The indicative habitable building envelope measures 389m^2 and is located in the southeastern most portion of the site, away from the waterway and features a 19 metre setback from the southern boundary, as recommended by the CFA. The waste envelope measures 400m^2 and is setback 30m from the waterway. There are two un-habitable building envelopes that measures 403m^2 and 342m^2 suitable for sheds and separated from the waterway by a vegetated buffer.	
Lot 8	Lot 8 has a proposed lot size of 4,016m^2 and is located in the southwestern corner of the subject site. The lot is accessed via the Common Property. The indicative building envelope measures 1,380m^2 in total area with 875m^2 in area suitable for habitable built form and 505m^2 in area suitable for non-habitable built form, such as shedding. The habitable building envelope is setback 19m from the southern boundary as per the CFA referral recommendations. The waste envelope measures 594m^2 and is setback 35m from the open drain adjacent to the western boundary.	

Lot 9	Lot 9 has a proposed lot size of 4,004m^2 and is located to the north of Lot 8. The lot is accessed via the Common Property. The indicative building envelope measures 1,215m^2. The waste envelope measures 590m^2 and is setback 32m from the main waterway.	
Lot 10	Lot 10 has a proposed lot size of 4,044m^2 and is located to the north of Lot 9 and to the south of Lot 1. The lot is accessed via the Common Property. The indicative building envelope measures 835m^2. The waste envelope measures 505m^2 and is setback 30m from the main waterway to the east and 31n from the open drain to the southwest. The lot features the existing dam that is located 10metres upslope from the waste envelope.	

SERVICES

The subject site does not feature connection to mains water therefore the proposed lots will rely on rainwater harvested from roof area for their potable water supply. The sites have been designed to ensure all waste and be retained and treated onsite. As per Amendment VC221 gazetted on 4*th* August 2022 we wish to advise that this development will not be connected to reticulated gas.

ECOLOGY

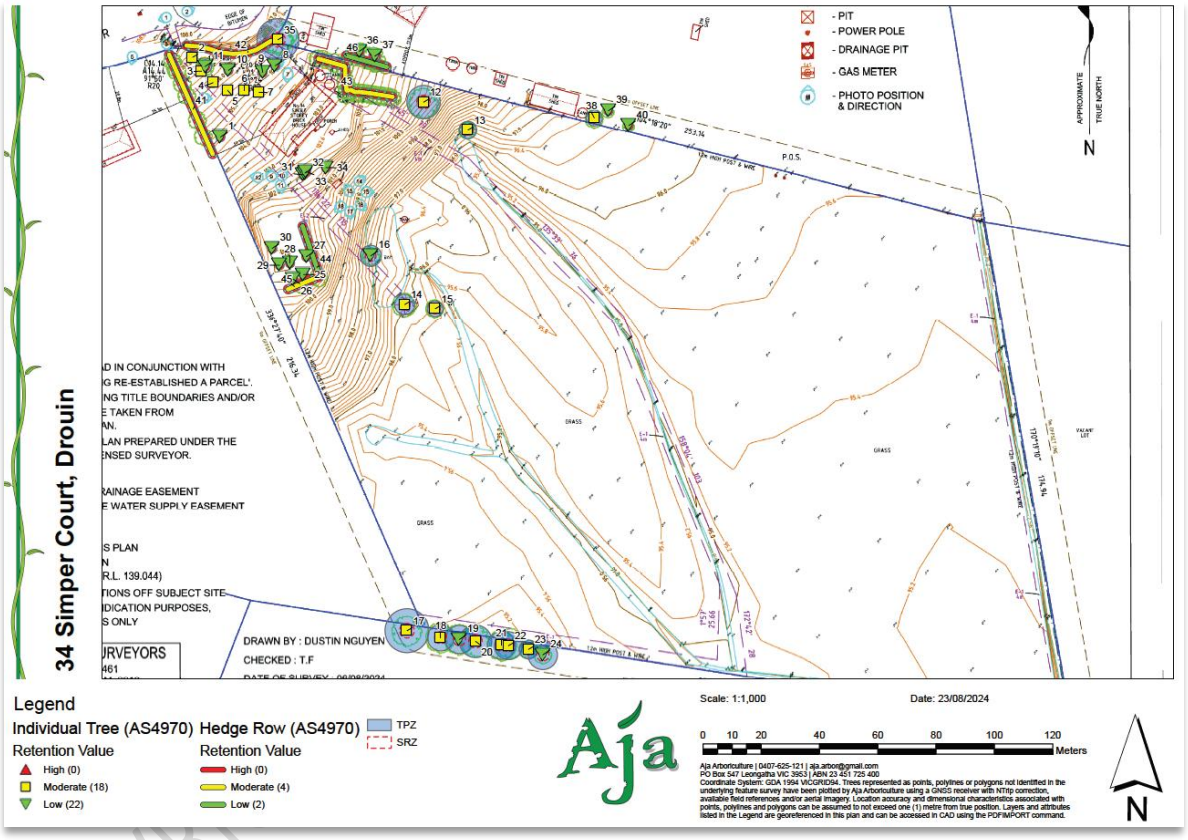
The Development Plan indicates the preservation of the waterway environment in consideration of the presence of the Warragul Burrowing Crayfish in the vicinity of the waterway. The plan shows the waterway contained within the Common Property to ensure its maintenance is the responsibility of future residents[1]. The Common Property has been designed to accommodate suitable setbacks of the access and building and waste envelopes from the waterway, with vegetated buffers the waterway.

[1] To be detailed in the Plan of Subdivision once details of the subdivision are confirmed.

VEGETATION

The assessment of vegetation undertaken by David Balsamo of *AJarboriculture* identified a number of windbreaks, orchard plants, ornamental plants and planted natives. There are a number of third party trees adjacent to the boundaries, of note those numbered 17 to 24, which are a mix of Australian and Victorian Natives that have been planted in a straight line and have moderate to low retention value (*AJarboriculture*, 2024:6-8). The onsite Victorian Natives number thirteen (13), nine of which are planted and do not represent the relevant EVC. Eighteen (18) trees and four (4) hedges have been attributed with a Moderate Retention Value and the remaining twenty two (22) trees and four (4) hedges received a Low Retention Value.

The arboricultural site plan is provided below showing the location of the moderate and low value trees.



The trees that have been identified as requiring removal are listed and detailed in the table below with information extracted from the accompanying arboricultural report by *AJarboriculture*, dated August 2024.

TREE ID	SPECIES	RETENTION VALUE	PERMIT REQUIRED?
1	Citrus X Sinensis (Orange)	Low	No (Planted)
2-7	Thuja occidentalis	Moderate to Low	No
8, 10	Acer palmatum (Japanese maple)	Low	No
9	Lagerstroemia indica (Crape Myrtle)	Low	No
11	Cupressus macrocarpa	Low	No

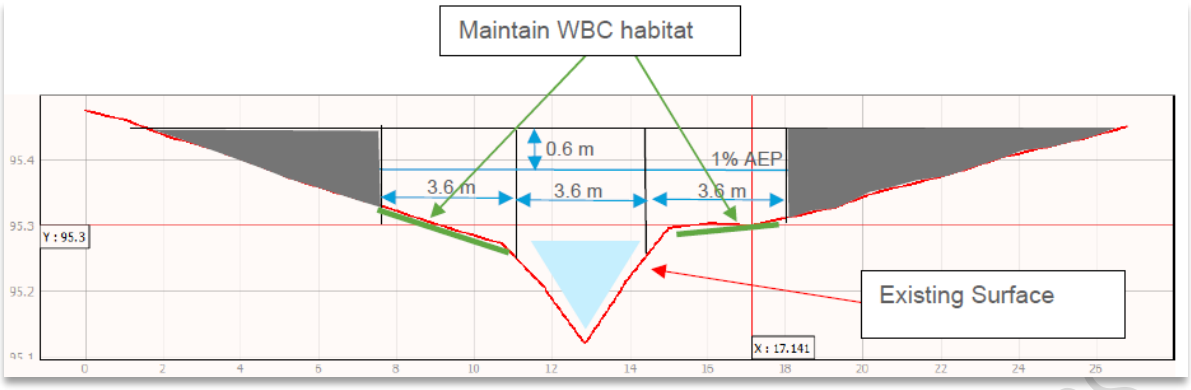
15	Eucalyptus camaldulensis (River Red Gum) – Victorian Native	Moderate	No (Planted)
25	Citrus japonica (Kumquat)	Low	No
26	Cirus X limon	Low	No (Planted)
27	Citrus X sinensis	Low	No (Planted)
28, 29	Malus domestica (apple)	Low	No
44	Pittosporum	Moderate	No
45	Pittosporum	Low	No

STORMWATER, FLOODING, WATER QUALITY AND HABITAT PRESERVATION (WBC)

Drainage of the subject site is currently provided via the centrally located waterway (E1 easement), the open drain to the west of the waterway, the swale adjacent to the southern boundary (E1 easement), and the swale adjacent to the eastern boundary described as E1 easement. The central waterway will be retained and unmodified as it is recognised as habitat for the endangered Warragul Burrowing Crayfish. The open drain to the west of the waterway will be piped from the dam to an open swale that is relocated to align with the western boundary and connect to the existing E1 drainage easement adjacent to the southern boundary. The subject site will ultimately benefit from and contribute to the increased drainage capacity associated with the King Parrot Drainage Scheme (DSS2912) and the scheme Treatment Asset RB1WL3 (please refer to Figure 5, page 5 of the accompanying SWMS report by *Afflux Consulting*). Essentially, the subject site has the ability to achieve the retention of increased volumetric and peak flows as a result of increased impervious areas[2] and meet best practice load-based reduction targets as required by the Victorian EPA Best Practice Environmental Management (BPEM) Guidelines (1999) that ensure the preservation of the water quality of downstream waterways. These outcomes will be achieved via water tanks (with a minimum capacity of 10,000kL) on each lot that harvest rainwater from roofed areas and provide potable water supply to future dwellings and contribute to the retention of increased volumetric and peak flows as a result of increased impervious areas. Please refer to Figure 18 – MUSIC model, page 23 of the SWMS report by *Afflux Consulting*.

Equally salient are those measures that have been taken to ensure the preservation of habitat for the WBC. As stated, the centrally located waterway that provides habitat for the WBC will be preserved and protected. There are three vehicular access points to lots to the east of the central waterway (identified on Figure 25 in the SWMS, 2024) which will feature a specially designed culvert that ensures the preservation of existing waterflow and unbridled access for the WBC to the water and bank of the waterway. Please refer below. The banks and buffer areas either side of the waterway, and open drainage swales will be planted with 'rushes and sedges and other appropriate EVC plantings for riparian habitats', as per the recommendations by ECO-Invert, page 24;2024 and consistent with Melbourne Water Standard Crossings.

[2] Please note that while this application does not contemplate development for dwellings, it is acknowledged that the ultimate outcome is to provide lots suitable for residential development therefore the consequences of this development have been considered and accommodated in this subdivision proposal.



NOBELIUS LAND SURVEYORS

5. RELEVANT PLANNING CONTROLS

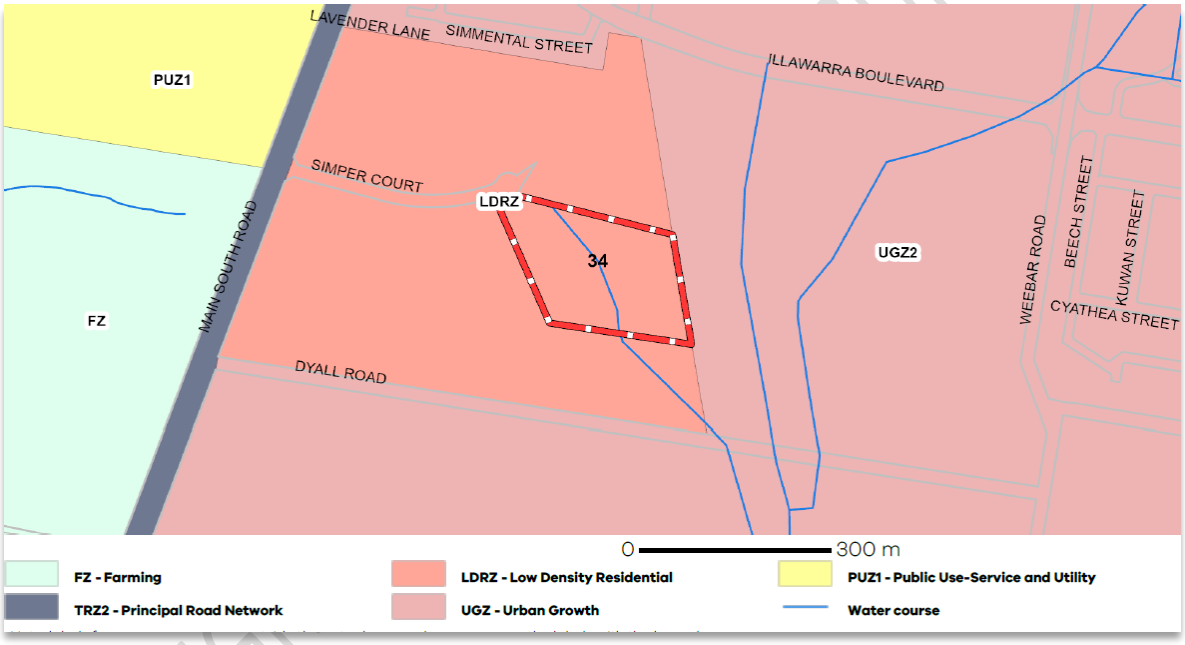
The following section addresses the objectives and requirements of the zoning and overlay controls relevant to the subject site identifying how these planning controls relate to the proposal, trigger an assessment and how we have addressed the requirements of planning provisions.

ZONING CONTROLS

The following provides a brief summary of the planning controls relevant to the subject site identifying how these planning controls relate to the proposal.

LOW DENSITY RESIDENTIAL ZONE

The subject site is mapped within the Low Density Residential Zone (LDRZ) in the Baw Baw Planning Scheme, as per the *VicPlan* map below.



The Low Density Residential Zone has the following purposes relevant to this proposal:

- *To implement the Municipal Planning Strategy and the Planning Policy Framework.*
- *To provide for Low Density Residential development on lots which, in the absence of reticulated sewerage, can treat and retain all wastewater.*

Pursuant to **Clause 32.03-3** a permit is required to subdivide land. Each lot must be at least 0.4 hectares where reticulated sewerage is not connected.

Please find attached the proposed development plan that has regard to the subdivision of the subject site. The plan shows indicative building and waste envelopes, existing vegetation and adjoining lots and boundaries, as per the requirements of Clause **32.03-5 Application requirements**.
The schedule to the zone is silent on additional requirements.

DECISION GUIDELINES

The decision guidelines contained in **Clause 32.03-6** have been considered in the proposed design. An assessment of the proposal against the relevant guidelines of the LDRZ is provided below:

GENERAL

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

SUBDIVISION

- *The protection and enhancement of the natural environment and character of the area including the retention of vegetation and faunal habitat and the need to plant vegetation along waterways, gullies, ridgelines and property boundaries.*
- *The availability and provision of utility services, including sewerage, water, drainage, electricity, gas and telecommunications.*
- *In the absence of reticulated sewerage:*
    - *The capability and suitability of the lot to treat and retain all wastewater as determined by a Land Capability Assessment on the risks to human health and the environment of an on-site wastewater management system constructed, installed, or altered on the lot in accordance with the requirements of the Environment Protection Regulations under the Environment Protection Act 2017.*
    - *The benefits of restricting the size of lots to generally no more than 2 hectares to enable lots to be efficiently maintained without the need for agricultural techniques and equipment.*
- *The relevant standards of Clauses 56.07-1 to 56.07-4.*

The proposal is considered to be consistent with the Municipal Planning Strategy and the relevant state and local policies, particularly those that have regard for the provision for the better utilisation of existing urban land. The proposal is consistent with the purpose of the zone, including the need to provide minimum lot sizes that are capable of containing and treating waste onsite. The subdivision has been designed to ensure the retention of vegetation, especially the Native trees of Moderate Retention Value. The existing centrally located waterway has been the landscape feature around which the subdivision has been designed to preserve. The drainage function and environmental benefits of this waterway are the nexus of the proposal and anchors the design. The waterway provides essential drainage for the site, in conjunction with the other drainage lines on the site, and also provides habitat for the Warragul Burrowing Crayfish. The waterway will be buffered from development by vegetated setbacks with crossovers to lots designed to provide protected thoroughfare for the WBC.

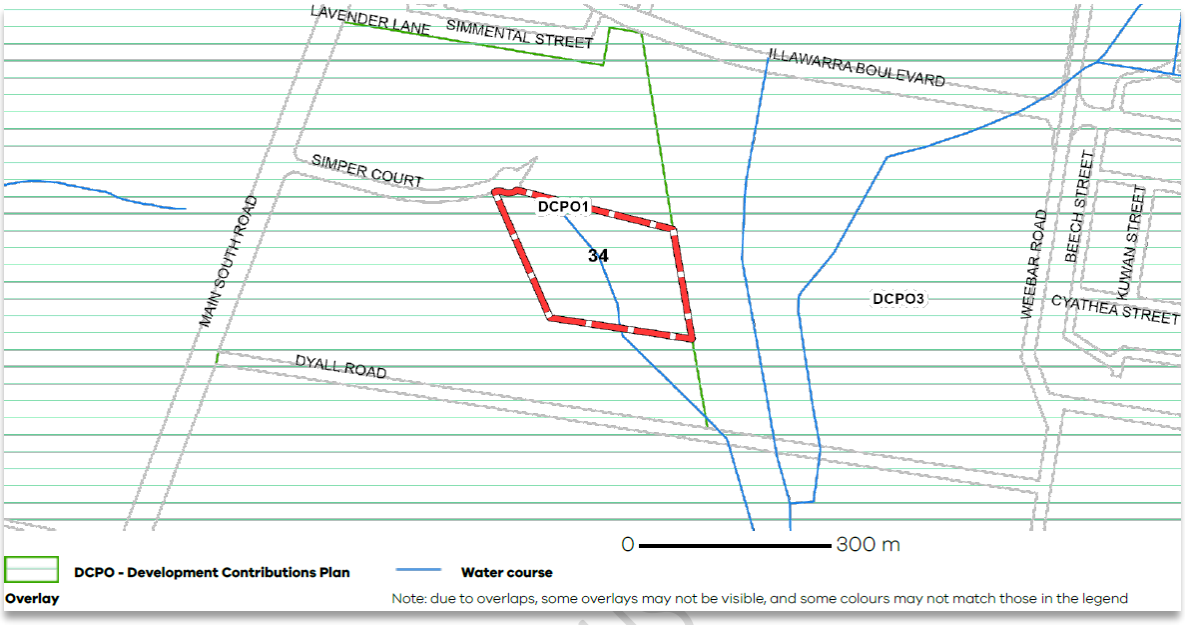
The proposed design is compatible with the existing and emerging residential character in the immediate and wider area, which is evolving from open rural landscape to residential development. The proposal provides for landscaping opportunities and has taken design cues from the subdivision pattern in the wider area.
The proposal satisfies all relevant standards and objectives of Clauses 56.07-1 to 56.07-4. Please refer to Section 8 of this report for an assessment of the proposal against the relevant requirements of clause 56.

For the reasons outlined above, it is submitted that the proposal is consistent with the relevant requirements of the Low Density Residential Zone.

OVERLAYS

DEVELOPMENT CONTRIBUTIONS PLAN OVERLAY – SCHEDULE 1

The subject site and all surrounding lots are subject to the Development Contributions Plan Overlay-Schedule 1.



The purpose of this overlay is to identify areas which require the preparation of a development contributions plan for the purpose of identifying contributions for the provision of works, services and facilities. The site is located within Area 46 as per part 1.0, Schedule 1 to Clause 54.06. Any permit granted must be consistent with the provisions of the Baw Baw Shire Development Contributions Plan. A levy as per Part 1- Residential Levy will be payable should any permit be granted.

6. MUNICIPAL PLANNING STRATEGY

Clause 02.02 provides a vision for the municipality which reads *Happy, healthy people sharing prosperity and knowledge from living sustainably and in harmony with our rural identity, thriving villages, productive and inspiring landscapes.* The Council Plan provides the three objectives that are relevant to land use planning that have regard to creating vibrant communities, a thriving economy and safe and sustainable environments.

Clause 02.03 provides the strategic directions that seek to achieve the above vision. Drouin is identified as a main centre within the shire with the cleared areas to the south of the town likely to support populations of Giant Gippsland Earthworm, Southern Brown bandicoot and patches of Strzelecki Gum. The strategic directions associated with Environmental and landscape values are to protect the Shires natural attributes, as per clause 02.03-2. The strategic direction for built form and heritage planning is to protect and preserve heritage places and the character of townships and to encourage a 'satisfactory level and standard of infrastructure for new subdivision and development', as per clause 02.03-4.

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 Baw Baw 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, 16 and 19.

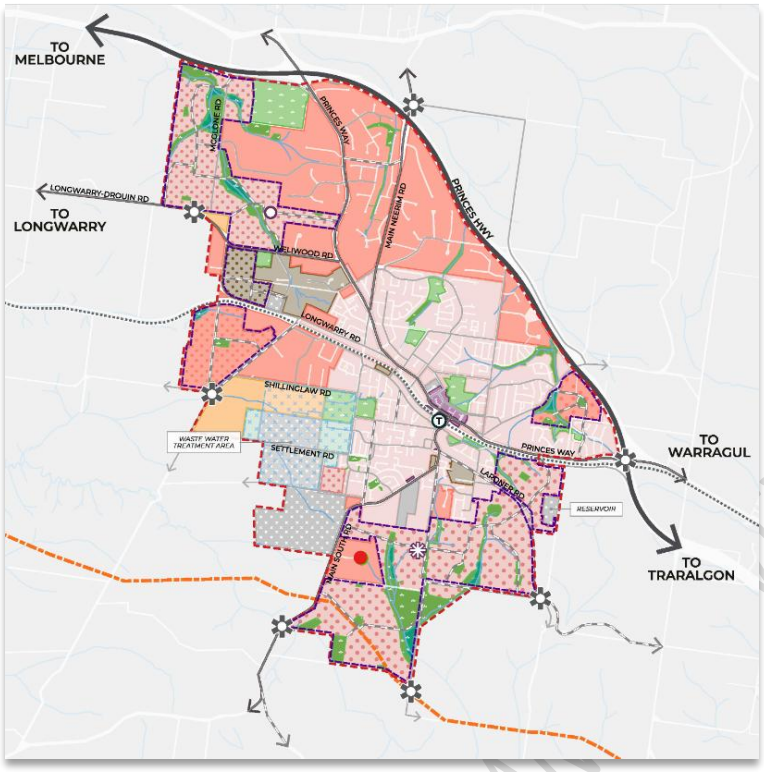
An assessment against the relevant clauses of the Baw Baw Planning Scheme has been provided below.

CLAUSE 11 SETTLEMENT

Clause 11.01-1S Settlement, and Clause 11.01-1R Settlement - Gippsland outline strategies to support sustainable development of Gippsland's regional centres including Warragul/Drouin and limit urban sprawl and direct growth into existing settlements.

This is reinforced by the general objective of **Clause 11.01-1L-01 Growth in Baw Baw** *to direct population growth into towns having regard to their servicing, environmental and heritage constraints.* The subject site provides an excellent opportunity to create an additional residential lot in an established and well serviced location. The subdivision design is sensitive to the environmental considerations of the site and has prioritised the preservation of the waterways and onsite drainage lines to contribute to the conservation of biodiversity and associated habitat, and to avoid any detriment to waterways downstream from the subject site.

Clause 11.01-1L-02 Main towns – High growth outlines that higher population and growth should be prioritised within the township boundary of Drouin to reinforce its role as the second largest town in Baw Baw Shire. The proposal provides an opportunity to consolidate infill development within the Low Density Residential Zone. The subject site is designated for residential purposes in the Drouin Framework Plan and located to the south of the township boundary.



Clause 11.02-1S Supply of urban land has the objective *to ensure a sufficient supply of land is available for residential, commercial, retail, industrial, recreational, institutional and other community uses.* In particular, Clause 11.02-1S outlines that sufficient land should be ensured to meet forecast demand, and that planning for urban growth should consider opportunities for the consolidation, redevelopment and intensification of existing urban areas. Warragul and Drouin experienced an annual growth rate of 3.6 per cent over the ABS 2020-2021 financial year, and this proposal is responsive to an increased demand for residential land in Drouin that is able to retain and treat waste onsite, in the absence of existing infrastructure and ensure the preservation of valuable biodiversity.

CLAUSE 12 ENVIRONMENTAL AND LANDSCAPE VALUES

Planning should contribute to the protection and health of ecological systems and the biodiversity they support (including ecosystems, habitats, species and genetic diversity). Those principles for ecologically sustainable development that have regard to international and national agreements should inform planning decision making. Here, state legislation is salient as the proposal has taken into account the Flora and Fauna Guarantee Act 1988 (please refer to the Ecological Assessment of the site by *Invert-Eco*, 2024), which the conservation of threatened species and communities and the management of potentially threatening processes. Recently amended (2019), the legislation contains an obligation on public authorities to consider potential biodiversity impacts when exercising their functions. It should be noted that the subject site is not determined as Critical Habitat.

The proposal has been designed with sensitivity to the preservation of native features on the site and surrounds, and the central waterway given its functional salience for drainage and ecological value as habitat for the WBC. The subdivision design evidences the preservation of native vegetation and generous setbacks boundaries and development from the waterway, which is buffered by vegetation suitable to riparian environments. This will contribute to habitat creation to protect WBC, and reduce runoff and suspended particulate matter from reaching the waterway and provide a pleasing natural environment within the urban setting. This is consistent with the strategies of **clause 12.01-1S**.

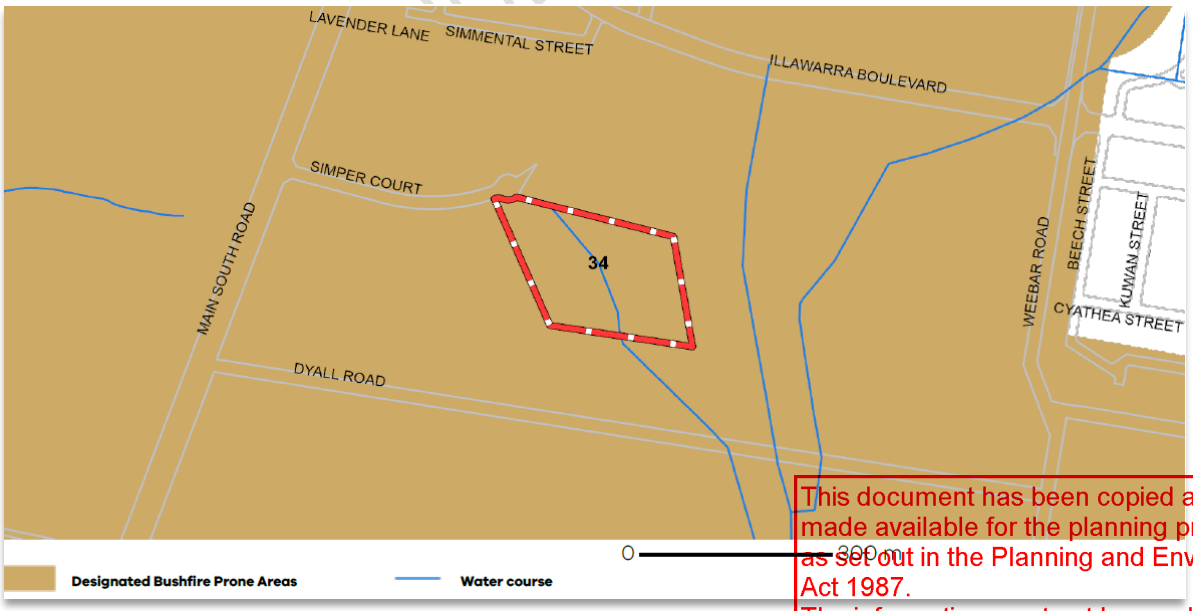
Protection of Biodiversity, Clause 12.01-1L Protection of Baw Baw's biodiversity and **clause 12.01-2S Native vegetation management.**

Clause 12.03-1S River and riparian corridors, waterways, Lakes, wetlands and billabongs seeks to protect and enhance waterway systems. As stated, the subdivision design has been significantly informed by the ecological values of the site with the preservation and enhancement of the central waterway prioritised through habitat enhancement and planting of buffers to protect the waterway and provide habitat for the WBC. Crossovers to lots on the northern and eastern side of the waterway will be specially designed to ensure protected thoroughfare for the WBC and onsite retention and harvesting of rainwater is intended to minimise impacts to the hydrology of the site and downstream. Additionally, planting EVC-appropriate rushes and sedges adjacent to the waterway will enhance amenity and the landscape values of the site, minimise the visual intrusion of development. These strategies are consistent with **Clause 12.05-2S Landscapes**

CLAUSE 13 ENVIRONMENTAL RISK AND AMENITY

Clause 13 has regard to the environmental risks and amenity associated with landscapes. Of salience here are **clauses 13.01 Climate change impacts**,**13.02 Bushfire Planning and 13.03 Floodplains**. Recently amended **clause 13.01-1S Natural hazards and climate change** seeks to minimise the impacts of natural hazards and pursue risk-based planning to mitigate risks such as bushfire and flooding. The proposal contemplates an increase in lots on land that is identified as low risk – there is no flood risk identified in the planning scheme, nor is it subject to the requirements of the BMO.

Clause 13.02-1S Bushfire Planning has the objective *to strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life* and is required to be addressed for proposals on land that is within a designated Bushfire Prone Area. The subject site is mapped as Bushfire Prone, as per the *VicPlan* below.



Strategies employed to achieve the above-mentioned objective include:

- *prioritising the protection of human life;*
- *requiring a robust assessment of the bushfire hazard and risk assessment before any strategic or statutory decision is made; and*

- *directing population growth and new settlements to low risk locations.*

Clause 13.02-1S provides strategies that seek to mitigate risk associated with bushfire. The following table provides a response to the strategies of clause 13.02-1S.

PROTECTION OF HUMAN LIFE

GIVE PRIORITY TO THE PROTECTION OF HUMAN LIFE BY:	RESPONSE
Prioritising the protection of human life over all other policy considerations.	• This proposal provides for subdivision of land with the ultimate intent for lots for the development of a dwelling. The report demonstrates that the lots meets the requirements of Clause 13.02-1S including the long term use and development controls through siting and construction to the required BAL. • Land managed as Defendable Space on Lots will improve the safety of residential lots to the east and south in the event a fire approaches from the north and the west (most likely scenario).
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.	• Dwellings exist adjacent to subject sites associated with the subdivision and the existing dwelling on Lot 1 is sited in an area of the site that is cleared of undergrowth with canopy separation achievable for onsite trees. The balance of the land has no onsite vegetation other than sown pasture (which would be managed to a Low Threat level should a permit be issued). • The existing (and proposed) road network facilitates vehicle access to areas in Drouin township identified as NSP-PLR. • Access and egress are facilitated from Simper Court and Main South Road with north to south egress routes available.
Reducing the vulnerability of communities to bushfire through the consideration of bushfire risk in decision making at all stages of the planning process.	• Any application to develop Lot2 2 to 10 needs to articulate how the design responds to the identified bushfire risk via construction to assessed BALs. • The subdivision has considered fire brigade access to all lots via the common property, which features widths and turning areas that accommodate emergency service vehicles. • Any future dwelling use and development will be designed and sited to respond to bushfire.

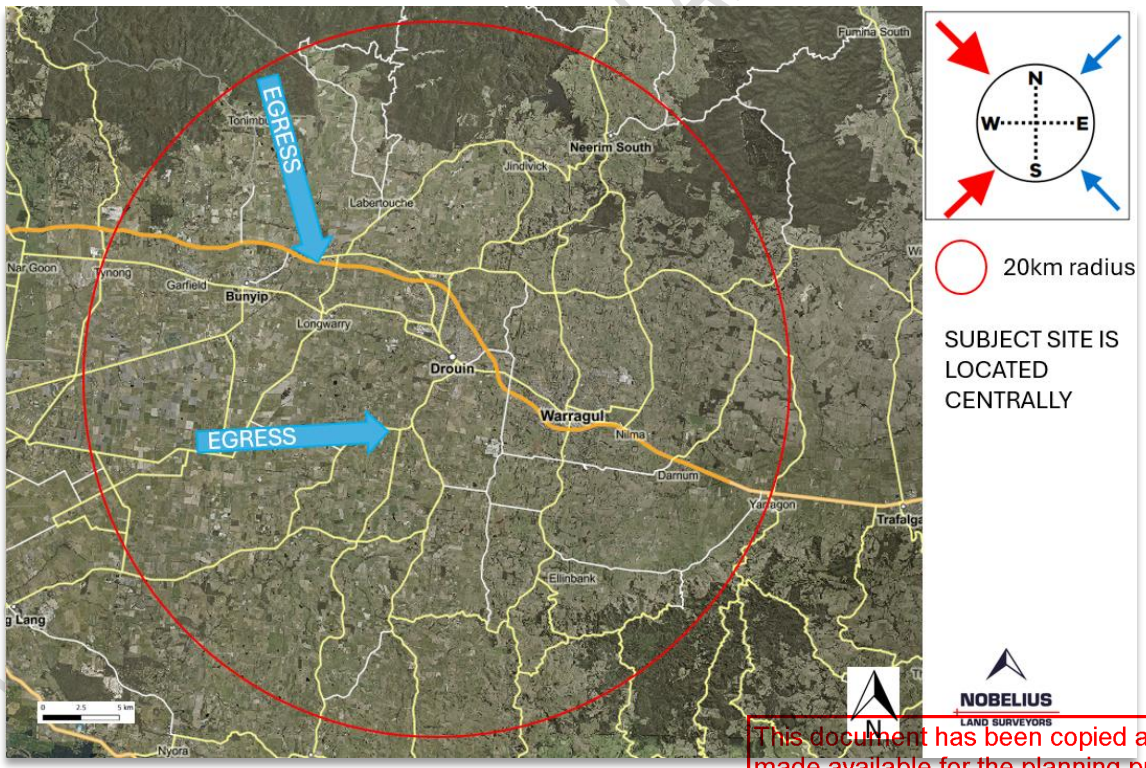
BUSHFIRE HAZARD IDENTIFICATION AND ASSESSMENT

IDENTIFY BUSHFIRE HAZARD AND UNDERTAKE APPROPRIATE RISK ASSESSMENT BY:	RESPONSE
Applying the best available science to identify vegetation, topographic and climatic conditions that create a bushfire hazard.	• The Baw Baw Planning Scheme relies on the planning proposal to respond to bushfire based on current assessment methods. • Clause 13.02-1S has been considered and addressed by the proposal. • Clause 71.02-3 Integrated Decision Making strengthens the importance of bushfire planning as an appropriate tool to reconcile potential conflicts in design and vision.
Considering the best available information about bushfire hazard including the map of designated bushfire prone areas prepared under the Building Act 1993 or regulations made under that Act.	• The planning proposal responds to the Bushfire Prone Area. • This report evidences that sufficient setbacks from vegetation can be achieved to meet Column A of Table 2 of Clause 53.02 in all directions, achieving BAL 12.5 in all directions.
Applying the Bushfire Management Overlay in planning schemes to areas where the extent of vegetation can create an extreme bushfire hazard	• The BMO does not apply to the subject site, nor to land in the vicinity.
Considering and assessing the bushfire hazard on the basis of: • *Landscape conditions - meaning the conditions in the landscape within 20 kilometres and potentially up to 75 kilometres from a site;* • *Local conditions - meaning conditions in the area within approximately 1 kilometre from a site;* • *Neighbourhood conditions - meaning conditions in the area within 400 metres of a site; and,* • *The site for the development*	• The subdivision of land for 10 lots has been considered in terms of all four scales. • The Landscape, Neighbourhood and Local conditions are provided below. • The Site conditions are considered and presented below.
Consulting with emergency management agencies and the relevant fire authority early in the process to receive their recommendations and implement appropriate bushfire protection measures.	It is expected that Council would seek advice from the CFA as the recommending authority, should they need further direction on the merit of this proposal (It should be noted however that referral of this application **is not mandated** by the planning scheme).
Ensuring that strategic planning documents, planning scheme amendments, planning permit applications and development plan approvals properly assess bushfire risk and include appropriate bushfire protection measures.	• This report provides evidence that informs the design and provides a basis for approval of the planning proposal, with regard to bushfire risk. • Assessing the site-based bushfire risk and including appropriate bushfire protection measures (e.g. separation from the hazard) enables the achievement of the direction of the Planning Scheme.

Not approving development where a landowner or proponent has not satisfactorily demonstrated that the relevant policies have been addressed, performance measures satisfied or bushfire protection measures can be adequately implemented.	• Perhaps the most salient element of clause 13.02 as it empowers the Responsible Authority to refuse a permit application until it is satisfied that the bushfire protection measures are being implemented. • This report demonstrates that the risk of bushfire should not be a reason for refusal.

The assessment of bushfire hazard requires an appraisal of the bushfire hazard on the basis of the landscape, local, neighbourhood and site conditions, which follows:

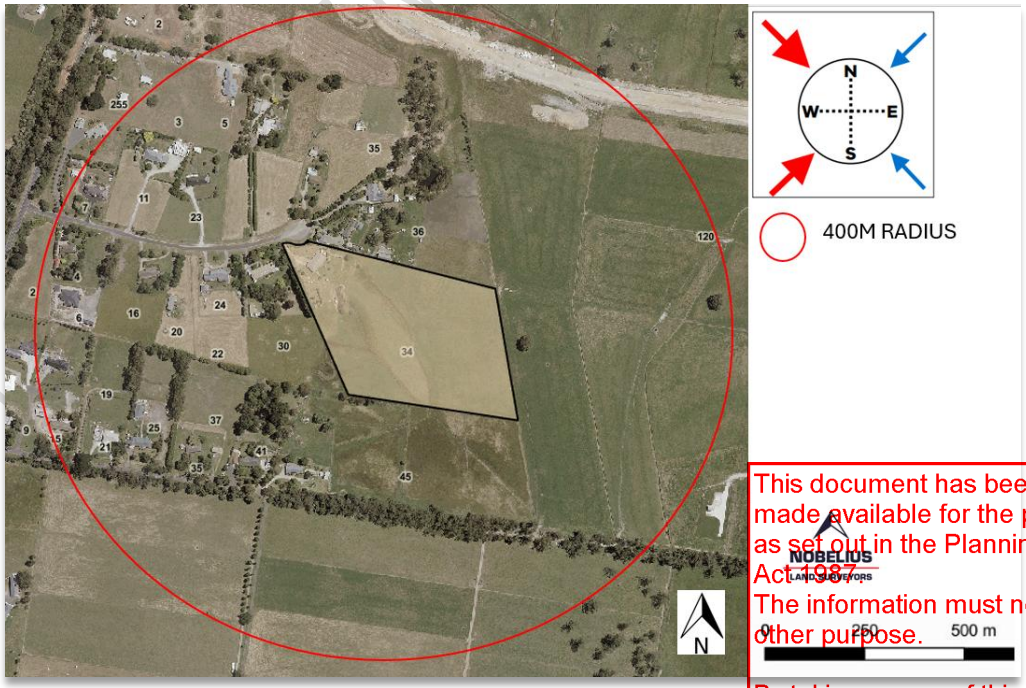
- Landscape conditions within 20 kilometres of the site is represented in the figure below, which shows the rural plains south of the Princes Freeway within the Shire which features grazed land interspersed with small rural townships. North is the heavily urbanised environment of Drouin with the hillier terrain and denser vegetation of Labertouche and the Dandenong Ranges further north. This area is characterised by patches of dense vegetation fitting the characteristics of Forest and Woodland as per Table 2.3 (AS3950-2018 Construction of Buildings in Bushfire Prone Areas). This area has a history of fires in the last two decades including Black Saturday and the Bunyip Complex bushfires (northeast) in March 2019. The Princess freeway is the main thoroughfare from the east to the west. The southeast south and southwest is low risk grazing land to Trafalgar and the more mountainous topography of Strzelecki to the southeast.



- Local conditions within 1 kilometre of the site as shown below encompass framing zoned land to the west with a patch of vegetation fitting the characteristics of Woodland as per Table 2.3 (AS3950-2018 Construction of Buildings in Bushfire Prone Areas) to which the BMO has been applied in the northwest, as per the figure below. The site is surrounded by like zoned and developed lots to the north and west with the land to the east subject to the Urban growth

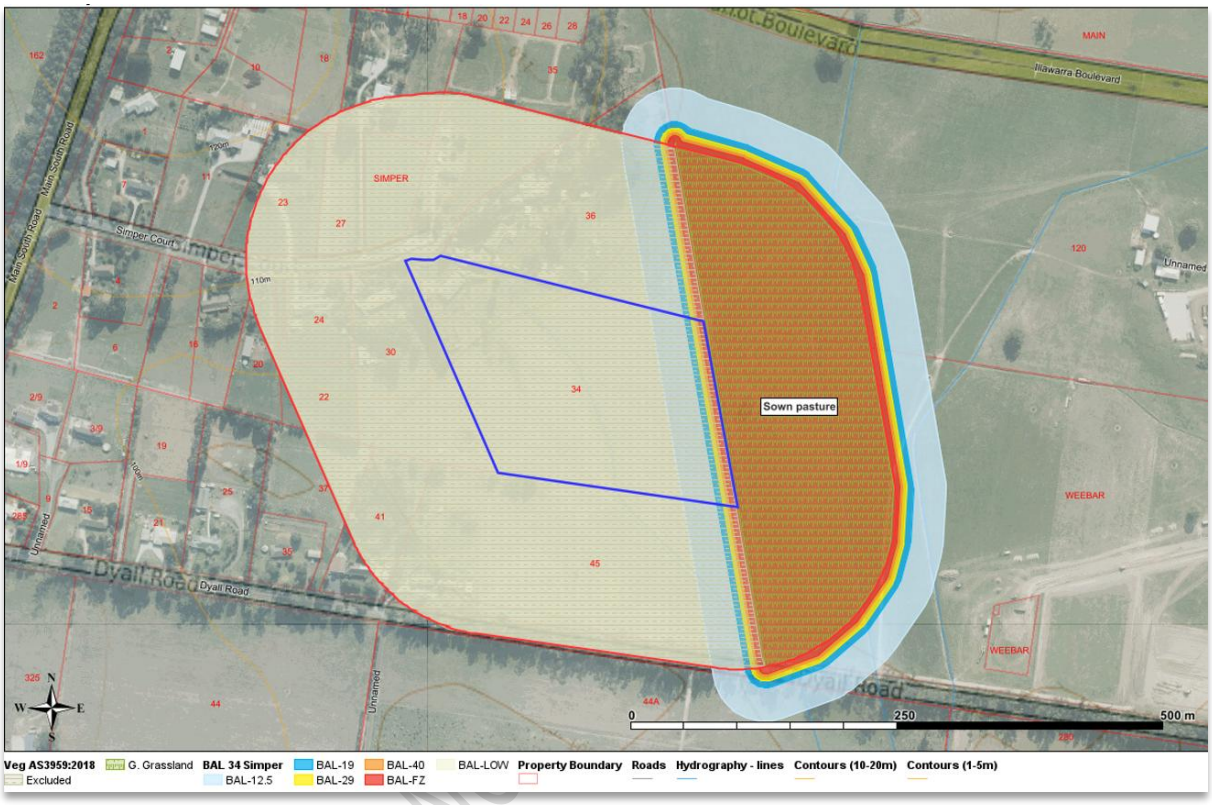
Zone and anticipating medium density development. This land will also accommodate the King Parrot Creek Drainage Scheme development.

- Neighbourhood conditions within 400 metres of the site is shown in the figure below which includes residential development consistent with the Low Density Residential zone with the western extend defined by Main South Road, the main north to south thoroughfare. The topography is mildly undulating with topographic peak located to the north west. Vegetation to the north and west is consistent with Low Threat vegetation[3] associated with modified gardens and maintained lawn. The to the east is land subject to the Urban Growth Zone and will be experiencing significant development, that will all but remove the threat associated with bushfire. Land to the south features pasture, though setbacks of indicative building envelopes ensure suitable separation from grassland vegetation.



[3] AS3959:2018 Construction of Buildings in Bushfire Prone Areas.

- The site vegetation conditions are characterised as modified vegetation. The vegetation located to the east of the site is consistent with that classified as grassland under AS3959:2018 Construction of Buildings in Bushfire Prone Areas. Given the contours of the land and the classified vegetation to the east, all building envelopes must be setback from the eastern boundary in the area shaded as light blue to achieve BAL 12.5. The proposal achieves this end. The site has access to Simper Court and South Main Road to the west that provide two options for egress in the event of an emergency.



SETTLEMENT PLANNING

PLAN TO STRENGTHEN THE RESILIENCE OF SETTLEMENTS AND COMMUNITIES AND PRIORITISE PROTECTION OF HUMAN LIFE BY:	RESPONSE
Directing population growth and development to low risk locations, being those locations 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, 2018).	• The land is adjacent to established lots in an area that is recognised as a low risk from bushfire; Development of the land through re-subdivision will further reduce the risk as the Urban Growth Zoned land to the east is titled and becomes available for development. Surrounding land to the north and west features Low Threat vegetation (managed gardens) that will be extended to the subject site once subdivided. • This report shows that lots can achieve suitable separation from the bushfire hazard and there are suitable egress options in the event of a fire.
Ensuring the availability of and access to areas assessed as BAL-LOW rating under AS3959-2018	• Lots can achieve setbacks of building envelopes from boundaries (and classified

Construction of Buildings in Bushfire Prone Areas (Standards Australia, 2018) where human life can be better protected from the effects of bushfire.	vegetation) associated with BAL 12.5, as per the BAL Contours plan (above).
Ensuring the bushfire risk to existing and future residents, property and community infrastructure will not increase as a result of the future land use and development.	• The proposal will result in the modification of 'pasture' to Low Threat vegetation associated with residential development which will moderate risk associated with bushfire, as will the urban growth developments to the east. The increased level of vegetation management on subdivided lots will reduce the risk of bushfire to existing dwellings and residents to the west of Main South Road.
Achieving no net increase risk to existing and future residents, property and community infrastructure, through the implementation of bushfire protection measures and where possible reduce the bushfire risk overall.	The BPA applies to the land recognising that the land is in an area of low bushfire hazard. Any new dwelling on the lots will implement the current regulations pertaining to bushfire construction.
Assessing and addressing the bushfire hazard posed to the settlement and the likely bushfire behaviour it will produce at a landscape, settlement, local, neighbourhood and site scale, including the potential for neighbourhood-scale destruction.	Please refer to the Landscape Assessment Plan, and the Local and Neighbourhood conditions which are considered above. The Site conditions are considered above. The proposal will not increase the risk associated with bushfire, indeed the replacement of unmanaged pasture on the subject site with managed residential landscape will contribute to the overall reduction of bushfire risk at a site, local, neighbourhood and landscape scale.
Assessing alternative Low Risk locations for settlement growth on a regional, municipal, settlement, local and neighbourhood basis.	• The proposal contemplates a subdivision adjacent to an established residential area of Drouin, which is anticipated to experience significant urban development in the new future. • The proposal increases resilience by applying a prescribed management to the defendable space across the land, which benefits the existing residential lots to the west and north.
Not approving any strategic planning document, local planning policy, or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more that BAL-12.5 rating under AS3959:2009.	• Perhaps the most important element of clause 13.02 as it empowers the Responsible Authority to refuse a permit application until it is satisfied with the bushfire protection measures being implemented. • The proposal contemplates a statutory application only, and is not a strategic proposal. • This report demonstrates that the risk of bushfire should not be a reason for refusal.

AREAS OF HIGH BIODIVERSITY CONSERVATION VALUE

The objective here is to ensure settlement growth and development approvals can implement bushfire protection measures without unacceptable biodiversity impacts by discouraging settlement growth and development in bushfire affected areas that are of high biodiversity conservation value.

The land is adjacent to established residential lots where understorey vegetation has been significantly modified to provide areas for dwelling development.
There is an existing dwelling on Lot 1 and the intent is to provide additional lots for the purpose of residential development that will be subject to planning requirements however, this proposal provides evidence that the subject lot in its entirety has the capacity to achieve BAL Low conditions (Please refer below) and mitigate the bushfire risk posed by the surrounding land, particularly with regard to vegetation management.

USE AND DEVELOPMENT CONTROL IN A BUSHFIRE PRONE AREA

REQUIREMENTS	RESPONSE
Use and development control in a Bushfire Prone Area designated in accordance with regulations made under the Building Act 1993, bushfire risk should be considered when assessing planning applications for the following use and development: • *Subdivision of more than 10 lots* • *Accommodation* *When assessing a planning permit application for the above uses and development:* • *Consider the risk of bushfire to people, property and community infrastructure.* • *Require the implementation of appropriate bushfire protection measures to address the identified bushfire risk.* • *Ensure new development can implement bushfire protection measures without unacceptable biodiversity impacts.*	• Use and development controls apply as the proposal contemplates subdivision of the land into ten (10) lots. This report demonstrates that the subject site meets the requirements of clause 13.02-1S including the long term intent of the use and development controls. • In the context of strategic planning decisions, this strategy needs to consider the '*net increase in risk to existing and future residents*'. As it relates to the objectives at Clause 13.02-1S of the Planning Scheme, it is necessary to ensure that the protection of human life is prioritised when decisions are made. However, the strategies listed at Clause 13.02-1S in the Planning Scheme are not 'mandatory requirements' and it is not necessary to 'tick every box'. It is more important to ensure that decisions are consistent with the State policy objectives and build resilient communities.

PLANNING POLICY DOCUMENTS TO BE CONSIDERED	RESPONSE
Any relevant approved state, regional and municipal fire prevention plan.	Fire prevention measures included in the Baw Baw Shire Municipal Fire Prevention Plan ensure roadsides and public space to the east of the site and west (of Main South Road) are managed.
AS3959:2018 Construction of Buildings in Bushfire Prone Areas (Standards Australia, 2018).	Bushfire Attack Levels employ this standard to determine the BAL for the site. Constructions standards for building in building fire prone areas should be considered at the construction stage.

Living in bushfire-prone areas – CSIRO & Standards Australia (SAA HB 330-2009, December, 2009)	This is the handbook to AS3959, which does not need to be considered in the planning proposal.
Any Bushire Prone Area map prepared under the Building Act 1993 or regulations made under the Act.	The updated Bushfire Prone Area mapping has been considered in this report.

Additional strategies associated with mitigating bushfire risk includes directing population growth to areas of low risk assessed as having a radiant heat flux of less than 12.5 kilowatts/square metre under AS3959:2018. While the subject site is mapped in a Bushfire Prone Area, future development associated with the Urban Growth Zone to the east and residential development on residentially zoned land to the north will reduce the bushfire risk on the site and surrounding area. The subdivision of the site ensures a balance Is achieved between settlement growth and the preservation of biodiversity given the preservation of the waterway have significantly informed the proposal design.

While the site is not subject to flooding or Inundation, it does feature an identified waterway, the preservation of which anchors the subdivision design. A Stormwater Management Strategy by *Afflux* 2024 provides evidence that the proposal has capacity to achieve the retention of flows to pre-development rates, with water tanks proposed to ensure rainwater harvested from roof area is suitably employed as potable water and reduces runoff from lots into waterways. This Is consistent with the strategies of **clause 13.03-1S Floodplain management**.

CLAUSE 14 NATURAL RESOURCE MANAGEMENT

Planning should contribute to the wise use and conservation of natural resources such as water. **Clauses 14.02-1S** and **14.02-1L** have regard to the protection of state and locate water catchments, which is salient here given the waterways and drainage lines on the site. The retention of natural drainage corridors with vegetated buffers and 30metre setbacks from the waterway for habitable building envelopes maintains natural drainage function of the catchment. Carefully designed culverts and vegetated waterway banks ensure stream habitat and wildlife corridors are preserved, and landscape values prioritised by the design. Currently the site is employed for small-scale grazing with the waterways subject to compaction and trampling by cattle. The proposal seeks to prioritise the conservation of the waterways by providing vegetated buffers, onsite retention and 30metre setbacks of development such as waste and building envelopes from all onsite drainage lines and waterways. These measures will reduce erosion of waterways banks, provide habitat, reduce polluted runoff reaching waterways and drainage lines, retain stormwater flows from (eventual) development areas and ensure downstream environments benefits from improved environmental outcomes. These measures are consistent with the strategies of **clause 14.02-2S Water quality.**

The development proposal has also been assessed by the eminent Ecologist Dr Beverley van Praagh of *Invert Consulting*, whose report states that the "development provides opportunities to avoid or mitigate negative impacts to WBC by design and is likely to be supported by the clients that may be attracted to this type of 'ecovillage' development" (page 5, 2024). The report goes on to say the existing conditions that include cattle grazing on the land, is resulting in plugging of the soil. The removal of the cattle along with supplementary planting (adjacent to the waterway) will improve the habitat of the species if the current hydrology can be maintained. The revised SWMS provides evidence this is the case. The report recommends that the a continuous, lineal exclusion of development around the waterway will serve as a natural corridor between properties and provide habitat of the WBC; include planting and buffers; designate the waterway as a conservation reserve; and encourage community-led monitoring and education. These recommendations have formed the basis of the proposed development plan and proposal.

CLAUSE 15 BUILT ENVIRONMENT AND HERITAGE

Clause 15.01-3S Subdivision design has the objective *to ensure the design of subdivisions achieves attractive, safe, accessible, diverse and sustainable neighbourhoods.* The proposal is responsive to Clause 15.01-3S and provides lot sizes that can support a range of dwellings and household types. The lot configuration provides safe access that is consistent with the Infrastructure Design Manual and amenity to each of the lots. The proposed lot sizes and layout are appropriate as an interface between the surrounding residential lots.

The subject site is within walking/cycling distance to the Drouin Activity Centre, and this connectivity helps to foster healthy lifestyles, active living and community wellbeing; key objectives of **Clause 15.01-4S Healthy neighbourhoods.**

Clause 15.01-5S Neighbourhood character has the objective *to recognise, support and protect neighbourhood character, cultural identity, and sense of place.* The neighbourhood encompassing the subject site is experiencing increased subdivision and infill development and the character of the neighbourhood can be described as *transitional*. The proposed lots are responsive to demand driven by population growth and are appropriate in dimension and size to support a single dwelling with spacing and setbacks consistent with those seen in the immediate area.

CLAUSE 16 HOUSING

Clause 16.01-1S Housing supply has the objective *to facilitate well-located, integrated and diverse housing that meets community needs* by concentrating housing development in areas zoned as such and to protect rural farming areas from conflicting land use. The proposal is responsive to Clause 15.01-3S and provides lot sizes that can support a range of dwellings and household types. The lot configuration provides safe access and amenity to each of the four lots. The proposed lot sizes and layout are appropriate as infill development and provide options for semi-rural development and the opportunity for affordable housing development as per the objectives of **clause 16.01-2S Housing affordability**.

CLAUSE 19 INFRASTRUCTURE

Clause 19 Infrastructure has regard to the provision of 'connectivity' for residents to social and economic opportunity and facilitates reliable movement for people and goods, and supports environmental sustainability, health and wellbeing. Of salience here are the strategies of **Clause 18.0-1S Land use and transport integration** that seek to reduce distances people have to travel between their place of residence and their employment, education, service providers, and mobility within and between communities. Our proposal implies infill residential development within an existing urban area with access to public transport, which promotes non-car dependant mobility and supports active living and improved wellbeing synonymous with the 20 minute neighbourhood. The proposal supports the preservation of onsite vegetation, where possible, and facilitates residential development on suitably zoned land, preserving the surrounding farmland from potentially conflicting land use.

NOBELIUS LAND SURVEYORS

8. PARTICULAR PROVISIONS

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

- Clause 52.17 Native vegetation
- Clause 53.01 Public Open Space Contribution and Subdivision
- Clause 56 Residential Subdivision

CLAUSE 52.17 NATIVE VEGETATION

Clause 52.17 has the purpose to ensure there is no net loss of biodiversity as a result of removal, destruction or lopping of native vegetation, achieved through the application of avoidance, minimisation and offsetting. The onsite vegetation on the subject site has been assessed with the vegetation identified for removal assessed as non-indigenous and planted natives, therefore meets the exemptions in clause 52.17-7.

Third party planted native trees adjacent to the southern boundary will avoid impacts as piped drainage will be located within the existing easement and outside the Tree Protection Zones of the trees identified as 17 to 24.

CLAUSE 53.01 PUBLIC OPEN SPACE CONTRIBUTION

Clause 53.01 Public open space contribution requires a person who proposes to subdivide land to make a contribution (8% of the site value) to Council for public open space. The proposed subdivision is not exempt from this requirement as it contemplates a ten lot subdivision. A condition requiring the payment of levies is anticipated as a permit condition, should a permit be issued.

CLAUSE 56 RESIDENTIAL SUBDIVISION

Clause 56 is applicable to this proposal, and has the following purposes:

- *To implement the Municipal Planning Strategy and the Planning Policy Framework.*
- *To create liveable and sustainable neighbourhoods and urban places with character and identity.*
- *To achieve residential subdivision outcomes that appropriate respond to the site and its context for:*
    - *Metropolitan Melbourne growth areas.*
    - *Infill sites within established residential areas.*
    - *Regional cities and towns.*
    - *To ensure residential subdivision design appropriately provides for:*
        - *Policy implementation*
        - *Liveable and sustainable communities.*
        - *Residential lot design.*
        - *Urban landscape.*
        - *Access and mobility management.*

- *Integrated water management.*
- *Site management.*
- *Utilities.*

Clause 32.03-6 Low Density Residential Zone states that applications for the subdivision of land must meet the objectives and should meet the standards of Clauses 56.07-1 to 56.07-4. An assessment of the proposal against the relevant objectives and standards contained within Clause 56 is provided below.

CLAUSE	RESPONSE
56.07 INTEGRATED WATER MANAGEMENT	
56.07-1 Drinking water supply objectives	Clause 56.07-1 has the objectives: • *To reduce the use of drinking water.* • *To provide an adequate, cost-effective supply of drinking water.* **Complies with Standard C22** The supply of drinking water will be provided for each lot via the mandatory provision of water tanks with the capacity of 10,000Kl, as per the Stormwater Management Strategy provided by *Afflux*, 2024. The water tanks have the purpose of potable water provision through the harvest of rainwater from roof area, which will reduce the reliance on drinking water and the preservation of pre-development stormwater flows, and will be provided to the satisfaction of the relevant water authority.
56.07-2 Reused and recycled water	Clause 56.07-2 seeks: • *To provide for the substitution of drinking water for non-drinking purposes with reused and recycled water.* **Complies with Standard C23** The supply of reused and recycled water will be designed, constructed and managed in accordance with the requirements, and provided to each of the lots via agreement consistent with the recommendations of the SWMS provided by Afflux, 2024, and to the satisfaction of the relevant water authority.
56.07-3 Wastewater management objective	Clause 56.07-3 has the objective: • *To provide a wastewater system that is adequate for the maintenance of public health and the management of effluent in an environmentally friendly manner.* **Complies with Standard C24** The ten lots have been assessed by Hardcore Geotech, who have confirmed the lots are all capable of retaining and treating the wastewater generated from a dwelling with 4 to 6 bedrooms and accommodating 5 to 7 occupants. All lots bar Lot 7 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. Lot

	7 has limited space and is recommended that a Mound system is employed, or a Vegetated Recirculating Evapotranspiration Bed or a Absorbs Advance Secondary Wastewater System can be used. Please read in conjunction with the Land Capability Assessment provided by *Hardcore Geotech* dated 2024. Wastewater systems will be designed, constructed and managed in accordance with the requirements, consistent with the relevant approved domestic wastewater management plan, and provided within the boundary of each lot upon development, to the satisfaction of the relevant water authority.
56.07-4 Stormwater management objectives	Clause 56.07-4 seeks: • *To minimise damage to properties and inconvenience to residents from stormwater.* • *To ensure that the street operates adequately during major storm events and provides for public safety.* • *To minimise increases in stormwater and protect the environmental values and physical characteristics of receiving waters from degradation by stormwater.* • *To encourage stormwater management that maximises the retention and reuse of stormwater.* **Complies with Standard C25** The proposal is accompanied by a Stormwater Management Plan by *Afflux Consulting*, dated 2024. The proposal is capable of retarding stormwater to ensure detriment to adjoining lots and adjacent waterways is avoided, and the subdivision has been designed to ensure existing flows are uninterrupted and environmental impacts are avoided. The urban stormwater management system has been designed and will be managed in accordance with the requirements and to the satisfaction of the relevant drainage authority. Please read in conjunction with the SWMS provided by *Afflux Consulting*, dated 2024.

9. 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 71.02-1 Purpose of the Planning Policy Framework
- Clause 71.02-3 Integrated decision making

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 and 65.02 relating to the approval of an application or plan and an application to subdivide the land respectfully are relevant to this application.

CLAUSE 65.01 APPROVAL OF AN APPLICATION OR PLAN

The decision guidelines outlined in Clause 65.01 are applicable to this proposal, in particular:

- *The matters set out in Section 60 of the Act.*
- *Any significant effects the environment, including the contamination of the land, may have on the use or development.*

The land is not identified as being contaminated. The site constraints and considerations of the land including native vegetation, topography and any overland flows have been responded to throughout the design process.

- *The Municipal Planning Strategy and the Planning Policy Framework.*
- *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 planning considerations have been adequately addressed within this report in sections 4-6.

- *The effect on the environment, human health and amenity of the area.*

The proposed subdivision 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, particularly with regard to the preservation of endangered species and their habitat, and mitigating any issues associated with overland flows.

- *The proximity of the land to any public land.*

The proposed subdivision does not adversely impact any public land within the vicinity of the site.

- *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.

- *Whether the proposed development is designed to maintain or improve the quality of stormwater within and exiting the site.*

A stormwater and drainage assessment was undertaken as part of the design process, and the proposed subdivision design is responsive to the findings of the SWMS assessment. The proposal is responsive to the findings of the ecological assessment by Eco-Invert, which found evidence of the WBC and the subsequent subdivision design is informed by the above mentioned reports to ensure it is responsive to maintaining and improving stormwater within and beyond the site.

- *The extent and character of native vegetation and the likelihood of its destruction.*

The proposal avoids the removal of non-planted native vegetation and only contemplates the removal of planted specimens of moderate to low retention value. The subject site in its existing state is a highly modified landscape, with the majority of the site cleared for small scale agriculture and lifestyle living. Landscape and habitat planting, especially adjacent to the identified waterway.

- *Whether native vegetation is to be or can be protected, planted or allowed to regenerate.*

The proposed subdivision provides landscaping buffers and lot sizes with dimensions appropriate for the planting and establishment of native vegetation.

- *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.*

The subject site is not prone to flood or erosion however, the design has been informed by the presence of waterways and drainage lines and has prioritised the preservation and enhancement of waterways through setbacks and planting of native sedges and rushes of a suitable EVC for the area. The site is mapped as a designated bushfire prone area and the risk has been further addressed as per the requirements of Clause 13.02. The proposed lots can achieve setbacks from surrounding vegetation and achieve BAL12.5, ensuring the proposal provides additional Low Density lots that do not increase risk to the future residents or surrounding development.

- *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

The decision guidelines outlined in Clause 65.02 have been considered in the proposed design. A response has been provided where applicable to demonstrate how the proposal meets the decision guidelines outlined below:

- *The suitability of the land for subdivision.*
- *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 land is zoned for residential purposes with the lot design reflecting the minimum lot sizes prescribed by the zone and the absence of reticulated sewerage. The land to the north and east is experiencing infill residential development in accordance with the Urban Growth Zone, and the lot sizes and street network of the proposed subdivision will integrate with and compliment the emerging character of the new residential precinct.

- *The effect of development on the use or development of other land which has a common means of drainage.*

A stormwater and drainage strategy has been developed to support the proposed subdivision to ensure that overland flows do not adversely affect any other land with common means of drainage.

- *The subdivision pattern having regard to the physical characteristics of the land including existing vegetation.*

The subdivision is responsive to the constraints and considerations posed by the site, including native vegetation and overland flows.

- *The density of the proposed development.*

The density of the proposed subdivision is appropriate for the locality and reflects the subdivision patterns seen on surrounding land.

- *The area and dimensions of each lot in the subdivision.*

The proposed subdivision has achieved lots with areas and dimensions consistent with those required by the Low Density Residential Zone where the absence of reticulated sewer is a matter to be considered.

- *The layout of roads having regard to their function and relationship to existing roads.*
- *The movement of pedestrians and vehicles throughout the subdivision and the ease of access to all lots.*

The proposed access is functional in design and integrates with the existing street network.

The movement of pedestrians and vehicles is not a consideration here.

- *The provision and location of reserves for public open space and other community facilities.*

The proposal does not include reserves for public open space or other community facilities.

- *The staging of the subdivision.*

The subdivision is not proposed to be undertaken in stages.

- *The design and siting of buildings have regard to safety and the risk of spread of fire.*

The risk of fire to the proposed subdivision is mitigated by the highly modified landscapes surrounding the subject site. The lot layout and generous setbacks of the indicative building envelopes ensures the risk of fire transfer between dwellings is minimised.

- *The provision of off-street parking.*

All lots are able to support off-street parking.

- *The provision and location of common property.*
- *The functions of any body corporate.*

Common property is proposed as part of this subdivision to provide access to all Lots and contain the identified waterway and is designed to accommodate a turning waste vehicle and emergency services[4].

- *The availability and provision of utility services, including water, sewerage, drainage, electricity and gas.*
- *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.*

The subject site is able to connect to all services, except reticulated sewerage and water. Each lot is capable of retaining and treating wastewater onsite and the provision of water tanks to harvest rainwater from roof area will provide potable water given the absence of water in Simper Court.

- *Whether, in relation to subdivision plans, native vegetation can be protected through subdivision and siting of open space areas.*

An Arboricultural Assessment has been undertaken that has outlined where native vegetation can be retained. All efforts have been made to retain as much vegetation as possible.

- *The impact the 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 71.02-3 INTEGRATED DECISION MAKING

Clause 71.02-3 Integrated decision making seeks to balance the needs and expectations of the community in terms of the provision of built form to accommodate a growing population, protection of the environment, economic wellbeing, various social needs, management of resources and infrastructure.
Clause 71.02-3 has been recently updated (February 2022) and aims to balance these needs and expectations through the employment of the Planning Scheme to ensure conflicting objectives are balanced in favour of net community benefit and sustainable development for the benefit present and future generations. It states that in bushfire affected areas, planning must prioritise the protection of human life over all other policy considerations.

Our proposal contemplates the subdivision of land in an area in a low risk environment. The subdivision of the subject site presents an opportunity to balance the demand for housing by the growing population, mitigate the risks associated with the land and preserve the environmental assets on and around the lot.

[4] Details of an Owners Corporation will be provided once the design of the subdivision has been finalised through the standard planning permit process. This is to avoid reworking Plans of Subdivision prematurely.

10. CONCLUSION

It is submitted that the proposal is consistent with the relevant policies and provisions of the Baw Baw Planning Scheme and should receive Council's support for the following reasons:

- The proposal is consistent with the Municipal Planning Strategy and the Planning Policy Framework.
- The proposal is consistent with the purpose of the Low Density Residential Zone.
- As stated in this report, the matters for consideration under the *Planning and Environment Act, 1987* and associated *Planning and Environment Regulations 2015* has been satisfactorily addressed through compliance with the Baw Baw Planning Scheme, demonstrating the subdivision is compatible with the existing subdivision and development pattern in the surrounding area.
- Onsite and third party vegetation has been assessed. Detailed assessments have been provided for each tree with high value vegetation preserved.
- The proposed lot sizes have dimensions appropriate for building and waste envelopes that will provide for future dwellings that will not overshadow the existing rooftop solar energy systems on dwellings on adjoining residential lots.
- The centrally located waterway has been incorporated into the design and enhanced through setbacks to envelopes and landscape planting with suitable riparian species. This will preserve the waterway as a habitat for the Warragul Burrowing Crayfish found onsite and ensure the waterway is protected from erosion, suspended sediment runoff into the waterway systems and contribute to the amenity of the subdivision.
- The proposal is respectful of the neighbourhood character and subdivision pattern evident in surrounding residential developments.
- The proposal has satisfied all relevant objectives and standards of Clause 56.

The proposal provides an excellent opportunity for further residential development in a well serviced location and in an area designated for residential growth in Drouin.

The constraints and considerations of the subject site have been appropriately responded to in the design process, and the proposal integrates into the surrounding subdivision pattern and street network.

AFFLUX CONSULTING
STORMWATER MANAGEMENT SOLUTIONS

STORMWATER MANAGEMENT PLAN

34 Simper Court Drouin

Date	28 March 2025
Project No.	24037
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Client	

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Version	Date	Description
01	04/11/2024	Initial issue
02	11/11/2024	Updated dev plan
03	28/03/2025	Updated dev plan, updated pictures (TCF)

Climate Change Statement

A wide range of sources, including but not limited to the IPCC, CSIRO and BoM, unanimously agree that the global climate is changing. Unless otherwise stated, the information provided in this report does not take into consideration the varying nature of climate change and its consequences on our current engineering practices. The results presented may be significantly underestimated; flood characteristics shown (e.g. flood depths, extents and hazards) may be different once climate change is taken into account.

Disclaimer

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Contents

Tables

Figures

1. Introduction

Afflux Consulting has been engaged by to complete a stormwater management plan for the proposed development at 34 Simper Court Drouin (Figure 1 and Figure 2). This report will cover the major drainage, flooding and water quality associated with the development. The intention of this report is to:

- Provide an assessment of major drainage associated with the site.
- Provide retention of post-development flows to pre-development levels.
- Ensure flooding of the site or potential off-site impacts are reduced or eliminated.
- Ensure safe conveyance of existing overland flow regimes, if required.
- Meet the EPA best practice environmental management (BPEM) water quality requirements.
- Include and consider guidelines and advice for stormwater management in line with Baw Baw Shire Council and WGCMA requirements.
- Identify mitigation and treatment options, if required.

To meet these requirements, a range of hydrological and water quality modelling methods have been undertaken.

Figure 1. Aerial of site

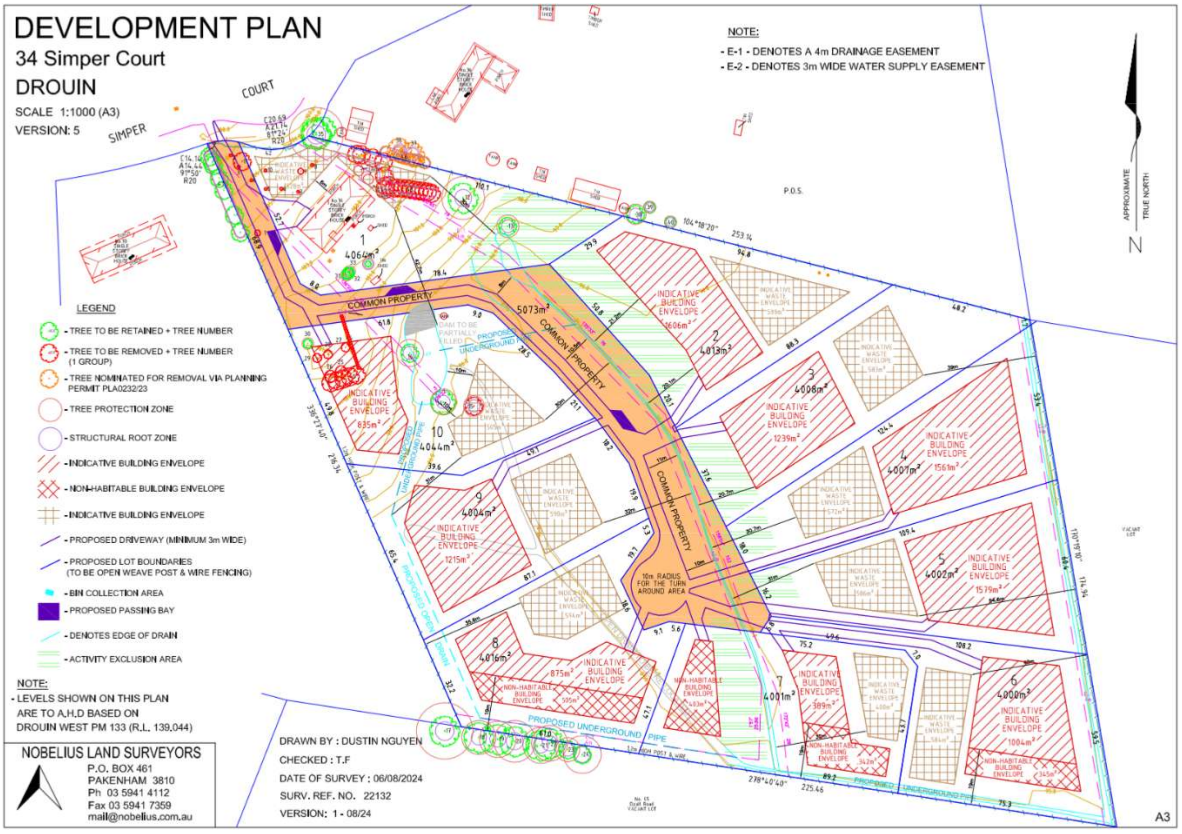


Figure 2. Proposed Development

1.1. Background

The local area around the site and Drouin in general has been the subject of significant planning and development works. Locally this site falls just outside of the Drouin PSP (Figure 3). The site is however considered in the King Parrot Creek DSS and as such has the opportunity to contribute to the rates of the scheme, as will be discussed in this report.

This stormwater management plan proposes a case that this site may be further developed, whilst keeping in line with the specific development requirements of the area, including water quantity and quality requirements.

Critically for this site, the retention of the Warragul Burrowing Crayfish (WBC) habitat is a major focus. The central 'waterway' corridor has been specifically designed to protect this feature, with much of the subdivision design then focused around this. This includes placement of house lots, waste areas, swales and pipe networks as explored further in this report.

Source: Victorian Planning Authority (2020)

Figure 3. Drouin PSP

1.2. Information Sources

A number of information sources have been used in the formation of this strategy; these include:

- Aerial imagery
- DEPI planning scheme and cadastral information as accessed online 04/06/2024
- Discussions with Baw Baw Shire Council
- Design Guidelines and Guidelines for Development
- Various Environmental Planning instruments and Planning Frameworks
- Preliminary plans and site survey received from client
- Existing infrastructure information
- Topographic information.

2. Existing Catchment

The existing catchment has been delineated as the relevant catchment for flows through the site and site outlet below (Figure 4). As shown, a steep external catchment of mostly low density properties and the road reserve of Simper Crt, currently drains through the site.

The site itself drains consistently towards a central valley as depicted both by the contours, and the existing farm drains shown in Figure 4. The upper reaches of the catchment are relatively steep, with the expectation of relatively short translation flow down to the relatively flat floodplain. This sets some natural limits for flow path location and possible treatment. Very limited vegetation is found on the site except for within the Dyall Road Reserve.

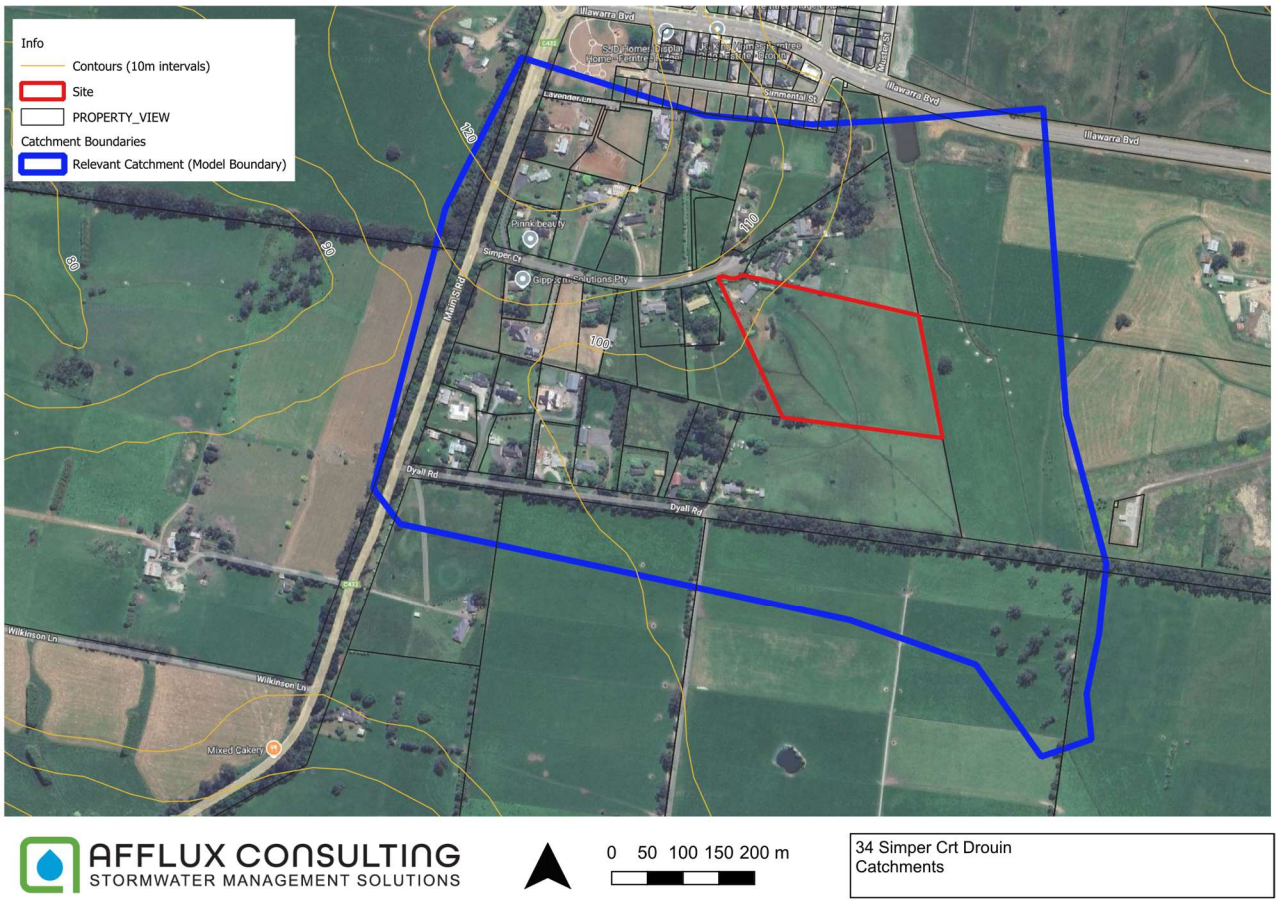


Figure 4. Existing catchment

2.1. Site Controls

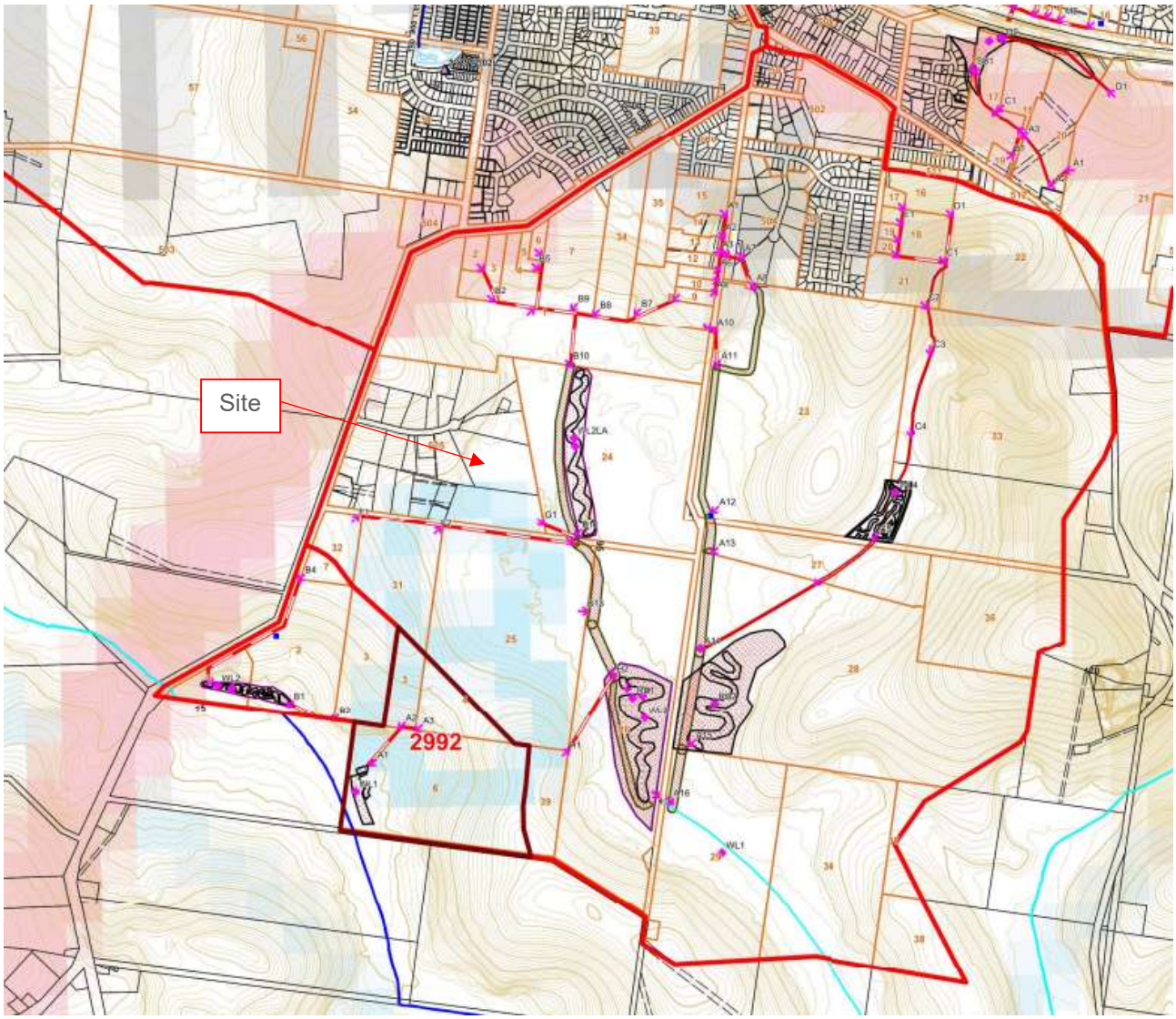
The adjacent farm drains throughout the network are ultimately controlled by an existing culvert crossing at Weebar Rd. As part of the King Parrot DS, this drainage network is proposed to have its capacity significantly increased. This includes the construction of a pipe connection to the property as previously discussed, G1-B11. Locally, this pipe will provide the outflow constriction along with the road to be constructed as an extension of Dyall Rd. The level that this road is set at will limit the flood depth within the subdivision.

2.2. Melbourne Water Drainage Scheme

This section reviews the proposed drainage scheme for the catchment and potential implications for the site. The site is located within the King Parrot Creek Drainage Scheme as shown in Figure 5.

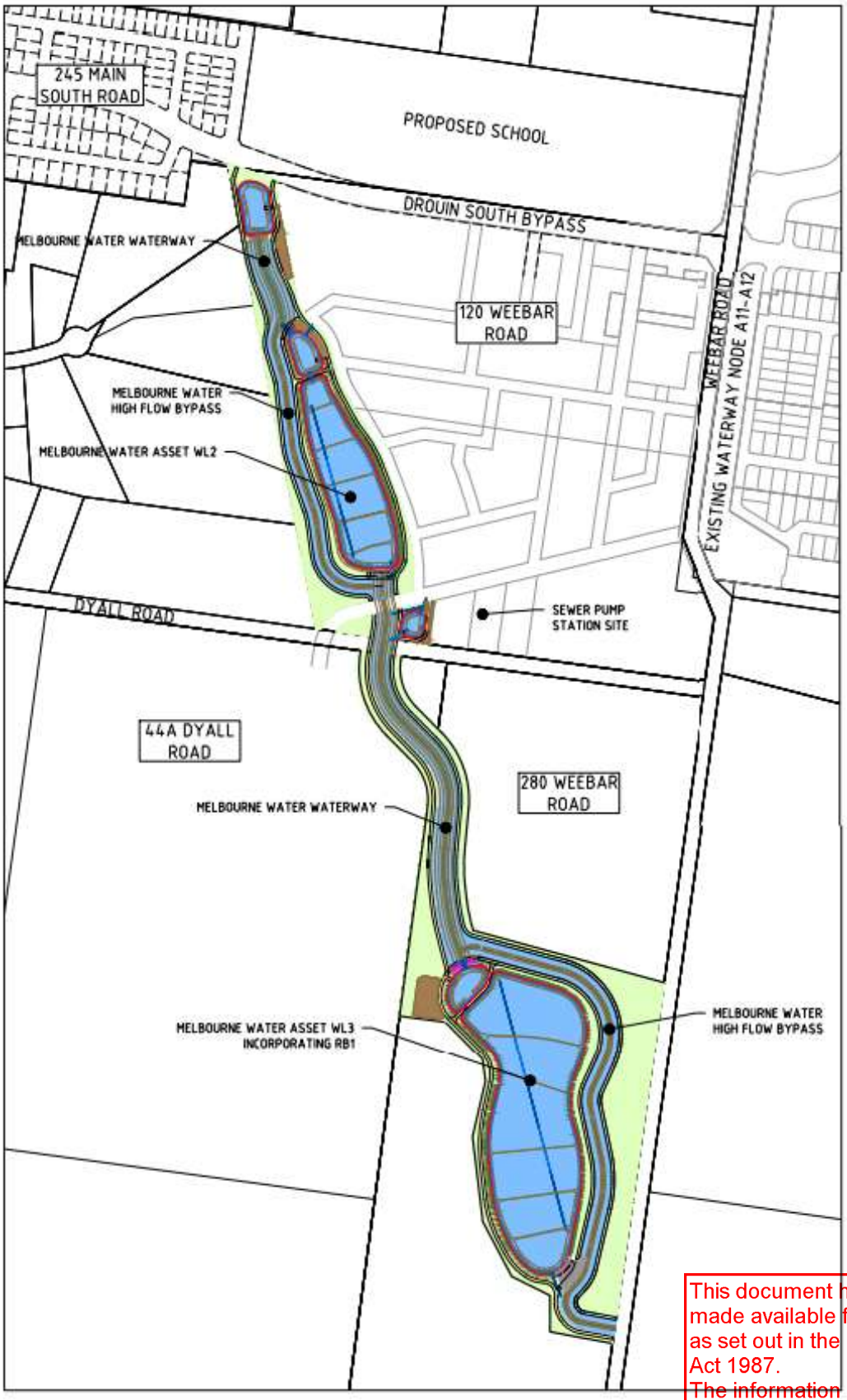
The existing RORB model of the King Parrot Creek DS was supplied by Melbourne Water. Afflux Consulting has previously been engaged in the functional design of the wetland and retarding basin system, WL2LA and RB1WL3, and associated waterways as shown in the DS (Figure 5). The current layout plan for the proposed wetlands and waterway is shown in Figure 6.

The functional design for the southern asset RB1WL3 is yet to be finalised but concept stages have included the subject site in catchment assessment. The RORB model used for this site will be discussed later in the report. For brevity, this report discusses updates to modelling which only relates to this site.



Source: Melbourne Water (2020)

Figure 5. King Parrot Creek DS



Source: Taylor Miller Consulting (2020)

Figure 6. King Parrot Creek DS wetland and retarding basin functional design plan

2.3. Scheme Review

The King Parrot Creek Drainage Scheme (DSS 2912) provides infrastructure requirements for the waterways and catchments associated with the King Parrot Creek. It is our understanding that MW are not taking fee's for this part of the catchment, and water quality must be met on site. The following assumptions regarding the scheme are:

- Water quality must be met by the proponent. This is what has been applied in adjacent parcels
- The area will discharge to the G1 node.
- Retardation will be achieved in the RB1 node downstream
- No temporary retardation is required, with such a low density development the change in hydrographs is minimal and practically not worth the logistics of temporary storage (also noting it would need to be within the WBC corridor).
- As the water quality will be met by the proponent, no water quality charges have to be paid.
- Hydraulic charge is not required (see Appendix B - Melbourne Water Response)

3. Catchment Design Objectives

All developments have the potential to adversely affect downstream environments through the effects of stormwater runoff as follows:

- Increased impervious areas resulting in increased volumetric and peak flows have been extensively researched and linked to downstream environmental degradation.
- Contaminants contained in the runoff have also been linked with adverse changes to both water quality and stream ecology.
- The contribution of increased runoff can be linked to downstream flooding and capacity constraints

To combat these affects a range hydrological and water quality mitigation measures have been researched and legislated. The design objectives for this catchment are considered below.

3.1. General Considerations

The Victorian State Planning Policy Framework includes provisions incorporating the provisions for stormwater management in its integrated water management clauses. The Shire of Baw Baw as part of its planning requirements, incorporates BPEM water quality targets, setting out objectives for stormwater runoff, floodplain management and other stormwater related policies.

3.2. Water Quality Requirements

Current water quality guidelines require developers to ensure water quality for the site meets best practice load-based reduction targets when compared with the unmitigated developed scenario. As listed by the Victorian EPA Best Practice Environmental Management (BPEM) Guidelines (1999) the development must meet:

- 80% Total Suspended Solids (TSS) reduction
- 45% Total Nitrogen reduction
- 45% Total Phosphorus reduction
- 70% Gross Pollutant capture

These water quality requirements will be met in water quality treatment recommendations as part of this development.

3.3. Integrated Water Management

Water quality and re-use have interactions relevant to stormwater management requirements. In attempt to reduce potable water consumption and ensure volumetric flow reductions within waterways, stormwater management incorporates consideration of integrated water management strategies as appropriate to site. Generally, when implementation is appropriate, flows from site will be reduced due to reuse and provision of alternative water sources. Recommended water saving and reuse targets must be explored alongside water quality requirements as reuse results in an improved capacity to meet Treatment, thereby, allowing opportunities to reduce treatment downstream. Provision of water quality requirements alongside reuse opportunities and current planning provisions have been analysed within this report as a part of stormwater management.

3.4. Flood Storage Requirements

The development shall be designed to ensure that flows are not to increase above the pre-development levels. Generally, this would be applied to the 1 % Annual Exceedance Probability (AEP) storm only and checked at each of the site discharge points. As this low density development is within an existing scheme, and the RB1 basin downstream is imminent, in this case it is not recommended to provide any catchment storage on this site. Exploration of flood impacts associated with this recommendation will be part of this report.

3.5. Flood Protection Requirements

All lots within the development will be provided at least 300mm freeboard above any predicted 1 % Riverine AEP flood level (with floors a further 300mm higher).Local stormwater protection may have a lower level of freeboard (300mm total).

3.6. Ecological Objectives

This site eventually discharges into the King Parrot Creek. The protection of downstream environs through the provision of water quality and quantity control devices is an important aspect of this site's development. The proposed development should be developed in such a way as to minimise its impact on the surrounding environment and improve ecological values where reasonably practicable.

On this site a number of Warragul Burrowing Crayfish have been found, and the stormwater design response must provide a sympathetic response to this habitat.

Vegetation and vulnerable species are impacted by activities related to development. Elimination and mitigation of these impacts are an important consideration in this process. Vulnerable species may be impacted by the following activities:

- Changes to ground water drainage patterns or stream channels which affect the water table (e.g. dam construction, stream diversion);
- Clearing of riparian vegetation, changing hydrology and causing drying out of sites;
- General road and drainage activities impacting on seepage, wetland and stream bank habitat and any activities that may degrade stream bank integrity, increase siltation and enhance erosion;
- Soil disturbance and compaction due to vehicles, stock trampling and inhibit burrow formation. Compaction also impairs soil permeability and water holding capacity;
- Water contamination, especially through application of chemical sprays, pesticides, excess nutrients or toxic leaching; and
- Drainage of swamps and conversion to pasture.

3.7. Specific Concerns for This Site

Based on the review of the catchment, the following stormwater elements should be considered for this site:

- **Managing flood extents and ensuring no worsening conditions on adjacent properties**
- **Fill requirements and waterway offsets**
- **Existing drainage infrastructure capacity**
- **Surrounding downstream development constraints and connections**
- **Burrowing Crayfish design constraints**

4. Hydrology

This section reviews the assumptions made when deriving estimated peak flows for this catchment in the scheme. This review will recommend if any changes are required for the overall scheme, or scheme assets within the site.

The peak flow was calculated for the site and for the wider catchment to determine the impact of development on expected runoff. This was done in TUFLOW using the catchment excess from the provided RORB model for King Parrot Creek.

4.1. Scheme Hydrology

The existing and developed RORB model was provided by the King Parrot Creek DS from Melbourne Water. These models have been reviewed extensively by Afflux Consulting and as such existing assumptions such as: catchment delineation, pre-developed and post-developed fraction imperviousness, modelling calibration factors and flow results have been adopted.

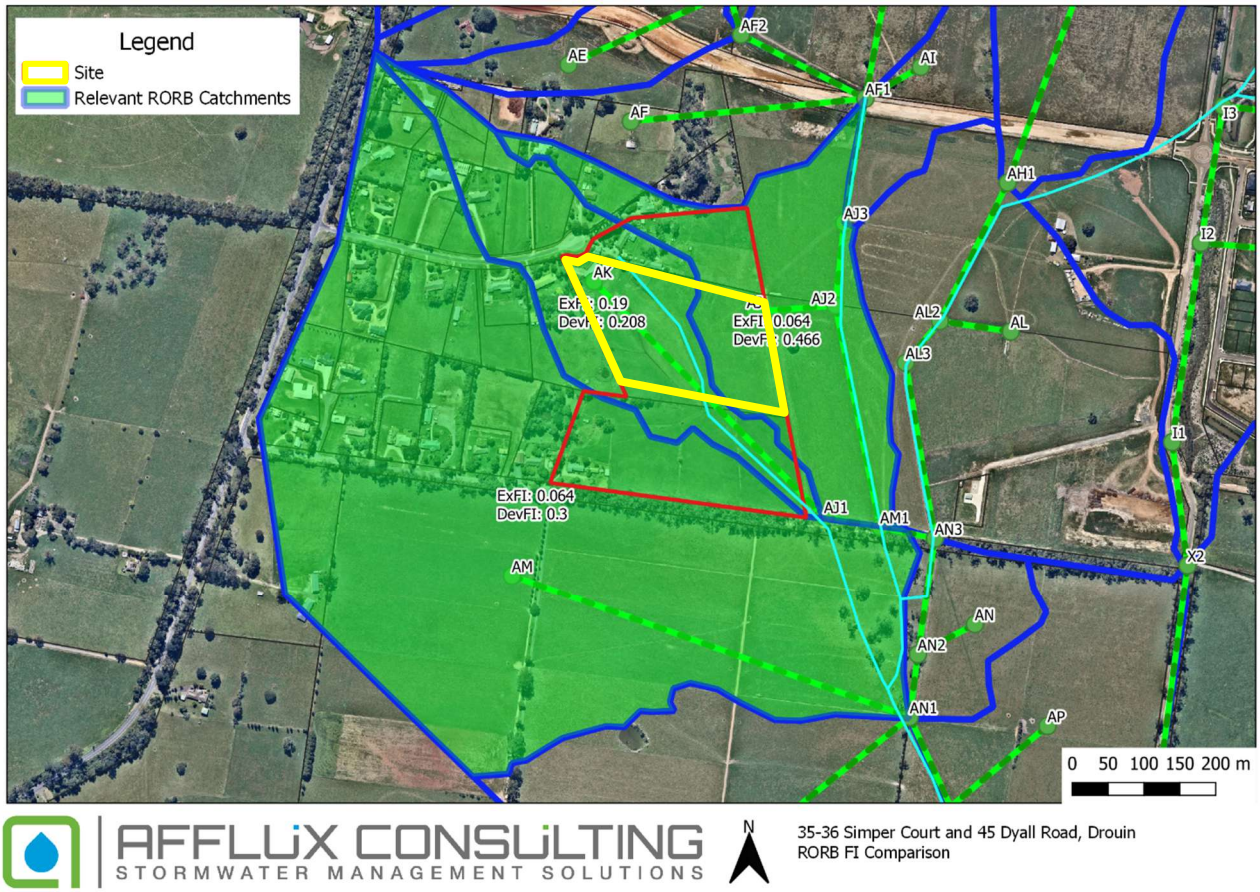
The model is representative for the site as shown in the below Fraction Impervious analysis and drains appropriately to the proposed constructed waterway.

4.1.1. Fraction Imperviousness (FI)

The development will increase imperviousness to the catchment due to the mix of land use proposed for the site. The block size as shown in Figure 2 can be seen to be generally around 2000m² with 5 larger lots. Accordingly, a recommended FI of between 0.1-0.3 should be applied (see Table 1).

For the scheme model (RORB), catchments have been delineated into large sub-catchments for both existing and developed conditions as shown in Figure 7. Catchment information has been provided in Table 1 and shows the general increases in FI for the sub-catchments associated with this development. As can be seen the average developed FI across the site is around 0.31, in line with the expected range.

These FI's align with those used in the Scheme asset design of RB1WL3. As such this design supports the proposed developed condition of these sites.



Source: DrouinSth_Existing (modified Kc May 16).catg and King Parrot Creek alternative RB (Modified Kc June 16)_AffluxDevApr20

Figure 7. RORB fraction impervious comparison (Site shown in yellow outline)

Table 1. Selected catchment information for existing and developed RORB models - site encumbered catchments highlighted

Subarea	Area (km²)	Existing FI	DSS Developed FI
AM	0.442	0.064	0.300
AK	0.093	0.190	0.208
AJ	0.113	0.064	0.466

4.2. Site Hydrology

4.2.1. RORB Model

Site hydrology has been sourced from the developed scheme RORB model. Rainfall excess hydrographs have been entered into the TUFLOW model to estimate peak flows through potential problem flow paths. The critical storm was estimated to be the 1% AEP 25minute storm as shown in Table 2 below.

Table 2. Rainfall excess estimation for the site encumbered catchments

Duration	AJ excess (m³/s)	AK excess (m³/s)	AM excess (m³/s)
20m	2.7	1.5	8.1
25m	2.7	2.0	9.9
30m	2.5	1.9	9.2
45m	2.2	1.4	7.9

4.2.2. Rational Method

Local site hydrology for concept design of treatment options was completed with the Rational Method. The peak flow estimation results are shown in Table 3 below. The IFD table for this area is shown in Figure 8.

Table 3. Rational Method peak flow estimation

ARI (years)	Catchment Area (ha)	FI Assumption	Tc (mins)	Peak Flow (m³/s)
3 month	10.7	0.3	12	0.2
1 year	10.7	0.3	12	0.3
5 year	10.7	0.3	12	0.6
100 year	10.7	0.3	12	1.3

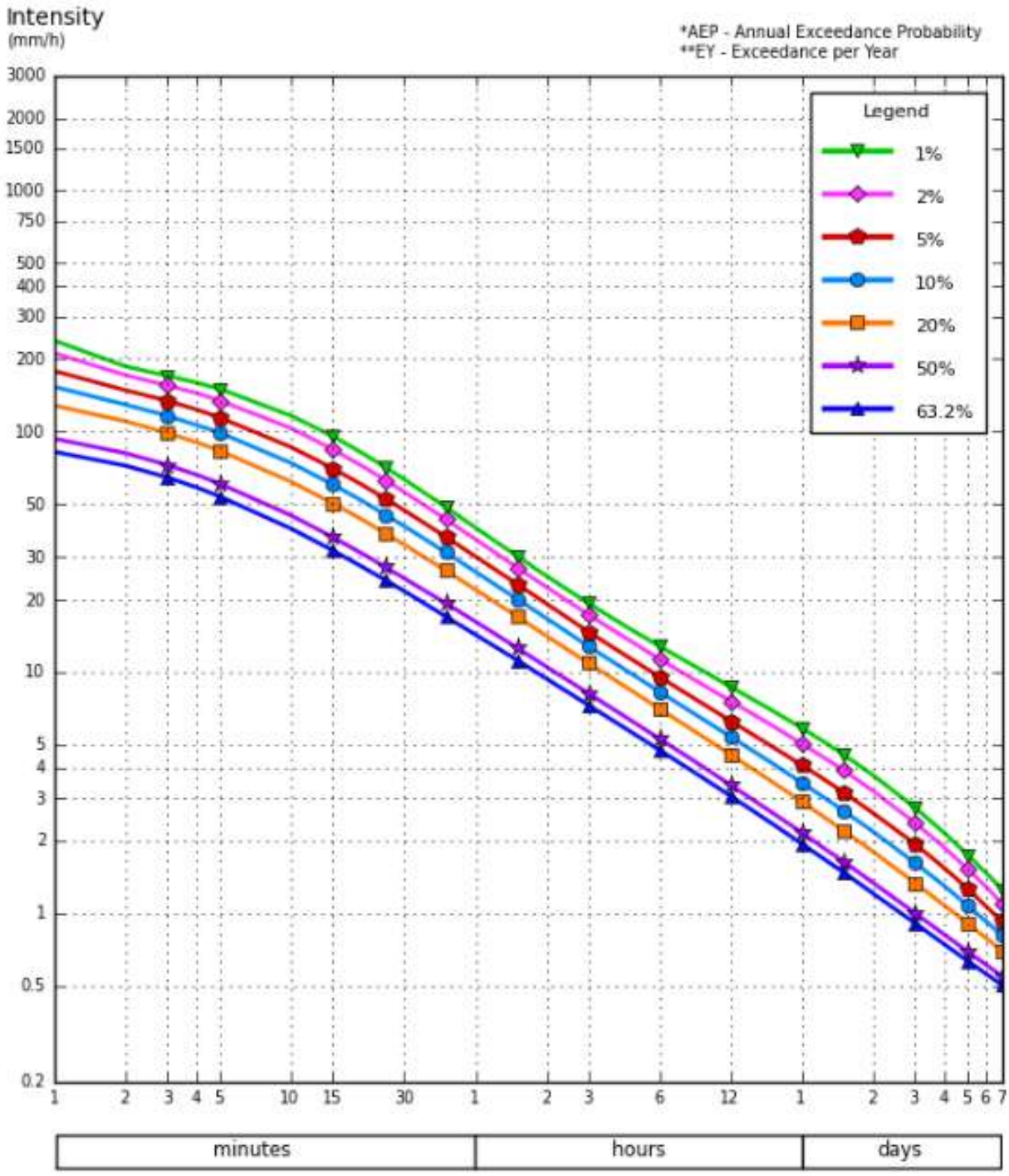


Figure 8. Intensity Frequency Duration curves for Drouin

5. Flood Modelling

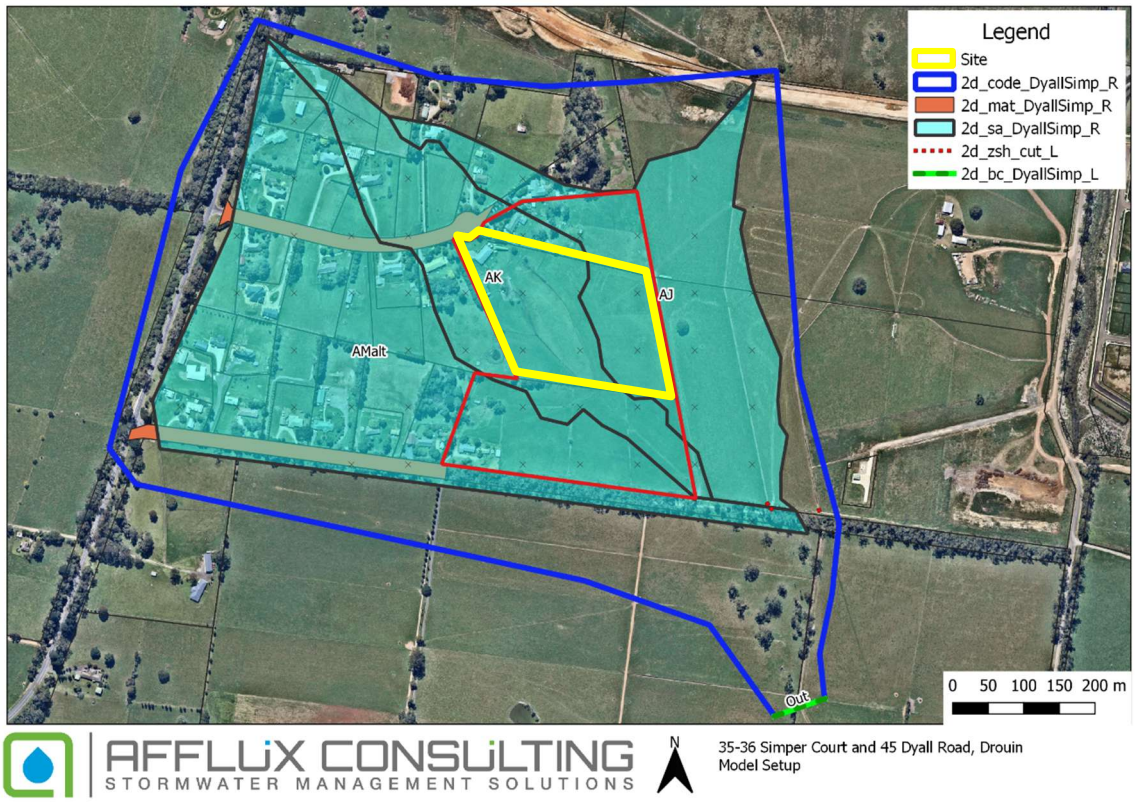
The major influencing factors within the flood modelling includes the impact of flooding from rainfall on the site, as well as interactions with incoming upstream catchment flows. The main considerations include the availability of flood storage, safe overland flow conveyance, water surface levels in relation to proposed developed floor levels, and any changing impacts to neighbouring properties.

Once the estimated rainfall magnitudes were decided upon (discussed within Hydrology section), a high-definition model was constructed to understand flood mechanisms during a 1% AEP storm event. The model was built and run in TUFLOW using a linked 1d/2d approach, parameters and data sources.

5.1. Model Setup

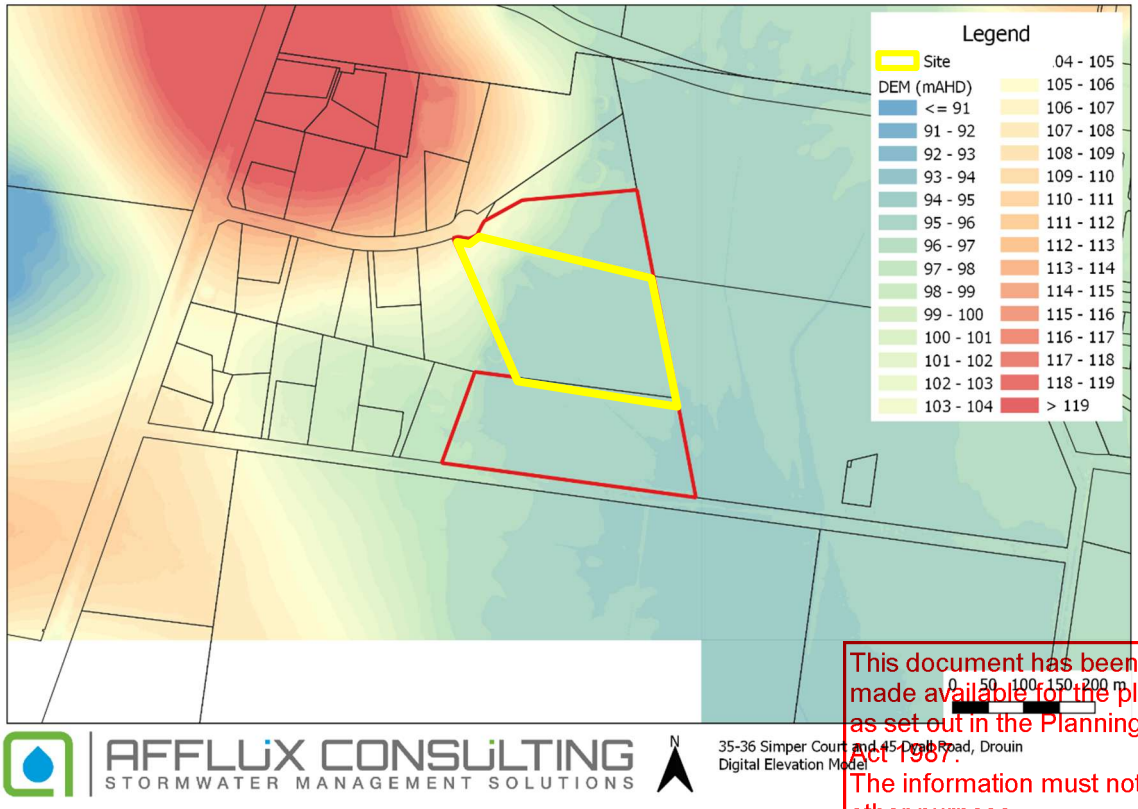
Initial model setup for the catchment model involved accessing survey surface levels and a setup of existing drainage networks for the model area. Model extent is based on topographical catchment boundaries. Land use in the model has been determined based on inspection of aerial imagery and visual inspection and has been used to inform Manning's roughness factors in the model. Downstream boundary conditions have been established based on an examination of topography. This has been set a considerable distance downstream of the proposed assets to ensure no undue model boundary influence. The model assumptions used in this TULOW assessment are:

- The model was run for the peak 25-minute event for the developed catchment. All hydrographs were derived from this event
- The site Digital Elevation Model (DEM) was sourced commercially with a 1m grid resolution used as shown in Figure 10
- The model was run for 4 hours to allow the peak flow to pass through the model
- Downstream culverts were assumed as open channels
- A slope boundary was assumed in the downstream section of the drainage channel
- The model was run HPC to reduce run time



Source: *DyallSimper.tcf*

Figure 9. TUFLOW model setup (Site shown in yellow outline)



Source: *e398n5776_bawbaw_2014nov12_dem1m_v10cm_mga55.asc;*
e399n5775_bawbaw_2014nov12_dem1m_v10cm_mga55.asc;
e399n5776_bawbaw_2014nov12_dem1m_v10cm_mga55.asc

Figure 10. Digital Elevation Model (Site shown in yellow outline)

5.2. Model Reporting and Analysis

The model has been set up to report the following key indicators:

- Water Surface Elevation (WSE) showing the water level relative to a datum (m AHD) at each model grid cell.
- Maximum water depths for each model grid cell.
- Maximum water depths at defined reporting cross sections immediately onto and off the site.
- 2D Time-Series Plot Output (PO) and Map Output data at various locations across 1D and 2D network.
- Critical flow path locations
- Decide major and minor network layout
- Preliminary required lot levels throughout the flatter sections of the site
- Approximate outlet flows to be dealt with by a scheme connection

It is noted that the development of this parcel will increase the capacity of flow paths in the construction of roads and underground drainage.

Analysis of results will show WSE and water depth based on flood conditions and will be used to establish flood extents on the property. The 2D Time-Series Plot Output (PO) data provide Flow-Time hydrographs at user defined locations. Additionally, the 1d connections report Flow-Time hydrographs for assessment and validation of underground drainage network systems.

Water Level Difference maps will be provided to show afflux changes between existing and developed conditions. Additional maps will be produced to provide an assessment of the proposed development against safety criteria. Based on the assessment of these results, site access and treatments will be made.

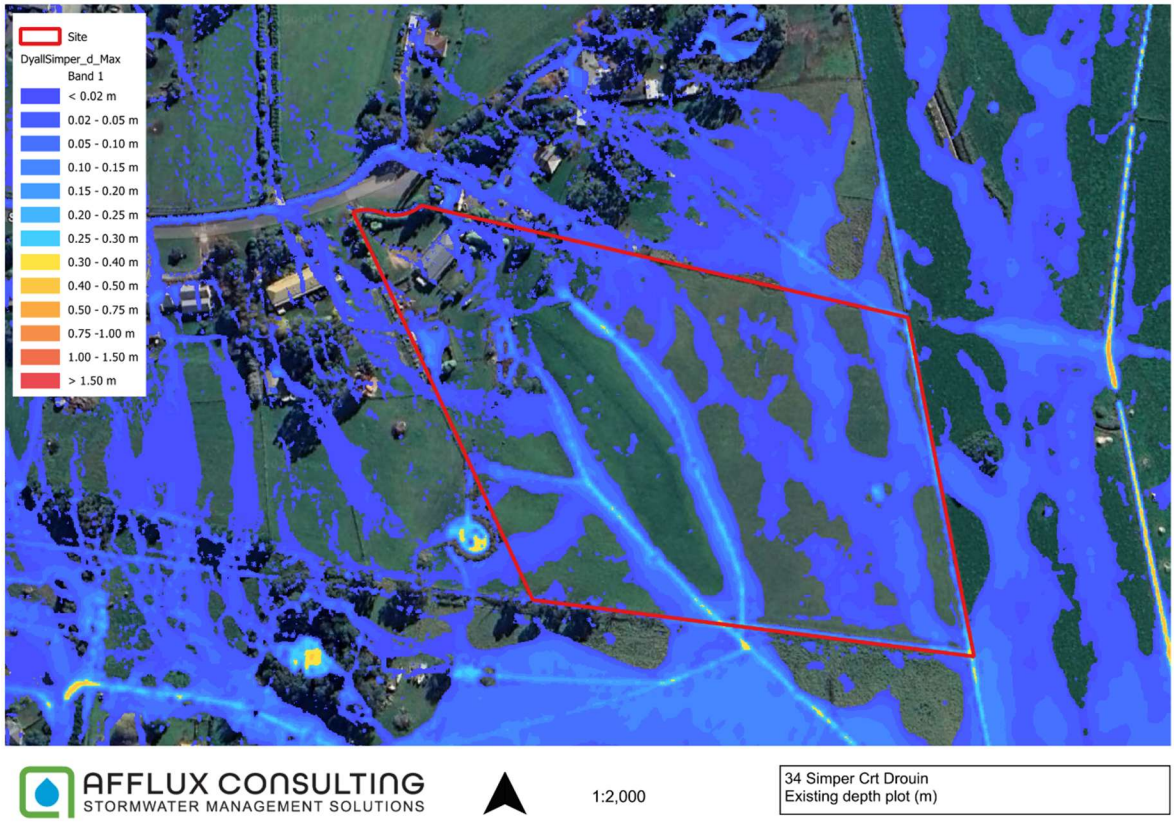
5.3. Existing Conditions

Interactions with immediate development and proposed development scenarios were assessed in a local model. Flows for critical storms (as defined in the Hydrology section) were run through the area defined by the local model extent. The local undeveloped model was run for comparative purposes. This enables identification of the flood extent and its impact on the proposed site and sites immediately adjacent.

The key assumptions made for this model include:

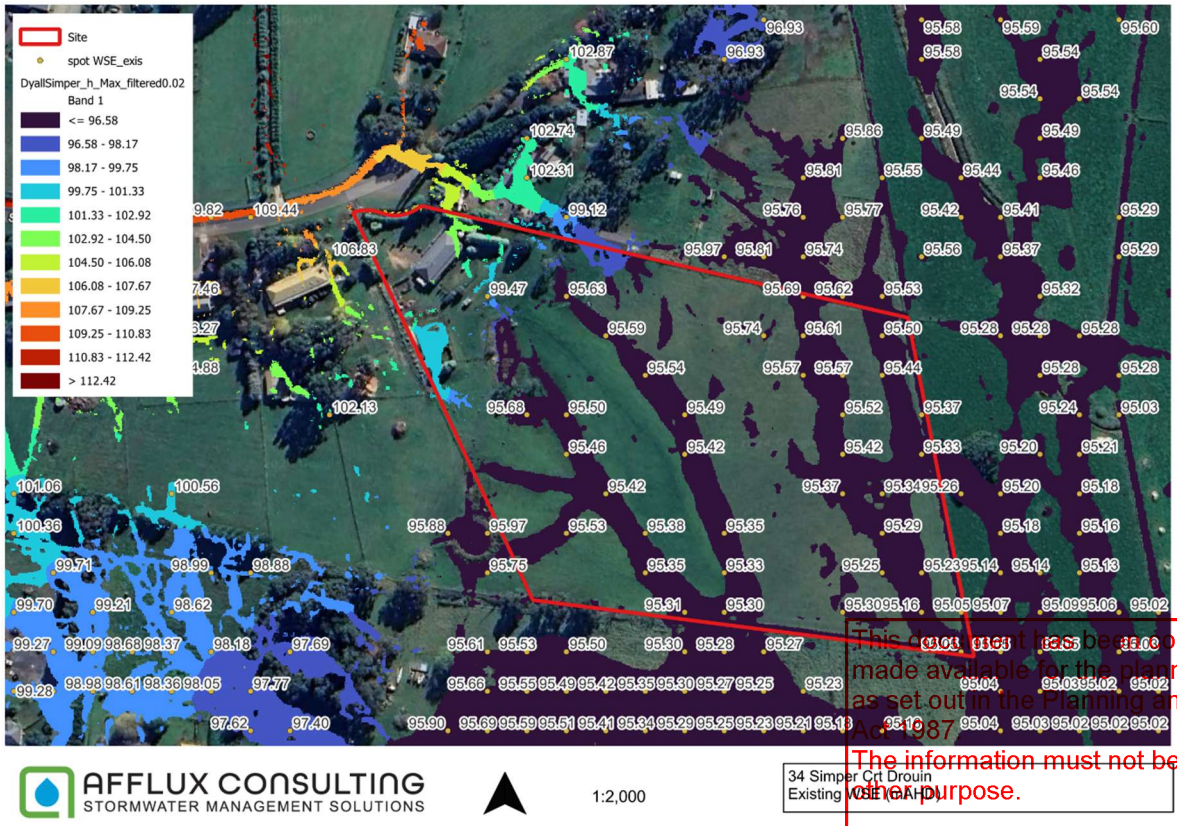
- Only the 1% Annual Exceedance Probability (AEP) critical duration storm presented
- A Manning's Roughness of 0.05 was set for all paddock and waterway areas. A Roughness of 0.02 was set for the road areas (Figure 9)
- Rainfall was applied as 2d_sa_all for all the area

Flood results for existing conditions are shown in Figure 11 through to Figure 12. Overland flow paths have been identified as requiring consideration for this development.



Source: DyallSimper_d_Max.flt

Figure 11. Site flood shape with estimated 1% AEP flood depth and flow reporting locations



Source: DyallSimper_h_Max_filtered0.02.flt

Figure 12. Site flood shape with estimated 1% AEP water surface elevation and flow reporting locations

5.4. Developed Conditions

The site was modelled with proposed development recommendations.

The proposed development was modelled with the following assumptions, as shown below.

- Updated Manning's roughness for the site
- Raised surface along the northern and western boundary as shown in Figure 13
- Cut drain along the road and western boundary as shown in Figure 13
- Rainfall was applied as 2d_sa_all and 2d_sa_streamlines, with regions as shown in Figure 9
- Buildings shapes
- Pipes connections to Simper Ct and the developments to the west as shown in Figure 13

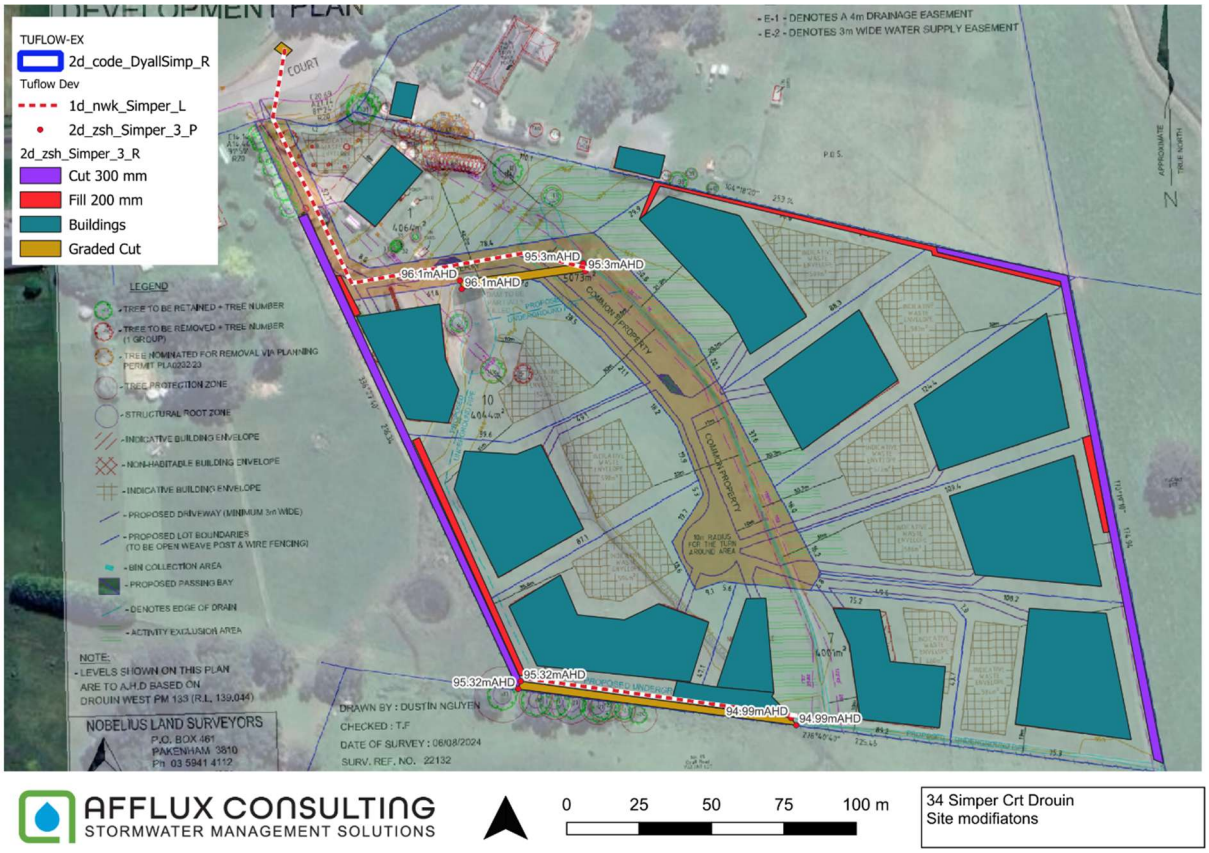


Figure 13. Developed conditions model setup (Based on Dev Plan V05)

Flood results for existing conditions are shown in Figure 14 to Figure 16. Results show that the modelled mitigations are very effective in keeping the development flood-free.

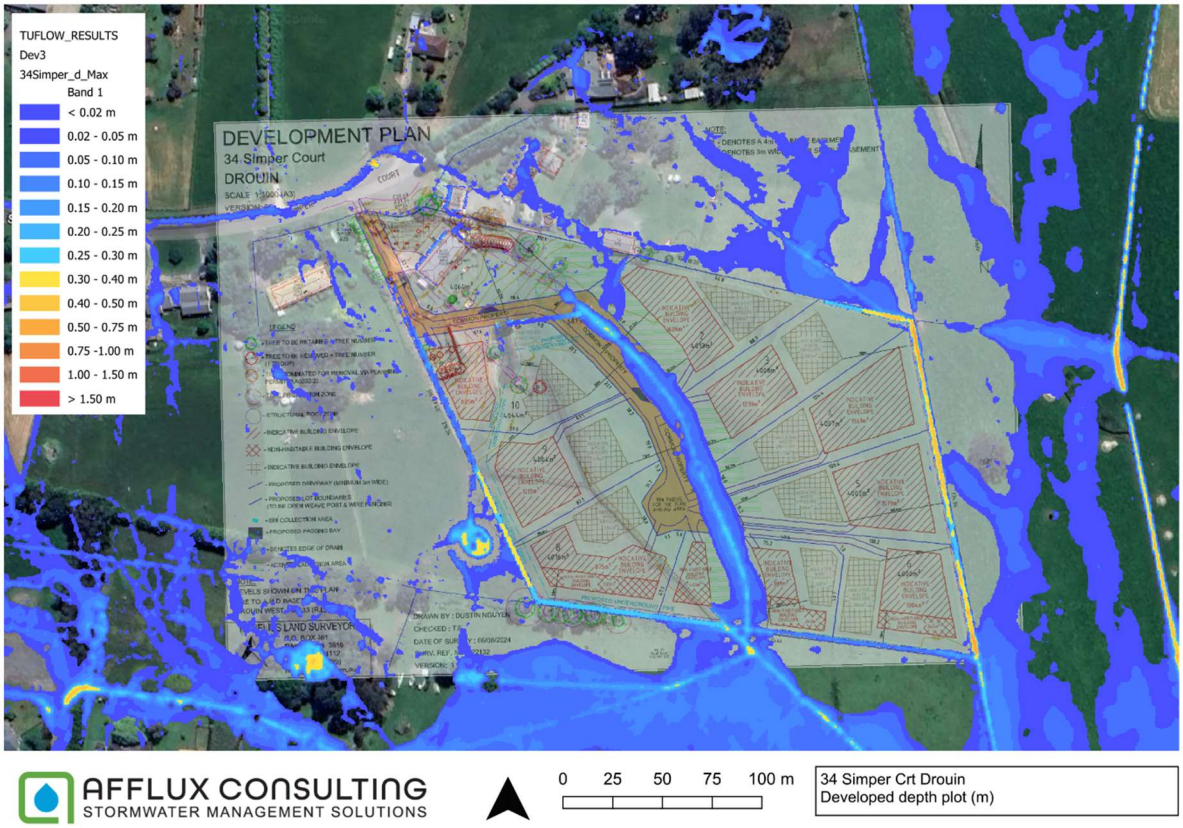


Figure 14. Developed conditions flood depth

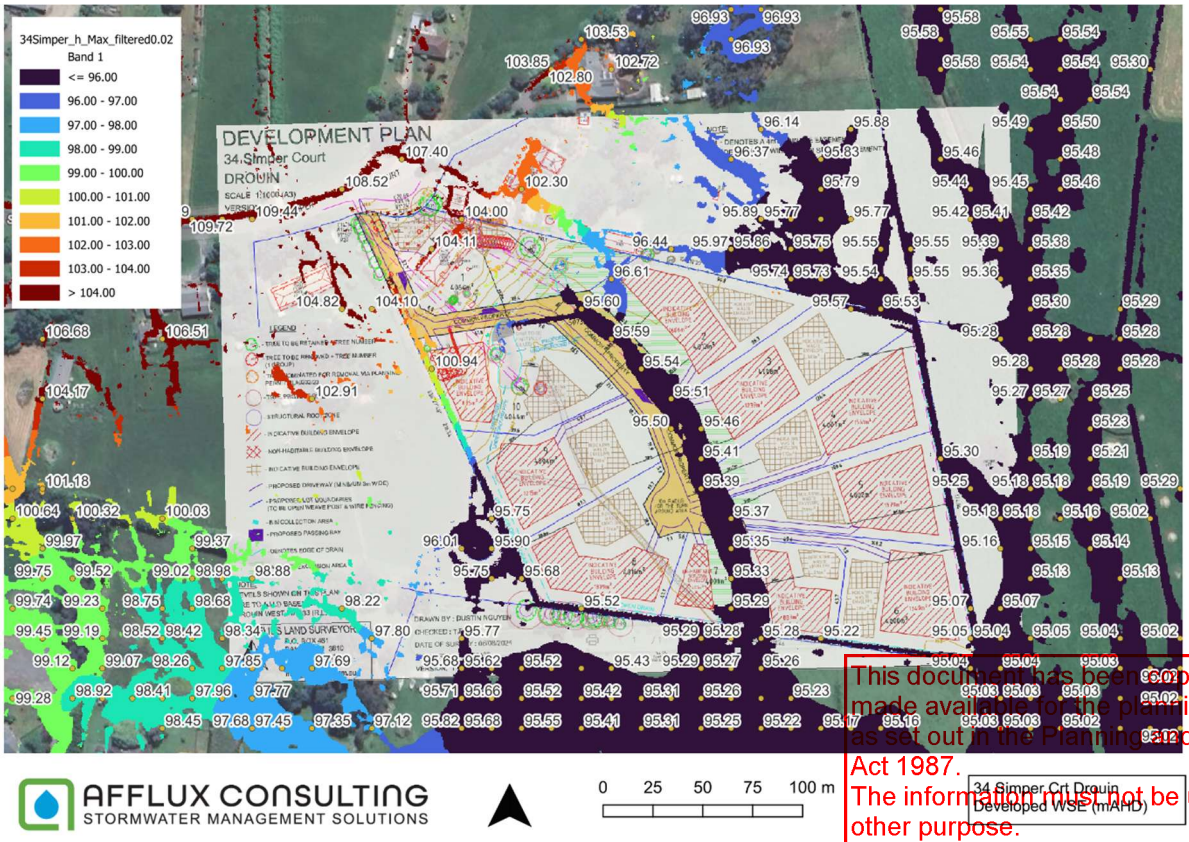


Figure 15. Developed conditions flood WSE

The afflux plot shows (Figure 16) that there is no significant offsite impact.

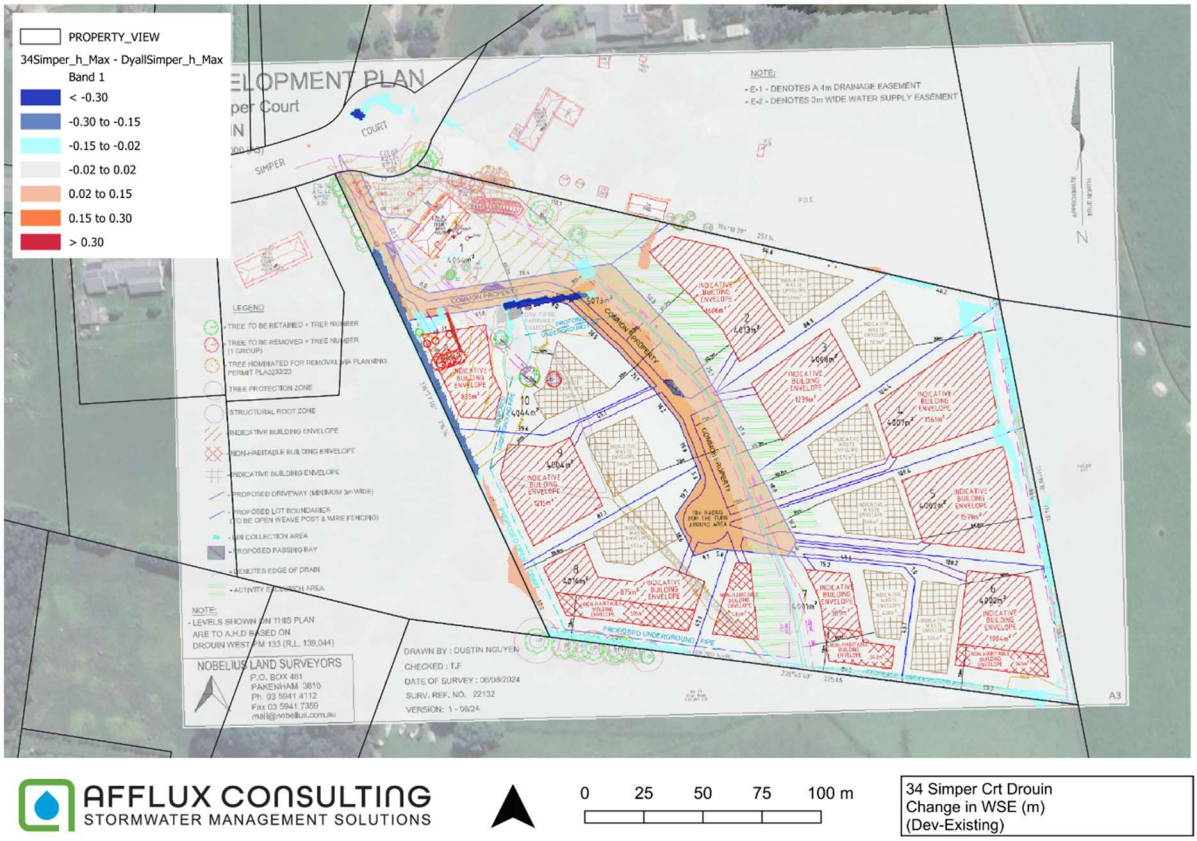


Figure 16. Developed - existing conditions difference plot

5.4.1. Flow Outputs for Design of Hydraulic Assets on Site

Figure 17 & Table 4 shows flow at different locations is extracted using 2d_po lines in order to assist in the design of hydraulic assets. Note all flow rates should be considered as absolute values.

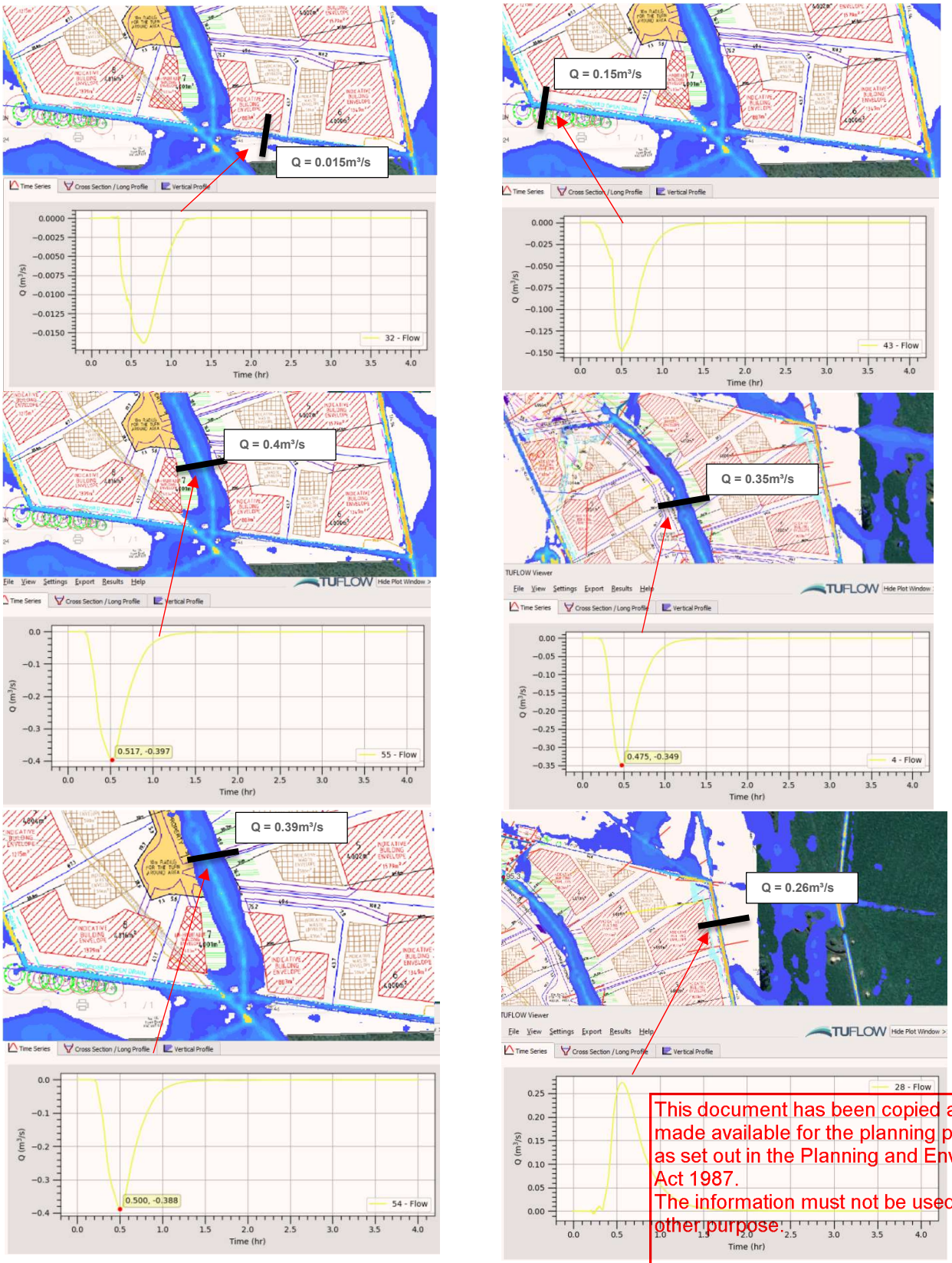


Figure 17. Flow at different cross sections

Table 4. Flow Paths Modelled Flows Summary

Location	Flow Rate (m^3/s)	Comment
Main Central Branch Upper	0.35	Takes road catchment flows, assume design rate for pipe connection to Simper Crt
Main Central Branch Lower	0.4	
NE Inflow Point	0.25	Inflow from 36 Simper
SW Inflow Point	0.15	Inflow from 30 Simper

6. Water Quality

The water quality for this site has been assessed to ensure the development meets best practice load-based reduction requirements. The water quality works must coincide with the proposed development to ensure runoff does not directly discharge into the existing drainage system to the detriment of downstream water quality.

6.1. Rainfall Information

The catchment is outside a MW drainage boundary and as such the rainfall template for Station 85277, Noojee with the period of 31 July 2000 to 1 August 2002 has been applied (Figure 18). Rainfall was run at a 6-minute interval to match the lowest Time of Concentration of the catchment.

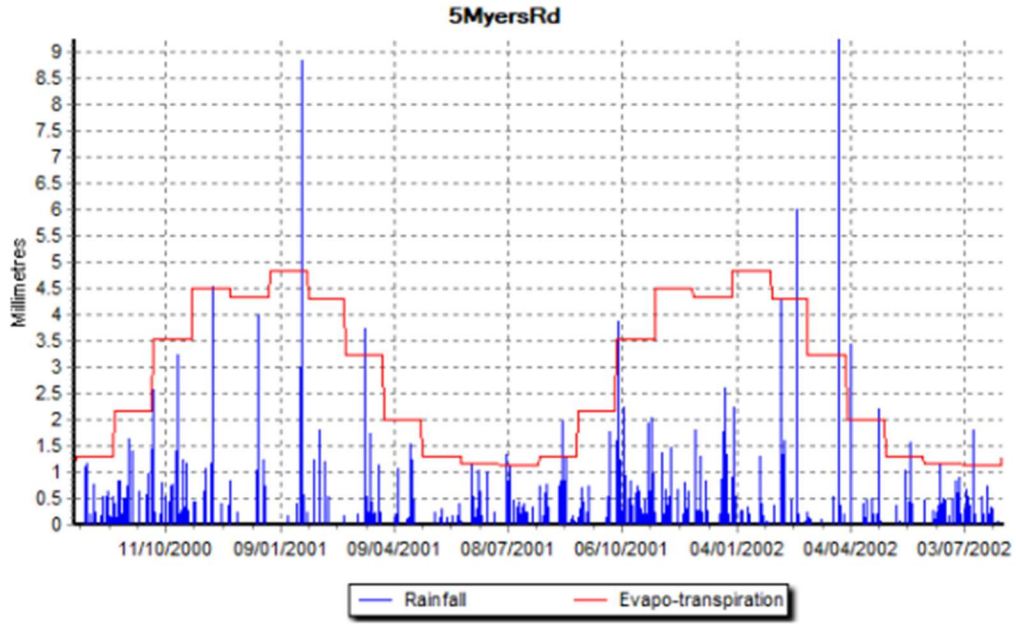


Figure 18. Noojee Rainfall Data

6.2. MUSIC Model Setup

To ensure that the development meets the BPEM requirements of Clause 56-7.04, a MUSIC model (v6) has been created for the catchment. MUSIC modelling is an industry-standard approach used to determine water quality treatment and sequencing. Guidance for model inputs was sourced from the IDM as well as Melbourne Water's MUSIC guidelines.

In order to reach BPEM Guidelines the model has been set up with the following notes:

- The model has been designed in alignment with proposed layout.
- The model is built using the most recent guidelines including soil losses and infiltration.
- The model is built using rainfall templates that include 10-year periods of rainfall data.
- The measured catchments are in alignment with hydrological model.

- Source node sub-catchment areas for the development are separated by impervious fraction, in alignment with MUSIC guidelines.

All other parameters were set as per Melbourne Water Guidelines.

6.3. Proposed Treatment

Runoff from the developed catchment will be treated by a treatment train to ensure the development does not result in significant degradation of downstream waterways and optimum stormwater treatment at site outlet. It is recommended that the development is treated by an on-site WSUD system (Figure 19). The results of the MUSIC simulation provide an estimation of the expected nutrient reduction performance.

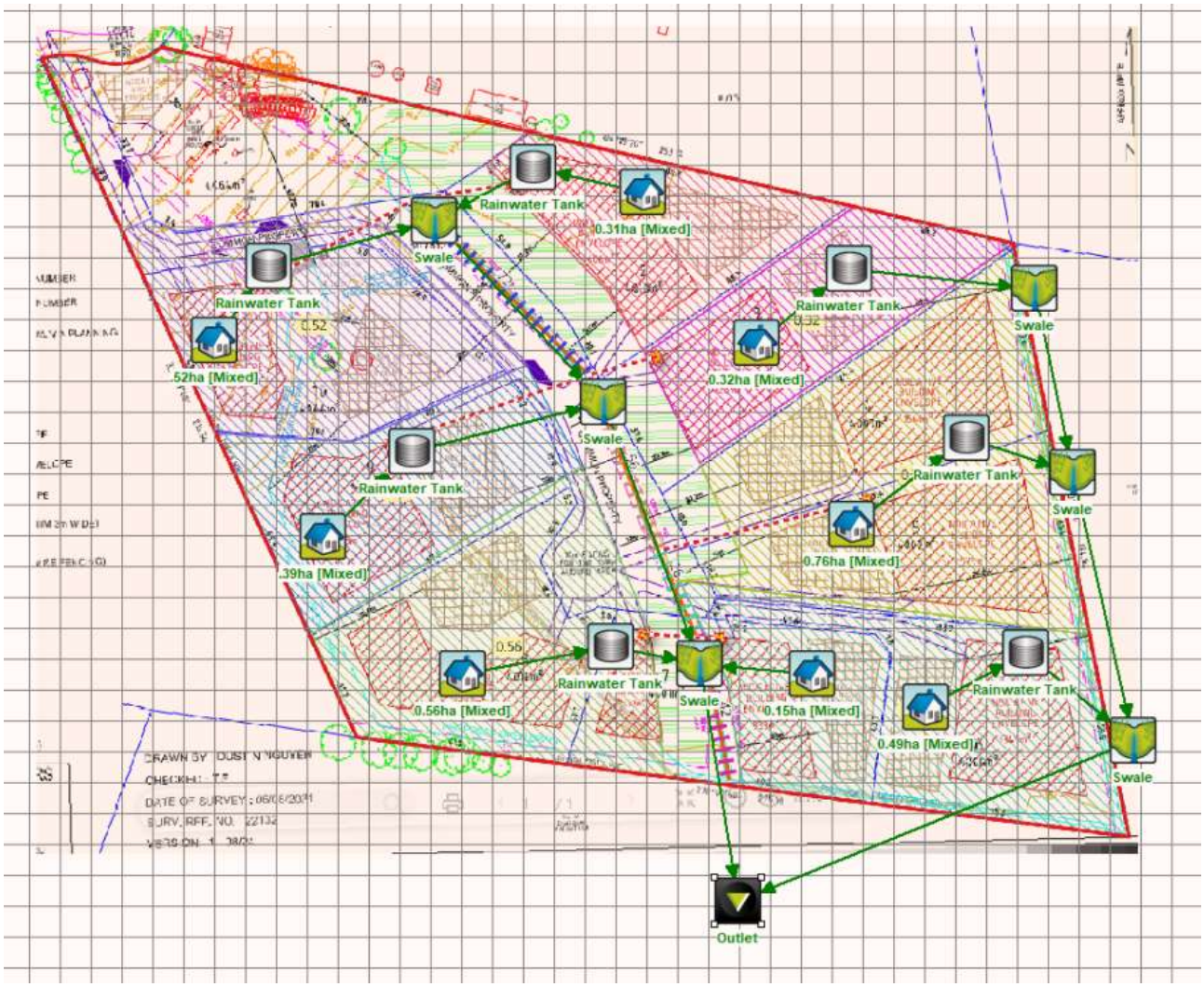
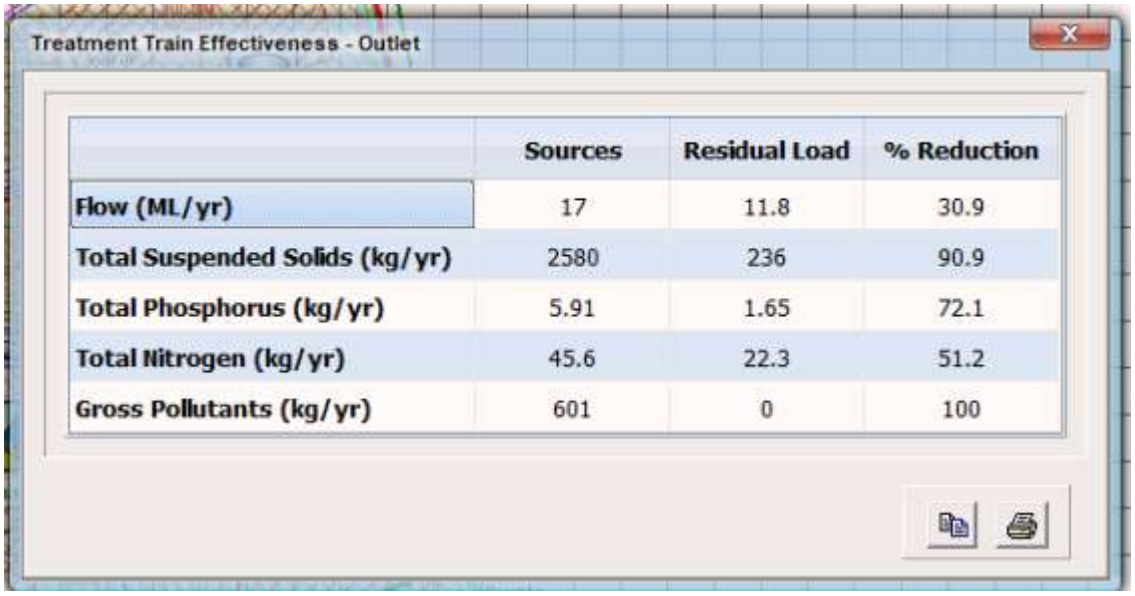


Figure 19. MUSIC model Treatment train (Dev Plan 2 shown; current, Dev Plan 5, doesn't change water quality)



	Sources	Residual Load	% Reduction
Flow (ML/yr)	17	11.8	30.9
Total Suspended Solids (kg/yr)	2580	236	90.9
Total Phosphorus (kg/yr)	5.91	1.65	72.1
Total Nitrogen (kg/yr)	45.6	22.3	51.2
Gross Pollutants (kg/yr)	601	0	100

Figure 20. MUSIC model Treatment train effectiveness

6.4. Rainwater Tanks

Stormwater reuse presents an opportunity to reduce the impact of increased runoff from the catchment whilst also reducing the community's reliance on potable water. Rainwater reuse at a household level can contribute to a decrease in total stormwater to receiving waters, reducing nutrient loads. Rainwater tanks may be considered for individual sites depending on the viability of entrenching the requirement on the title.

Given the recommendation to include rainwater tanks within this development, a reuse demand has been included in the water quality calculations.

Rainwater tanks have been modelled with conservative reuse assumptions. Toilet flushing has been assumed to be 100L/household/day, based on 5-person occupancy and contemporary guidelines. Garden watering assumes additional reuse demand, particularly during warmer months – however this was not included for conservatism. The following points result in the optimum stormwater treatment:

- 10 kL tanks (one per building) are recommended to be installed.
- All toilets and garden taps should be plumbed to rainwater tanks.
- Water efficient appliances are recommended for use where water is sourced from potable supplies.
- Removal of nutrients to system is sensitive to tank size (i.e., re-use capacity) and should be considered in conjunction with selected treatment devices.

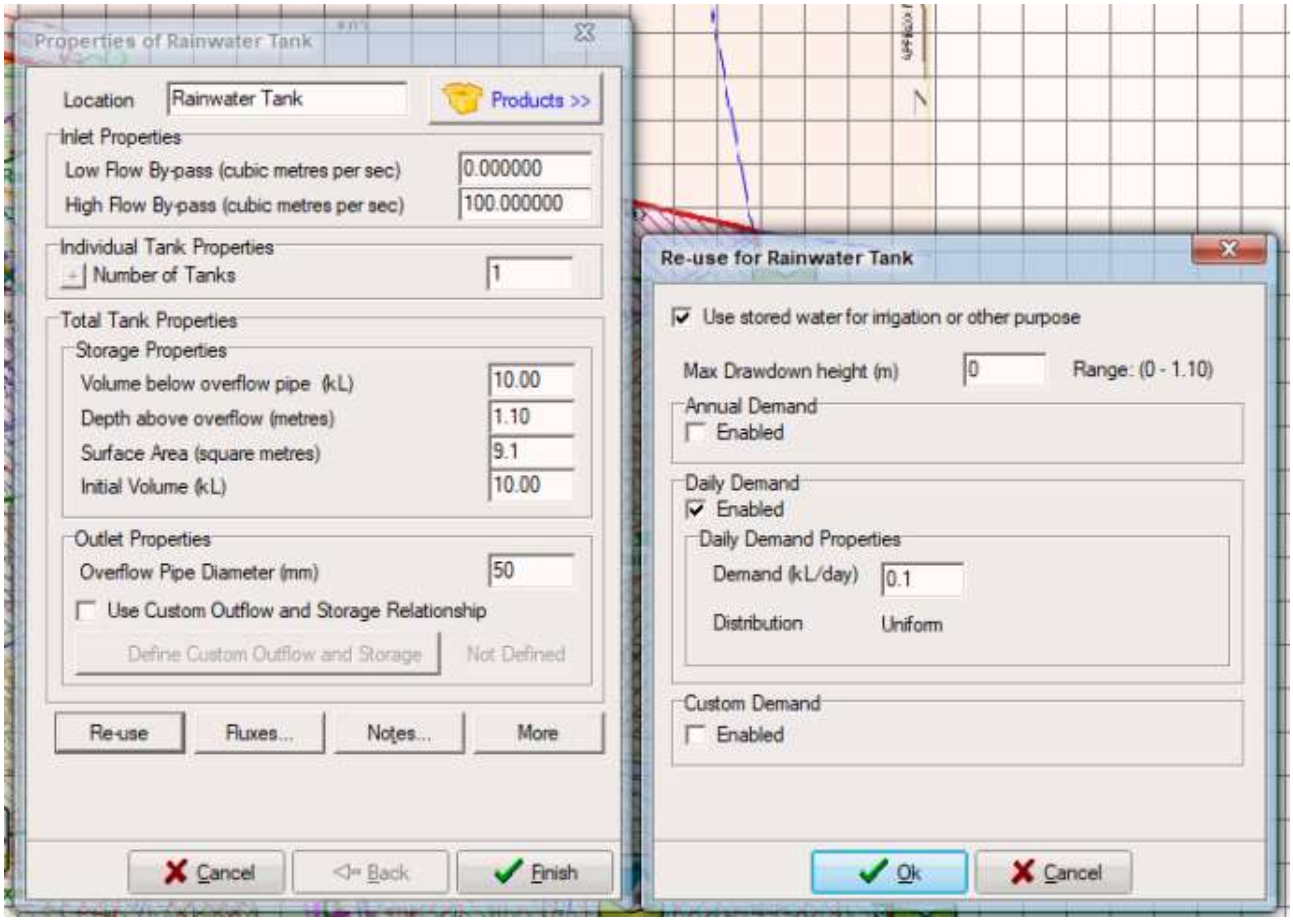


Figure 21. Rainwater tank properties

6.5. Treatment Concept Plan

The water quality is achieved by a treatment train of rainwater tanks and swales. The treatment concept plan is shown in Figure 22.

Given the size of the blocks and capacity for potential water reuse, it is recommended that each property have a 10 kL rainwater tank installed, plumbed in for toilet flushing and garden use as a minimum. These rainwater tanks are connected to swales along the centre and edges of the property to be further treated.

Figure 22. Treatment concept plan

7. Design Requirements

In modelling flood interactions across the site, design requirements are highlighted to reduce the impact of the development on neighbouring properties and surrounding water systems, while increasing amenity for future residents.

7.1. Lot Levels

Floor levels are required to be 600mm above flood level for dwellings and 300mm for garages. Figure 23 shows minimum floor levels for proposed lots and should be graded between the shown points. The floor levels are based on ultimate developed conditions.

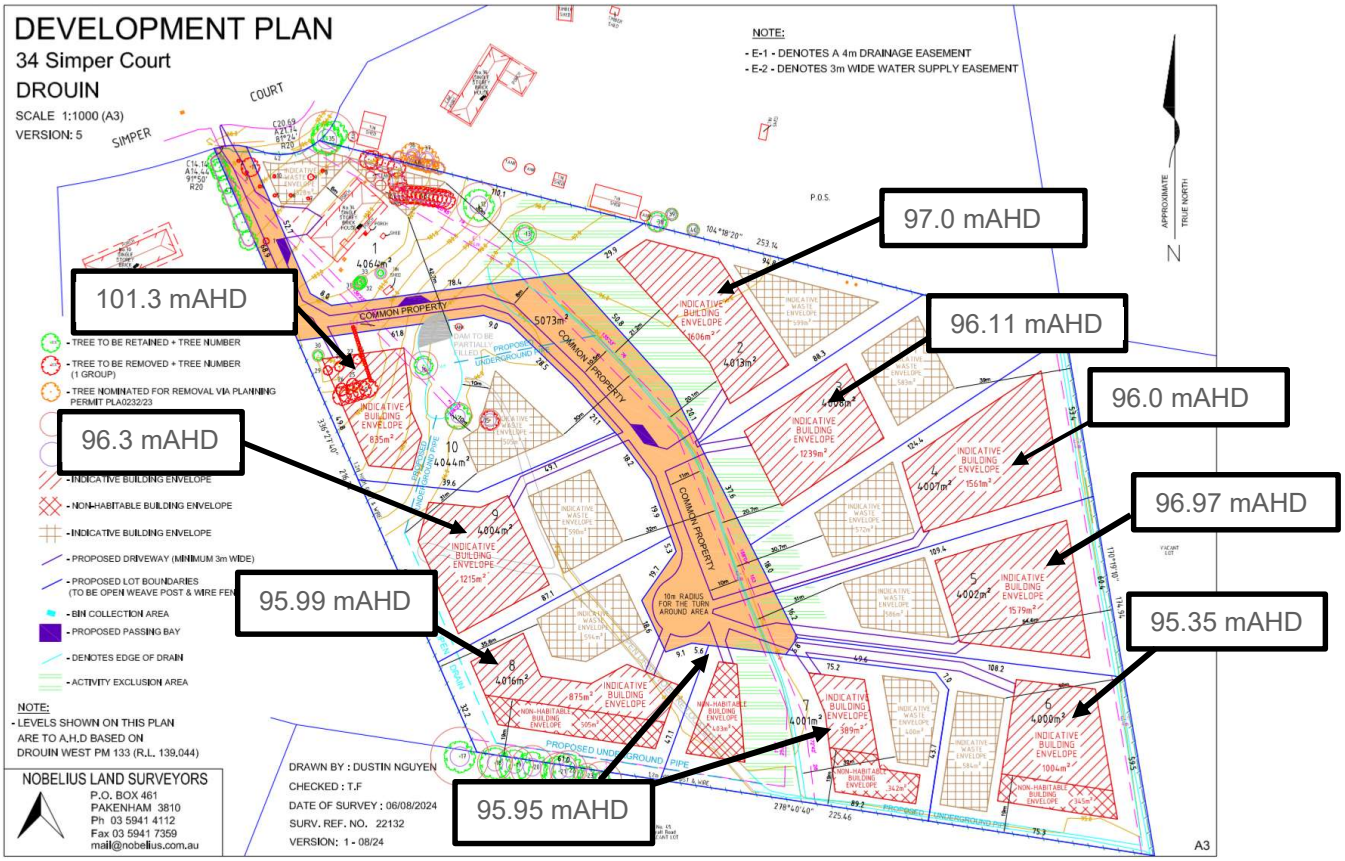


Figure 23. Finished Floor Levels

7.2. Flow Paths and Drainage

A concept drainage plan of the site has been developed to determine how the site can manage surface water. This concept considers the runoff from the developed site as well as existing drainage interactions.

7.2.1. Legal point of discharge

The existing conditions of the site help to determine both the development potential and the drainage treatments for the area. The existing outfall is a drainage reserve traversing the middle portion of the site.

Figure 24 below outlines the major and minor flow paths, the minor flow paths are directed towards treatment assets (via rainwater tanks) to maximise treatment capacity. Major overland flow paths are subject to fill plans.

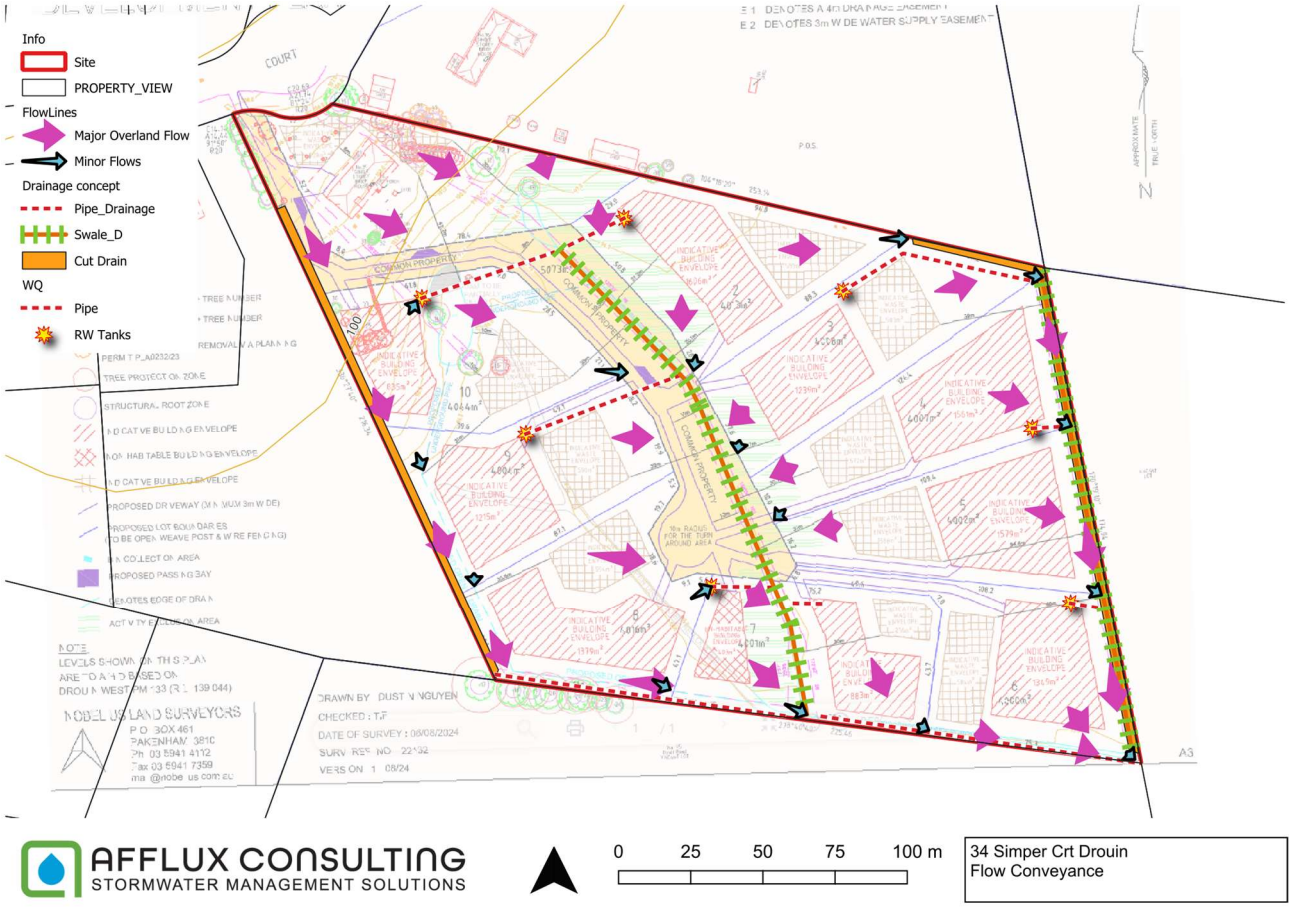


Figure 24. Major and Minor Flow Conveyance

7.2.2. Storage and flow attenuation

We have not recommended flow attenuation on this site for the following reasons:

- The flood modelling has shown that there are no detrimental effects on neighbouring properties (Figure 16) this implicitly means that there is no detrimental change across the boundary of the site, and therefore this meets the intent of the Water Act.
- The low density of the subdivision results in very little change in flow (hence the flood model result). The recommended addition of rainwater tanks will further dull any small change in hydrology
- The future RB1 downstream of this site is imminent. This basin is intended to minimise any hydrology effects on King Parrot Creek, and would effectively dwarf any storage associated with this site and render it useless. The effort of maintaining a storage on a small low density subdivision for Council or the landholders into infinity does not make sense with this RB1 asset immediately downstream.
- The sites main stormwater objective is to maximise the waterway and WBC habitat extent. Any realistic flow attenuation would need to be in this corridor.

7.2.3. Drainage and Waterway Requirements

The central waterway along through the site and pipes from the rainwater tanks are expected to carry runoff from the site to the outlet, with an emphasis on draining captured roof water towards treatment systems where reasonable. This minimises flows discharging directly to the outlet and ensures that for the region is as effective as possible.

The total waterway area as recommended, requires an offset as shown in Figure 25 by the green hatched area. The proposed building near the southern boundary should be relocated outside the flood zone to preserve the waterway as shown in the picture below.

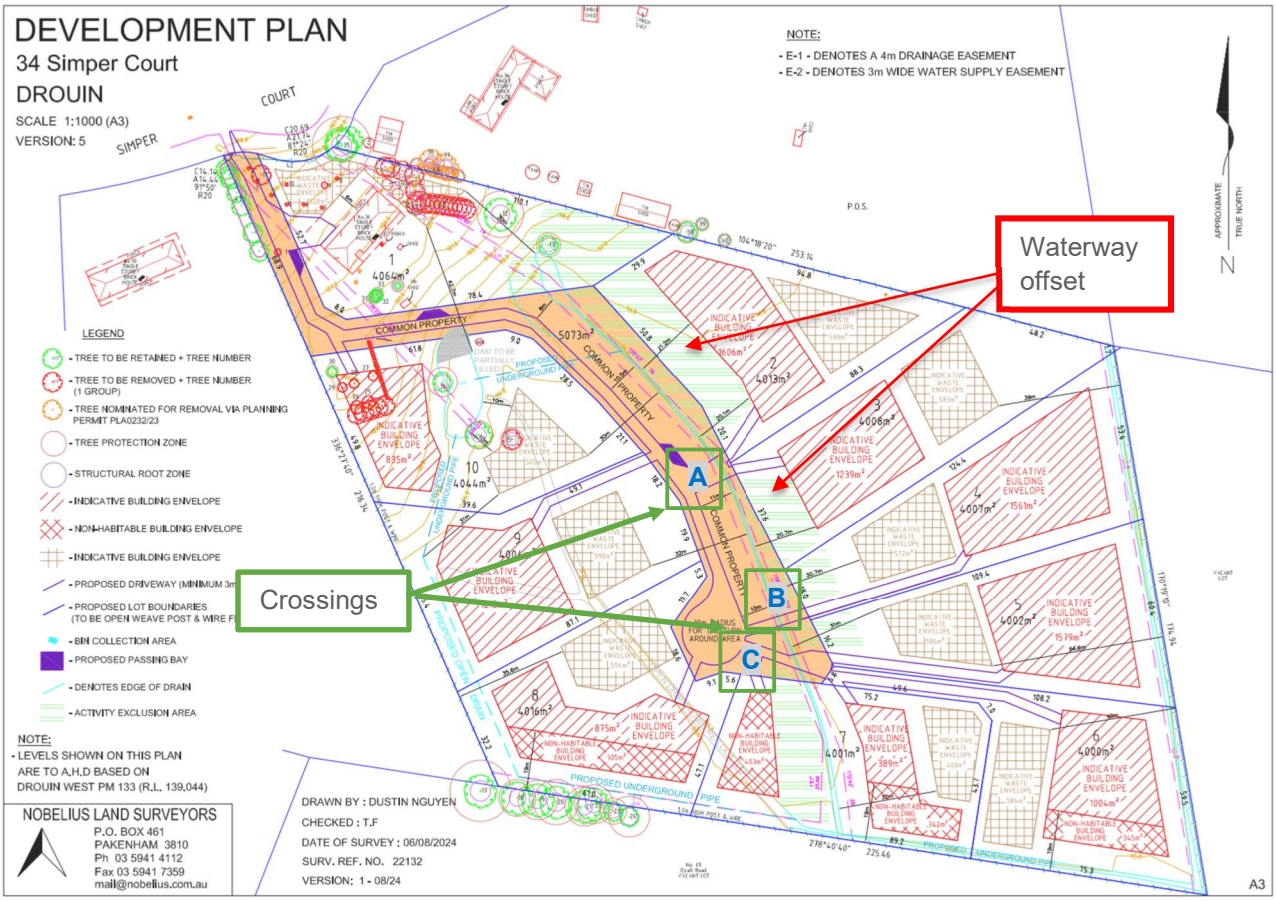


Figure 25. Proposed Development (annotated)

There are 3 crossings across this waterway A, B and C as seen in the figure above. A section of this proposed crossing is shown in Figure 26. The crossings are intended to be extended across the WBC corridor with the majority of flows maintained in the existing swale system. The below concept approximates the 1% AEP flood extent, or approximately ~10m. Given the low flow rate the crossings could be completed in a single culvert, however for the maintenance of WBC movement the additional culverts are recommended. It is expected that the two outer culverts are quite shallow ~3.6 x 0.3m culverts.

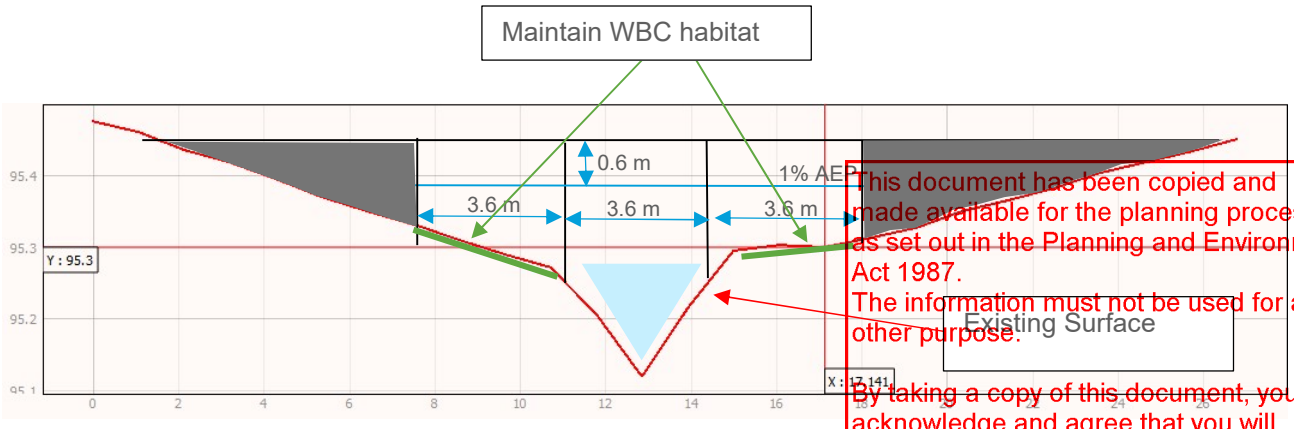


Figure 26. Example water corridor section for a constructed waterway

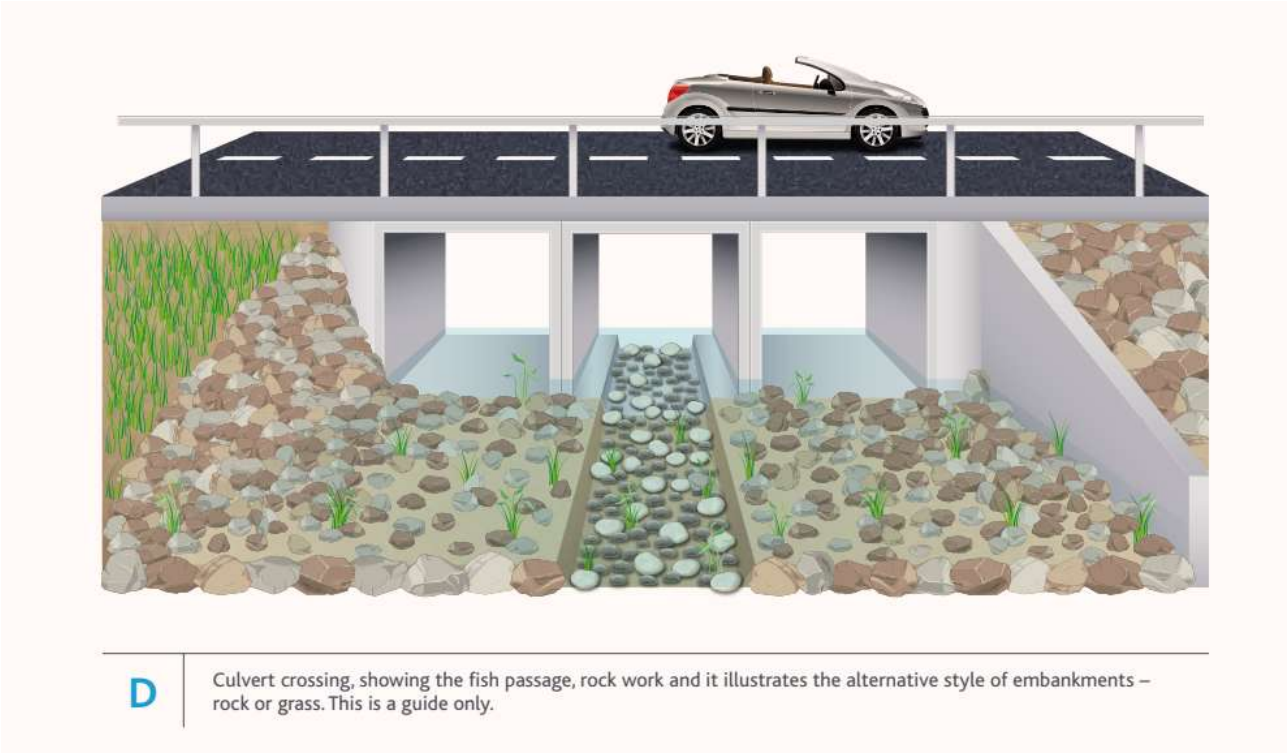


Figure 27. Melbourne Water Standard crossing

8. Design Concept

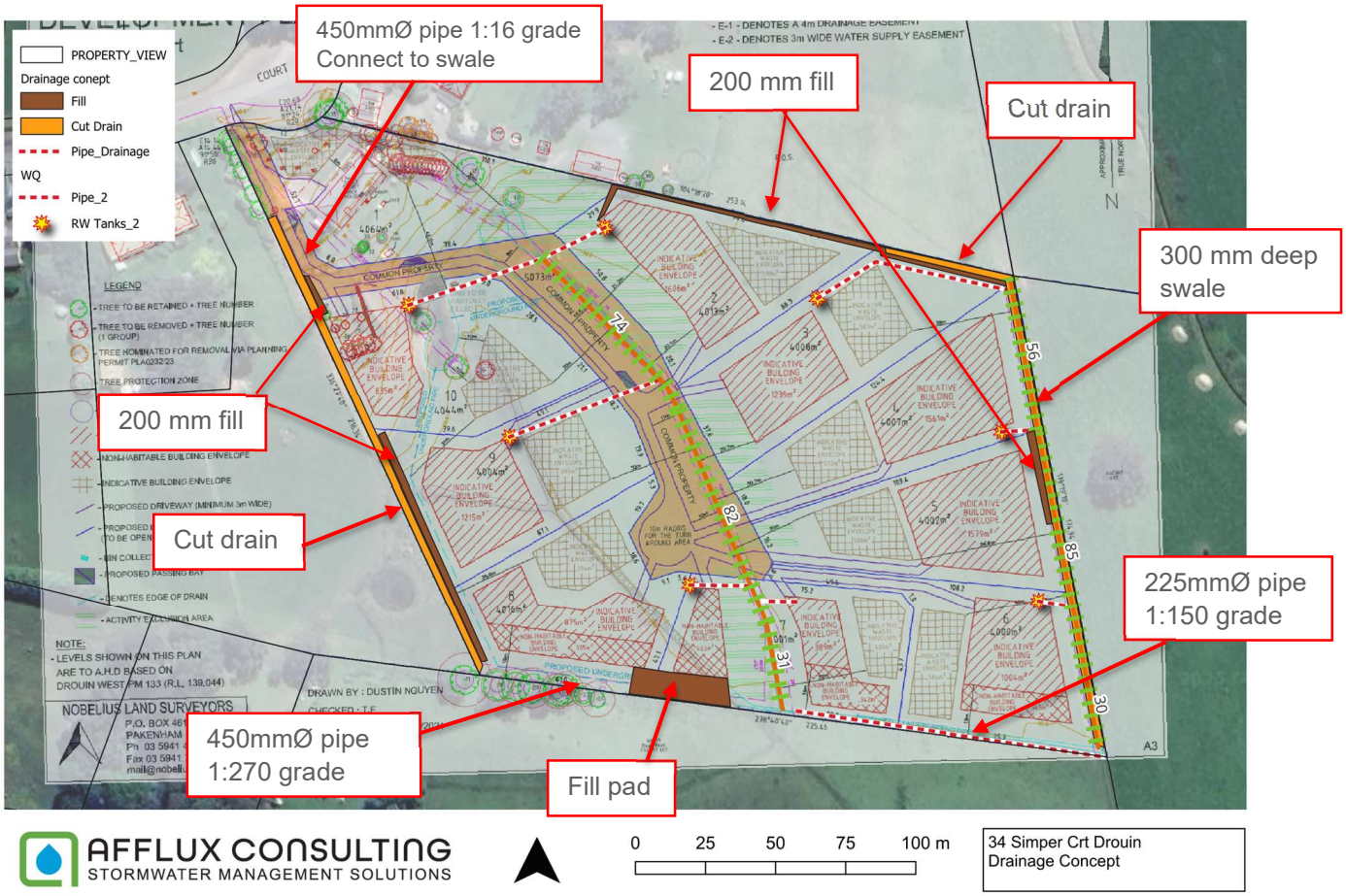


Figure 28. SWMP Concept design

9. Conclusions

This report presents a stormwater management plan for the proposed development at 34 Simper Court, Drouin within Baw Baw Shire Council.

To meet the requirements, the following measures are recommended:

- Installation of 10 kL rainwater tanks on specified buildings with toilet flushing reuse. Additional irrigation demand should be encouraged.
- Construction of vegetated swale at north eastern and south western connection points
- Installation pipe network to minimise interaction with waste disposal areas and tree zones along southern boundary
- Central swale corridor to maximise WBC habitat. Crossing points to span a minimum 10m with minimal disturbance of existing ground conditions
- Flood levels applied to the proposed building envelopes as recommended in this report
- Pipe connection to Simper Court to provide formal stormwater connection to central corridor

Appendix A - Request For Further Information (Baw Baw Council)

The applicant has received a Request for Further Information dated 31 January 2024.

The application information and the information requests relevant to the SWMP has been reproduced below.

Responses have been included under each item.

This SWMP has been updated in response to the RFI and has now been re-versioned as R03.

Application No.:	**PLA0245/24**
Proposal:	**Subdivision of the land into ten lots, remove an E3 drainage easement and replace it with a drainage easement**
Location:	**34 Simper Court DROUIN VIC 3818**
	V 9473 F 810 Lot 13 LP 136189 Drouin West Parish

SWMP - Afflux Report

1. Most of the figures in the report are too blurry. Please ensure that text is legible. The Fig can be provided on A3 sheets as appendices if required.

Images have been reproduced with improved resolution.

2. Provide electronic copies of MUSIC, TUFLOW and RORB models, complete with input and output data.

Provided.

3. The catchment area in Fig 4 requires amendment. The catchment should include the entire lots from # 2 to 32 Simper Court - not parts of the lots. Please update the modelling.

Figure 4 has been updated and now shows the catchment modelled within the hydraulic model.
Figure 7 shows the catchment modelled in the hydrology model.
Figure 9 shows how the rainfall excess from the hydrology catchment has been input into the hydraulic catchment.

4. We need to see the impact (if any) of the development on the property immediately downstream, i.e. 45 Dyall Road Drouin. Fig 17 doesn't seem to show "developed – existing conditions difference plot". Similarly, Fig 18 only provides info for the development site. Text in the figures is too blurry.
It's noted that a basin will be constructed downstream as part of Melbourne Water (MW)'s DSS. However, we need to confirm that drainage works be carried out so as not create nuisance on the property downstream.

An additional image has been provided (below) without the development plan (for improved clarity). The image has been zoomed to see the downstream properties. Please note that the blue represents areas of reduced flooding (i.e. a drop in water surface elevation from existing to developed).

Figure 16 has been reproduced in the report at a better resolution to better show developed – existing conditions difference plot.

Figure 17 – additional annotations have been added to the figures.

5. Advise if the proposed wetlands and RBs in Fig 6 have been accepted by MW. (built in next year – design plans already in review, MW requires d/s dev really early)

The concept is currently with Melbourne Water awaiting approval. A request for development staging plan was made early this year and has since been provided to Melbourne Water. As such, the Construction Staging Plan is now awaiting approval in order to facilitate the construction of the asset alongside early stages of development within the Altura Drouin estate.

The updated concept layout can be seen in the image below.

6. Advise if MW has accepted the hydraulic charge as indicated on Fig 7.

In response to the planning permit for subdivision, Melbourne Water provided a letter of conditions with the following note:

> *"The site is excluded from the King Parrot Creek Development Services Scheme (DSS) and therefore receives no service from the DSS, and requires no payment of DSS contributions."*

Source: Melbourne Water reference: MWA-1353843, communications dated 30 December 2024.

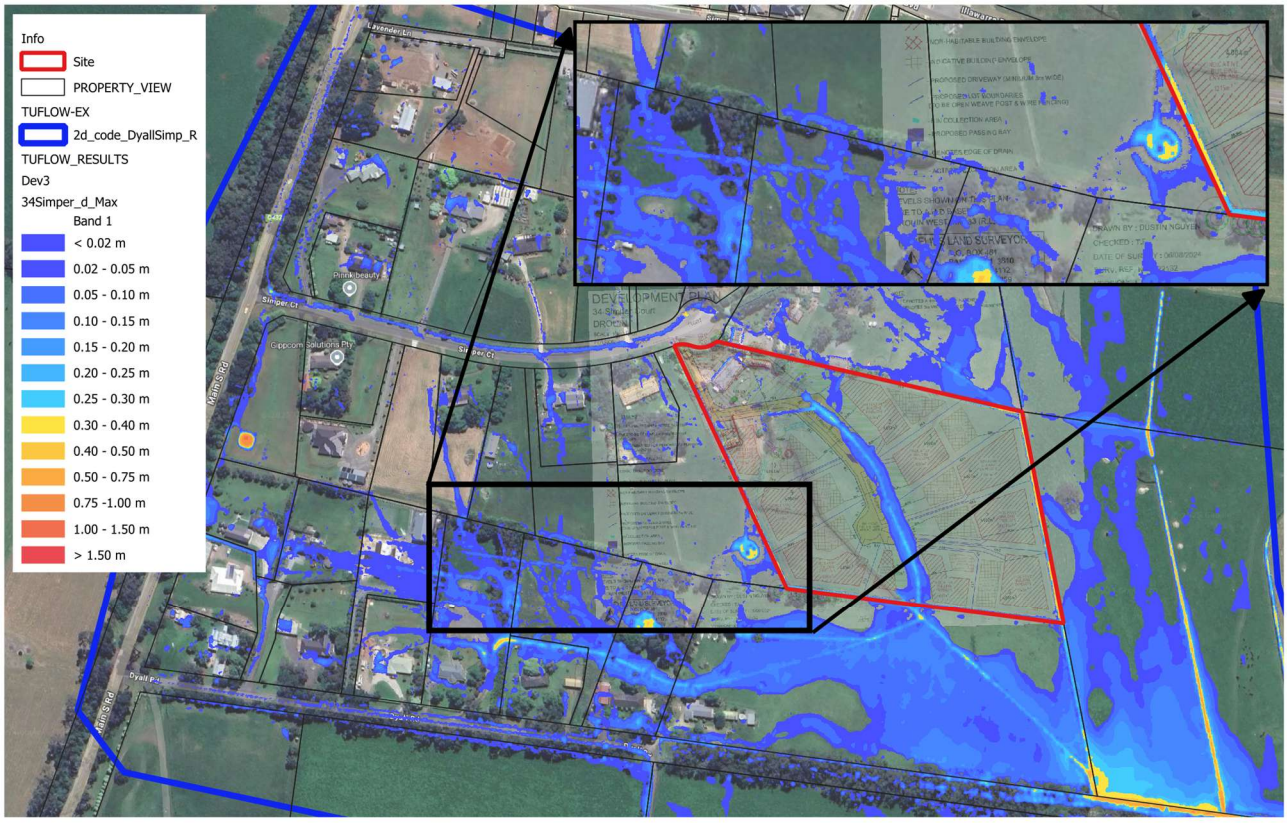
The letter has been attached in Appendix B.

7. There's a swale drain running from the west along the southern boundary of properties #2 to 32 Simper Court. The swale is to be connected to the proposed pipe along the southern boundary of the development. Please show this swale, the proposed pipe may have to be larger.

An additional flood map has been produced (below) based on the modelling. As shown, flows do not appear to drain all the way to the western corner of the site.

However, to provide council with an additional pipe sizing assessment, a Rational calculation was undertaken. Assuming that 5.6ha of developed catchment drained to the western portion of the site. The resultant flow estimates are provided in the table below.

The $Q_{5yr(ARI)}$ flow rate of 0.26m³/s was input into the Mannings Equation for pipe sizing. Noting that this is larger than the $Q_{100yr(ARI)}$=0.15m³/s estimate output from TUFLOW reaching the site (Figure 17 in report). Catering for the flow rate of 0.26m³/s results in a pipe diameter output of 518mm. The council may prefer the client to increase the pipe to 525mmØ. However, Afflux recommends a pipe upgrade to 450mmØ will be sufficient. This has been reflected in the Drainage Concept (Figure 28).

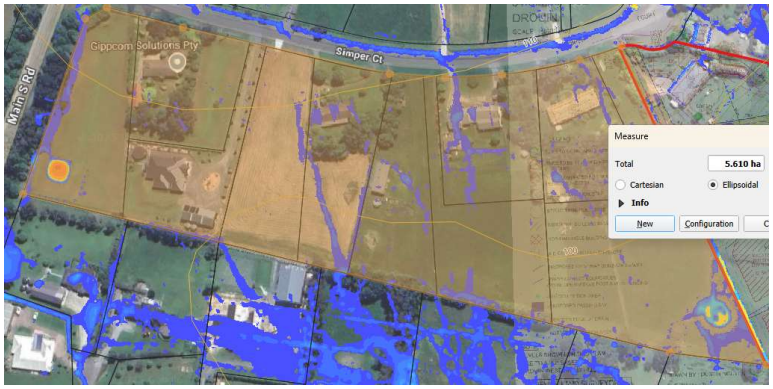


AFFLUX CONSULTING
STORMWATER MANAGEMENT SOLUTIONS

0 50 100 150 200 m

34 Simper Crt Drouin
Developed depth plot (m)

ARI (years)	Q (m^3/s)
1	0.14
2	0.17
5	0.26
10	0.33
20	0.40
50	0.52
100	0.62



Formula	$D = [4^{5/3}Qn / PI\ S^{1/2}]^{3/8}$		
Inputs	Q	0.26	m^3/s
	n	0.013	
	Grade	255	
Output	D	518	mm

Formula	$D = [4^{5/3}Qn / PI\ S^{1/2}]^{3/8}$		
Inputs	Q	0.15	m^3/s
	n	0.013	
	Grade	255	
Output	D	422	mm

8. Advise of the purpose of the 200mm fills and the fill pad shown on Fig 28.

The drainage concept creates orderly drainage for the development and surrounds.
Each building envelope was provided a suggested lot levels which is filled by taking a copy of this document, be incorporated with the 200mm fills.
The southernmost fill pad provides cover to the proposed pipe and fills the current cut drain.

9. Advise where drainage from each lot is direct to, i.e. their legal points of discharge.

This has been incorporated into section 7.2.1 Legal point of discharge.

10. There are many springs in the area. Please review that the FI, Roughness and Tc (both existing and post development) used in the modelling are appropriate.

Site hydrology has been sourced from the King Parrot Creek Melbourne Water scheme RORB model for both existing and developed conditions.

Refer to section **4.1.1 Fraction Imperviousness (FI)** *regarding use of FI's in alignment with MW scheme asset design and scheme model.*

The assumptions seem appropriate for this area. In addition, we have provided swales surrounding the site development, any springs would move towards the low points within the swales.

11. Section 2.3 discusses headworks contributions. We await MW's response.

Section 2.3 has been updated to reflect that there is no payment requirement for the site.

Appendix B - Melbourne Water Response

30 December 2024

Baw Baw Shire Council
Po Box 304
Warragul VIC 3820

Dear

Proposal: Planning permit for subdivision
Site location: Lot No 13, 34 SIMPER COURT DROUIN 3818

Melbourne Water reference:MWA-1353843
Council reference: PLA0245/24
Date Received: 03/12/2024

Plan number: LP136189

Our Decision

Melbourne Water, pursuant to Section 56 (1) of the Planning and Environment Act 1987, does not object to the proposal, subject to the conditions specified in this letter:

Conditions

1. Prior to the issue of consent to Statement of Compliance a free draining outfall to the satisfaction of Council and Melbourne Water is to be provided

1. Prior to the issue of consent to Statement of Compliance, council approved engineering plans (road and drainage) of the subdivision (in electronic format) are to be forwarded to Melbourne Water for our records. These plans must show road and drainage details and any overland flow paths for the 1% AEP storm event. The plans must also allow for on site retardation to the satisfaction of Council.

Note:

The site is excluded from the King Parrot Creek Development Services Scheme (DSS) and therefore receives no service from the DSS, and requires no payment of DSS contributions. The subdivision is therefore required to retard and treat on

Melbourne Water ABN 81 945 386 953
990 La Trobe Street Docklands VIC 3008
PO Box 4342 Melbourne VIC 3001 Australia
T 131 722 F +61 3 9679 7099
melbournewater.com.au

site to the satisfaction of Council.

Advice

To find out more information in regards to building in flood prone areas please visit our website for more information.

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

In accordance with Section 66 of the Planning and Environment Act 1987, please ensure an electronic copy of the decision and any endorsed plans (whenever available) are provided to Melbourne Water for our records.

Regards,

Melbourne Water ABN 81 945 386 953
990 La Trobe Street Docklands VIC 3008
PO Box 4342 Melbourne VIC 3001 Australia
T 131 722 F +61 3 9679 7099
melbournewater.com.au

10. References

Ball, J., Babister, M., Nathan, R., Weeks, W., Weinmann, E., Retallick, M., and Testoni, I. (Editors). (2019). Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia: Geoscience Australia.

Coombes, P. and Roso, S. (Editors). (2019). Runoff in Urban Areas, Book 9 in Australian Rainfall and Runoff - A Guide to Flood Estimation, Commonwealth of Australia: Geoscience Australia.

Local Government Infrastructure Design Association. (2019). Infrastructure design manual, Version 5.30. Golden Square: LGIDA.

Melbourne Water. (2007). Principles for Provision of Waterway and Drainage Services for Urban Growth, Melbourne Water

Melbourne Water. (2013). Waterway Corridors: Guidelines for greenfield development areas within the Port Phillip and Westernport Region, Melbourne Water

Melbourne Water. (2018). MUSIC Guidelines; Input parameters and modelling approaches for MUSIC users in Melbourne Water's service area. Melbourne Water.

The State of Victoria Department of Environment, Land, Water and Planning. (2019). Guidelines for Development in Flood-prone Areas, Department of Environment, Land, Water and Planning

Victoria Stormwater Committee. (1999). Urban Stormwater: Best Practice Environmental Management Guidelines, CSIRO.

For information on this report:

Afflux Consulting Pty Ltd
PO Box 457 Emerald VIC 3782

03 9036 2530

info@afflux.com.au

afflux.com.au

Aj arboriculture

Arboricultural Appraisal

34 Simper Court, Drouin

August 2024

PO Box 547 Leongatha VIC 3953 | 0407 625 121 |

Client: Nobelius Land Surveyors

Appraisal Prepared by: I

1. Summary

The subject site has a number of wind breaks, orchard and ornamental plantings surround the existing dwelling. There are very few internal or boundary plantings. The remainder of the site is pasture.

2. Objectives

In this appraisal, the following objectives have been identified.

2.1. Inspect the tree(s) located within and adjacent to the subject site as requested by the client and determined by the assessor during the site inspection. A tree is defined in this appraisal as a perennial plant that is greater than 3 metres in height. Perennial plants smaller than 3 metres in height are shrubs or small and/or young trees that may be included in this appraisal contingent on landscape contribution.

2.2. Collect and report details concerning the identified tree(s) in accordance with the Australian Standard AS 4970 - 2009 'Protection of trees on development sites', subsequent amendments, applicable local laws, statutory requirements and other relevant documents.

2.3. Provide an unbiased arboricultural perspective within the aforementioned frameworks that clearly informs the client and associated stakeholders of the tree populations merit with due consideration for local laws and statutory planning.

3. Method

The following methods were employed to inform the contents of this appraisal.

3.1. The site inspection was undertaken on Tuesday, 6 August 2024.

3.2. Individual Trees and Hedge Rows identified in this appraisal have been located and numbered in Appendix 1 - 'Site Plan'. Definitions for the data catalogued in Appendix 2 - 'Site Data' are contained in Appendix 3 - 'Tree Feature Descriptions'. Observations including relevant photographs have been incorporated in the appraisal where appropriate. All trees were visually assessed from the ground. Where access to a tree was limited, dimensional characteristics were estimated and some observational features may have been overlooked.

3.3. Tree Protection Zones (TPZ) including variations, Structural Root Zones (SRZ) and tree protection measures identified in this appraisal have been determined in accordance with AS4970 and current industry best practice. Please refer to Section 6.4 for a concise description of TPZ and SRZ calculations.

4. Documents and Literature

The following documents were reviewed in the preparation of this appraisal.

4.1. Planning Property Report from https://mapshare.vic.gov.au/vicplan/ accessed on the Saturday, 24 August 2024 for 36 Simper Court, Drouin.

4.2. 52.17 Native Vegetation and the associated Schedule from the Baw Baw Planning Scheme.

4.3. Victorian Biodiversity Atlas observations from https://maps2.biodiversity.vic.gov.au accessed on the Saturday, 24 August 2024 with 34 Simper Court, Drouin centred at 1:25,000.

4.4. Bioregion Benchmarks for Vegetation Quality Assessment Gippsland Plains bioregion including Ecological Vegetation Classes (EVC) 16 and from the Strzelecki Ranges bioregion EVC 29 and 83 as published by the Victorian Department of Energy, Environment and Climate Action (DEECA).

4.5. Survey Ref. 22132 Feature and Level Plan for 34 Simper Court, Drouin prepared by Nobelius Land Surveyors and dated 6 August 2024.

4.6. Common Weeds of Gippsland published by Baw Baw Shire Council and is undated.

5. Observations

The ensuing observations were made during the site inspection and have been included to summarise data, inform discussion, opinions and recommendations contained in this appraisal.

5.1. Forty (40) Individual Trees and eight (8) Hedge Rows as defined in this appraisal were identified during the site inspection. Six (6) trees and one (1) hedge were located in the adjoining property to the north east identified as 36 Simper Court, eight (8) trees were located in the adjoining property to the south identified as 45 Dyall Road and one (1) hedge was located in the adjoining property to the south west identified as 30 Simper Court. The remaining twenty-six (26) trees and six (6) hedges were located within the subject site.

5.2. The area of the subject site is approximately 4.5 hectares and is subject to the provisions of the Native Vegetation ordinance listed in Section 4.2.

5.3. Thirteen (13) trees were identified as Victorian natives.

Nine (9) of those trees including Site ID. #13, #14, #15, #18, #20, #23, #34, #36 and #37 appear to have been planted and are not represented in the relevant EVC listed in Section 4.4. Refer to Appendix 2 - Site Data with Images for details concerning these trees and Appendix 1 - Site Plan for site location.

Four (4) trees including #21 and #22 both identified as Blackwoods (*Acacia melanoxylon*), #12 a Southern Blue Gum (*Eucalyptus globulus*) and #24 identified as dead native vegetation with a trunk diameter of 40 centimetres or more are identified in the relevant EVC listed in Section 4.4 and are protected under the Native Vegetation ordinance.

5.4. Eighteen (18) trees and four (4) hedges received Moderate Retention Values as defined in this appraisal. The remaining twenty-two (22) trees and four (4) hedges received Low Retention Values.

5.5. Additional shrubs and small and/or young trees were noted during the site assessment but have not been included in this appraisal as they do not provide any particular landscape significance or make a contribution to local amenity. Trees in adjoining properties where drip lines did not extend into the subject site were also observed during the site assessment but have not been included in this appraisal as they will not be affected by any proposed development within the subject site.

6. Discussion

6.1. In this appraisal and as required under AS4970; the relative environmental, social and economic virtues of a tree are expressed in its ***Retention Value***. The benefits of tree retention within an evolving urban landscape are significant and quantifiable.

Social Benefits - tree stature and longevity provide a sense of 'place' and a direct link with a sites past. They are living structures that instill serenity, soften vistas and provide cover from the harsh planes of surrounding concrete, glass, brick and asphalt.

Environmental Benefits - Trees contribute to privacy, emphasise views, reduce glare, moderate climate, improve air quality, conserve water and harbour wildlife.

Economic Benefits - Trees provide direct economic benefit through increased property values and reduced energy costs.

Trees that receive a ***High*** or ***Moderate*** value express one or more of these qualities and can with adequate design consideration and protection during construction, continue to contribute as landscape elements. Trees that receive a ***Low*** value add little to the site; may not respond well to changes in their environment, become hazardous or create an amenity nuisance in a transforming landscape. These trees should be excluded from retention considerations.

6.2. In Victoria, tree protection is afforded through local planning laws, policy and other legal instruments. Protection provisions relevant to the subject site are listed in Section 3 of this appraisal. Vegetation located within the subject site and on adjoining land that may be impacted by proposed development and are subject to protection provisions must be managed in accordance with AS4970 and local policy where it exists. In this appraisal, these trees are designated as ***Protected Trees***.

Trees on adjoining property that are exempt from protection provisions and could potentially be impacted by proposed development should be managed in accordance with AS4970. Local government does not enforce the common law tort of negligence where an act or omission leads to damage, loss or injury to a tree. However, failure to apply appropriate protection measures to a tree on adjoining land could result in project delays, unnecessary disputes, undermine good neighbourly relationships or gives rise to needless legal action.

52.17 Native Vegetation applies to all living and dead Victorian native tree and plant species on contiguous land under single ownership equal to or greater than 4,000 square metres (≈1 acre) where there is no Native Vegetation Precinct Plan (52.16).

The purpose of this provision is to ensure no net loss in biodiversity and to minimise land and water degradation as a result of the removal, destruction or lopping of native vegetation.

These objectives are achieved through a three step process detailed in Guidelines for the removal, destruction or lopping of native vegetation (Department of Environment, Land, Water and Planning, 2017) that aims to avoid loss, minimise impact or provide an offset to compensate for outcomes where loss or impact cannot be circumvented.

There are various exemptions to the provisions of this ordinance including planted vegetation where the native vegetation that is to be removed, destroyed or lopped was either planted or grown as a result of direct seeding.

6.3. Acknowledging the value of trees and adopting a balanced perspective between a trees ***Retention Value*** and ***Protected Tree*** status is an important design consideration in ensuring a successful outcome.

There are just as many reasons to remove a tree as there are to retain the very same. What an existing tree will bring to a renewing landscape is at the discretion of the imagination but at the very least, should be a representative symbol of a living and dynamic location where people, structures and trees can coexist in harmony.

6.4. The TPZ as defined under the AS4970 is an area (nominally cylindrical) above and below ground, at a given distance from the trunk center, set aside for the viability of a tree where it is potentially subject to damage by change. The SRZ is the area within the root plate where roots and soil cohesion are necessary to maintain tree stability.

Defining the area and extent of the TPZ and SRZ is determined by the diameter of the trunk, the projection of the crown and the presence of obstacles to root and crown growth. Please refer to Diagram 1 for detail.

The calculated radial distances contained in Appendix 2 - Site Data are designed to provide architects and planners with guidance to the extent of the obscured root plate. Modified zones determined by the arborist are diagrammatically represented in Appendix 1 - Site Plan.

An encroachment of up to 10% into the area on one side of a TPZ is generally tolerated. However; incursions greater than 10%, on multiple sides of the TPZ or into the SRZ are considered unacceptable and is only permissible if it can be demonstrated that after such an incursion the tree will remain a viable landscape element.

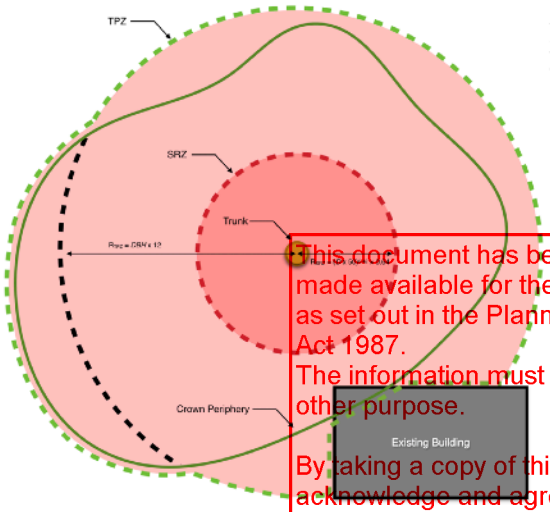


Diagram 1 - Nominal extent of the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) for a tree with an asymmetrical crown.

- R_{TPZ} is the calculated radius of the TPZ measured from the trunk center and usually expressed in metres. *DBH* is the diameter of the trunk measured 1.4 metres above ground level. The TPZ can be modified to consider obstacles affecting growth, root plate and crown asymmetry.
- R_{SRZ} is the calculated radius of the SRZ measured from the trunk center and usually expressed in metres. *DBH* is the diameter of the trunk measured immediately above the root buttress. The SRZ can be modified to consider obstacles affecting growth, root plate and crown asymmetry.
- TPZ and SRZ calculations do not apply to palms, ferns and cycads.

Extracted from Australian Standard AS4970 - 2009 'Protection of trees on development sites'

7. Opinions and Recommendations

The following opinions and recommendations have been made within the context of the existing proposal without modification.

The property title for the subject site was not inspected and it is unknown if there are any specific tree protection controls under existing planning permits or Section 173 Agreements for the subject site.

7.1. Three (3) of the four (4) trees that are subject to the native vegetation ordinance are located in the adjoining property to the south and should not be impacted by any proposed development within the site.

7.2. Tree #12 is the only tree within the site that is subject to the native vegetation ordinance however; the size of the tree and its proximity to the existing dwelling (making it unlikely it is natural regeneration) would suggest it is planted vegetation and may be exempt.

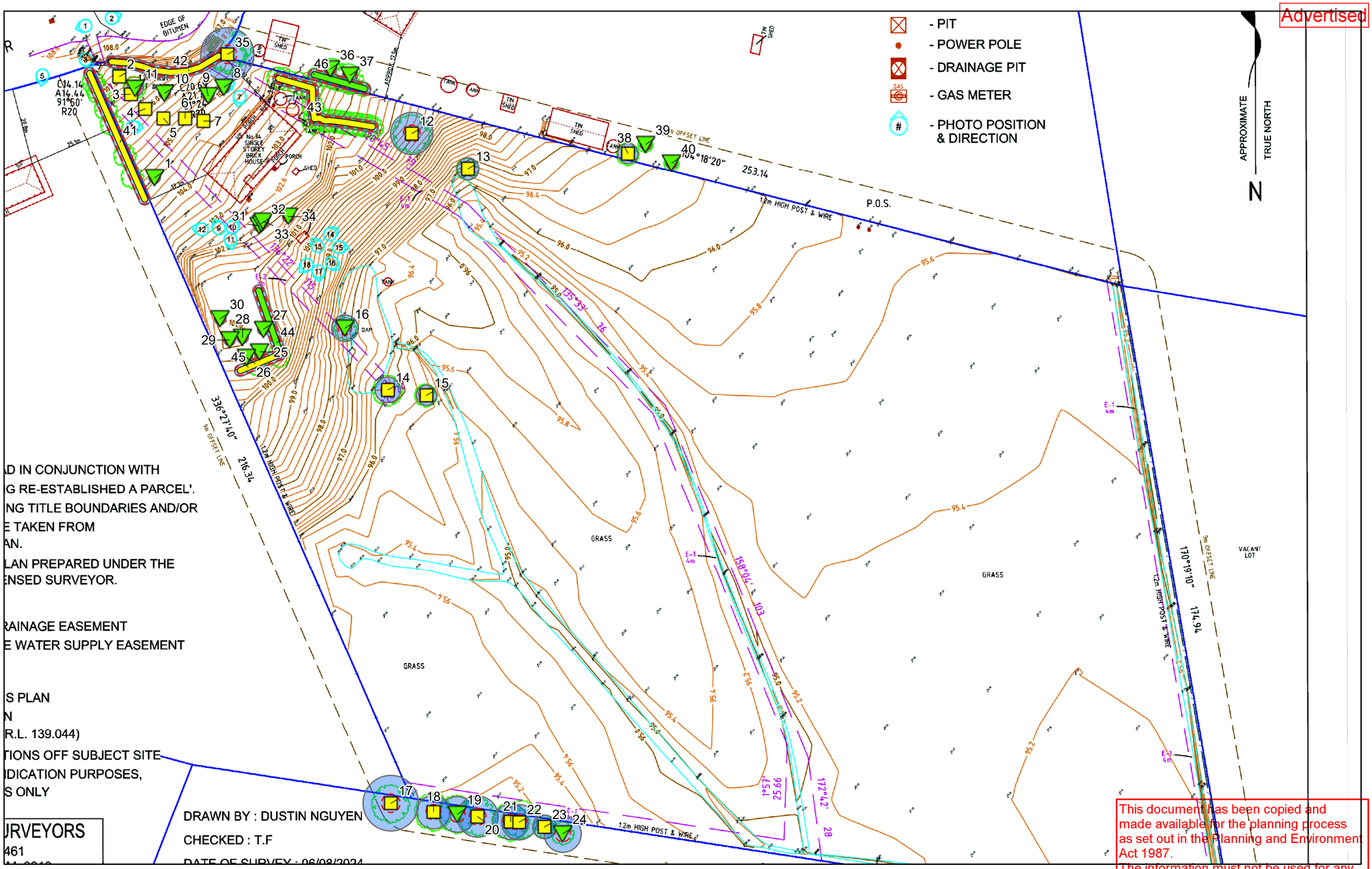
This tree received a Moderate Retention Value and like any Moderate or High Retention Value tree, could be maintained in an evolving landscape as a long-term viable landscape element should development design accomodate.

7.3. No other tree identified in this appraisal is considered a Protected Tree as discussed in Section 6.2.

Attachments

- Appendix 1 - Site Plan
- Appendix 2 - Site Data
- Appendix 3 - Tree Feature Descriptions

34 Simper Court, Drouin



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URVEYORS
461

Legend

Individual Tree (AS4970)

Retention Value
- High (0)
- Moderate (18)
- Low (22)

Hedge Row (AS4970)

Retention Value
- High (0)
- Moderate (4)
- Low (2)

TPZ
SRZ

Aja

Scale: 1:1,000 Date: 23/08/2024

0 10 20 40 60 80 100 120 Meters

Aja Arboriculture | 0407-625-121 | aja.arbor@gmail.com
PO Box 547 Leongatha VIC 3953 | ABN 23 451 725 400

Coordinate System: GDA 1994 VICGRID94. Trees represented as points, polylines or polygons not identified in the underlying feature survey have been plotted by Aja Arboriculture using a GNSS receiver with NTrip correction, available field references and/or aerial imagery. Location accuracy and dimensional characteristics associated with points, polylines and polygons can be assumed to not exceed one (1) metre from true position. Layers and attributes listed in the Legend are georeferenced in this plan and can be accessed in CAD using the PDFIMPORT command.

Site #:	1
Species & Common Name:	***Citrus X sinensis (Sweet Orange)***
Origin:	Exotic
Height (m):	2
Width (m):	2
DBH Field Measurements (cm):	11
AS4970 DBH Calculation (cm):	11
Basal Diameter (cm):	13
Life Stage:	Semi-mature
Vigour:	Poor
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Medium**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Marginal
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments: Infested with sooty mold.

Site #:	2
Species & Common Name:	***Thuja occidentalis (Arborvitae)***
Origin:	Exotic
Height (m):	3
Width (m):	1
DBH Field Measurements (cm):	4,4,6
AS4970 DBH Calculation (cm):	8
Basal Diameter (cm):	13
Life Stage:	Semi-mature
Vigour:	Excellent
Structure:	Acceptable
Growth Space:	Minor Limitation
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	3
Species & Common Name:	***Thuja occidentalis (Arborvitae)***
Origin:	Exotic
Height (m):	3
Width (m):	1
DBH Field Measurements (cm):	4,4,6
AS4970 DBH Calculation (cm):	8
Basal Diameter (cm):	13
Life Stage:	Semi-mature
Vigour:	Excellent
Structure:	Acceptable
Growth Space:	Minor Limitation
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	4
Species & Common Name:	***Thuja occidentalis (Arborvitae)***
Origin:	Exotic
Height (m):	3
Width (m):	1
DBH Field Measurements (cm):	4,4,6
AS4970 DBH Calculation (cm):	8
Basal Diameter (cm):	13
Life Stage:	Semi-mature
Vigour:	Excellent
Structure:	Acceptable
Growth Space:	Minor Limitation
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	5
Species & Common Name:	***Thuja occidentalis (Arborvitae)***
Origin:	Exotic
Height (m):	3
Width (m):	1
DBH Field Measurements (cm):	4,4,6
AS4970 DBH Calculation (cm):	8
Basal Diameter (cm):	13
Life Stage:	Semi-mature
Vigour:	Excellent
Structure:	Acceptable
Growth Space:	Minor Limitation
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	6
Species & Common Name:	***Thuja occidentalis (Arborvitae)***
Origin:	Exotic
Height (m):	3
Width (m):	1
DBH Field Measurements (cm):	4,4,6
AS4970 DBH Calculation (cm):	8
Basal Diameter (cm):	13
Life Stage:	Semi-mature
Vigour:	Excellent
Structure:	Acceptable
Growth Space:	Minor Limitation
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	7
Species & Common Name:	***Thuja occidentalis (Arborvitae)***
Origin:	Exotic
Height (m):	3
Width (m):	1
DBH Field Measurements (cm):	4,4,6
AS4970 DBH Calculation (cm):	8
Basal Diameter (cm):	13
Life Stage:	Semi-mature
Vigour:	Excellent
Structure:	Acceptable
Growth Space:	Minor Limitation
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	8
Species & Common Name:	***Acer palmatum (Japanese Maple)***
Origin:	Exotic
Height (m):	1
Width (m):	1
DBH Field Measurements (cm):	3,3
AS4970 DBH Calculation (cm):	4
Basal Diameter (cm):	5
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Marginal
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	9
Species & Common Name:	***Lagerstroemia indica (Crape Myrtle)***
Origin:	Exotic
Height (m):	1
Width (m):	2
DBH Field Measurements (cm):	7
AS4970 DBH Calculation (cm):	7
Basal Diameter (cm):	9
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Marginal
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments: Manipulated crown.

Site #:	10
Species & Common Name:	***Acer palmatum (Japanese Maple)***
Origin:	Exotic
Height (m):	1
Width (m):	1
DBH Field Measurements (cm):	5
AS4970 DBH Calculation (cm):	5
Basal Diameter (cm):	9
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Marginal
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	11
Species & Common Name:	***Cupressus macrocarpa 'Saligna Aurea' (Weeping Golden***
Origin:	Exotic
Height (m):	2
Width (m):	6
DBH Field Measurements (cm):	23
AS4970 DBH Calculation (cm):	23
Basal Diameter (cm):	27
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Minor Correction
Growth Space:	Minor Limitation
Landscape Viability:	**Medium**
AS4970 TPZ Calculation (m):	2.8
AS4970 SRZ Calculation (m):	1.9
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Marginal
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments: Manipulated crown.

Site #:	12
Species & Common Name:	***Eucalyptus globulus (Southern Blue Gum)***
Origin:	Victorian Native
Height (m):	13
Width (m):	7
DBH Field Measurements (cm):	61
AS4970 DBH Calculation (cm):	61
Basal Diameter (cm):	73
Life Stage:	Semi-mature
Vigour:	Excellent
Structure:	Minor Correction
Growth Space:	Optimal
Landscape Viability:	**Medium**
AS4970 TPZ Calculation (m):	7.3
AS4970 SRZ Calculation (m):	2.9
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	13
Species & Common Name:	***Eucalyptus camaldulensis (River Red Gum)***
Origin:	Victorian Native
Height (m):	14
Width (m):	7
DBH Field Measurements (cm):	32
AS4970 DBH Calculation (cm):	32
Basal Diameter (cm):	38
Life Stage:	Semi-mature
Vigour:	Fair
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Medium**
AS4970 TPZ Calculation (m):	3.8
AS4970 SRZ Calculation (m):	2.2
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments: Planted vegetation

Site #:	14
Species & Common Name:	***Eucalyptus camaldulensis (River Red Gum)***
Origin:	Victorian Native
Height (m):	11
Width (m):	7
DBH Field Measurements (cm):	37
AS4970 DBH Calculation (cm):	37
Basal Diameter (cm):	41
Life Stage:	Semi-mature
Vigour:	Fair
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Medium**
AS4970 TPZ Calculation (m):	4.4
AS4970 SRZ Calculation (m):	2.3
Retention Value:	**Moderate**

Land Use and Social Contribution

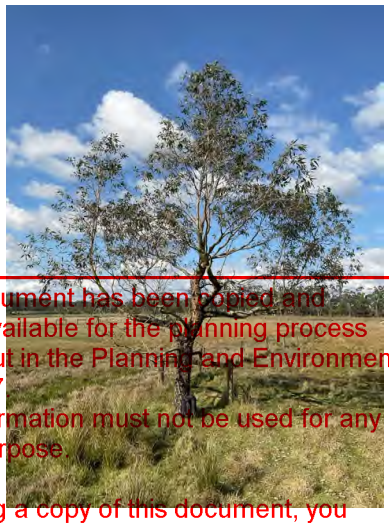
Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments: Planted vegetation

Site #:	15
Species & Common Name:	***Eucalyptus camaldulensis (River Red Gum)***
Origin:	Victorian Native
Height (m):	8
Width (m):	7
DBH Field Measurements (cm):	29
AS4970 DBH Calculation (cm):	29
Basal Diameter (cm):	33
Life Stage:	Semi-mature
Vigour:	Fair
Structure:	Minor Correction
Growth Space:	Optimal
Landscape Viability:	**Medium**
AS4970 TPZ Calculation (m):	3.5
AS4970 SRZ Calculation (m):	2.1
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen



Comments: Planted vegetation

Site #:	16
Species & Common Name:	***Fraxinus excelsior (European Ash)***
Origin:	Exotic
Height (m):	5
Width (m):	5
DBH Field Measurements (cm):	21,18,19,17
AS4970 DBH Calculation (cm):	38
Basal Diameter (cm):	41
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Major Correction
Growth Space:	Optimal
Landscape Viability:	**Short**
AS4970 TPZ Calculation (m):	4.6
AS4970 SRZ Calculation (m):	2.3
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Marginal
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments: Tree has been topped.

Site #:	17
Species & Common Name:	***Eucalyptus nicholii (Narrow-leaved Peppermint)***
Origin:	Australian Native
Height (m):	15
Width (m):	13
DBH Field Measurements (cm):	80
AS4970 DBH Calculation (cm):	80
Basal Diameter (cm):	90
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Minor Correction
Growth Space:	Optimal
Landscape Viability:	**Medium**
AS4970 TPZ Calculation (m):	9.6
AS4970 SRZ Calculation (m):	3.2
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments: Mistletoe present in crown. Planted vegetation.

Site #:	18
Species & Common Name:	***Eucalyptus leucoxylon (Yellow Gum)***
Origin:	Victorian Native
Height (m):	15
Width (m):	14
DBH Field Measurements (cm):	48
AS4970 DBH Calculation (cm):	48
Basal Diameter (cm):	55
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Minor Correction
Growth Space:	Optimal
Landscape Viability:	**Medium**
AS4970 TPZ Calculation (m):	5.8
AS4970 SRZ Calculation (m):	2.6
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments: Planted vegetation

Site #:	19
Species & Common Name:	***Eucalyptus nicholii (Narrow-leaved Peppermint)***
Origin:	Australian Native
Height (m):	15
Width (m):	7
DBH Field Measurements (cm):	52
AS4970 DBH Calculation (cm):	52
Basal Diameter (cm):	59
Life Stage:	Semi-mature
Vigour:	Poor
Structure:	Major Correction
Growth Space:	Major Limitation
Landscape Viability:	**Remove**
AS4970 TPZ Calculation (m):	6.2
AS4970 SRZ Calculation (m):	2.7
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments: Planted vegetation.

Site #:	20
Species & Common Name:	***Eucalyptus leucoxylon (Yellow Gum)***
Origin:	Victorian Native
Height (m):	15
Width (m):	10
DBH Field Measurements (cm):	43,40
AS4970 DBH Calculation (cm):	59
Basal Diameter (cm):	75
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Minor Correction
Growth Space:	Optimal
Landscape Viability:	**Medium**
AS4970 TPZ Calculation (m):	7.1
AS4970 SRZ Calculation (m):	2.9
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments: Planted vegetation

Site #:	21
Species & Common Name:	***Acacia melanoxylon (Blackwood)***
Origin:	Victorian Native
Height (m):	15
Width (m):	12
DBH Field Measurements (cm):	51
AS4970 DBH Calculation (cm):	51
Basal Diameter (cm):	58
Life Stage:	Semi-mature
Vigour:	Fair
Structure:	Minor Correction
Growth Space:	Minor Limitation
Landscape Viability:	**Short**
AS4970 TPZ Calculation (m):	6.1
AS4970 SRZ Calculation (m):	2.6
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Indigenous

Comments:

Site #:	22
Species & Common Name:	***Acacia melanoxylon (Blackwood)***
Origin:	Victorian Native
Height (m):	15
Width (m):	12
DBH Field Measurements (cm):	51
AS4970 DBH Calculation (cm):	51
Basal Diameter (cm):	58
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Minor Correction
Growth Space:	Minor Limitation
Landscape Viability:	**Medium**
AS4970 TPZ Calculation (m):	6.1
AS4970 SRZ Calculation (m):	2.6
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Indigenous

Comments:

Site #:	23
Species & Common Name:	***Eucalyptus leucoxylon (Yellow Gum)***
Origin:	Victorian Native
Height (m):	9
Width (m):	9
DBH Field Measurements (cm):	34
AS4970 DBH Calculation (cm):	34
Basal Diameter (cm):	39
Life Stage:	Semi-mature
Vigour:	Fair
Structure:	Minor Correction
Growth Space:	Optimal
Landscape Viability:	**Medium**
AS4970 TPZ Calculation (m):	4.1
AS4970 SRZ Calculation (m):	2.2
Retention Value:	**Moderate**

Land Use and Social Contribution

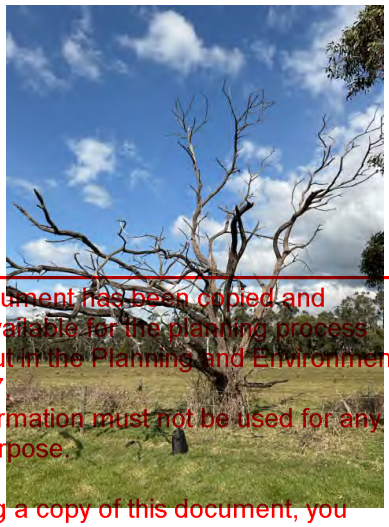
Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments: Mistletoe present in crown. Planted vegetation.

Site #:	24
Species & Common Name:	***Eucalyptus sp. (Gum Tree)***
Origin:	Australian Native
Height (m):	10
Width (m):	15
DBH Field Measurements (cm):	53
AS4970 DBH Calculation (cm):	53
Basal Diameter (cm):	61
Life Stage:	Semi-mature
Vigour:	Dead
Structure:	Major Correction
Growth Space:	Optimal
Landscape Viability:	**Remove**
AS4970 TPZ Calculation (m):	6.4
AS4970 SRZ Calculation (m):	2.7
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Minimal
Landscape Significance
None
Ecosystem Contribution
Specimen



Comments:

Site #:	25
Species & Common Name:	***Citrus japonica (Kumquat)***
Origin:	Exotic
Height (m):	4
Width (m):	4
DBH Field Measurements (cm):	14
AS4970 DBH Calculation (cm):	14
Basal Diameter (cm):	16
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	26
Species & Common Name:	***Citrus X limon (Lemon)***
Origin:	Exotic
Height (m):	3
Width (m):	4
DBH Field Measurements (cm):	10
AS4970 DBH Calculation (cm):	10
Basal Diameter (cm):	12
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	27
Species & Common Name:	***Citrus X sinensis (Sweet Orange)***
Origin:	Exotic
Height (m):	2
Width (m):	3
DBH Field Measurements (cm):	10
AS4970 DBH Calculation (cm):	10
Basal Diameter (cm):	12
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	28
Species & Common Name:	***Malus domestica (Common Apple)***
Origin:	Exotic
Height (m):	2
Width (m):	3
DBH Field Measurements (cm):	12
AS4970 DBH Calculation (cm):	12
Basal Diameter (cm):	14
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	29
Species & Common Name:	***Malus domestica (Common Apple)***
Origin:	Exotic
Height (m):	2
Width (m):	3
DBH Field Measurements (cm):	12
AS4970 DBH Calculation (cm):	12
Basal Diameter (cm):	14
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	30
Species & Common Name:	***Juglans regia (Common Walnut)***
Origin:	Exotic
Height (m):	2
Width (m):	3
DBH Field Measurements (cm):	11
AS4970 DBH Calculation (cm):	11
Basal Diameter (cm):	13
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	31
Species & Common Name:	***Citrus japonica (Kumquat)***
Origin:	Exotic
Height (m):	2
Width (m):	3
DBH Field Measurements (cm):	11
AS4970 DBH Calculation (cm):	11
Basal Diameter (cm):	13
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	32
Species & Common Name:	***Citrus X sinensis (Sweet Orange)***
Origin:	Exotic
Height (m):	2
Width (m):	4
DBH Field Measurements (cm):	15
AS4970 DBH Calculation (cm):	15
Basal Diameter (cm):	19
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.6
Retention Value:	**Low**

Land Use and Social Contribution

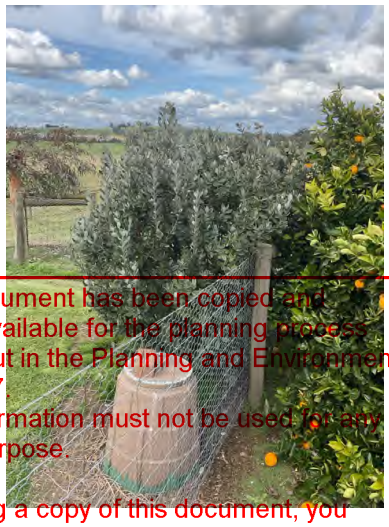
Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	33
Species & Common Name:	***Acca sellowiana (Feijoa)***
Origin:	Exotic
Height (m):	2
Width (m):	3
DBH Field Measurements (cm):	10
AS4970 DBH Calculation (cm):	10
Basal Diameter (cm):	12
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen



Comments:

Site #:	34
Species & Common Name:	***Corymbia maculata (Spotted Gum)***
Origin:	Victorian Native
Height (m):	2
Width (m):	2
DBH Field Measurements (cm):	14
AS4970 DBH Calculation (cm):	14
Basal Diameter (cm):	17
Life Stage:	Semi-mature
Vigour:	Poor
Structure:	Major Correction
Growth Space:	Optimal
Landscape Viability:	**Short**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.6
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Minimal
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments: Tree has been topped.

Site #:	35
Species & Common Name:	***Cupressus lusitanica (Mexican Cypress)***
Origin:	Exotic
Height (m):	17
Width (m):	11
DBH Field Measurements (cm):	77
AS4970 DBH Calculation (cm):	77
Basal Diameter (cm):	89
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	9.2
AS4970 SRZ Calculation (m):	3.2
Retention Value:	**Moderate**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	36
Species & Common Name:	***Acacia cognata (Narrow-leaf Bower Wattle)***
Origin:	Victorian Native
Height (m):	5
Width (m):	7
DBH Field Measurements (cm):	16,9
AS4970 DBH Calculation (cm):	18
Basal Diameter (cm):	21
Life Stage:	Mature
Vigour:	Good
Structure:	Major Correction
Growth Space:	Minor Limitation
Landscape Viability:	**Short**
AS4970 TPZ Calculation (m):	2.2
AS4970 SRZ Calculation (m):	1.7
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	37
Species & Common Name:	***Acacia cognata (Narrow-leaf Bower Wattle)***
Origin:	Victorian Native
Height (m):	5
Width (m):	7
DBH Field Measurements (cm):	13,10,11,10
AS4970 DBH Calculation (cm):	22
Basal Diameter (cm):	32
Life Stage:	Mature
Vigour:	Fair
Structure:	Major Correction
Growth Space:	Minor Limitation
Landscape Viability:	**Short**
AS4970 TPZ Calculation (m):	2.6
AS4970 SRZ Calculation (m):	2.1
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	38
Species & Common Name:	***Prunus avium (Sweet Cherry)***
Origin:	Exotic
Height (m):	5
Width (m):	9
DBH Field Measurements (cm):	10,9,8,18,16
AS4970 DBH Calculation (cm):	29
Basal Diameter (cm):	32
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	3.5
AS4970 SRZ Calculation (m):	2.1
Retention Value:	**Moderate**

Land Use and Social Contribution

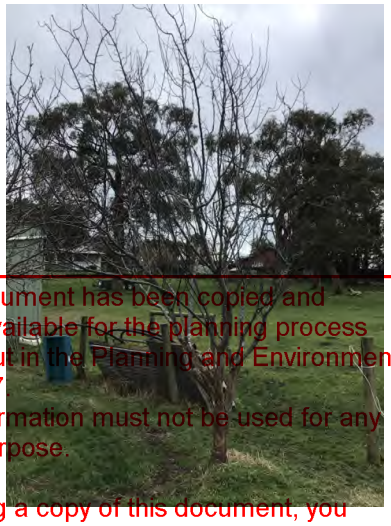
Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Comments:

Site #:	39
Species & Common Name:	***Prunus avium (Sweet Cherry)***
Origin:	Exotic
Height (m):	4
Width (m):	3
DBH Field Measurements (cm):	8,9,9,5
AS4970 DBH Calculation (cm):	16
Basal Diameter (cm):	15
Life Stage:	Semi-mature
Vigour:	Poor
Structure:	Major Correction
Growth Space:	Optimal
Landscape Viability:	**Short**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen



Comments:

Site #:	40
Species & Common Name:	***Prunus avium (Sweet Cherry)***
Origin:	Exotic
Height (m):	3
Width (m):	3
DBH Field Measurements (cm):	3,3,3,4,3,3
AS4970 DBH Calculation (cm):	8
Basal Diameter (cm):	12
Life Stage:	Semi-mature
Vigour:	Dying
Structure:	Major Correction
Growth Space:	Optimal
Landscape Viability:	**Remove**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**

Land Use and Social Contribution

Land Use (Victoria)
Low Density

Landscape Function
Adequate

Landscape Significance
None

Ecosystem Contribution
Specimen

Comments:

Site #:	41
Primary Species:	***Pittosporum eugenioides 'Variegatum' (Variegated Tarata)***
Secondary Species:	***Pittosporum tenuifolium (Kohuhu)***
Other Species:	
Average Height (m):	4
Average Width (m):	3
Average DBH Measurements (cm):	15
AS4970 DBH Calculation (cm):	15
Average Basal Diameter (cm):	20
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.7
Retention Value:	**Moderate**
Comments:	Located on adjacent property.

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Site #:	42
Primary Species:	***Pittosporum tenuifolium 'Aureum' (Kohuhu)***
Secondary Species:	
Other Species:	
Average Height (m):	2
Average Width (m):	2
Average DBH Measurements (cm):	4,4,4
AS4970 DBH Calculation (cm):	7
Average Basal Diameter (cm):	10
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Moderate**
Comments:	

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Site #:	43
Primary Species:	***Pittosporum eugenioides 'Variegatum' (Variegated Tarata)***
Secondary Species:	***Pittosporum tenuifolium (Kohuhu)***
Other Species:	
Average Height (m):	4
Average Width (m):	4
Average DBH Measurements (cm):	9,10
AS4970 DBH Calculation (cm):	13
Average Basal Diameter (cm):	16
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Moderate**
Comments:	

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Site #:	44
Primary Species:	***Callistemon citrinus (Crimson Bottlebrush)***
Secondary Species:	
Other Species:	
Average Height (m):	2
Average Width (m):	1
Average DBH Measurements (cm):	5,5
AS4970 DBH Calculation (cm):	7
Average Basal Diameter (cm):	11
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.5
Retention Value:	**Low**
Comments:	

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Site #:	45
Primary Species:	***Pittosporum eugenioides 'Variegatum' (Variegated Tarata)***
Secondary Species:	
Other Species:	
Average Height (m):	5
Average Width (m):	5
Average DBH Measurements (cm):	15
AS4970 DBH Calculation (cm):	15
Average Basal Diameter (cm):	20
Life Stage:	Semi-mature
Vigour:	Good
Structure:	Acceptable
Growth Space:	Optimal
Landscape Viability:	**Long**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.7
Retention Value:	**Moderate**
Comments:	

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Adequate
Landscape Significance
None
Ecosystem Contribution
Specimen

Site #:	46
Primary Species:	***Syzygium paniculatum (Magenta Cherry)***
Secondary Species:	
Other Species:	
Average Height (m):	4
Average Width (m):	3
Average DBH Measurements (cm):	8,7,5
AS4970 DBH Calculation (cm):	12
Average Basal Diameter (cm):	20
Life Stage:	Semi-mature
Vigour:	Fair
Structure:	Minor Correction
Growth Space:	Minor Limitation
Landscape Viability:	**Short**
AS4970 TPZ Calculation (m):	2
AS4970 SRZ Calculation (m):	1.7
Retention Value:	**Low**
Comments:	Severe possum damage.

Land Use and Social Contribution

Land Use (Victoria)
Low Density
Landscape Function
Marginal
Landscape Significance
None
Ecosystem Contribution
Specimen

Appendix 3 - Tree Feature Descriptors

Feature Classes - Trees are classified into three groups, Individual Trees, Grouped Trees or Hedge Rows.

Category	Description
Individual Tree	An individual tree with one or more trunks that is represented in the Site Plan as a point. This may include two or more trees growing in close proximity where all trees are engaged in mutual structural support.
Grouped Trees	Multiple trees of one or more species that are represented in the Site Plan as a polygon. Grouped trees are generally managed as a discrete unit.
Hedge Row	Multiple trees of one or more species in a linear arrangement that are represented in the Site Plan as a polyline. Hedge Rows are generally managed as a discrete unit.

Site ID. ## - textural reference to the location of an Individual Tree, Grouped Trees or Hedge Rows within the attached Site Plan appendix.

Species and Common Name - Defines the botanical name including genus, species, sub-species, variety and cultivar (if known) according to current taxonomical classifications as published in current literature. The common name will be that that is familiar to the arboricultural assessor, the local community or referenced literature.

Origin - Identifies the general geographic origins of the tree species identified.

Category	Description
Victorian Native	Occurs naturally within some part of the State of Victoria.
Australian Native	Occurs naturally within Australia but is not a Victorian native.
Exotic	Does not occur naturally within Australia.
Mixed	Applies to Hedge Rows and Groups of Trees only where the feature is comprised of multiple species that have multiple places of origin.

Height and Width - Dimensions are expressed in metres (m). Identifies the estimated height and width of a tree crown or combined crown for Grouped Trees or Hedge Rows. Crown heights are measured with a clinometer where possible. Crown widths are paced and estimated at the widest axis unless otherwise stated. Measurements rounded to the nearest metre.

Diameter at Breast Height (DBH) - Identifies the trunk diameter expressed in centimetres (cm) of a tree measured at 1.4m above the site grade unless otherwise stated. The methods used to determine this measurement are described in Appendix A of the Australian Standard AS 4970-2009 'Protection of trees on development sites'. Measurements undertaken using a diameter tape or builders tape. In the case of multi-stem (2 - 5 stems) Single Trees, DBH measurements shown are calculated in accordance with the aforementioned Standard. Where the number of stems for a Single Trees exceeds five, the calculation is the square root of the mean stem diameter squared, multiplied by the number of stems and is specified in the British Standard BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'. Multi-stem DBH calculations are rounded to the nearest centimetre.

Stem Diameter - Identifies the diameter of the trunk expressed in centimetres (cm) of a tree immediately above the root buttress. Measurements undertaken using a diameter tape or builders tape and rounded to the nearest centimetre.

Life Stage - Identifies the physiological stage of the Features life cycle.

Category	Description
Young	Sapling tree and/or recently planted.
Semi-mature	Tree rapidly increasing in size and yet to achieve expected size in situation.
Maturing	Specimen approaching expected size in situation, with reduced incremental growth.
Over-mature	Tree may be senescent and in decline or crown area substantially reduced relative to trunk size.

Vigour - Describes the overall health and vigour of a Feature and is derived from the Condition variables identified in the iTree Eco v6.0 model. Category selection is based on the Feature displaying one or more of the criteria listed in the corresponding Description.

Category	Description
Excellent	100% live crown. Leaf size and colour is consistent with that of a healthy example of the species. Shoot tips are healthy and display excellent extension. Buds are swollen.
Good	97% - 92% live crown. Leaf size and colour is consistent with that of a healthy example of the species. Shoot tips are healthy and display adequate extension. Buds are swollen.
Fair	87% - 77% live crown. Leaf size and colour is generally consistent with that of a healthy example of the species although some foliage (less than 20% of total crown volume) displays discolouration or reduced leaf size. Some shoot tips may display reduced extension and buds may show signs of damage or desiccation.
Poor	72% - 52% live crown. Leaf size and colour is not consistent with that of a healthy example of the species. Foliage (greater than 20% but less than 40% of total crown volume) displays discolouration or reduced leaf size. Shoot tips may display reduced extension and buds may show signs of damage or desiccation.
Critical	47% - 27% live crown. Leaf size and colour is not consistent with that of a healthy example of the species. Foliage (greater than 40% but less than 60% of total crown volume) displays discolouration or reduced leaf size. Shoot tips display reduced extension and buds show signs of damage or desiccation.
Dying	22% - 2% live crown. Leaf size and colour is not consistent with that of a healthy example of the species. Foliage (greater than 60% but less than 95% of total crown volume) displays discolouration or reduced leaf size. Shoot tips display limited extension and buds show distinct signs of damage or desiccation.
Dead	0% live crown. Leaf size and colour is not consistent with that of a healthy example of the species. Foliage (greater than 95% of total crown volume) displays discolouration or reduced leaf size. Shoot tips display no extension and buds are damage or desiccated.

Appendix 3 - Tree Feature Descriptors

Structure - Adapted in part from the Quantified Tree Risk Assessment (QTRA) manual, the descriptor is designed to inform planners, architects and arborists of the overall structural capacity of a Feature and provide a concise description of the input required to maintain a Feature within the landscape.

Category	Description
Acceptable	Minimal or no damage, disease or decay visible in the root plate, trunk, primary scaffold limbs or outer crown. No works are required to relieve structural faults or remedy conflict with adjoining edifices. The probability of failure is generally considered to be less than 1/1M
Minor Correction	Minimal to moderate damage, disease or decay visible in primary scaffold limb(s), outer crown or peripheral root(s) that could be corrected through appropriate treatment that would moderately improve Landscape Viability. Adjoining edifices may benefit from treatment. The probability of failure is generally considered to be less than 1/10K but greater than 1/M.
Major Correction	Moderate to major damage, disease or decay visible in primary scaffold limb(s), outer crown or peripheral root(s) that could be corrected through appropriate treatment that would significantly improve Landscape Viability. Adjoining edifices would benefit from treatment. The probability of failure is generally considered to be less than 1/1K but greater than 10/K.
Unacceptable	Moderate to major damage, disease or decay visible in the root plate or lower trunk. Major damage, disease or decay in primary scaffold limb(s) that cannot be corrected through appropriate treatments. Landscape Viability unlikely to be improved by treatment. The probability of failure is generally considered to be greater than 1/1K.

Available Growth Space - Describes the space above and below ground that can be reasonably assumed based on visual inspection of the site that the Feature can exploit for future crown and root development.

Category	Description
Optimal	Open, level or gently sloping ground. Minimal competition for available light, water and nutrient. Part of a group of similar species that is suitably spaced and likely to provide mutual support. Specie genetically suited or adapted to the existing environment.
Minor Limitation	Moderately constrained location. Long standing built form present on one side of Features root zone. Surrounding trees are competing for available space, light, water or nutrients. Feature is regularly pruned to meet clearance requirements.
Major Limitation	Heavily constrained location. Root zone has been compacted by continuous and on-going traffic movements or built over with impervious surfaces. Crown crowded by surrounding larger trees or structures that impede natural form development.

Landscape Viability - Adapted from Tree AZ, describes how long it could be reasonably expected that a Feature will remain a viable asset in an evolving landscape. Landscape Viability is informed by Life Stage, Vigour, Structure and Available Growth Space.

Category	Description
Long	Feature will likely contribute to the landscape for forty (40) or more years.
Medium	Feature will likely contribute to the landscape for between fifteen (15) to forty (40) years.
Short	Feature will likely contribute to the landscape for between five (5) to fifteen (15) years.
Remove	Feature will likely require removal within five (5) years.

Land Use and Social Contribution - Describes the contribution or value a Feature provides to an existing landscape and is derived from MIS506 (2022) Tree Valuation published by Arboriculture Australia. It has four primary components including Land Use (State), Landscape Function, Landscape Significance and Ecosystem Contribution.

Land Use (Victoria)	
Category	**Description**
Legal Instrument	Legal Instrument. Section 173 agreements that contain conditions on the property title requiring the retention and/or protection of vegetation.
Local Law	Local laws protecting vegetation on all land within a municipal area. Exempt trees are attributed according to designated land use for the site.
Statutory Planning	Statutory planning scheme overlays that protect vegetation on private and public land. Existing planning permits requiring the retention of trees. Exempt trees are attributed according to designated land use for the site.
Native Vegetation	Property subject to the provisions of 52.16 or 52.17 Native Vegetation. Exempt trees are attributed according to designated land use for the site.
Public Space	Public Space. Public Park and Recreation Zones. Public Conservation and Resource Zones.
High Density	High Density Mixed Use Zones. Township Zones.
Medium Density	Medium Density. Residential Growth Zone. General Residential Zone.
Low Density	Low Density Residential Zones. Neighbourhood Residential Zones. Green Wedge Zones. Rural Conservation Zones.
Special Purpose	Special Purpose Zones. Public Use Zones. Transport Zones. Commercial Zones.
Industrial/ Farming	Industrial and Farming Zones.
Exempt Land	Exempt Land. Land subject to statutory land zoning, native vegetation provisions, legal instruments or local laws.

Appendix 3 - Tree Feature Descriptors

Landscape Function	
Category	**Description**
Minimal	Nondescript tree, hedge or grouped planting in a poorly designed and/or maintained landscape. Planting contributes minimally to positive architectural, engineering, aesthetic or climate function. Canopy intersecting another tree
Marginal	Tree, hedge or grouped planting in a poorly designed and/or maintained landscape. Planting contributes marginally to positive architectural, engineering, aesthetic or climate function. One of a group of close plantings
Adequate	Tree, hedge or grouped planting of moderate value that contributes as a positive architectural, engineering, aesthetic or climate function. Wide plantings. Irregular spacing between trees; regular spacing one side (not hard surface)
Notable	Tree, hedge or grouped planting of moderate to high value that contributes as a positive architectural, engineering, aesthetic or climate function in a built environment. Hard surface planting (street or pathway), or plantings with regular spacing both sides
Exceptional	Individual feature specimen tree, hedge or grouped planting of significant value as a positive architectural, engineering, aesthetic or climate modifier. Avenue, park, reserve or other green space feature planting.

Landscape Significance	
Category	**Description**
None	The tree(s) is not considered significant within the landscape.
Important private property	The tree(s) represents a significant feature within the subject site or adjoining properties.
Important public space	The tree(s) represents a significant feature within the public realm as viewed from the subject site, adjoining properties and/or streetscapes.
Horticultural Rarity	Outstanding horticultural or genetic value; could be an important source of propagating stock, including specimens that are particularly resistant to disease or exposure. Any tree of a species or variety that is rare.
Local/state significant tree	Tree is listed in either a local or state significant tree register.
National significant tree	Tree is listed in a national significant tree register.

Ecosystem Contribution	
Category	**Description**
Weed	The tree(s) is a listed weed species.
Specimen	A typical garden specimen of a species commonly found in the urban context.
Indigenous	Remnant, regenerated or planted indigenous vegetation that contributes to biological diversity.

Ecosystem Contribution	
Category	**Description**
Habitat	Tree(s) could have value as habitat for indigenous wildlife, including providing breeding, foraging or roosting habitat, or is a component of a wildlife reserve.

Retention Value - Provides a concise rating of the Features value within the context of an evolving landscape that may include built form. Retention Value is informed by Landscape Viability, Landscape Contribution, published literature and the experience of the surveyor on the capacity of the Feature to tolerate and adapt to change.

Category	Description
High 	A tree of good quality that displays acceptable vigour and structure. The tree contributes to the existing landscape and has the potential to be long-term component in an evolving one if appropriately managed. The species is known to perform well within its given context and has desirable aesthetic traits. Retention of this tree is highly desirable.
Moderate 	A tree of reasonable quality that displays acceptable vigour and structure. The tree may have a condition, and or structural problem that can be corrected with arboricultural treatment. The species is known to perform within its given context. The tree has the potential to be a medium to long-term component of the landscape if managed appropriately. Retention of these trees is generally desirable.
Low 	A tree of poor quality that displays unacceptable vigour or structure. The tree may present an unacceptable hazard to existing and future users of the site. The tree is not considered significant within the landscape. These tree is easily replaceable. The species is functionally inappropriate given the context and may demand excessive management if retained. The cost to maintain this tree within the given context may exceed the benefit it provides to the landscape.

Comments - Provides additional information concerning the Feature.

Tree Protection Zone (TPZ) - Dimensions are expressed in metres (m) as a radius measured from the center of the trunk. Defined under the Australian Standard AS 4970 - 2009 “Protection of trees on development site’ as a specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree’s roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.

Structural Root Zone (SRZ) - Dimensions are expressed in metres (m) as a radius measured from the center of the trunk. Defined under the Australian Standard AS 4970 - 2009 “Protection of trees on development site’ and the subsequent amendment AS 4970/Amdt 1/2010-03-26 as the area around the base of a tree required for the tree’s stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright.

Warragul Burrowing Crayfish Assessment:

34 Simper Court Drouin

Report October 2024

For: Nobelius

INVERT-ECO

Terrestrial Invertebrate Consulting

Prepared for

Prepared by

INVERT-ECO
Terrestrial Invertebrate Consulting

Title Invert-Eco 2024: **Warragul Burrowing Crayfish Assessment 34 Simper Court Drouin. August 2024**

Version

Version	Date	Reviewer
1.0 Draft	13 August 2024	
Final	25 October 2024	

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ABBREVIATIONS

BBSC: Baw Baw Shire Council

DCCEEW: Department of Climate Change, Energy, the Environment and Water

DEECA*: Department of Energy Environment and Climate Action*

EPBC Act: Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

ESO: Environmental Significance Overlay

FFG Act*:* State *Flora and Fauna Guarantee Act 1988*

MNES: Matters of National Environmental Significance

WBC: Warragul Burrowing Crayfish

EXECUTIVE SUMMARY

Nobelius is preparing an application for a multi-lot subdivision of the land at 34 Simper Court, Drouin. The proposed concept for the development is an eco-style village. The land is located within the Baw Baw Shire and is Zoned Low Density Residential Zone (LDRZ). Invert-Eco has undertaken assessments at the site in 2019 where the threatened Warragul Burrowing Crayfish (WBC) was recorded (Van Praagh 2019 a, b). Invert-Eco has been engaged by Nobelius to conduct an updated assessment in order to facilitate the design of the subdivision to minimise any impacts on crayfish habitat.

The land is 4.52 ha of primarily cleared pasture with a single dwelling to the north. A tributary of King Parrot Creek runs north-south through the middle of the site along with several smaller tributaries and man-made channels.

Methods

A desktop and field assessment were undertaken as part of this project. A field assessment was conducted on 06 August 2024.

Findings

Evidence of WBC was found to be slightly more widespread than documented in the 2019 assessment. The distribution was similarly associated with the main tributary running north-south through the property. The highest density was recorded at the head of the tributary where a spring originated. Two smaller clusters were recorded from the south of the property. Overall, the crayfish occurred in a relatively low density with 21 chimneys recorded across the property. All crayfish chimneys were located adjacent to the shallow waterways in pasture, with moist, clay dominated soils.

Potential Impacts

The proposed residential development could negatively impact WBC habitats through soil compaction, excavation, alteration of water tables and drainage patterns, and introductions of pollutants and sedimentation via run-off.

This development is to be low density and marked as a self-contained eco-village. This type of development provides opportunities to avoid or mitigate negative impacts to WBC by design and is likely to be supported by the clients that may be attracted to this type of development. Encouraging restoration and protection of the WBC habitat may improve the quality of the habitat for the local population of the species. Permanent removal of the stock which are currently pugging the soil, along with supplementary planting may improve the habitat for the species if the hydrological processes can be maintained.

Recommendations

The recommendations in this report include:

1. Excise all or part of the WBC habitat around the waterway to create a continuous, linear feature. This approach allows the habitat to serve as a natural corridor between properties.
   - Develop a landscape plan that includes planting and buffers
   - Designate the habitat as a conservation reserve
   - Encourage community-led monitoring and education

2. Retain the WBC habitat in private ownership and protect the habitat by a Section 173 agreement. This agreement could be used to protect the habitat via certain restrictions and conditions discussed/imposed by Council. Potential conditions are included in the recommendation section 7.1.2

3. A combination of a conservation reserve and Section 173 Agreement may also be considered such as protecting the WBC habitat around the spring head and part of the tributary in a reserve with the remainder of the habitat protected via a Section 173 Agreement.

The development of a low-density housing and eco-village concept that incorporates low-impact land use and ecological sustainability practices together with the implementation of the recommendations provided is likely to significantly reduce negative impacts on the WBC.

1 INTRODUCTION

1.1 Background

Nobelius is preparing an application for a multi-lot subdivision of the land at 34 Simper Court, Drouin. The land is located within the Baw Baw Shire and is Zoned Low Density Residential Zone (LDRZ). Invert-Eco has undertaken assessments at the site in January and July 2019 where the threatened Warragul Burrowing Crayfish (WBC) was recorded (Van Praagh 2019 a, b). Invert-Eco has been engaged by Nobelius to conduct an updated assessment in order to facilitate the design of the subdivision to minimise any impacts on crayfish habitat. The WBC is listed as Critically Endangered under the *Flora and Fauna Guarantee Act 1988* (FFG Act).

1.2 Purpose

The purpose of this investigation is to provide an assessment on the presence of these threatened species and their habitats, guiding mitigation measures and project planning to avoid or minimise potential impacts and address the requirements of the relevant State legislation.

1.3 Scope of Assessment

The specific tasks of this report are to:

- Review background information and conduct a desktop assessment in relation the species and the study area
- Undertake a field assessment for the WBC and identify any colonies/habitat present
- Provide an assessment of the potential impacts associated with the proposed works should the species be identified on site
- Identify mitigation opportunities to protect the species habitat
- Address relevant biodiversity related policy, including
  - the Flora and Fauna Guarantee Act 1988 (FFG Act),
  - the Wildlife Act 1975, and
  - Local planning provisions under the planning Act

2. STUDY AREA

2.1 Location

The project area is approximately 2.3 km south of the township of Drouin (Figure 1).

2.2 Zoning and Overlays

The project area is zoned Low Density Residential Zone (LDRZ) in the Baw Baw Planning Scheme and is subject to a Development Contributions Plan Overlay (DPCO). It is also a Designated Bushfire Prone Area.

2.3 Site Description

The land at 34 Simper Court is 4.52 ha of primarily cleared pasture with a single dwelling to the north (Photo Set 1). A tributary of King Parrot Creek runs north-south through the middle of the cleared land along with several smaller tributaries and man-made channels. A large dam is situated to to the south of the dwelling.

The project area occurs within the Strzelecki Bioregion and the pre-1750 vegetation Ecological Vegetation Class (EVC) is Swampy Riparian Complex (EVC 126) over the majority of the site with Damp Forest: EVC 29 in the north-west corner of the property (NatureKit 2024).

2.4. Proposed Works

A concept plan is yet to be finalised and will be informed by the findings of this report.

The proposed subdivision includes a low-density Eco-village style development.
The features of an eco-village are likely to include:

- No Sewerage Infrastructure:
- Water Tanks
- Recycling:
- Renewable Energy

Figure 1. Location of the project area 34 Simper Court Warragul

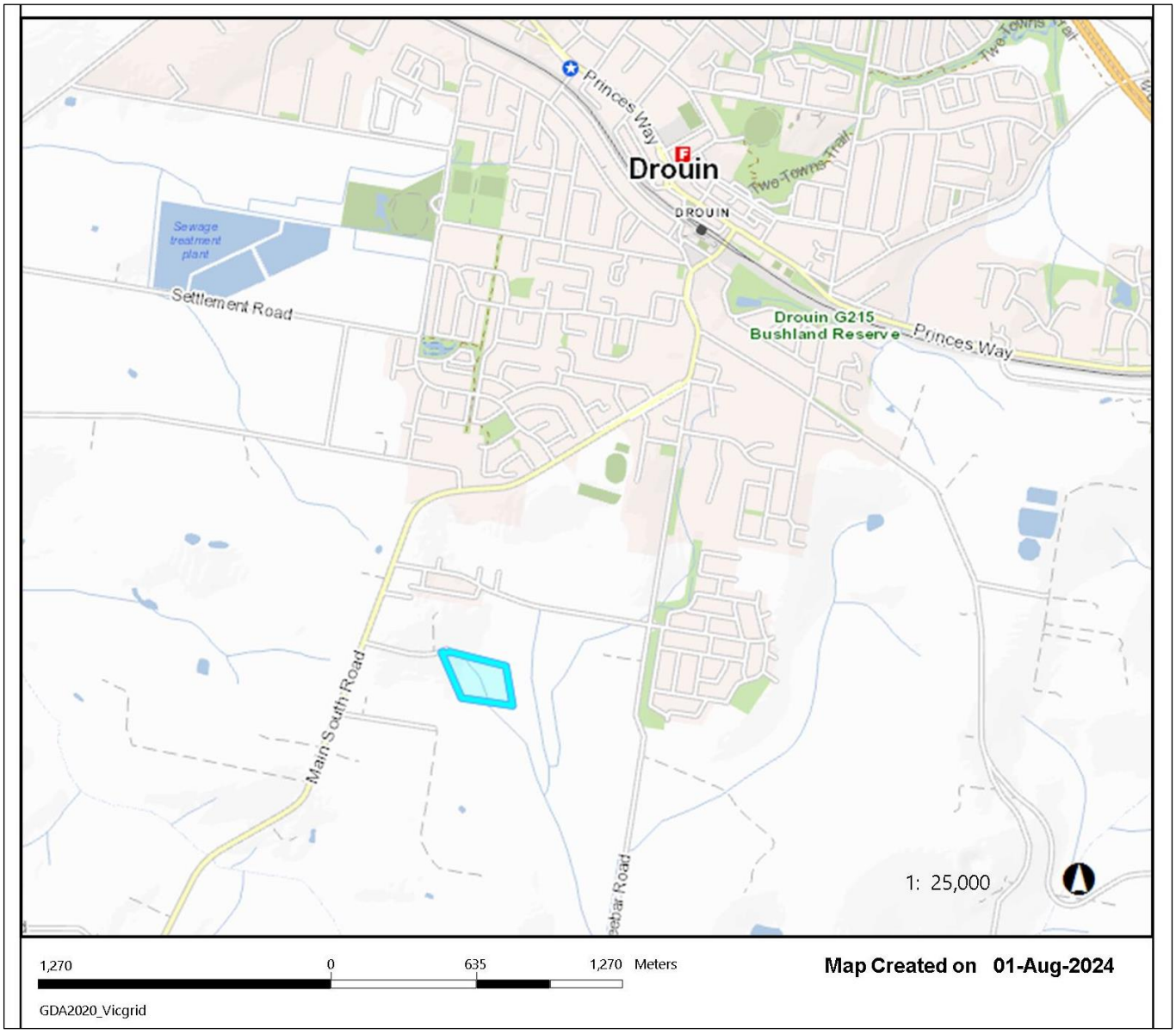


Figure 2. Aerial view of study site with tributary of Hazel Creek

View northwest along Hazel Creek showing wide floodplain.

View southwest of minor tributary.

Wetland area at the north-western end of Hazel Creek.

Photo Set 1. Site characteristics (July 11 2024)

3 Warragul Burrowing Crayfish

The WBC (*Engaeus sternalis*) is listed as a threatened species under State legislation

- FFG Act Conservation Status (1988): Critically Endangered
- IUCN Red List of Threatened Animals (IUCN 2010) Critically Endangered (CR)

Warragul Burrowing Cray (L) blue form (R) Pale cream adult

The Warragul Burrowing Crayfish is a small burrowing crayfish, with adults having a carapace length of about 20 mm and a total length of about 70 mm (Horwitz 1990). The species is characterised by its very small eyes and fine downy hairs covering its carapace. It is usually a pale, cream colour but may also present in shades of blue and grey. The WBC has been identified from an area of approximately 30 x 20 kms in west Gippsland. This includes a 4 km stretch of creek bank along Labertouche and Wattle Creek in Labertouche (Horwitz 1990, Morey & Hollis 1997, & Shaw 1996) and in and around the township of Drouin and Warragul (Van Praagh 2011).

The habitat at Labertouche is remnant swampy woodland where the species can be found within the clayey creek banks. This contrasts with their habitat in Warragul and Drouin where it is found within open pasture along edges of creek banks, drainage lines and within floodplains. The species can be found some distance from open waterways. It tends to be found in the less saturated areas of flood zones. The crayfish builds small chimneys, composed of small, spherical balls of soil and small openings. Several adults and young can be found in the same burrow system. While the specific life-cycle of WBC is unknown, in most burrowing crayfish, breeding occurs over spring and summer (Doran 1999).

Many burrowing crayfish are relatively sedentary with poor powers of dispersal, relatively long life cycles and maturation rates leading to narrow endemic ranges, rendering them highly vulnerable to threatening processes. Key threats relate to changes in the quality and quantity and seasonal regime of water, soil and food availability (Doran 1999, March and Robson 2006, Honan 2010). Significant impacts to WBC colonies are likely to occur where there is alteration to the water table, drainage patterns or surface flows: permanent or long-term change (increase or decrease) outside of the natural annual variation.

Further information can be found at http://www.burrowingcrayfish.com.au/

4 METHODS

4.1 Desktop Assessment

To inform the current assessment of WBC habitat within the project area, prior assessments were reviewed to determine the historical and current distribution of the species at the site.

4.2 Field Inspection

The presence of burrowing crayfish is determined by targeting potential habitat and searching for the conspicuous chimneys of soil surrounding burrow entrances. WBC habitat includes floodplain, soaks and riparian areas along waterways. Chimney shape, burrow structure and position in the landscape may vary between species. WBC have distinctive chimneys comprised of small, spherical balls of soil surrounding comparatively small burrow openings (Van Praagh 2015a) (Photo Set 2). Where chimneys cannot be observed, small quadrats are dug to examine soil type and burrows.

Photo Set 2. Examples of conspicuous, small chimneys made by WBC (left) compared with the chimneys of other crayfish species found within the local region (right) and small WBC burrows. Photos taken by B. Van Praagh outside the study area.

A field inspection was undertaken on 6 August 2024 by two field staff. All waterways within the project area and surrounding were targeted for sampling. Searching included 20 m either side of the banks searching for chimneys. The remainder of the paddocks were walked over to visually inspect the land for any other indicators of suitable WBC habitat such as wet areas or the presence of other species of crayfish.

The entire site was traversed on foot, searching for chimneys.

4.3 Assessment Qualifications and Limitations

Sampling was optimal for WBC in terms of seasonal activity:

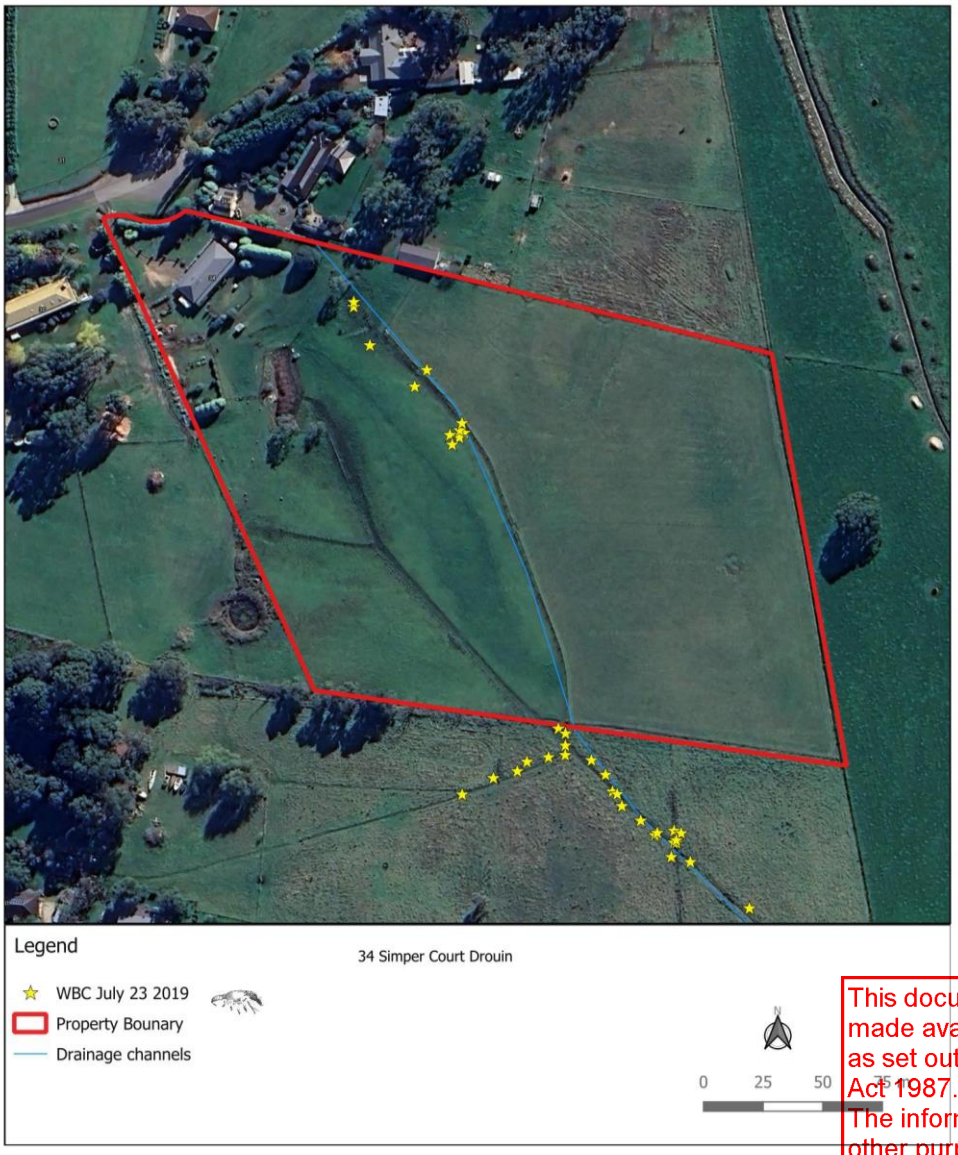
- Increased visibility of WBC activity as chimney building season has commenced
- Good visibility due to the presence of short, grazed grass

5 FINDINGS

5.1 Desktop Assessment

In February 2019, Invert-Eco undertook a WBC assessment at 34 Simper Court Drouin. The results were inconclusive as the assessment was undertaken outside the chimney building season. An additional assessment was conducted in July 2019. WBC were recorded along the northern section of the north-western tributary of King Parrot Creek (Figure 3). It was noted that large chimneys belonging to common species of burrowing crayfish were observed along the drainage channels and paddocks. Where these chimneys dominated, WBC were generally absent. WBC have also been recorded extensively along the same waterway in the adjacent land to the south.

Figure 3. Historic WBC records within the vicinity of the project area



5.2 Field Assessment

Evidence of WBC was found to be slightly more widespread than documented in the 2019 assessment (Figure 4). The distribution was similarly associated with the main tributary running north-south through the property. The highest density was recorded at the head of the tributary where a spring originated. Two smaller clusters were recorded from the south of the property, most likely an extension of the large colony found in the adjacent land in 2011 and 2019 (Invert-Eco). Overall, the crayfish occurred in a relatively low density with 21 chimneys recorded across the property. All crayfish chimneys were located adjacent to the shallow waterways in pasture, with moist, clay dominated soils.

Although evidence of other species of crayfish were found further away from the waterways, the paddocks were generally too dry to support WBC.

Figure 4. Evidence of WBC (chimneys)

Photo Set 3. Main area of WBC habitat along shallow western waterway.
Above: View south from spring across WBC habitat within ~1-2 m of edges of waterway
Below: View north-west across WBC habitat

Photo Set 4. Small area of WBC habitat

Photo Set 5. Examples of Evidence of WBC chimneys

5.2.1 WBC Habitat

Most crayfish chimneys occurred within 5 m of the edges of the waterways, with the majority found within 1 to 2 m. The relatively low number and widely spaced clusters of chimneys suggest that the site may not be optimal habitat for the species at present. In contrast to many other sites supporting WBC habitat, there was no small patches of wetland vegetation present such as Rushes where the crayfish were recorded. However other typical elements of WBC habitat such as blue-grey clay soils, high water-tables and low-lying pasture were present. The reliance on the edges of the waterways and the spring indicates that these sources of water are critical for the species' survival at this site. The soils became particularly drier to the east of the property and away from the waterways.

6 POTENTIAL IMPACTS

6.1 General Impacts

Potential Impacts on WBC from residential developments can be classified as direct or indirect impacts and can result in habitat loss and reduction in habitat quality.

1. Direct Impacts

Disturbance to Burrows and Habitat:

- **Excavation and Fill Works:**
    - Construction activities involving excavation and fill can directly destroy individuals and burrows and disrupt the soil structure, leading to immediate habitat loss.
- **Compaction:**
    - Heavy machinery used during construction can compact the soil, making it less suitable for burrowing by crayfish. Compacted soil reduces aeration and water infiltration, adversely affecting the habitat.
- **Removal of Existing Vegetation:**
    - The removal of native vegetation during site clearance may directly reduce habitat quality and availability for WBC. Vegetation provides necessary cover, food sources, and helps maintain soil structure and moisture.

2. Indirect Impacts

Changes in Water Quality and Hydrology:

- **Changes to Local Hydrology:**
    - Construction activities can alter both subsurface and surface drainage patterns. Changes in water flow can affect the moisture levels in the soil, essential for WBC
    - Altered topography, can impact local hydrology by changing natural water runoff patterns and increasing erosion risks.
- **Alteration of Chemical Composition:**
    - The introduction of pollutants through leachate, runoff, and groundwater contamination can alter the chemical composition of the environment. Toxic substances can degrade water quality and soil health, impacting both species.
- **Erosion and Sedimentation:**
    - Construction activities can lead to increased erosion and sedimentation. Sedimentation can clog crayfish burrows and degrade water quality, while erosion can lead to loss of soil structure and stability.

- **Inappropriate Planting:**
    - Planting inappropriate species or woody plants in high density can alter the local hydrology and cause drying out of the soils
- **Weed Infestations:**
    - Disturbed areas are more susceptible to invasive weed species, which can outcompete native vegetation and degrade habitat quality

This development is low density and intended to be marketed as a self-contained eco-village. This type of development provides unique opportunities to avoid or mitigate negative impacts to WBC by design and is likely to be supported by the clients that may be attracted to this type of development. Encouraging restoration and protection of the WBC habitat may improve the quality of the habitat for the local population of the species. Permanent removal of the stock which are currently pugging the soil, along with supplementary planting may improve the habitat for the species if the hydrological processes can be maintained.

7 RECOMMENDATIONS

7.1 Impact Mitigation

Mitigation has the principle aim of avoiding significant impacts to threatened species that might arise from proposed works and should be applied in a hierarchical order and considered early in the design of the project:

1. **Avoid** adverse impacts-avoid habitat loss
2. **Minimise** and/or mitigate impacts and minimise habitat loss through appropriate consideration in planning processes and expert input to project design, construction, and management
3. **Offset**. Identify appropriate offset options if avoidance or minimisation is not achievable or to compensate for residual impacts
4. **Monitor** mitigation to assess its effectiveness and feed back into adaptive management plan outcomes.

The low-density, self-contained eco-village concept provides an opportunity to design the subdivision in a way that minimizes habitat disruption. Several opportunities include:

7.1.1 Excise all or part of the WBC habitat around the waterway.

Habitat Retention and Enhancement:

- **Linear Asset Creation:** Retain the WBC habitat as a continuous linear feature along the waterway. This approach allows the habitat to serve as a natural corridor between properties, supporting crayfish habitat and their movement and/or expansion along the corridor.

Develop a landscape plan for WBC habitat to include:

- **Vegetation Buffer:** Plant native species such as rushes and sedges along the waterway. These plants are known for their ability to stabilise soil, reduce erosion, and provide a natural buffer that enhances habitat quality for the WBC while protecting the waterway from runoff and pollutants.
- Leave gaps within plantings so WBC can build chimneys between and at the base of plants, particularly rushes and sedges.
- Do not use weed mat or similar within identified as potential WBC habitat to allow crayfish to build chimneys. Use mulch instead.
- **Focus on Critical Areas:** The most important section of the habitat is the spring at the head of the waterway and the area extending 30 meters downstream, as this section is identified

as having the highest density of crayfish chimneys and likely retains moisture throughout much of the year.

- **Conservation Zone Designation:** Designate the area as a WBC conservation zone. This could involve installing signage to raise awareness among the locals about the significance of the habitat.
- **Community-Led Monitoring:** Encourage local residents to participate in monitoring the conservation zone. Regular monitoring can help track the health of the crayfish population and ensure the habitat remains in good condition. This participatory approach fosters a sense of stewardship and ensures ongoing maintenance and protection of the habitat and is likely to be well-received by the clients attracted to this type of eco-village.
- **Public Access Restrictions:** Limit public access to sensitive WBC habitats to reduce disturbance and potential harm. Provide designated viewing areas or educational signage to inform visitors.

7.1.2 Retain the WBC habitat in private ownership and protect the habitat by a Section 173 Agreement.

A Section 173 Agreement is a legal agreement made under Section 173 of the Planning and Environment Act 1987. It allows local councils in Victoria to place restrictions and obligations on private land to achieve specific planning objectives. Once registered, these agreements are binding on the current and future landowners, ensuring that the protection measures remain in place regardless of property ownership changes.

This agreement could be used to protect the habitat via certain restrictions and conditions discussed/imposed by Council. Conditions might include:

- **No Disturbance to the Waterway:**
  - Prohibit any activities that could disturb the natural state of the waterway, including construction, vegetation clearing, and modification of the water flow to maintain existing conditions.
- **Protection Envelope:**
  - Define a protection envelope around the WBC habitat, within which certain activities, such as building works or heavy machinery use are prohibited.
- **Buffer Zones:**
  - Establish guidelines for creating and maintaining buffer zones of a specified width around the waterway. These buffers would be based on a landscape plan designed to protect the WBC habitat by filtering runoff, reducing erosion, and providing additional habitat.
- **Specified Plantings:**
  - Mandate the planting of native species in buffer zones, such as rushes and sedges and other appropriate EVC plantings for riparian habitats.
- **Restricted Activities:**
  - Restrict activities like soil disturbance, heavy machinery operation, and construction within and around the WBC habitat.

- **Weed Management:**
  - Specify Weed management guidelines.
  - Use non-chemical weed removal methods wherever possible. Do not use glyphosate or any fungicides in a spray situation.
  - Use physical methods of weed control prior to flowering / seeding e.g., hand weeding, brush cutting and chainsaws.
  - If heavy e.g. ragwort infestation, target spot spraying prior to seeding.

3. Hydrological Integrity:

- **Natural Water Flows:**
  - Ensure that natural water flows are maintained and protected from alterations that could harm the WBC habitat. This includes managing water extraction to ensure sufficient water availability for the crayfish and preventing artificial drainage systems from negatively impacting the habitat.

4. Low-Impact Infrastructure:

- If infrastructure development is necessary, it should be designed to minimize impacts on the WBC habitat. For instance, pathways and fencing should use permeable materials and be constructed in ways that do not disrupt natural water flows or habitat integrity.

- Avoid road crossing the waterway if possible. If not possible, chose an area that has the no chimneys and is already disturbed. Considered a raised roadway.

A combination of a conservation reserve and Section 173 Agreement may also be considered – such as protecting the WBC habitat around the spring head and part of the tributary in a reserve, with the remainder of the habitat protected via a Section 173 Agreement.

The development of a low-density housing and eco-village concept that incorporates low-impact land use and ecological sustainability practices together with the implementation of the recommendations is likely to significantly reduce negative impacts on the WBC.

8 LEGISLATION IMPLICATIONS (DETAILED IN APPENDIX 3)

Table 1. Summary of legislative and policy requirements

Policy/ Legislation	Requirement/Listing	Action
State		
Flora and Fauna Guarantee Act 1988 (FFG Act) **Flora and Fauna Guarantee Amendment Act 2019**	WBC is listed as Critically Endangered A permit is required from DEECA to remove listed flora or fauna from public land. The FFG Act 's amendment strengthens the framework for protection of Victoria's biodiversity. This includes: -the requirement of public authorities to consider impacts on threatened species in their decision-making processes such as under the Planning Scheme when deciding on planning permit applications. -Strengthened provisions for the identification and protection of critical habitats for threatened species. -The amendment empowers the Minister to make binding determinations on critical habitats. Critical habitats can be on Public or Private land. Regulatory Protection comes with the issue of a Habitat Conservation Order (HCO) by the Minister.	A Permit under the FFG Act is not required as the land assessed is on private land. However, as WBC are listed as Critically Endangered under the FFG Act, when assessing development applications, local authorities will consider the conservation and mitigation measures undertaken to protect the habitat of the WBC. There is no determination of Critical Habitat for the land at present.
Wildlife Act 1975	All Invertebrates listed under the FFG Act considered "wildlife" for the purposed of the Act. This included the WBC and GGE.	A licence is required by any person engaged to take or destroy wildlife. Includes any handling, salvage and translocation of wildlife. The relocation or removal of any native wildlife must therefore be conducted by a qualified, licenced and experienced contractor with appropriate Permits or at the direction of DEECA.

9 REFERENCES

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Appendix 1 Legislation Considerations

This section explores environmental policy and legislation most pertinent to the GGE and WBC. However, it is not a comprehensive list of all legislation and the guidance provided does not constitute legal advice.

STATE LEGISLATION

Planning and Environment Act 1987

The Planning and Environment Act 1987 (Vic) provides a legislative framework for the Victorian *Planning Provisions*, commonly referred to as the Planning Scheme. The Planning Scheme sets out the conditions for development within Victoria.

The study area is not covered by any environmental planning overlays in relation to the Warragul Burrowing Crayfish.

Flora and Fauna Guarantee Act 1988

The Flora and Fauna Guarantee Act 1988 (FFG Act) which is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes. The recently amended *Flora and Fauna Guarantee Act 1988* (2019) strengthens the legislative framework for biodiversity conservation in Victoria, introducing modern principles, improving habitat protection, enhancing management strategies, and increasing public involvement and accountability. It contains an obligation or duty on public authorities and ministers to consider potential biodiversity impacts when exercising their functions (set out in new section 4B). This reflects the Victorian Government's commitment to embed biodiversity consideration in government decision making.

The local planning authority is likely to consider impacts on FFG Act-listed species and communities under the Planning Scheme when deciding on planning permit applications.

The Key Changes include:

1. **Modernized Framework:**
   - Updates to reflect current best practices in biodiversity conservation.
2. **Critical Habitat Determination:**
   - Stronger protections for critical habitats.
   - Minister can issue binding Habitat Conservation Orders (HCO).
3. **Conservation Strategies:**
   - Mandatory strategies and action plans for threatened species recovery.
4. **Greater Accountability:**
   - Enhanced reporting and accountability for public authorities.
   - Biodiversity must be considered in decision-making across governments.
5. **Public Participation:**
   - More opportunities for public involvement.
   - Public can nominate species and ecological communities for threatened status.
6. **Compliance and Enforcement:**

- Stronger enforcement provisions and new penalties.

7. **Climate Change Considerations:**
   - Recognition of climate change impacts.
   - Integration of adaptation measures into conservation planning.

Under the Flora and Fauna Guarantee (FFG) Act, critical habitats are defined as areas that are essential for the survival of threatened species and ecological communities. The FFG Amendment Act provides an inclusive list of factors that may contribute to an area being listed as critical habitat. The Act involves the Scientific Advisory Committee (SAC) in recommending areas for critical habitat designation and assisting in drafting eligibility guidelines. The Secretary must manage critical habitats through agreements with affected landholders or managers, ensuring collaboration and compliance. A site's determination as critical habitat does not automatically trigger regulatory protections. Regulatory measures are implemented through the issuance of a Habitat Conservation Order (HCO) by the Minister, which mandates notification to all affected parties. Critical habitat can apply to public or private land.

Implications

A permit is required from DEECA if an action on public land proposes to collect, kill, injure or disturb protected flora and fauna and ecological communities. It is not anticipated that these activities will be undertaken in relation to WBC as part of this project and the project involves private land. However, if the crayfish is unearthed during construction, consultation with DEECA may be required if a salvage and release is deemed appropriate.

The land has not been determined as Critical Habitat.

Wildlife Act 1975

This Act forms the procedural, administrative and operational basis for the protection and conservation of native wildlife, specific use of, and prescriptions for access, prohibition and regulation of associated activities involving native wildlife within Victoria. This Act is the basis for the majority of wildlife permit/licensing requirements within the state. All terrestrial invertebrates listed under the *FFG Act 1988* are considered "wildlife".

Legislative Implications

The GGE and WBC are listed under the FFG Act and are thus considered "wildlife" for the purposes of this Act. A license is required under this Act to take or destroy wildlife. This includes any handling, salvage and translocation of native wildlife. If these activities are undertaken as a result of this proposal they must be conducted by a qualified, licenced and experienced contractor with appropriate Permits.

NATIONAL LEGISLATION

Environmental Protection and Biodiversity Conservation Act

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a process for assessment of proposed actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES). It applies to both public and private land. Matters of National Environmental Significance include nationally threatened species and ecological communities.

A person who proposes to take an action that will have, or is likely to have, a significant impact on a matter of national environmental significance must refer that action to the minister Department of Climate Change, Energy, Environment and Water (DCCEEW) for a decision on whether assessment and approval is required under the EPBC Act. Documentation on the referral process, including documentation requirements, can be obtained by contacting the Department of the Environment's Community Information Unit on the EPBC website.

A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

The Warragul Burrowing Crayfish is not listed under the EPBC Act

HardCore Geotech

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LAND CAPABILITY ASSESSMENT

Client: Nobelius Land Surveyors

Project: No. 34 Simper Court, DROUIN.

Date of site visit: 6th August, 2024, revised 20th November, 2024, revised 31st May, 2025

Report Number: 240806 – LCA – revision two

Executive Summary

The proposed development at No. 34 Simper Court, DROUIN, is suitable for on-site effluent disposal.

The site is located in the Baw Baw Shire Council.

The existing site is approximately 45232 m^2, 4.52ha in size and covered in natural pasture grasses with an existing single storey brick dwelling, shed and trees, the site has a gentle slope to the east to south-east across the site and a moderate slope to the south-east where the existing dwelling is located. The recommended Land Application Areas (LAA) are open with grass cover.

The proposal for the site is for a ten-lot subdivision with existing dwelling to remain as Lot 1 and nine new Lots to be developed at the rear of site. Lot 1 is to be approximately 4064m^2 with the existing dwelling and existing site effluent system which has been checked by a qualified and licensed plumber and will need to be replaced. Lot 2 to be approximately 4013m^2, Lot 3 to be approximately 4008m^2, Lot 4 will all be approximately 4007m^2 in size, Lot 5 to be approximately 4002m^2, Lot 6 to be approximately 4000m^2, Lot 7 will all be approximately 4001m^2 in size, Lot 8 to be approximately 4016m^2, Lot 9 to be approximately 4004m^2 and Lot 10 will all be approximately 4044m^2 in size.

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

There are open drains running through the site. It is proposed that the drains will be filled and re-diverted with concrete pipes. There is also a marked water course that runs through the site. A 30m offset will be required from the LAA's to the marked water course.

There are also several dams and springs on the site. All of the LAA's will need to be either downslope or at least 30m away from any dam or spring.

For Lots 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 the effluent at the sites 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.

For Lots 1, 2, 3, 4, 5, 6, 8, 9 and 10 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 litres/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 (Litres/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.

Contents

1. Introduction

Hardcore Geotech Pty Ltd has been contracted to perform a Land Capability Assessment for No. 36 Simper Court, DROUIN. The existing site is approximately 45232m^2, 4.52ha in size, with a proposal for a ten-lot subdivision with nine new lots created. The allotment falls within the Baw Baw Shire Council. This LCA is to show that Lots 1 to 10, can contain their own waste.

Lot 1 has an existing dwelling and septic system that has been checked by a qualified and licensed plumber. The existing septic system is failing and needs to be replaced.

This report has been completed in order to show that No. 34 Simper Court, DROUIN, can comply with the EPA 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. The spacing between the irrigation lines must be at least 1000mm.

The site is covered in an existing brick dwelling and shedding with natural pasture grasses and trees. The site has a moderate slope to the south- east where the existing dwelling is and then has a gentle slope to the south-east across the rest of the site. There are trees on and adjoining the site. The site is typical of the undulating landscape throughout the area. The site has non potable water supplies that will be required to be 30m+ away or downslope from the LAA's. As the site's elevation is in a lower area of Drouin, there is a high risk of any seasonal flooding. A cut off drain will be constructed around the high side of the LAA's to prevent any surface or subsurface waters entering the LAA's, and ensure it only has to cope with the calculated loading.

There are open drains running through the site. It is proposed that there drains will be filled and re-diverted with concrete pipes. There is also a marked water course that runs through the site. A 30m offset will be required from the LAA's to the marked water course.

There are also several dams and springs on the site. All of the LAA's will need to be either downslope or at least 30m away from any dam or spring.

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 1059mm. These values were obtained from the stations at Drouin Bowling Club – 085023 and Noojee (Slivar) – 085277, respectively.

For Lots 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 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 6th August, 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 to moderate slope, existing water course, dams, springs and open drains and a low permeable soil.

The irrigation systems are to be constructed in area's that are covered in natural 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's has been worked out assuming that nine (9) new dwellings may be constructed with one each on the new Lots 2 to 10 as per the proposed sub-division. It has been assumed that the new dwelling will be a four (4), bedroom dwelling, that will be suitable for a maximum occupancy of up to five (5) people 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 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 150L per person per day has been used giving a total daily design load of 750 litres dependent on the final floor plan. This design load was determined using Table 4, EPA Code of Practice 891.4.

2.2 Available land for LAA – The proposal is to create a LAA's for Lots 2 to 10 on 4000-4044m^2 each. For this site size is not a constraining factor, and there is sufficient land available for future expansion if required. This gives a low rating risk for the secondary treatment system that is recommended within this report.

2.3 Aspect and Exposure – The area allocated for the systems has a moderate slope to the south-east where the existing dwelling is located and then the site has a gentle slope to the south - east. The site is located in an open area of Drouin. The site is covered in pasture grasses and there are trees adjoining the site. This gives the site high sun and wind exposure.

2.4 Slope form and gradient – the area recommended as suitable for the LAA has a gentle slope to the east/south-east of approximately 1:20, 5%, based on the site visit. 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 run along the contours as mentioned in Section M9.3 of AS/NZS 1547, 2012. Pressure compensated irrigation lines are essential to distribute the effluent evenly over the distribution bed and mound.

2.5 Site Drainage – A cutoff drain will be required around the high side of the systems. The cutoff drain will prevent overland water flow from entering the system during high rainfall events.

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 were no signs of erosion at the site, however this may be a problem as the soils tested were found to be dispersive. This is a moderate risk issue.

2.8 Flood Inundation – as the site elevation is located in a lower area of Drouin, there is a moderate chance of the site experiencing seasonal flooding. Cutoff drains around the high side of the LAA's have been directed to prevent any overland water flow and ensure the system only has to cope with the calculated hydraulic loads.

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, including the marked water course and any open drain, and over 200m (as water would run) from any potable reservoir supplies. The LAA's also need to be located downslope from any dams or springs located on the site, or if upslope will need to be at least 30m away.

2.10 Distance to groundwater bores – there are zero (0) bores on the site. 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 locations.

2.11 Vegetation – the overall site is covered in pasture grasses and there are trees adjoining the site. The area chosen for the LAAs is open and covered in pasture grasses. This can be seen by looking at the photos from the site and survey.

2.12 Depth to water table / perched water table – A Perched water table / groundwater was encountered at the time of the investigation. During the wetter months of the year, it is possible that 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 area.

2.13 Rainfall – the site has a moderate to high annual rainfall of 1003 mm (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 LAAs, and appropriately sized areas.

2.14 Pan Evaporation – the site has a high pan evaporation of 1040 mm (mean), and this is a low risk. Evaporation will likely exceed rainfall at the site for the warmer months of the year from November through to April.

2.15 Site History

Historic Satellite imagery accessed from Nearmaps (see figure 1 below), shows the site has remained relatively unchanged in recent years.

Figure 1: Satellite imagery from Nearmaps
Source: https://apps.nearmap.com/maps/ (Accessed 2024)

3. Site Plan

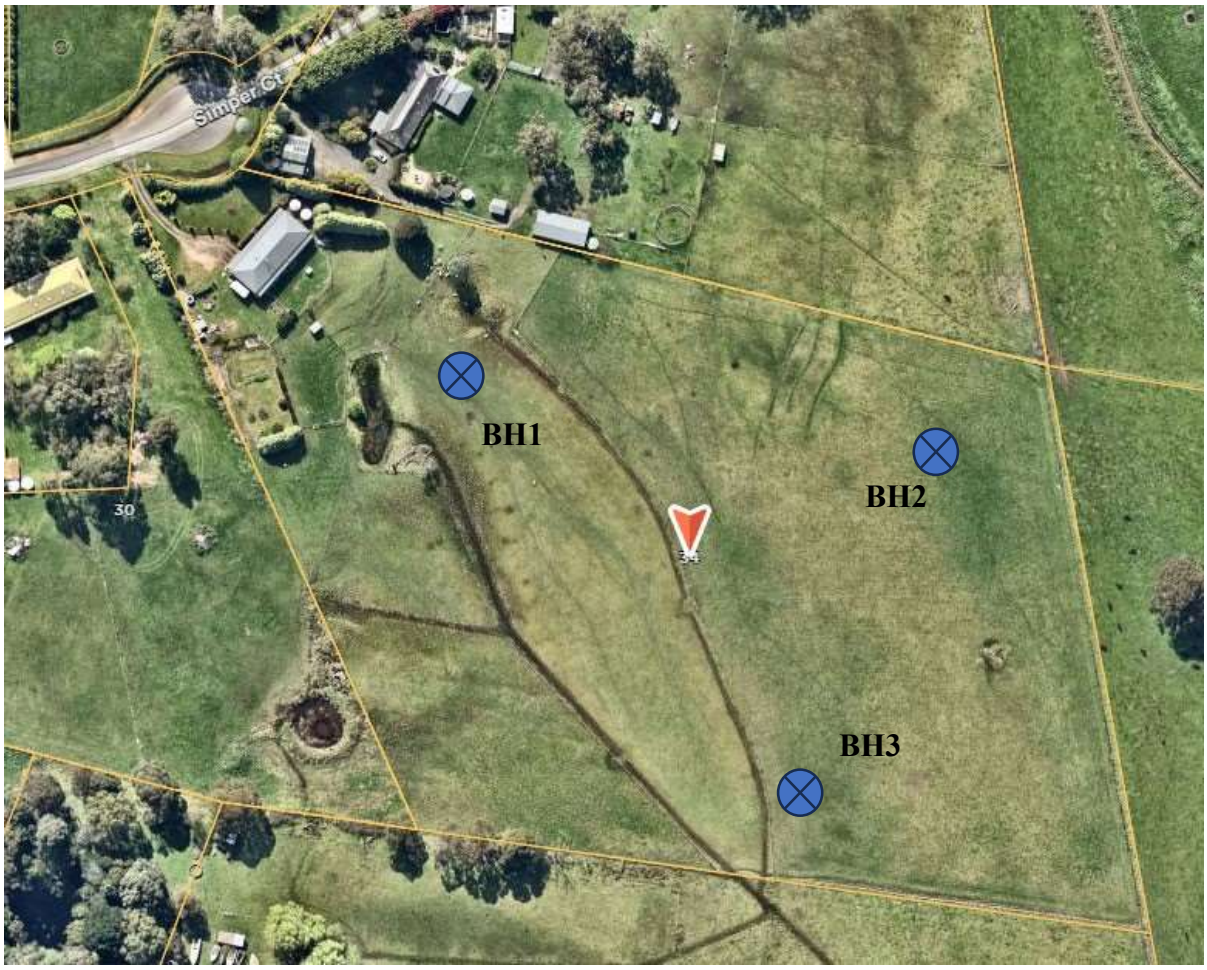

Figure 2: (Existing plan) No. 34 Simper Court, DROUIN.

Note: This site plan is not to scale and an indicative guide only. See site survey for more information. This plan of existing conditions at the site was provided by the client prior to the site visit.

3.1 Proposed Site plan with LAA

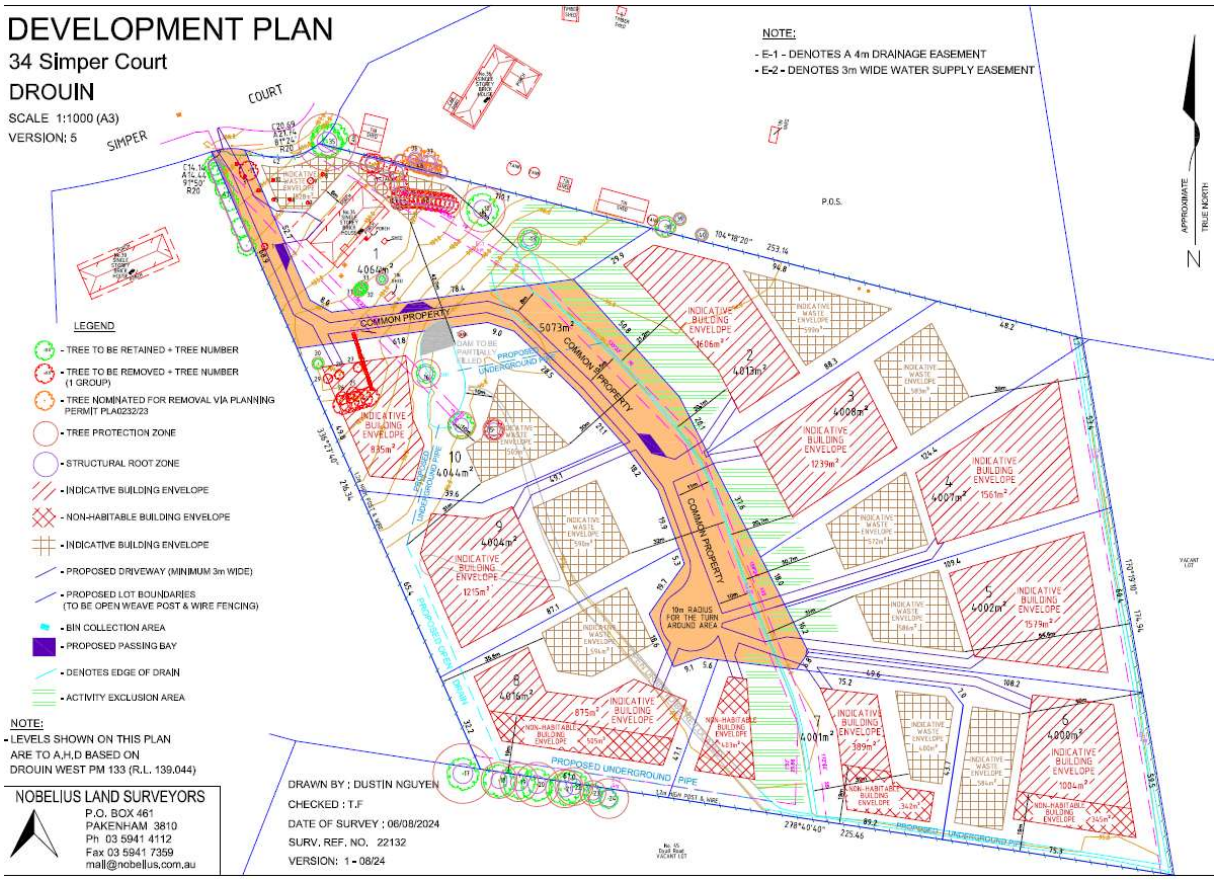

Figure 3: Proposed LAA's –No. 34 Simper Court, DROUIN.

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

3.2 Proposed LAA Sizes

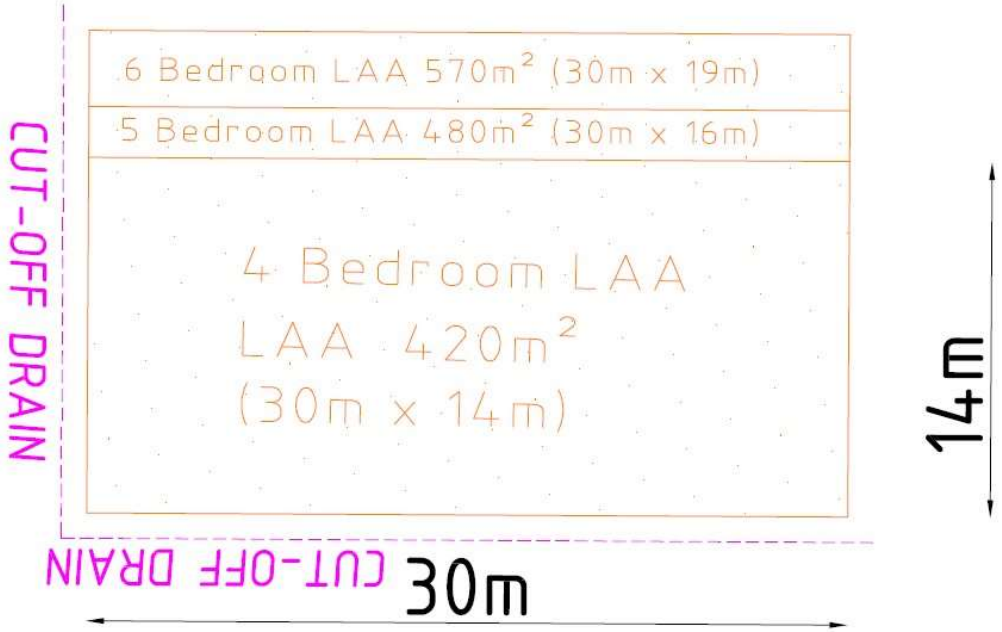

Figure 4: Proposed LAA Sizes depending on amount of bedrooms – No. 34 Simper Court, DROUIN.

Note: This site plan is not to scale and an indicative guide only. See site survey for more information.

4. Soil Assessment

Three (3) boreholes were completed at the site as shown on the site plan. The bore log of the boreholes are provided below and showed that the site consists of a Dark Brown clayey SILT, overlaying a Brown / Grey silty CLAY overlying Brown / Grey mottled Orange Silty CLAY.

Borehole 1

Depth (m)		Description	Strength / Density	Moisture
0.300		Clayey SILT Dark brown Paler with depth	Soft	Moist
1.000		Silty CLAY Grey / Brown Becomes wet below 1200.	Stiff	Moist
2.000		Silty CLAY Grey / brown mottled orange Paler with depth	Stiff	Very Moist

Borehole 2

Depth (m)		Description	Strength / Density	Moisture
0.600		Clayey SILT Dark brown Paler with depth	Soft	Moist
1.800		Silty CLAY Grey mottled red	Firm	Moist
2.000		Silty CLAY Grey / brown mottled orange Traces of weathered Basalt gravels Paler with depth	Stiff	Very Moist

Borehole 3

Depth (m)		Description	Strength / Density	Moisture
0.500		Clayey SILT Dark brown Paler with depth	Soft	Moist
1.000		Silty CLAY Grey / Brown Traces of weathered Basalt gravels	Stiff	Moist

4.1 Soil Features

Profile Depth – Three (3) boreholes were completed up to 2000mm. The profile for the boreholes is included in the LAA's are shown in the Borehole logs above.

Depth to water table: A Perched water table/ground water was encountered at the time of the investigation. It is possible that there may be a transient 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 silty 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 ranged between 4.9 to 5.2. 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) ranged between 0.037 to 0.16. This indicates that the CLAY soils are slightly-saline. This will affect sensitive crops.

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 these sites on Lots 1, 2 3, 4, 5, 6, 7,8, 9 and 10. 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. Pressure compensated irrigation lines are essential to distribute the effluent evenly over the distribution bed and mound. 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 secondary treatment systems are used as it will reduce the risks at the site to negligible levels.

For Lots 1, 2 3, 4, 5, 6, 7,8, 9 and 10, the size of the irrigation areas 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 areas 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 LAA will reduce the risk of a perched water table occurring.

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

Table 3: 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's at a rate of 1kg per square meter and should be spread over the LAA's 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's that has been determined to be the most appropriate for the systems on the site are shown on the previous site plan. This system also allows for the subsurface irrigation or mound system to be set up on 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.

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's. 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 500mm deep, **to a depth 500mm into the clayey SILT soils**. Due to the perched water table and free flowing soils it is recommended that the cutoff drain is installed in the summer months. 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.

Due to the gentle slope on some of the sites a pit with a pump may be required in order to remove the water from the cut-off drain away from the LAA's. A suitable qualified and licensed plumber is required to install the cut off drain and pit with pump if required.

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

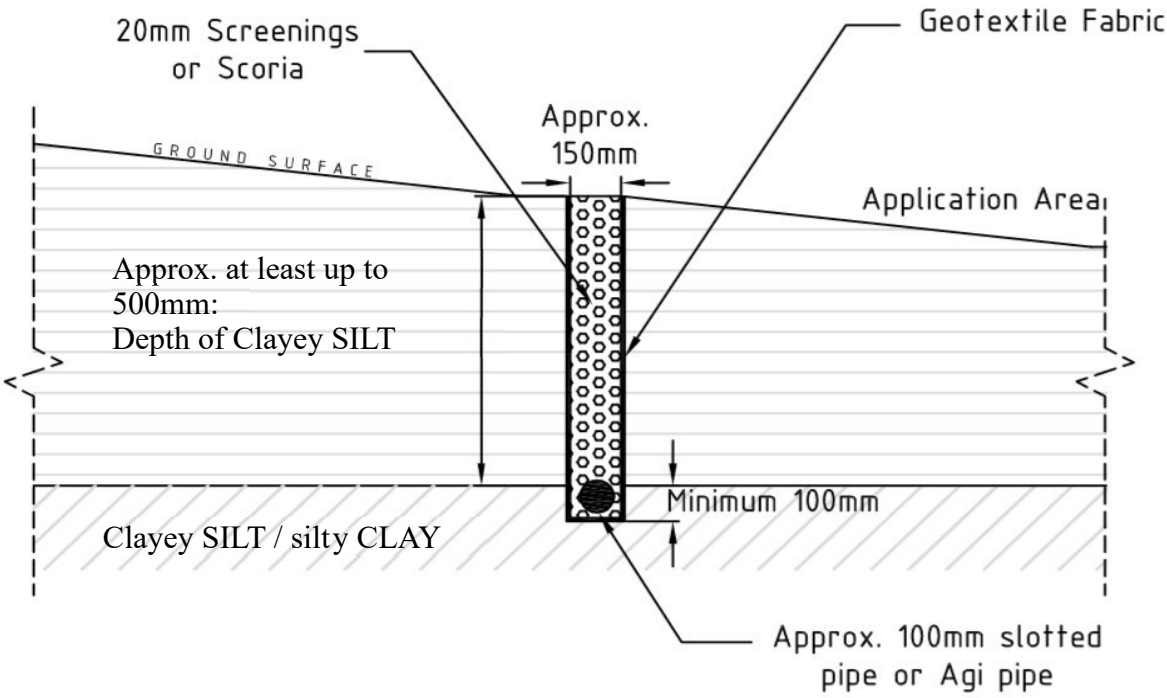

Figure 7: Typical Cut-off drain design socked into the clayey SILT soils for sub-surface irrigation.
NOTE: Drawing is not to scale.

The cut-off drain is to be completed along the high sides of the LAA's and completed across the site. This will give the drain somewhere to flow to as shown on the site plan of the site. Due to the perched water table and free flowing soils it is recommended that the cutoff drain is installed in the summer months.

Due to the gentle slope on some of the sites a pit with a pump may be required in order to remove the water from the cut-off drain away from the LAA's. A suitable qualified and licensed plumber is required to install the cut off drain and pit with pump if required.

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

For Lots 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 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 sites. It is recommended that a secondary treatment facility, either a sand filter or an AWTS 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 either 400, 480 or 560 square meters, depending on the number of bedrooms the final house designs adopt. Drawn on the previous site plan is the recommended LAA option.

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 mitigate the risk of a perched water table ingress during the wetter months of the year. The cut off drain and if required pit with a pump must be installed by a licensed and suitably qualified plumber. It is recommended that the cut-off drain is installed 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.

Alternative options for the sites are that a Vegetated Recirculating Evapotranspiration Bed or a Absorbs Advanced Secondary Wastewater System can be used. Further information on the system and its installation will be provided by the supplier.

The risks associated with the sites are addressed through the use of a Vegetated Recirculating Evapotranspiration Bed which will have a smaller footprint, requiring less removal of native vegetation and less earthworks, cut and fill. The Vegetated Recirculating Evapotranspiration Bed can also be used along the existing slope and be used to create a tiered effect down the slope of the site.

As the Vegetated Recirculating Evapotranspiration Bed does not use the existing soil this also lowers the risk of any issues at the site

9. 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

10. Sources of Information

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

1) "*Guideline for onsite wastewater management", Environmental Protection Agency, May 2024.*

2) *"Guideline for onsite wastewater effluent dispersal and recycling systems", Environmental Protection Agency, May 2024.*

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

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

11. Site Photos






































Appendix A - Water/Nitrogen Balance Tables

Hardcore Geotech Pty Ltd — HARDCORE 01

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

Rainfall Data: Drouin Bowling Club - 85023 / Evaporation Data: Noojee (Slivar) - 085277

Location: No 34 Simper Court, DROUIN
Date: 6th August, 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	152	126	102	63	43	36	40	56	75	99	114	133	1040
Rainfall (Mean)		mm	B1	61	55	68	83	92	86	87	95	100	105	89	80	1002.5
Effective rainfall		mm	B2	55	50	61	75	83	77	78	86	90	95	80	72	902
Peak seepage Loss[1]		mm	B3	140	126	140	135	140	135	140	140	135	140	135	140	1643
Evapotranspiration(KA)		mm	C1	106	88	72	38	22	16	16	25	41	64	80	93	662
Waste Loading(C1+B3-B2)		mm	C2	191	164	150	98	78	74	77	79	86	109	135	161	1402
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 Wastewater		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	0	626
Irrigation Area(E/C2)annual.		m²	G													400
Surcharge		mm	H	-133	-112	-92	-42	-20	-18	-19	-21	-30	-51	-78	-103	0
Actual seepage loss		mm	J	7	14	48	93	120	117	120	119	105	88	57	37	925
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 : 4.5mm (<12% ksat)												
Lagoon Area:	0	ha	L	CROP FACTOR												
Wastewater(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):	4.5	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	m²	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													
Plant Uptake:	220	kg/ha/y	T													
Average daily seepage:	2.5	mm	U													
Annual N load:	6.57	kg/yr	V													
Area for N uptake:	299	m²	W													
Application Rate:	2.5	mm	X													

Species:	Kg/ha.yr	pH	Species:	Kg/ha.yr	pH	Species:	Kg/ha.yr	pH
Ryegrass	200	5.6-8.5	Bent grass	170	5.6-6.9	Grapes	200	6.1-7.9
Eucalyptus	90	5.6-6.9	Couch grass	280	6.1-6.9	Lemons	90	6.1-6.9
Lucerne	220	6.1-7.9	Clover	180	6.1-6.9	Ccunn'a	220	6.1-7.9
Tall fescue	150-320	6.1-6.9	Buffalo (soft)	150-320	5.5-7.5	Pradiata	150	5.6-6.9
Rye/clover	220		Sorghum	90	5.6-6.9	Poplars	115	5.6-8.5

Figure 6 (above): Water/Nitrogen Balance for a four (4) bedroom, five (5) person maximum occupancy house design.

Appendix B - Water/Nitrogen Balance Tables

Hardcore Geotech Pty Ltd

HARDCORE 01

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

Rainfall Data: Drouin Bowling Club - 85023 / Evaporation Data: Noojee (Slivar) - 085277

Location: No 34 Simper Court, DROUIN

Date: 8th August, 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	152	126	102	63	43	36	40	56	75	99	114	133	1040
Rainfall (Mean)		mm	B1	61	55	68	83	92	86	87	95	100	105	89	80	1002.5
Effective rainfall		mm	B2	55	50	61	75	83	77	78	86	90	95	80	72	902
Peak seepage Loss[1]		mm	B3	140	126	140	135	140	135	140	140	135	140	135	140	1643
Evapotranspiration(IXA)		mm	C1	106	88	72	38	22	16	16	25	41	64	80	93	662
Waste Loading(C1+B3-B2)		mm	C2	191	164	150	98	78	74	77	79	86	109	135	161	1402
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	0	626
Irrigation Area(E/C2)annual.		m^2	G													**480**
Surcharge		mm	H	-133	-112	-92	-42	-20	-18	-19	-21	-30	-51	-78	-103	0
Actual seepage loss		mm	J	7	14	48	93	120	117	120	119	105	88	57	37	925
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 : 4.5mm (<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):	4.5	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/y	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 7 (above): Water/Nitrogen Balance for a five (5) bedroom, six (6) person maximum occupancy house design.

Appendix C - Water/Nitrogen Balance Tables

Hardcore Geotech Pty Ltd

HARDCORE 01

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

Rainfall Data: Drouin Bowling Club - 85023 / Evaporation Data: Noojee (Slivar) - 085277

Location: No 34 Simper Court, DROUIN
Date: 8th August, 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	152	126	102	63	43	36	40	56	75	99	114	133	1040
Rainfall (Mean)		mm	B1	61	55	68	83	92	86	87	95	100	105	89	80	1002.5
Effective rainfall		mm	B2	55	50	61	75	83	77	78	86	90	95	80	72	902
Peak seepage Loss[1]		mm	B3	140	126	140	135	140	135	140	140	135	140	135	140	1643
Evapotranspiration(IXA)		mm	C1	106	88	72	38	22	16	16	25	41	64	80	93	662
Waste Loading(C1+B3-B2)		mm	C2	191	164	150	98	78	74	77	79	86	109	135	161	1402
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	0	626
Irrigation Area(E/C2)annual.		m^2	G													**560**
Surcharge		mm	H	-133	-112	-92	-42	-20	-18	-19	-21	-30	-51	-78	-103	0
Actual seepage loss		mm	J	7	14	48	93	120	117	120	119	105	88	57	37	925
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 : 4.5mm (<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):	4.5	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/y	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 8 (above): Water/Nitrogen Balance for a six (6) bedroom, seven (7) person maximum occupancy house design.

Appendix D - 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 34 Simper Court, DROUIN
Job No: 240806-LCA

HardCore Geotech

LAND FEATURE	LAND CAPABILITY RISK RATING: LOW	MEDIUM	HIGH	LIMITING	COMMENTS
Available land for LAA	**Exceeds LAA and duplicate LAA requirements**	Meets LAA and duplicate LAA requirements	Meets LAA and partial duplicate LAA requrements	Insufficient LAA area	Sufficient 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 & East facing
Exposure	**Full sun and/or high wind or minimal shading**	Dappled light (partial shade)	Limited light, little wind to heavily shaded all day	perpetual shade	Full Sun
Site Drainage (runoff/run-on)	**Very slow to slow**	Moderate	Rapid	Very rapid or depressed	A four site are relatively flat. A cut off drain has been directed around the high side of the LAA
Slope gradient (%)	0-2	**2-15**	15-25	25+ or locally depressed	Slope is approximately 5%
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%	10% slope
Landslip	**Potential**	Potential	Potential	Existing	No signs of landslip at the site
Erosion potential	**Low**	Moderate	High	No practical amelioriation	Non-dispersive soils
Flood/ Innundation	Never	**YES**	<1% AEP	>5% AEP	Site is located in the lower areas of Drouin, cut off drains have been directed.
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. There are dams and springs that are either downslope or at least 30m away and there are drains that have been filled and redirected. There is also a watercouse through the site and there needs to be a 30m offset from the LAA's.
Distance to potable surface waters (m)	**Buffer distance complies with code requirements (>100m for waterways, >300m for reserviors)**		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 (<50m)**	Buffer distance complies with code	Buffer distance does not comply with code requirements	No suitable treatment methods	There are no bores within the proposed LAA
Vegetation	**Plentiful / healthy vegetation**	Moderate vegetation	Sparse or no vegetaion	Propogation not possible	Good cover of grass pasture, various trees across site
Trafficking	**None to low**	Moderate	High	Excessive	Provide fencing to stop any live stock and vehicle access
Depth to water table (potentiometric) (m)	**>2**	2 to 1.5	<1.5	surface	Cut off drain around the high sides of the LAA will prevent overland flow entering the LAA
Depth to water table (seasonal perched) (m)	>1.5	**0.5 to 1.5**	<0.5	surface	Cut off drain around the high sides of the LAA will prevent overland flow entering the LAA.
Rainfall (Mean)	<500	500-750	750-1000	**>1000**	Drouin Bowling Club - Station No. 85023
Pan Evaporation (mean) (mm)	>1250	**1000-1250**	750-1000	<750	Noojee (Slivar) - Station No. 085277
SOIL PROFILE CHARACTERISTICS					
Structure	High or moderately structured	**Weakly Structured**	Structureless, massive or hardpan		
Fill materials	**Nil or mapped good quality topsoil**	Mapped variable depth and quality materials	Variable quality and/or uncontrolled filling	Uncontrolled poor quality/unsuitable filling	No fill
Thickness: (m)					
Trenches and beds	>1.4		<1.4	**<1.2**	Not suitable for the site conditions
Subsurface Irrigation	1.5+	1.0 to 1.5	0.75	<0.75	
Permiability (limiting Horizon) (m/day)	0.15-0.30	0.03-0.15, 0.3-0.6	0.01-0.03, 0.6-3.0	>3.0, <0.03	
Permiability (buffer evaluation) (m/day)	<0.3	0.3-3	6 to 5	>5	
Stoniness	**<10**	10 to 20	>20		Some rock fragments and basalt gravels
Emerson number	**4, 5, 6, 8**	7	2, 3	1.0	Not dispersive
Dispersion Index	**0**	1 to 8	8 to 15	>15	Not dispersive
Reaction Trend (pH)	**5.5-8**	4.5-5.5	<4.5, >8		pH ranged between 3.8 to 4.5- slightly acidic, needs lime fertilisers.
E.C. (dS/m)	**<.8**	0.8-2	>2	>2	Ranged between 0.19 to 0.36 - soils are slightly saline may affect crops
Sodicity (ESP) (%)	<6	6 to 8	>8	>14	Not measured however due to the pH will not be a problem
Cation Exchange Capacity (cmol/kg)	**>15**	5 to 15	<5		Heavy Clay 20-30 as per published values
Free Swell	**<30**	30 to 80	80 to 120	>120	Measured free swell at BH3 - 10mm