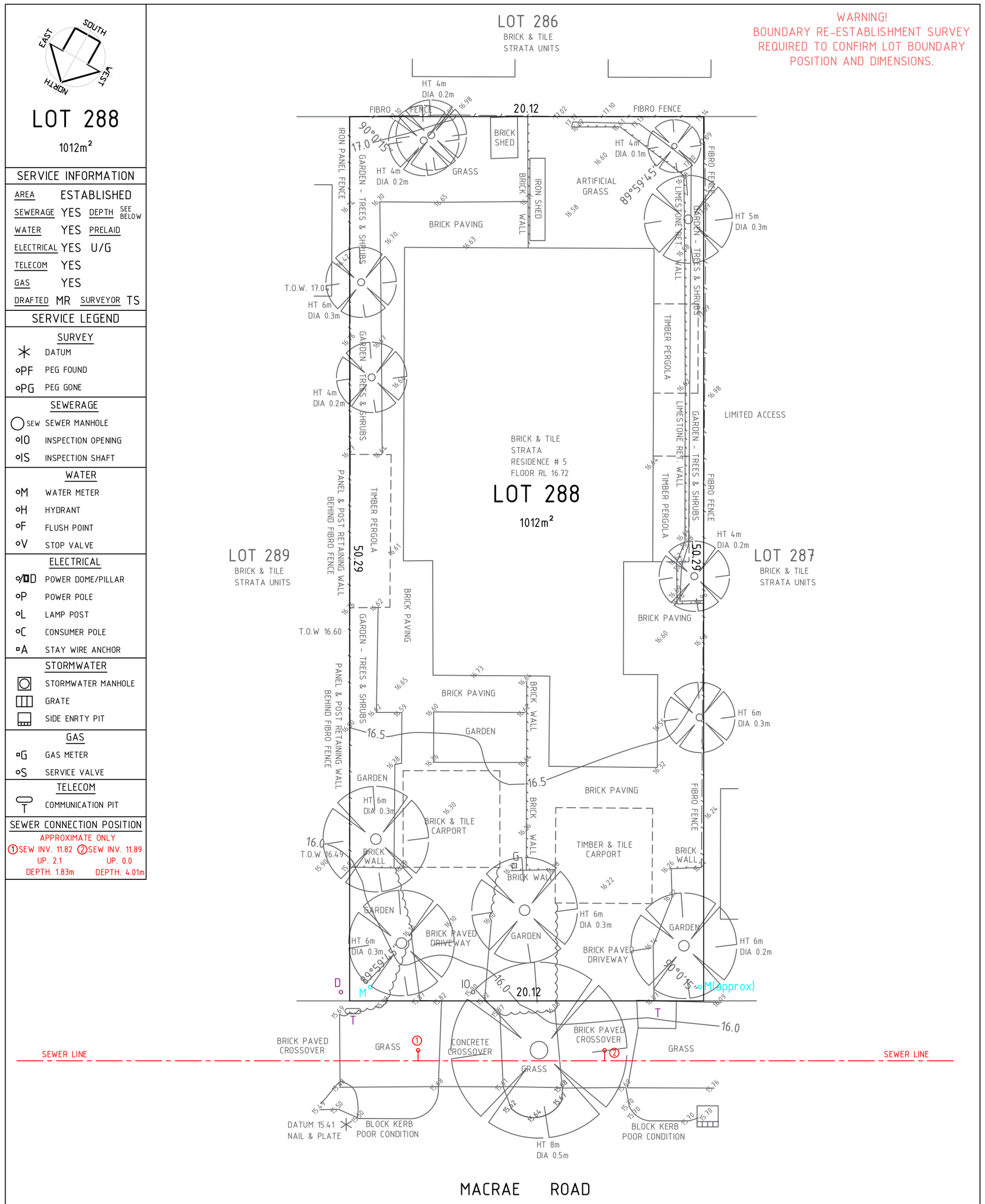
5 MACRAE ROAD, APPLECROSS

ARCHITECTURAL DRAWINGS FOR
DEVELOPMENT APPLICATION

PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA000**	**COVER PAGE**

DEVELOPMENT APPLICATION

plus architecture



CLIENT: STAG DEVELOPMENTS

ADDRESS: LOT 288 (#5) MACRAE ROAD, APPLECROSS

PLAN:	C/T:	AUTHORITY:
P4990	SP11566	CITY OF MELVILLE

DATE: 12/05/2021 JOB REFERENCE: DP2175 - Macrae Rd 5, Applecross

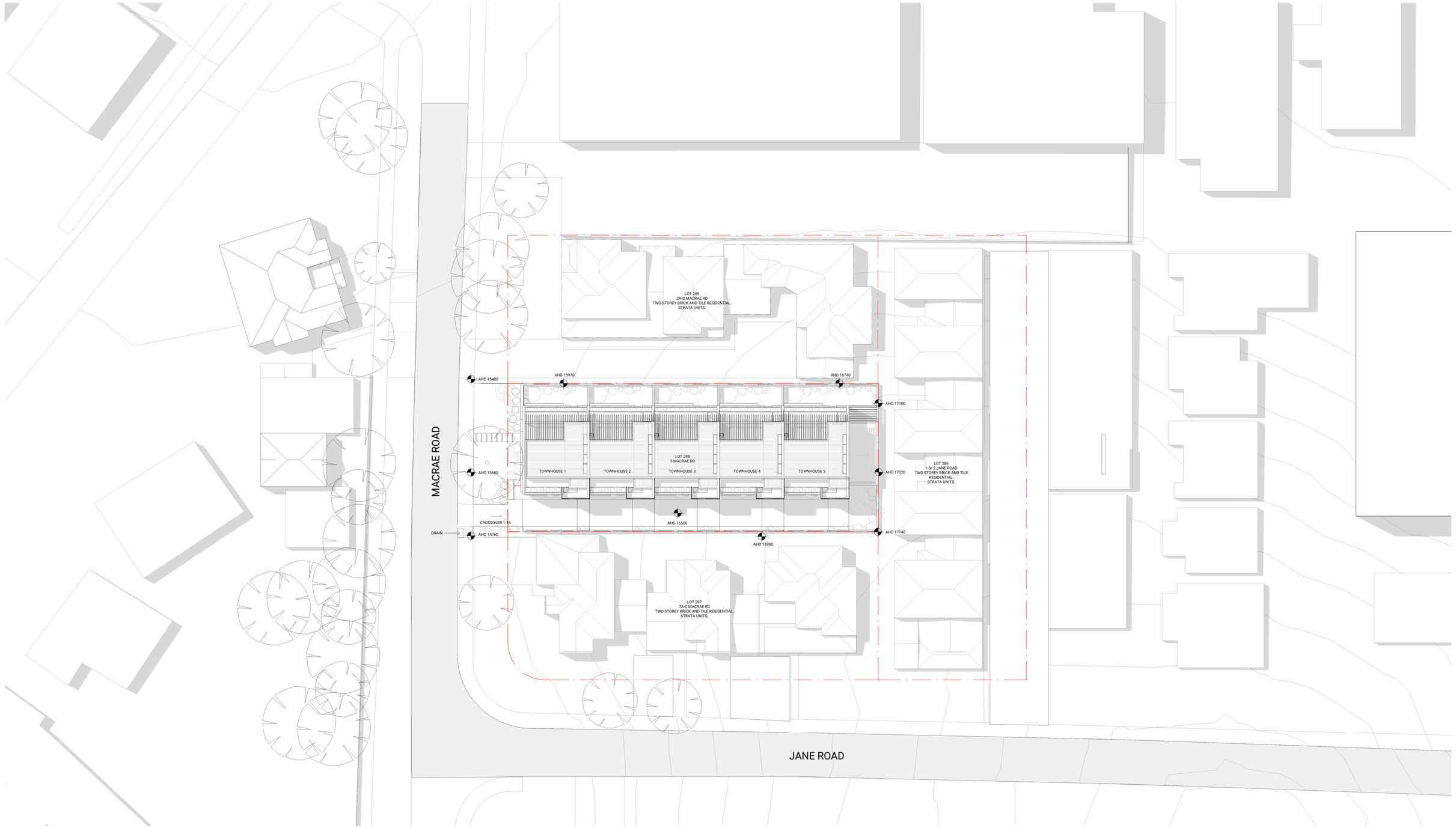
H. Grid : LOCAL	Local level : N/A	A.H.D. value SEWER M/H Distance
V. Datum : AHD	A.H.D. level : 15.13	derived from : 1375 from Datum : 20.62m

VERSION	DATE	DESCRIPTION	APPROVED BY

DEVELOPED
Property Advisory | Town Planning | Project Management | Surveying
Email: projects@dvlpd.com.au
Website: www.developedproperty.com.au
Office: 315 Rokeby Road, Subiaco WA 6008
Mail: P.O.Box 61 Scarborough WA 6019

IMPORTANT NOTES:
1. The information on this drawing is current at the date of survey.
2. All services are to be confirmed with relevant authorities. This include without limitation; Sewerage / Water / Drainage / Electrical / Gas & Communications
3. Further Limitations / Interests / Encumbrances / Notifications may be listed on the Certificate of Title.
4. Original lot dimensions taken from Landgate Survey Plans.
5. Boundary Re-establishment Survey required to confirm lot boundary position and dimensions.
6. The sole purpose of this plan is for presentation to WAPC for process of application for subdivision to produce a conditional approval.
7. Final lot numbers, dimensions and areas may vary due to WAPC requirements, government authority conditions and final field survey.
8. This plan is for the purpose of application and in no way represents WAPC conditional approval.
9. Developed Property does not accept liability for loss or damage to any person or corporation who may rely on this plan for any purpose.
10. Permission is required from Developed Property for the reproduction or copying of this plan.

Scale: 1:200 at A3 (0 5 7.5 10 15)



PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA100**	**SITE PLAN**

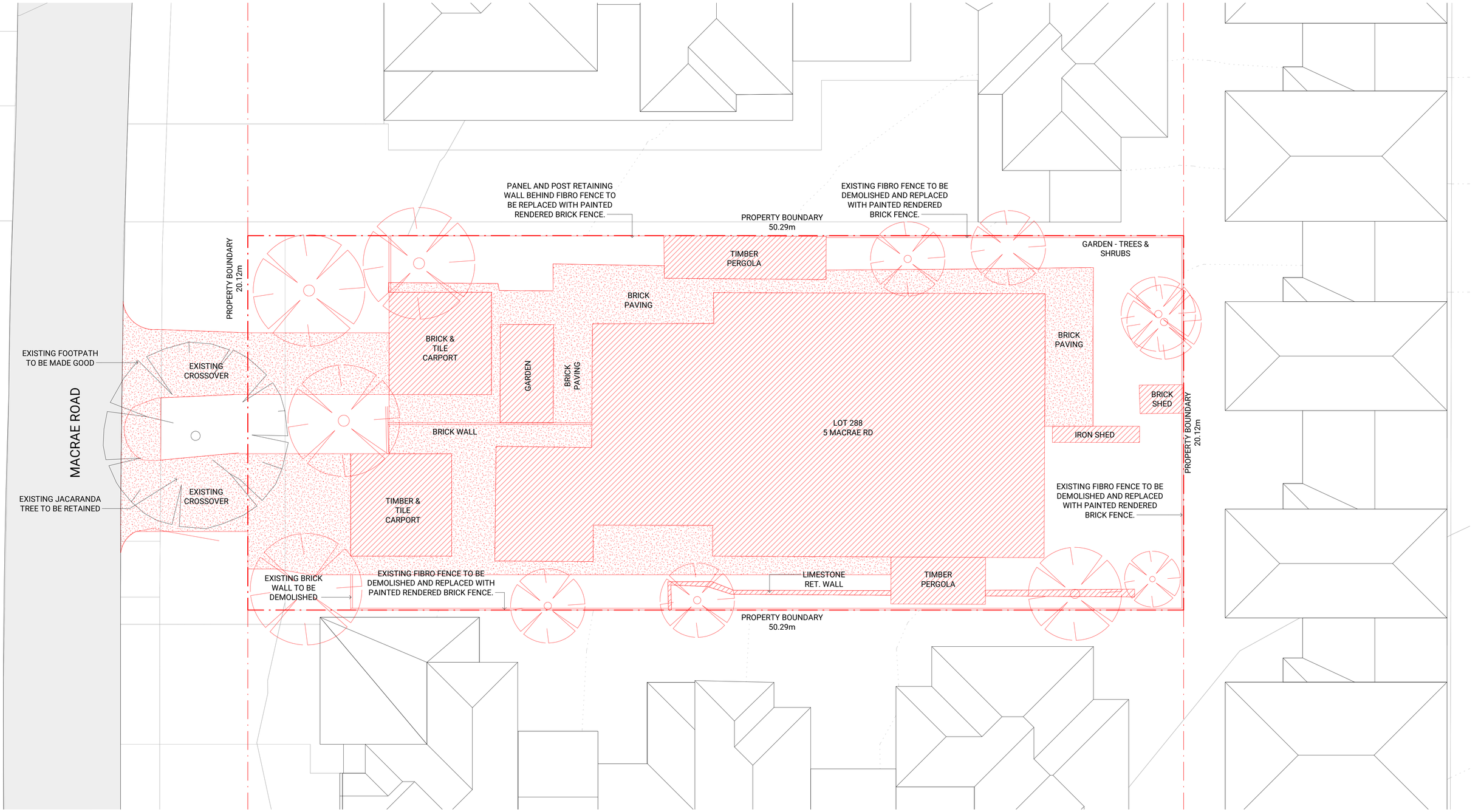
NORTH

SCALE

1 : 250 @A1

plus architecture

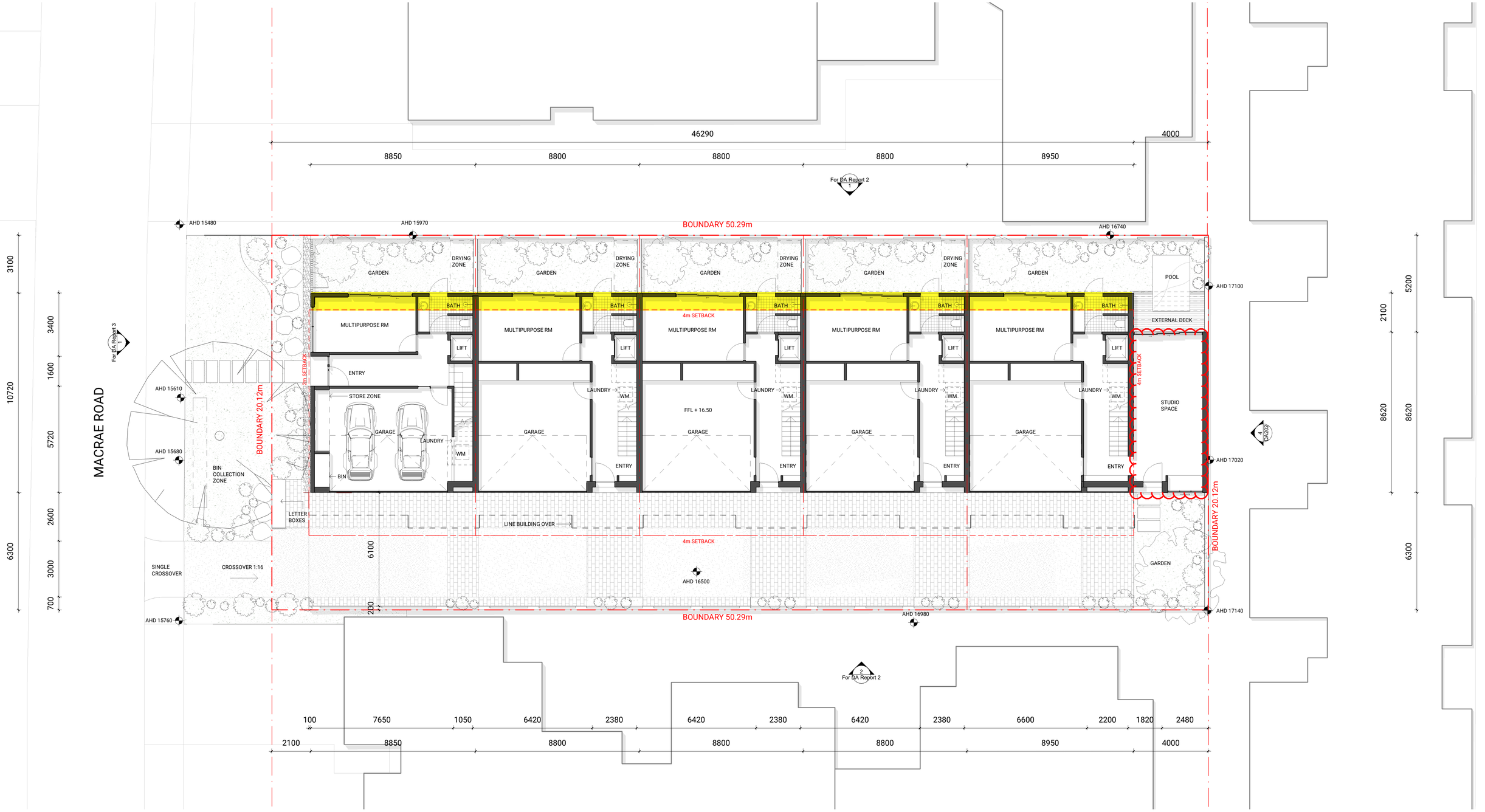
DEVELOPMENT APPLICATION



PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING	NORTH	SCALE
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA101**	**DEMOLITION PLAN**		1 : 100 @A1

plus architecture

DEVELOPMENT APPLICATION



PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA102**	**GROUND FLOOR PLAN**

NORTH

SCALE
1 : 100 @A1

DEVELOPMENT APPLICATION

MACRAE ROAD

BOUNDARY 50.29m

BOUNDARY 20.12m

BOUNDARY 20.12m

2m SETBACK

4m SETBACK

4m SETBACK

4m SETBACK

BOUNDARY 50.29m

BATH
BED 1
LIFT
GALLERY
BED 2
BED 3
FFL + 19.70
PERGOLA
ROOF

2000 44290 4000

5550 3550 5250 3550 5250 3550 5250 3550 5250 3550

900 1000 1650

For DA Report 2 1

For DA Report 3 1

For DA Report 2 2

DA202 4

15020 5100 3000 4200 200

1600 1850 300 7370 1100 300 900

2800 2200 300 8390 8620 12620 900 3330 1800 4500

5370 3730 5070 3730 5070 3730 5070 3730 5070 3730

900 420

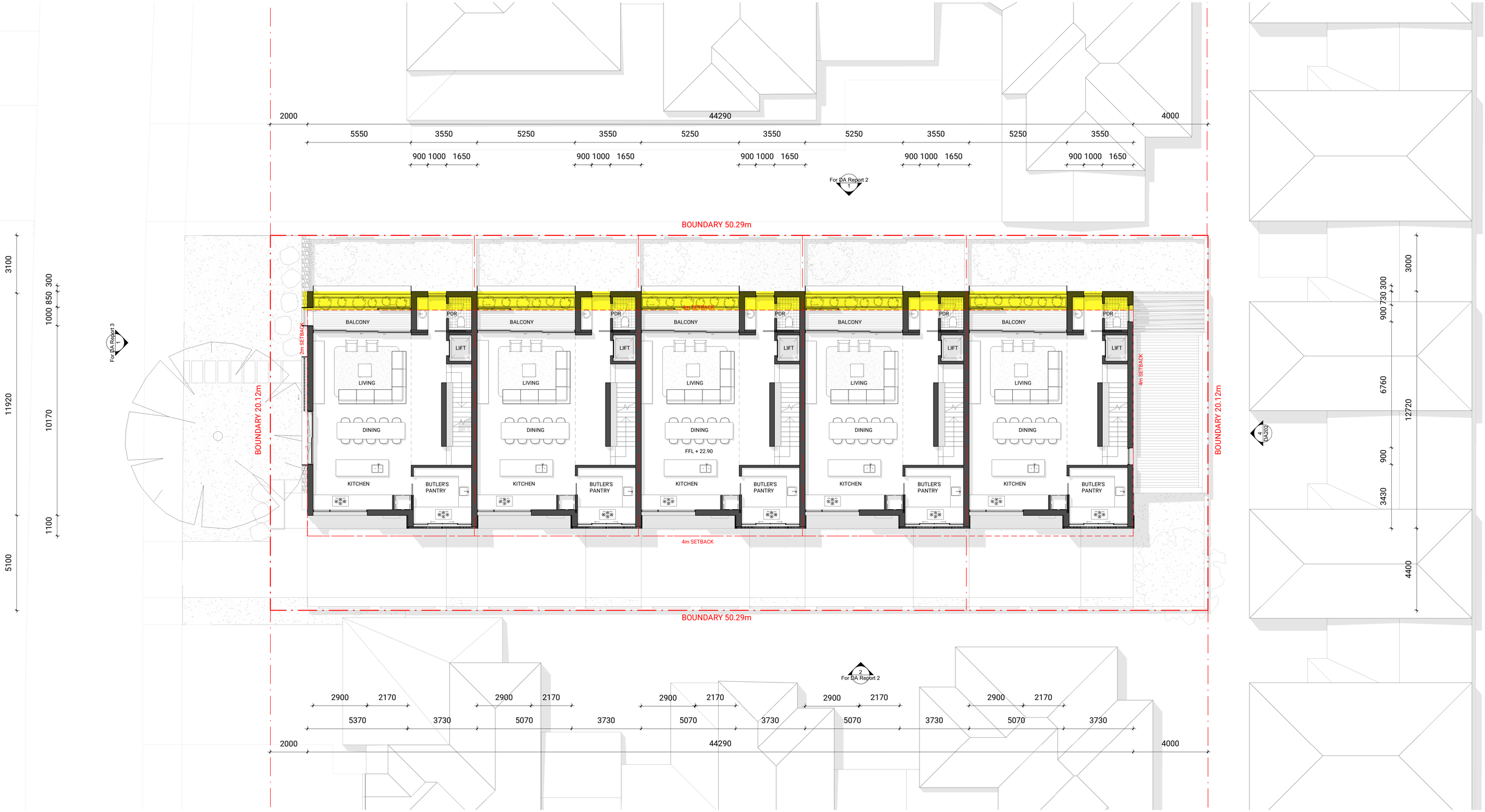
PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA103**	**LEVEL 01 FLOOR PLAN**

NORTH

SCALE
1 : 100 @A1

plus architecture

DEVELOPMENT APPLICATION



PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA104**	**LEVEL 02 FLOOR PLAN**

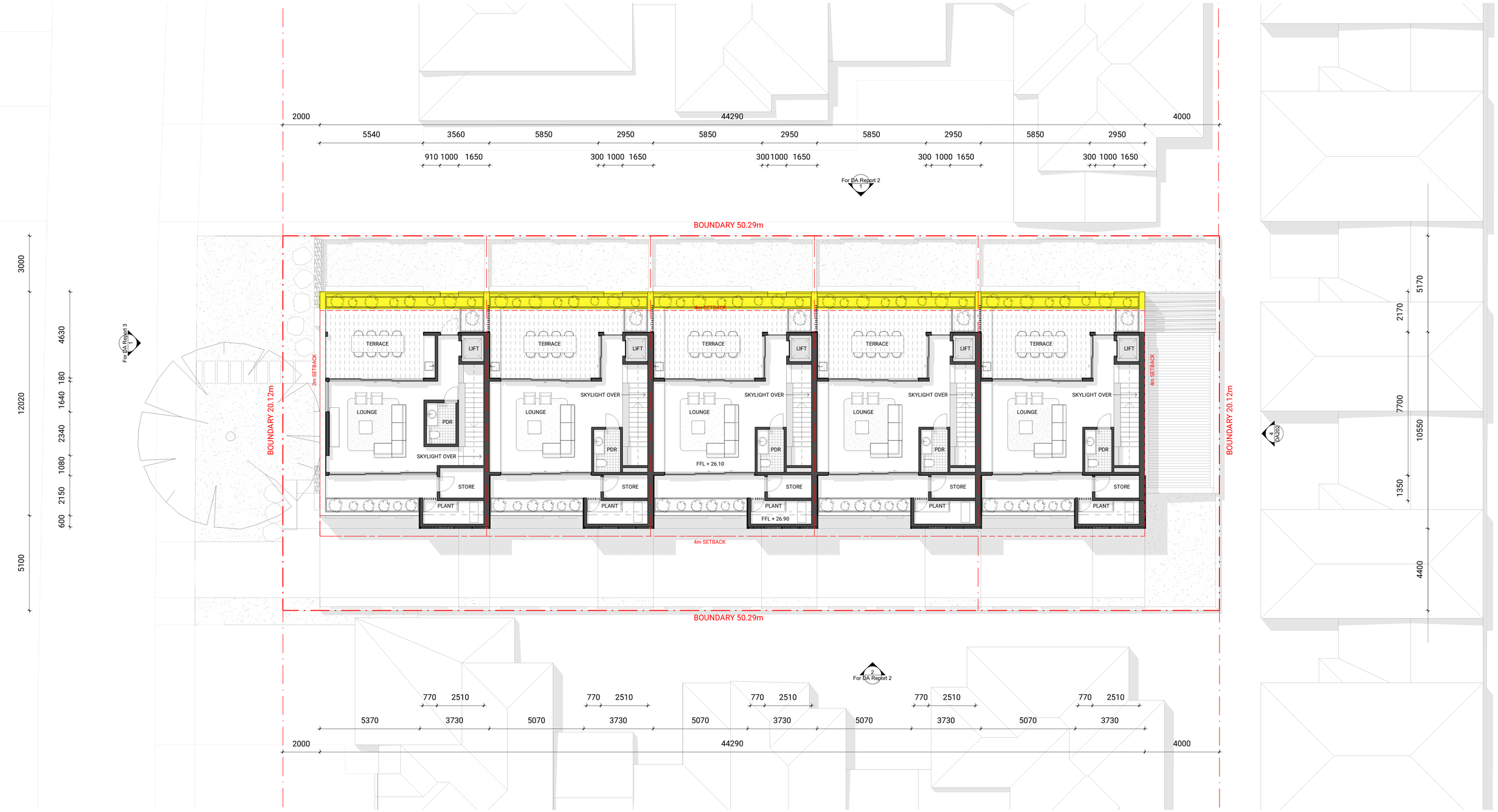
NORTH

SCALE

1 : 100 @A1

plus architecture

DEVELOPMENT APPLICATION



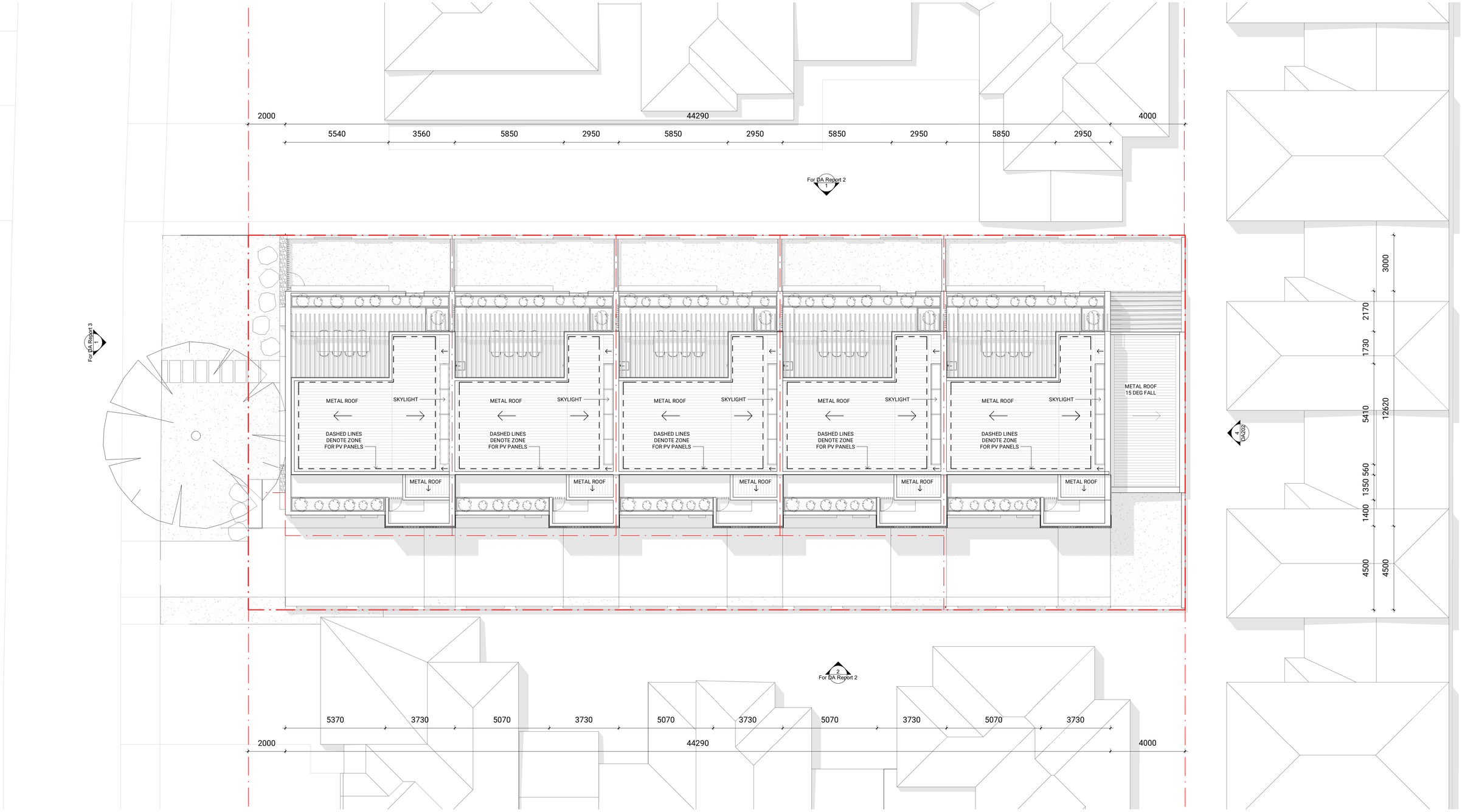
PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA105**	**LEVEL 03 FLOOR PLAN**

NORTH

SCALE: 1 : 100 @A1

plus architecture

DEVELOPMENT APPLICATION



PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA106**	**ROOF PLAN**

NORTH

SCALE

1 : 100 @A1

plus architecture

DEVELOPMENT APPLICATION

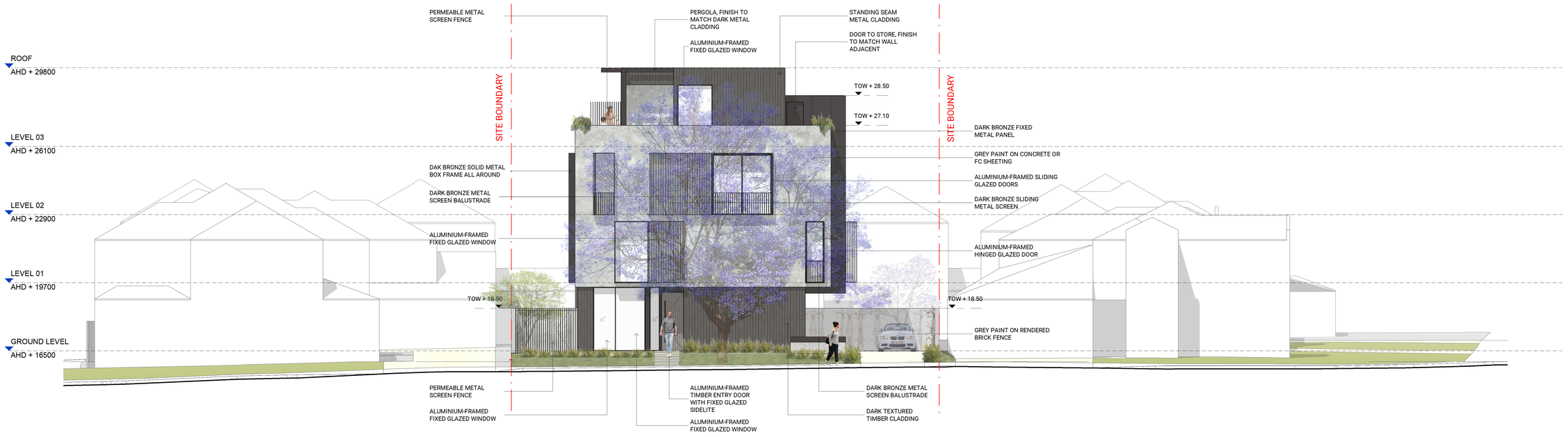
1 DA102 SOUTH-WEST ELEVATION
Scale: 1 : 100

2 DA102 NORTH-EAST ELEVATION
Scale: 1 : 100

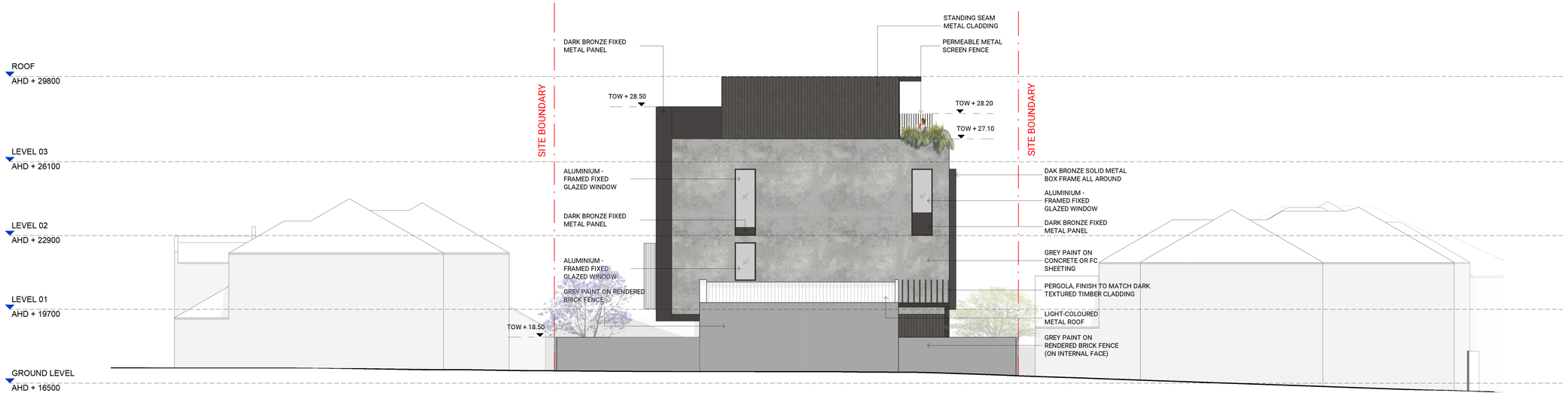
PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING	NORTH	SCALE
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA201**	**SOUTH-WEST ELEVATION AND NORTH-EAST ELEVATION**		**1 : 100 @A1**

plus architecture

DEVELOPMENT APPLICATION



3 DA102 NORTHERN ELEVATION
Scale: 1 : 100

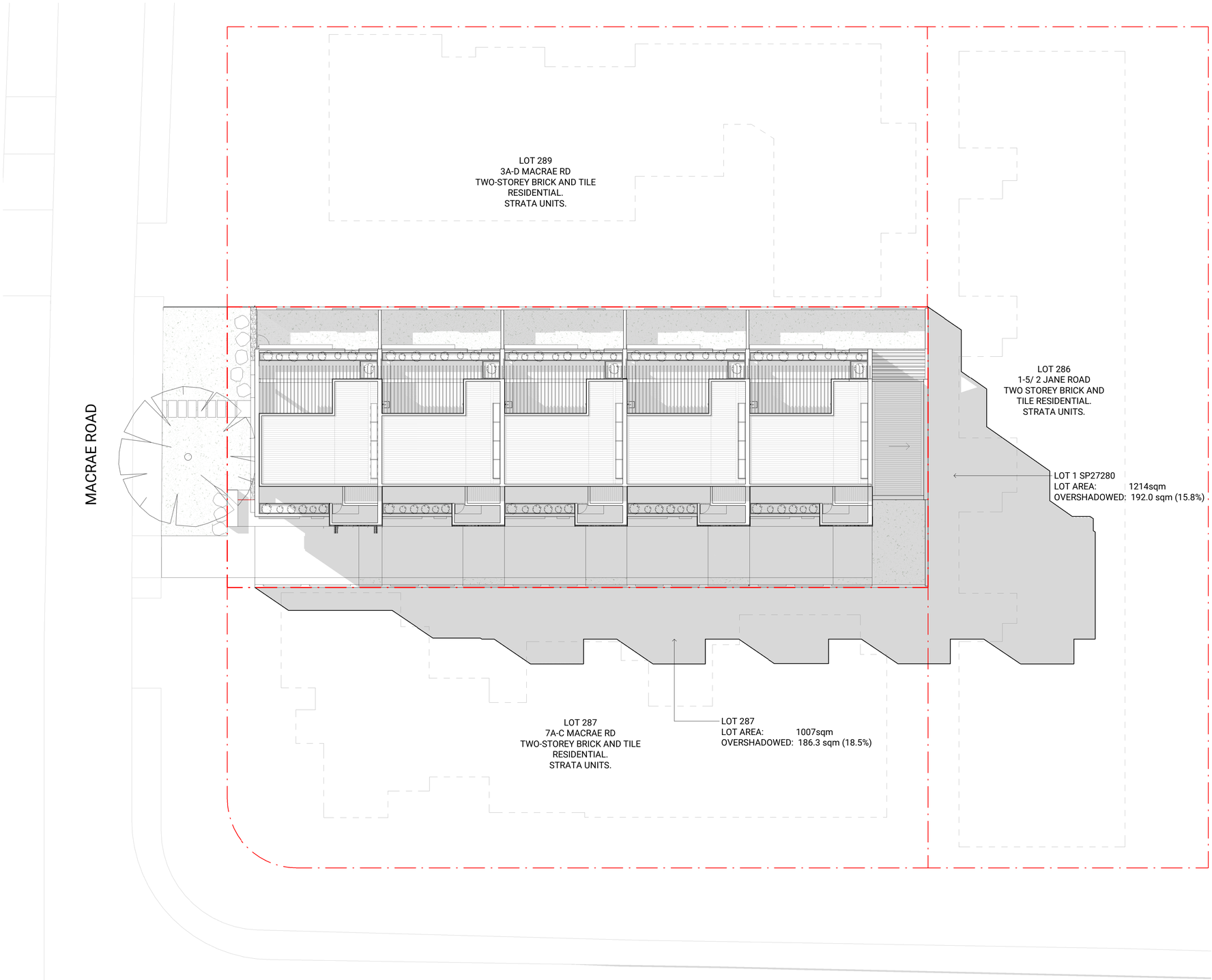


4 DA102 SOUTHERN ELEVATION
Scale: 1 : 100

PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING	NORTH	SCALE
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA202**	**NORTH-WEST ELEVATION AND SOUTH-EAST ELEVATION**		**1 : 100 @A1**

DEVELOPMENT APPLICATION

plus architecture



PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA400**	**SHADOW DIAGRAMS - JUNE 21 AT 12PM**

NORTH

SCALE
1 : 150 @A1

plus architecture

DEVELOPMENT APPLICATION

PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING	NORTH	SCALE
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA401**	**PERSPECTIVE**		@A1

DEVELOPMENT APPLICATION

plus architecture

PROJECT	JOB NUMBER	DATE	REVISION	DRAWING No.	DRAWING	NORTH	SCALE
MACRAE 5 MACRAE RD, APPLECROSS WA 6153	80377	29/10/21	A	**DA402**	**PERSPECTIVE**		@A1

DEVELOPMENT APPLICATION

5 MACRAE ROAD, APPLECROSS

DEVELOPMENT APPLICATION PACKAGE

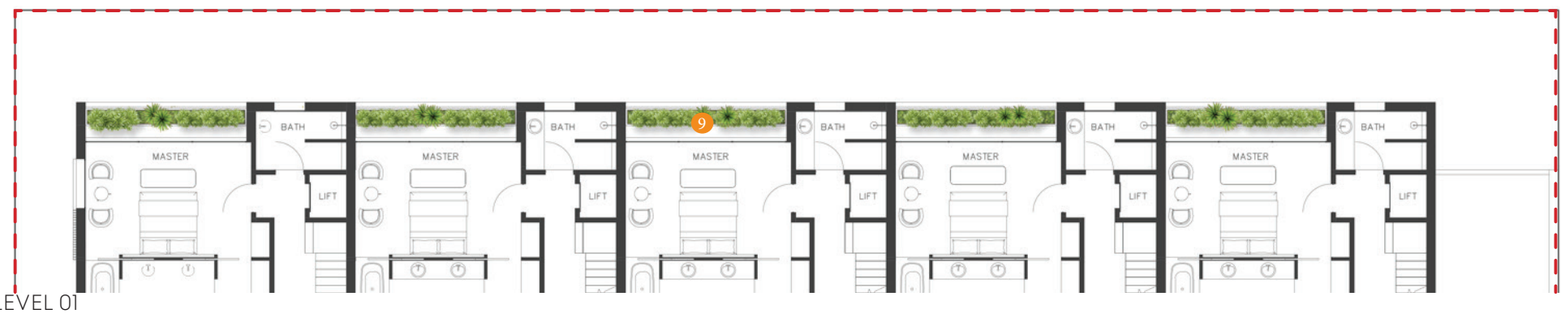
LANDSCAPE DESIGN

ISSUE FOR
DEVELOPMENT APPLICATION

TDL
BEYOND GREEN

LANDSCAPE MASTERPLAN

GROUND FLOOR
SCALE 1:200



LEVEL 01
SCALE 1:200

LEVEL 02
SCALE 1:200

LANDSCAPE DESIGN NOTES

1. Pedestrian access to the front unit.
2. Reinstated grass verge.
3. Existing street tree *Jacaranda mimosifolia* to be retained.
4. Proposed groundcovers and flowering shrubs on the verge to create a welcoming frontage and also soften the building boundary. Shade tolerant groundcover to be planted under existing street tree.
5. Private courtyard with concrete slab steppers, small trees, a mix of flowering shrubs and groundcovers to create seasonal colour and interests.
6. Proposed pool and deck.
7. Permeable paving with smoother texture for pedestrian use and to break up the long driveway while guiding entry to each unit.
8. South west garden to be filled with a medium tree (*Jacaranda mimosifolia*) shade tolerant groundcovers and low shrubs.
9. Planter with flowering shrubs, climbers and trailing shrubs to provide some shade interest to the adjacent room.
10. Herbs and vegetable garden.
11. Proposed small trees, hedges and climbers along driveway.
12. Proposed cobblestone paving to slow down vehicular movement.

PRELIMINARY TREE SELECTION


Pyrus calleryana


Tristaniopsis luscious


Jacaranda mimosifolia

PRELIMINARY PLANT SELECTION


Acacia saligna prostrate


Anigozanthos manglesii


Casuarina Glauca 'Cousin It'


Kennedia coccinea


Damperia diversifolia


Dianella revoluta


Dichondra argentea


Eremophila glabra prostrata


Grevillea gin gin gem


Hibertia scandens


Lomandra longifolia 'Tanika'


Murraya paniculata


Liriope muscari


Thryptomene baeckeacea


Trachelospermum jasminoides

TDL BEYOND GREEN

AUTHOR: QY Q.A: GD
SCALE: 1:200@A3

PROJECT #: 13068
DATE: OCTOBER 2021

5 MACRAE ROAD, APPLECROSS
LANDSCAPE DESIGN

SK01-C

LANDSCAPE MASTERPLAN (CONTINUED)

LEVEL 03
SCALE 1:200

LANDSCAPE STANDARDS

GROUND FLOOR
DSA(in ground): 188m2
Permeable Paving: 113.5m2

LEVEL 02
DSA(planter): 0m2

LEVEL 01
DSA(planter): 0m2

LEVEL 03
DSA(planter): 45m2

DEVELOPMENT PROVISIONS

CRITERIA	DEVELOPMENT PROPOSAL
Site Area	1012m2
DSA	188m2 (in ground) + 158.5m2 (planter/permeable paving) = 267.3m2 (26.4%)
Min. Trees	1 medium tree (compliant) 6 small trees (compliant) 14 small trees (non-compliant)

LANDSCAPE DESIGN INTENT

All planting beds are to be fully irrigated and operated off a timed controller with rain sensor shut-off.

Irrigation design to comply with waterwise design principles and the City's tree policy. Detailed irrigation plan to be provided at building license stage.

Water efficient irrigation system to be installed to best WSUD practice, using hydro-zoning and water harvesting principals where appropriate.

Additional waterwise design principles employed:
> Low water use plant selection suited to the local soil complex.
> Complete omission of water intensive turf areas.
> Water retention soil preparation.
> Reduction in soil water loss through perscribing course mulch.

Proposed plant distribution rate 4 per m2.

Proposed plant pot sizes:
> Small Tree 100L
> Medium 200L
> Large Tree 500L
> Shrubs/groundcovers 140mm-200mm

LEGEND

- Planter / Permeable Paving
- Planting in ground/Planter/Permeable Paving (under canopy cover)
- DSA in ground
- Proposed medium tree
- Proposed small tree

TDL BEYOND GREEN

AUTHOR: QY Q.A: GD
SCALE: 1:200@A3

PROJECT #: 13068
DATE: OCTOBER 2021

5 MACRAE ROAD, APPLECROSS
LANDSCAPE DESIGN

SK02-C

DEVELOPED

Planning Justification
5A and 5B Macrae Road, Applecross
5x Grouped Dwellings

Prepared for: City of Melville
On Behalf of: Landowner of 5 Macrae Road
Date: 9/11/2021

DEVELOPED

Document Control

Issue	Date	Statues	Prepared By	Approved By	Circulated
V1	09/10/2021	Draft	K.G		Internally
V2	21/10/2021	Draft	R.D		Internally
V3	10/11/2021	Final	R.D	Daniel Paton	Externally

Table of Contents

1.0 Introduction

Developed Property Pty Ltd have been engaged by the owners of 5A and 5B Macrae Road, Applecross to prepare and submit a development application for 5 grouped dwellings.

5A and 5B Macrae Road (the subject site) is located within the City of Melville's jurisdiction and is therefore governed by the City of Melville's Local Planning Scheme No 6.

This report provides a detailed assessment of the proposal in accordance with the relevant state and local planning frameworks to comprehensively demonstrate the merit of the proposal in relation to the planning framework. Where a variation has been sought against the prescribed development controls, a justification/assessment has been undertaken against the relevant objectives.

1.1 Site Description

The proposed development is located at 5A and 5B Macrae Road, Applecross and currently has an existing residential building on it that comprises of two strata dwellings. The site has a total area of 1012m^2 with a street frontage of 20.12m and a depth of 50.29m. The below table provides a summary of the legal property details of the site.

Table 1 – Property Details

LOT NO.	PROPERTY ADDRESS	LANDOWNER	VOLUME/FOLIO	PLAN NO
1	5A Macrae Road, Applecross		1689/796	SP11566
2	5B Macrae Road, Applecross		1689/795	SP11566

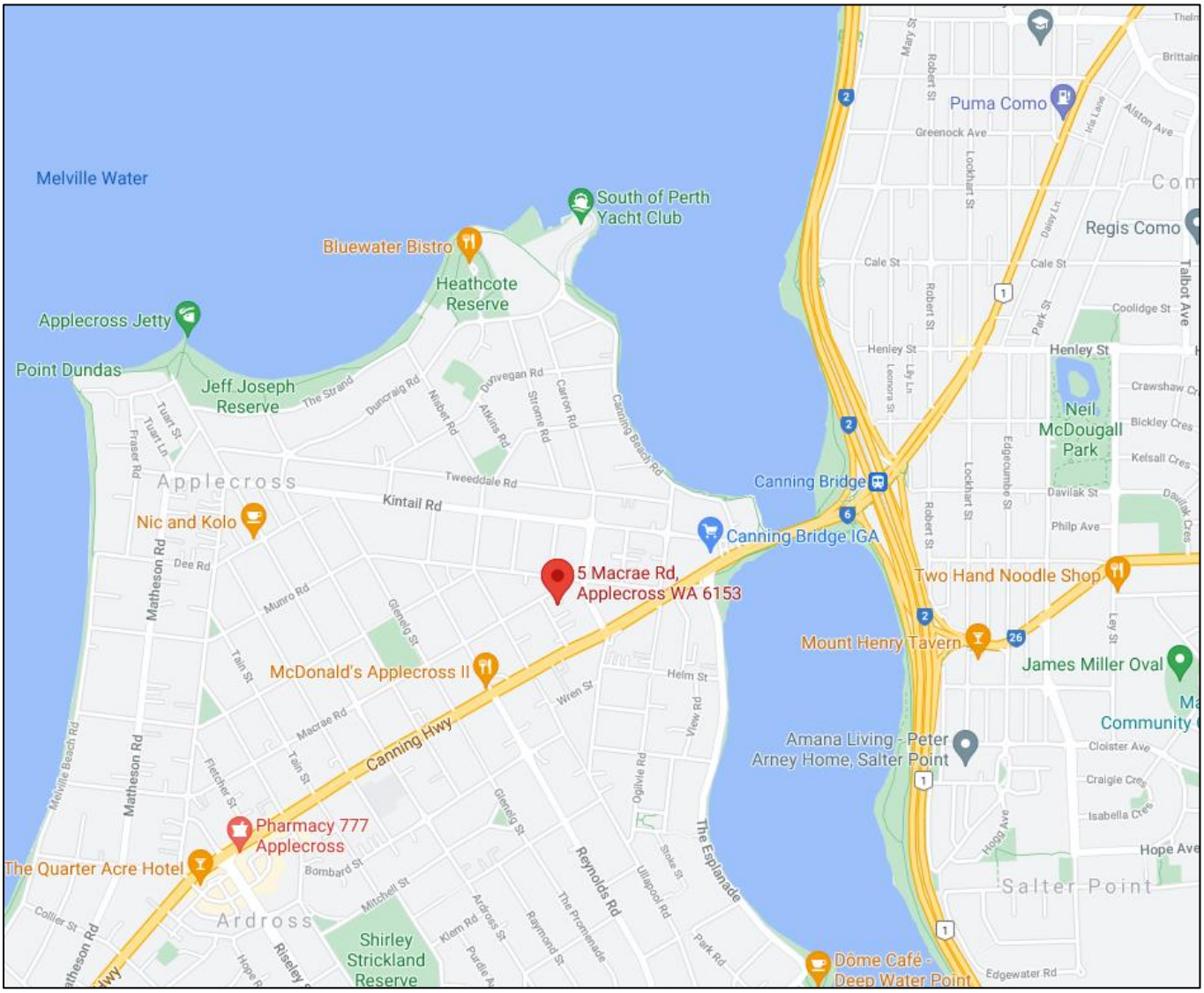


Figure 1- Location Plan (Source: Google Maps)

The site is located 113m north of Canning Highway and 1km from Canning Bridge Train Station. The property is bound by Macrae Road to the north and residential development to the east, west and south.

The surrounding residential land has the same development potential as the site with these areas proposed to have a maximum building height of 6-8 Storeys in height with the adjoining properties on Canning Highway having the potential to be 10 Storeys.

1.2 Proposed Development

The proposed development application relates to the construction of five four-storey dwellings comprising of 3 bedrooms and 2 bathrooms, which have been designed by Plus Architecture.

The dwellings have been designed to take advantage of the prescribed maximum building heights with habitable rooms such as living rooms, dining rooms and outdoor habitable spaces being integrated on the second and third floor level. These dwellings have been located to the north of the allotment to ensure that any overshadowing impacts to adjoining properties are minimised.

The design integrates features such as building articulation and landscaping to ensure that any overlooking issues to the northern neighbour are minimised. This articulation also breaks up the building bulk of the site creating a building façade that has some visual interest.

Careful consideration has been made to ensure that each dwelling has access to ground floor areas of private open space with each dwelling having 24-56m^2 of north facing private open space. Solar access to habitable rooms has been a key design consideration of the proposal with the master bedroom, bedroom 3 and balcony all being located to the north of each dwelling.

Access to the site is proposed off Macrae Road which will require an extension/relocation of the existing crossover. Access to the site will be via a 3m wide crossover which will widen to a 5.5m driveway within the site. There is proposed two-way access being proposed through the inclusion of a passing bay easement to town house number 2.

2.0 Environmental Considerations

This section of the report refers to any environmental considerations that need to be considered/addressed as part of the development application process.

2.1 Heritage

A review of the Heritage Council's inherit database and the City of Melville's intra mapping software has been undertaken with the site not being listed on the State Heritage List or the Local Government's Municipal Heritage List.

2.2 Land Contamination

A review of the Department of Water and Environmental Regulation Services contaminated sites database has been undertaken with the subject site not being listed as a contaminated site.

2.3 Bushfire

A review of the Department of Fire Emergency Services bushfire prone mapping software has been undertaken with the site not being mapped as containing bushfire prone vegetation.

3.0 Planning Framework

This section of the report assesses the proposed development against the relevant state and local planning framework.

3.1 Metropolitan Region Scheme

The subject site is zoned Urban by the Metropolitan Region Scheme. Land uses proposed on the site will need to be consistent with the Local Governments Local Planning Scheme.

3.2 State Planning Policy

The following State Planning Policies are applicable to the site:

- State Planning Policy 2.10 Swan Canning River System Policy
- State Planning Policy 5.4 Road and Rail Noise.
- State Planning Policy 7.0 Design of the Built Environment

In accordance with Canning Bridge Activity Centre Plan, State Planning Policy 7.3 Residential Design Codes – Volume 1 (R-Codes) does not apply. The provisions of the Canning Bridge Activity Centre Plan outline the development controls for the area.

3.2.1 State Planning Policy 2.10 Swan Canning River System Policy

State Planning Policy 2.1 is applicable to all residential, commercial, industrial, rural and recreation land uses within the Catchment of the Peel-Harvey Estuarine System. The policy is intent is to ensure that changes to land use are controlled to avoid and minimise environmental damage to the Swan and Canning River Systems. As part of this application consideration has been made to ensure that all drainage systems operate in accordance with the policy.

3.2.2 State Planning Policy 5.4 Road and Rail Noise

State Planning Policy 5.4 (SPP5.4) applies to any development proposals in Western Australia, where there is a noise-sensitive land-use within the policy's trigger distance of a transport corridor. The site is located within the 300m noise assessment trigger routes of Canning Highway. In accordance with Table 2 of the Road and Rail Noise Guidelines 2019, the site is expected to have a decibel rating of 59dB and should be designed to meet Quiet House Design Package B because it is:

- is located approximately 115m from the kerb line to the property line, and
- the portion of Canning Highway consists of 5 to 6 lanes of traffic.

A Section 70A (S70A) notification of the Transfer of Land Act 1893 would also be required on the Certificate of Title as per Clause 6.5.3.1 of SPP 5.4. Notwithstanding this however, Element 12 – Acoustics, Part 7 of the Canning Bridge Activity Centre Plan 2016 (CBACP) does not require a s70A notification or noise mitigation building requirements to be incorporated as this site is not adjacent to Kwinana Freeway or Canning Highway. Furthermore, the CBACP encourages the mixed-use development of 10 to 15 stories along Canning Highway effectively screening the subject site. On this basis, no additional noise mitigation building requirements are required nor should a s70 notification be imposed on the Certificate of Title.

3.2.3 State Planning Policy 7.0 Design of the Built Environment

State Planning policy 7.0 prescribes ten design principles that should be considered in order for development to achieve 'good design' outcomes. To address these ten principles, a design statement has been prepared by Plus Architecture with this statement addressing context and character, landscape quality, built form and scale, functionality and build quality, sustainability, amenity, legibility, Safety, Community and Aesthetics.

The proposed development was presented to the City's Design Review Panel (DRP) on 6 October 2021, who considered the development favourably and outlined a number of key strengths of the proposal such:

- The 4-storey townhouse typology offered a diversity in residential offering within the precinct,
- The development provides good daylight access to primary living areas and the kitchens,
- The bulk and scale is well managed throughout the mews/laneway through a modulated form incorporating volumetric setbacks and reveals,
- Incorporates a ground floor bedroom and ensuite to facilitate future ageing in place flexibility,
- Incorporation of lifts to further facilitate ageing in place and accessibility,
- All garaging accessed off the mews laneway and away from the street thereby minimising the number of cross-overs,
- The front town house capitalises on the opportunity to have a street front entry,
- It is functional and well-arranged units,
- There is high quality roof terrace amenity,
- ESD professional and associated commitment to 4 Star Green Star equivalence,
- AC and plant allocation accommodated in a purpose designed and fully screened location,
- Tree retention in the setback,
- Servicing and waste management strategy considered early in the process, and
- Garden courtyard at the termination of the laneway and with the capacity to host a tree.

The proposal has been updated to incorporate the recommendations of the DRP. This has been outlined in the design statement as prepared by Plus Architecture. Please refer to Appendix 1 – Architects Design Statement.

3.3 Local Planning Scheme

The subject site is governed by the City of Melville's Local Planning Scheme No.6 and is zoned 'Centre' with an R-Coding of R-AC0. The overall intent of a 'Centre' Zone is to designate land for future development as a city centre or activity centre. The City of Melville have adopted an activity centre plan over the site with this being the Canning Bridge Activity Centre.

3.4 Canning Bridge Activity Centre Plan

The Canning Bridge Activity Centre Plan (CBACP) was adopted by the City of Melville and the Western Australian Planning Commission (WAPC) in 2016. Section 7 of the CBACP outlines specific development controls for this application. The subject site is located within the Kintail Quarter (Q1) and falls under the (H8) design guidelines. A full assessment against these provisions is undertaken in Section 4.0 of this report with the following variations to the requirements of those design guidelines have been noted:

- Clause 5.6, of Element 5 – Side and Rear Setbacks
- Clause 18.3 of Element 18 – Parking
- Clause 19.3 and 19.5 of Element 19 – Servicing and Functionality

These variations have been justified against the Desired Outcomes within the report.

4.0 Planning Assessment

This section of the report provides a full planning assessment of the application in relation to the planning framework outlined in section 3 and includes development provisions from the Canning Bridge Activity Centre Plan.

Element 1 – Land Use

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)	Assessment/Comment	Complies
DO 1.1 Q1 will be the premier retail and entertainment destination within the CBACP area. Retail, entertainment and food and beverage outlets are encouraged at the ground floor, visually interacting with pedestrians, cyclists and vehicle passers-by. Uses within the Residential zone will remain as residential only to establish an appropriate buffer between the centre and the surrounding suburb.	**Preferred Land Uses** *1.1 Q1 – Ground Floor Uses* 1.1.3 H4 and H8 Zone – Multiple Dwelling, Grouped Dwelling, Aged or Dependant Person's Dwelling, Single Bedroom Dwelling, Residential Building, Recreation – Private, Recreation – Public, Home Occupation, Home Office *1.2 Q1 – Uses for all Storeys other than Ground Floor* 1.2.3 H4 and H8 Zone – Multiple Dwelling, Grouped Dwelling, Aged or Dependant Person's Dwelling, Single Bedroom Dwelling, Residential Building, Recreation – Private, Recreation – Public, Home Occupation, Home Office	The proposed development comprises of 5 grouped dwellings with this being a permitted use within the Q1 and H8 Zone of the Canning Bridge Activity Centre Plan.	Yes
DO 1.7 All Quarters will comprise a mix and variety of development. Housing should be diverse and affordable, with a mix of options in all areas. Innovative land uses which support the Desired Outcome of each Quarter will be encouraged.	There are no specified development controls for less than 10 grouped dwellings.	While there are no development controls, the application was reviewed by the Design Review Panel, who supported the proposal and acknowledged that it had been designed to: - offer a diversity housing choice in a high-density area, and - support aging in place as demonstrated with lifts provided access to each floor.	Yes

Element 2 – Form and Mass

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)	Assessment/Comment	Complies
DO 2 Site planning should create attractive streetscapes which respond to human scale. Site planning should encourage a consistent frontage with variation in front setbacks to mark decision points (to support wayfinding), entrances and to	There are no specified development controls for less than 10 grouped dwellings.	The development has been appropriately setback and is proposing five (5) four storey town houses.	Yes

allow for enjoyable and surprising spaces (see Figure 5). Site planning should encourage the development of adequate sites for certain building types and heights to ensure street frontages are appealing and not overly interrupted. Site planning should avoid buildings which do not relate to the street, create excessively bulky single elements or comprise of overly repetitive elements both within the development site and as it relates to the surrounding development (see Figure 6 and Figure 7 and Figure 8).			

Element 3 – Heights

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)		Assessment/Comment	Complies
DO 3 To ensure that building heights are consistent with the desired scale and built form of the centre and to ensure that the interface between Zones is appropriately managed and the amenity of property both within and adjacent to the CBACP is adequately considered. Applicants are encouraged to provide variation in scale, bulk and form along the streetscape as per Figure 8. Where an applicant proposes heights greater than those identified in these requirements the applicant may choose to have the development assessed against the Requirements of Element 21 and Element 22 of these Guidelines, *NB: Building Height is defined in the Interpretation Section of these Guidelines.*	3.1	Maximum building heights shall be in accordance with Figure 2 Canning Bridge Activity Centre Plan Land Use, Built Form and Zones Land Use, Built Form and Zones Plan, noting the minimum site area requirements of Clause 2.2 and 2.3.	The site is designated within the H8 zone, allowing for heights up to 8 storeys. The application is proposing the construction of 5 four storey grouped dwellings thereby complying with the maximum height limits. The development therefore complies.	Yes
	3.5	For buildings in the H8 Zone, notwithstanding the 8-storey height limit, no building shall exceed 26 metres above NGL.	The development has a total height of 13.3m above the NGL when measured from the site.	Yes
	3.7	Notwithstanding Clause 3.5, any H8 Zoned development which is immediately adjoining to the property boundary of a H4 Zoned site shall be designed to reduce impact to the adjoining property by being limited to a building height of 20 metres for that part of the development within 5 metres of the property boundary. The setback of the building can comprise balconies and terraces with open roofed structures.	The site doesn't abut any H4 zoned sites, however there are H4 zoned sites directly across the road to this site.	N/A

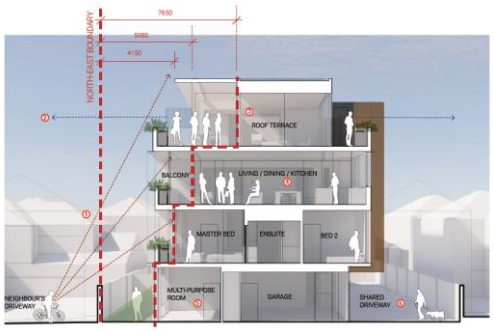
3.8	Notwithstanding Clause 3.5, any H8 Zoned development which is immediately across the road from a H4 Zoned site shall be designed to reduce undue impact on the residential street by being limited to a building height of 20 metres for that part of the development within 5 metres of the street boundary. The setback of the building can comprise balconies and terraces with open roofed structures.	The proposed grouped dwellings are proposed to have a 13.3m wall height within 5m of the street boundary. The development therefore complies.	Yes

Element 4 – Street Setbacks

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)		Assessment/Comment	Complies
DO 4 To ensure that the setback to buildings contributes to a distinct street character and that the form of multi-level development is sensitive to pedestrian scale. Podiums will provide an opportunity for creating a diversity of scale and form at lower levels, whilst taller elements are encouraged with setbacks comprising rooftop terraces and gardens at varying levels throughout development. Alternative means to reduce bulk and scale such as green walls and façade articulation are also encouraged. New buildings that are setback from the street boundary should not adversely affect the vibrancy and activity required to support the expected outcomes of the CBACP by creating unnecessary breaks in active frontages as per Figure 7.	4.5	All development within H8 Zones in Q1 and Q2 shall have a minimum 2 metre and maximum 4 metre setback to street boundaries.	The development has a setback of minimum 2m to Macrae Road. The development therefore complies.	Yes
	4.9	Where a street setback is required, the setback area shall be activated and/or landscaped.	There is an existing Jacaranda Tree within the Macrae Road Streetscape. The front setback area has been landscaped in context of the existing streetscape. The development therefore complies.	Yes

Element 5 – Rear and Side Setbacks

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)	Assessment/Comment	Complies
DO 5 To provide a continuity of frontage at ground and podium levels to encourage activity whilst providing interest. To allow opportunities for tower elements to access sunlight, ventilation and view corridors throughout the area from and between multi-level developments. To ensure that development opportunities throughout the precinct are maximised. Developers should consider the amenity of the precinct by minimising overlooking and overshadowing of adjacent and adjoining properties through appropriate design response, supported by the setback provisions of this Element.	5.6 Side and rear setbacks for all development within the H8 and H4 Zones shall be 3 metres for any lot which is less than or equal to 14 metres in width or shall be 3.5 metres for any lot which is greater than 14 metres in width but less than 16 metres in width or 4 metres for any lot which is equal to or greater than 16 metres in width. Setbacks do not apply to any eaves and sun shading devices.	The site has a total lot width of 20.12m. As such a 4m setback is required to the side and rear boundaries. The setbacks of the 5 grouped dwellings have been measured as a whole building and not separate buildings, i.e. to the boundaries of the adjoining properties. The setbacks have not been measured internally between the 5 grouped dwellings. **Northeast Setback (all units):** *Ground Floor (total wall length 8.9m of each unit):* - 3.1m setback (total wall length 8.9m) - For Unit 5, there is an additional 5.2m setback from studio space (additional wall length of 4m) *Level 1 (total wall length 8.9m of each unit):* - 3m setback from the bathroom (wall length 3.4m) - 3.1m setback from the outside edge of the planter box (wall length 5.2m), - 3.9m setback from the inside edge of the balcony (wall length 5.2m) - 4.2m setback from the wall of Bedroom 1 (wall length 5.2m) *Level 2 (total wall length 8.9m of each unit):* - 3m setback from the bathroom (wall length 3.4m) - 3.1m setback from the outside edge of the planter box (wall length 5.2m), - 3.9m setback from the inside edge of the balcony (wall length 5.2m) - 5.2m setback from the living room wall inside edge of the balcony (wall length 5.2m) *Level 3 (total wall length 8.9m of each unit):* - 3.3m setback from the planter box (total length 9m), - 3.8m setback from the roof top terrace ***Justification against Desired Outcome DO 5*** The development has been designed to have a lesser setback to the north-eastern boundary. This setback variation can be addressed against the Desired Outcome DO 5 for the following reasons: - the development has been designed to maximise northern solar access and river views, while minimising overshadowing to the southern neighbours. This was noted by the DRP who acknowledged that the development provides good daylight access to primary living areas and the kitchens. - the bulk and scale is well managed throughout the mews/laneway through a modulated form incorporating volumetric setbacks and reveals as noted by the DRP,	**No, however the variation has been justified against the Desired Outcomes.**

		- the northeast elevation has been articulated in such a manner that: • the setback is progressively increased with the rise of each level when measured from the wall of the building, • above the ground floor, the balconies project within the 4m setback area which include 0.5m wide planter boxes allowing for a green wall to be planted to soften the bulk along that elevation, • the wall of the room adjoining each of the balconies to each level is setback behind the 4m setback area as demonstrated in the diagram below:  Only a portion of the building of each of the dwellings (the bathrooms) project into the setback area, and - different colours, materials and finishes have been used to break up the bulk and scale of that elevation. Given the above, it is considered that the Desired Outcome DO 5 has been adequately addressed.	
		Southeast Setback (unit 5 only): *Ground Floor (total wall length 10.8m):* - Nil setback from studio room wall (wall length 8.6m, wall height 3m to adjoining neighbour) - 4m setback from bathroom wall (wall length 2.1m) *Levels 1 – 3 (total wall length 12.7m):* - 4m setback from the wall of Bedroom 1 (wall length 5.2m) ***Justification against Desired Outcome DO 5*** It is proposed that Unit 5 is provided with a studio room that abuts against 2/2 and 3/2 Jane Road, Applecross. This setback variation can be addressed against the Desired Outcome DO 5 for the following reasons: - There is an existing 0.6m high retaining wall between the subject site and 2/2 and 3/2 Jane Road, Applecross, with the subject site being on the lower side of that retaining wall. The proposed wall on the boundary will be built on the lower side of the existing retaining wall and measure 3m from the adjoining properties. The length of the wall spans over	**No, however the variation has been justified against the Desired Outcomes.**

		8.6m and has been distributed relatively evenly between the two properties. In addition, it proposed that a 1.8m masonry dividing fence is proposed, hence the wall will project 1.2m above the fence. - The bulk and scale of this wall is therefore considered relatively negligible in context of the current and future development of the area. - 2/2 and 3/2 Jane Road, Applecross are located within the M10 zone. Under the CBACP, the podium level is allowed to have a nil setback under Clause 5.1 of the Design Guidelines. The Tower element of the Design Guidelines is required to have 4m setback to provide an 8m separation between the building towers. The upper floor are setback 4m from the boundary which will allow for this building separation. - This studio room provides for an additional recreation, hobby, or home office space, allowing the site to be maximised whilst being contextually appropriate with the bulk and scale of the locality. Given the above, it is considered that the Desired Outcome DO 5 has been adequately addressed.	
		Southwest Setback (all units): *Ground Floor (total wall length 8.9m):* - 6.3m setback from garage and entry to common boundary. - For Unit 5, there is an additional 5.2m setback from studio space (additional wall length of 4m) *Levels 1 – 3 (total wall length 8.9m):* - 4m setback from the wall of Bedroom 3 (wall length 3.7m)	Yes
5.8	Provisions of privacy and solar access and overshadowing do not apply within Q1 and Q2.	Although there are no requirements to address solar access, overshadowing or privacy requirements, the development has been designed to: • provide adequate setbacks to limit the impact of overshadowing to the adjoining southern neighbours, • include some privacy for the balconies along the northeast elevation of the building, and • articulating the building form to allow solar access into the design as explained in the Architect's design report.	Yes

Element 9 – Facades

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)	Assessment/Comment	Complies
DO 9 Development of the centre should respond sensitively to the site and support a sense of place. Development should be pleasing to the eye, be interactive, and provide definition between public and private spaces. Maintaining a strong urban edge with the built form and providing a variety of high quality architectural forms and features will attract people to the centre and establish a sense of place.	9.1 In Q1 and Q2, developments shall be sympathetic to the surrounding environment in composition, proportion, materials, colours and finishes. This includes responding to (not replicating) vertical and horizontal fenestration of adjoining developments and providing responses to elements within the street verge such as bus stops, parking and service infrastructure or service entrances.	The building will a grey and subdue monotone colour scheme celebrates the natural purple flowers, green leaves and dark brown bark of the Jacaranda tree. The dark textured timber cladding, windows and bronze sliding screens ensure that the bulk and scale of the front façade is articulated and adds interest to the urban fabric without dominating the existing leafy streetscape of Macrae Road. Additional landscaping (shrubs) on the ground floor will also help to soften the development.	Yes
	9.4 Windows and balconies shall be incorporated into the design of developments above ground level. In Q1 and Q2, balconies shall have a minimum 2.4 metre depth and a minimum area of 10m^2, to encourage use.	A 20.3m^2 roof top terrace has been provided for each unit. Unit 1's terrace roof top terrace overlooks the street and has been designed as an active outdoor living area. In addition, there are windows along the front façade of Unit 1 that addresses the street.	Yes
	9.5 Developments shall be designed so as to discourage vandalism by use of materials such as sacrificial paint or architectural features to discourage inappropriate activity.	The front of Unit 1 has been designed with windows and a roof top terrace that overlook the street, providing passive surveillance and discourages antisocial behaviour and vandalism.	Yes
	9.7 In Q1 and Q2, the internal floor level of any development shall, where possible, have a finished floor level no greater than 500 mm below or above the adjoining footpath or verge level to ensure interaction between pedestrians and the adjoining buildings. Development which fronts a street with differing levels should consider innovative design to meet this requirement.	The proposed floor level of the development will be 300mm above the natural ground when measured from edge of the verge abutting the property boundary. The verge naturally slopes 400mm from the edge of the verge to the footpath. No additional fill has been proposed and will have a final floor level of 16.5m. The site will be developed taking advantage of the natural contours of the site.	Yes

Element 10 – Open Space and Landscaping

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)	Assessment/Comment	Complies
DO 10 To encourage intensity of development whilst also catering for the enjoyment,	10.4 Development in the H8 Zone shall be provided with a minimum provision of 30%	There are no communal open spaces provided as part of this development and is not required as each Unit is provided with its	Yes

comfort and sense of security of centre users… However, open space at ground levels in the form of active plazas, public or private open space at podium levels which are visible from the streetscape, terraced areas and balconies and rooftop gardens is encouraged. Ground floor or podium level open space should comprise trees and other vegetation to contribute to the overall leafy nature of the CBACP area.		open space which shall be provided in shared common space at ground levels and/ or shared common space on areas such as the roof.	own open space and outdoor living areas. The development is proposing 504m^2 of open space (as defined under the R-Codes) overall on the ground floor. In addition, each unit has been provided with its own 31m^2 roof top garden on the 3rd floor and a 25m^2 garden on the ground floor.	
	10.6	Where development is not proposed to all boundaries of a site, landscaping design shall be incorporated providing that such landscaping maintains openness and visibility into the development site. Landscaping in the form of hard and soft landscaping can be utilised. Water sensitive design shall be implemented for all landscaped areas.	A landscaping plan has been prepared that incorporates a mix of soft and hard landscaping elements. The landscaping plan sets out to achieve the requirements of 10.6 and the broader Desired Outcome.	Yes
	10.7	In Q1 and Q2, landscaping and/or low fencing below 1.2 metres on property boundaries, where buildings are setback from the boundary, shall reinforce the separation between public and private realm.	There are no front fences proposed for this development. The natural elevation of the site, internal footpaths and landscaping helps provide the distinction between the public and private realm without the need for a physical barrier.	Yes

Element 11 – Sustainability

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)		Assessment/Comment	Complies
DO 11 To encourage the use of sustainable forms of transport including cycling and walking and provide end-of-trip facilities including showers and change rooms. Applicants are encouraged to propose innovative sustainability measure such as exclusive bays for carpooling organisations and car-sharing schemes which may be managed by the strata company or an external provider. All developments should follow ecologically sustainable design principles to develop a world class showcase of environmentally sound development techniques. Principles which should be applied include: • Minimise operational and maintenance costs of the development;	11.5	All new development shall be designed to maximise passive solar principles for heating, cooling, ventilation and energy conservation. East and west facing glazing shall be minimised and shading devices shall be employed to reduce heat loads within buildings and reduce the need for air-conditioning systems. All buildings shall be designed to enable access to natural light and cross ventilation. At a minimum, all new development within … the Kintail and Ogilvie Quarters … shall achieve a 4-Star Green Star design rating under Green Building Council of Australia. Applicants shall submit as part of their development application either a Green Star Design Review certificate or a qualified consultant's report	The proposal addresses the 10 Design Principles as outlined in Schedule 1 of the State Planning Policy 7.0 – Design of the Built Environment. The proposal has been reviewed by the City's Design Review Panel (meeting dated 6th October 2021). A Sustainable Design Assessment report has been prepared by Sustainability WA (dated 29 October 2021) and submitted as part of this application. The recommendations of that report have will be incorporated as part of the building permit to ensure that a minimum 4-Star Green Star rating as per the Green Building Council of Australia has been achieved.	Yes

• Innovative and integrated water resource management; • Reduction in the use of fossil fuel energy by using renewable energy supply sources and employing demand-efficient building techniques and technologies; and • Biodiversity and habitat enhancement through appropriate and native landscaping. To achieve the Desired Outcomes development within … the Kintail and Ogilvie Quarters … development is expected to achieve a design rating of 4 Stars under the national rating scheme of the Green Building Council of Australia.		supporting the developments achievement of the required level of performance. Under either approach any development approval granted will be conditional upon submission of a Green Star certificate, prior to commencement of the development, which confirms achievement of the required rating.		
	11.6	In the H4 and H8 areas, as evidence in support of compliance with the required rating, as a minimum applicants shall submit as part of their development application a report from a Green Building Council of Australia qualified consultant demonstrating that the proposal will achieve the required level of performance. In these areas (H4 and H8) any development approval granted will be conditional upon the development being designed and constructed to include the elements identified in the supporting consultants report.	A Sustainable Design Assessment report has been prepared by Sustainability WA (dated 29 October 2021) and submitted as part of this application. The recommendations of that report have will be incorporated as part of the building permit to ensure that a minimum 4-Star Green Star rating as per the Green Building Council of Australia has been achieved. A copy of this report is provided in Appendix 2.	Yes

Element 15 – Level Changes

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)		Assessment/Comment	Complies
DO 15 The centre shall be an inviting and user friendly place for all members of the community and universal access/accessibility shall be provided for all developments in a variety of ways. Blank facades may affect the vibrancy and activity in an area, or encourage graffiti, and as such design should limit this outcome by considering façade treatments such as wall art, landscaping or furniture.	15.1	All proposed retaining walls shall be treated with a non-sacrificial anti-graffiti coating to discourage potential graffiti and/or be decorated in such a way as to reduce the effect of blank facades. Landscaping in front of retaining, street furniture and articulation of the wall itself may be utilised as an alternative way of treating blank walls.	There are no retaining walls within the development that are visible to the street.	N/A
	15.2	All development shall provide universal access in accordance with relevant codes and standards. Innovative design features for ramps are encouraged to make universal access an integral part of design.	With the exception of Unit 1, all the Units will have the doors that are level with the communal accessway. Lifts have also been provided within each unit providing universal access to each floor.	Yes

Element 16 – Fencing

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)	Assessment/Comment	Complies
DO 16 Fencing should be designed to be aesthetically pleasing to all users who can see it and should be treated in the same way as blank facades (see Element 14).	16.1 All proposed fencing which is visible from a public place shall be treated in the same way as required in Clause 15.1. Fencing shall be of a high quality on both sides.	There is a 1.8m high visually permeable gate on the ground floor providing access to the rear courtyard of Unit 1.	Yes

Element 17 – Public Art

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)	Assessment/Comment	Complies
DO 17 To provide for an exciting and enticing public realm which supports the extensive growth of the CBACP area. To promote cultural vitality within the CBACP area.	17.1 Artwork associated with all proposed development is encouraged. 17.2 All development which is greater than $1 million in total capital cost of development shall contribute 1.0% of the total capital cost of development to a CBACP wide public art fund. The fund is to be used solely for the development of a strategy and acquisition of public art works to be displayed within the CBACP area. Alternatively, the developer may propose to provide on-site public art works which are integrated into the design of the development. Any public art proposed shall form part of the development application to be considered by the Design Advisory Group. 17.3 Notwithstanding Clause 17.2, the total cost liability for contribution to the public art fund shall be capped at $500,000.	No public art has been proposed to be integrated into this development. Given the scale of the development, it would be appropriate for a 1% cash-in-lieu contribution to be provided.	Yes – To be addressed via a condition of Development Approval

Element 18 – Parking

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)	Assessment/Comment	Complies
DO 18 Parking is an important element to consider for development, and considerable analysis has been undertaken to respond to this need. Parking should be provided to ensure that the CBACP area can provide for its residents and guests, but should balance this need with a need to discourage private vehicle travel generally. Alternative transport is encouraged by way of providing for bicycle parking and storage, and motorcycle and scooter parking. Basement and multi storey car parks can present long blank walls to the street, or a gap with undesirable views into the basement car park, which should be avoided.	18.1 Basement car parking or parking sleaved by other uses is encouraged within the CBACP area. All parking areas shall be well lit and clearly signed.	All cars parking associated with this development will be enclosed with each unit provided with its own garage. The access ways will be well lit and will not dominate the streetscape.	Yes
	18.3 Car parking and motorcycle/scooter parking for residential development shall be provided as follows: • Two or three bedroom dwellings - Min: 1.0 - Max: 1.5 • Residential visitor – N/A • Motorcycle/Scooter parking – N/A	The development compromises of 5 three bedroom grouped dwellings thereby requiring a minimum of 5 car parking bays or a total maximum of 7.5 car parking bays. Each dwelling has a double garage allowing for 2 cars to be parked, providing a total of 10 car parking bays. This exceeds the total maximum number of car parking bays by 2.5. ***Justification against Desired Outcome DO 18*** The development can be addressed against the Desired Outcome DO 18 as follows: • It is intended to survey strata subdivide the site. Under the current development provision each dwelling on each lot would be allowed a maximum 1.5 car parking bays. This should be rounded up to 2 bays as this meets the practical needs of the residents. • The double garage can be used as extra storage or parking of other types of vehicles, such as motorcycles, scooters, bikes, campervans, trailers etc. • The size of the garage allows for vehicles that provide disability services to be parked for aging and disabled residents. • A Traffic Impact Statement (TIS) has been provided which outlines the availability of public transport and other alternative transport means that would discourage private vehicle travel generally. Given the above, it is considered that the Desired Outcome DO 18 has been adequately addressed.	**No, however the variation has been justified against the Desired Outcomes.**
	18.8 Bicycle storage/parking shall be provided for all residential development at a ratio of one bay for every dwelling within a development site, and can be comprised within storage areas required as per Clause 19.5 or in shared parking areas or both.	Each dwelling has a storage area within the garage that can park a bicycle.	Yes

Element 19 – Servicing and Functionality

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)	Assessment/Comment	Complies
DO 19 Servicing of the CBACP area should occur outside of busy periods and as a preference should occur via underground or basement service areas. Individual residential developments should be provided with adequate storage facilities for the storage of bikes and other household items. Services design, such as power and gas, should consider precinct wide safety including appropriate physical separation, venting and ventilation as required.	19.3 Developments within the M15, M10 and H8 Zones shall provide for all management of waste wholly within the development site, including the ability for service vehicles to circulate within the development. No on-street waste collection areas are permitted within the M15, M10 and H8 Zones.	It is proposed that verge waste collection is made available to these 5 grouped dwellings. Each dwelling will be provided with their own internal bin storage area and a bin collection point has been provided. ***<u>Justification against Desired Outcome DO 19</u>*** Discussions with the City of Melville's Waste Services Department have been undertaken with the city agreeing to verge waste collection. Verge waste collection is considered appropriate because: • The site abuts the H4 zone which is allowed to have verge waste collection. • Along Macrae Road, southwest of Jane Road is a H4 zone area which is allowed to have verge waste collection. The waste collection trucks would be going past the site to service those properties. • The site is too narrow due to allow waste collection trucks to manoeuvre internally without allowing for them to reverse directly into the property or on to Macrae Road. • There will only ever be 10 bins on the road collect domestic waste every Monday. A Waste Management Plan has been prepared in support of this development application supporting on-street collection. Please see Appendix ** for a copy of the proposed Waste Management Plan.	**No, however the variation has been justified against the Desired Outcomes.**
	19.4 Applicants within the M15, M10 and H8 Zones shall provide a Movement Summary in their written Statement of Support which provides the design intent behind the development of the site in relation to pedestrian access points, access to parking and cycling, pedestrian and cyclist pathways, loading areas and waste management.	A Traffic Impact Statement (TIS) has been prepared by Urbii Sustainable Transport (dated 29 October 2021). The TIS assesses the development and addresses the following key points: • Car parking requirements, • Bicycle paths and access, • Public transport access, and • Walkability. Please see Appendix ** for a copy of the TIS.	Yes

	19.5	In Q1 and Q2, all residential developments shall comprise an enclosed, lockable storage area, with a minimum dimension of 1.5m with an internal area of at least 4m², for each grouped or multiple dwelling(s).	All dwellings have integrated a storeroom within the double garage and an additional storeroom on the 3rd floor. The minimum dimension of the store area within the garage and the storeroom on the 3rd floor for Unit 1 are as follows: Garage: 3.3m(L) x 1m (W). Total Area= 3.3m² Storeroom: 2.3m(L) x 1.2m (W). Total Area= 3.5m² The minimum dimension of the store area within the garage and the storeroom on the 3rd floor for Units 2 – 5 are as follows: Garage: 3.9m(L) x 1m (W). Total Area= 3.9m² Storeroom: 2.8m(L) x 1.2m (W). Total Area= 2.8m² ***Justification against Desired Outcome DO 19*** While these store areas don't meet the minimum 1.5m dimension, combined each dwelling is provided with at least 6.7m² of storage space. In addition, the lifts provided in each dwelling makes the third-floor storeroom useable and convenient. This is more than adequate to meet the needs of the future residents and allows for the storage of bikes and other household items. D019 has therefore been adequately addressed.	**No, however the variation has been justified against the Desired Outcomes.**

Element 20 – Safety and Security

Desired Outcomes (relevant provisions)	Requirements (relevant provisions)	Assessment/Comment	Complies
DO 20 Crime Prevention Through Environmental Design or CPTED uses the built environment to reduce the opportunity for crime, increase the perception of safety perceived by authorised users of a space, while increasing the perception of risk by unauthorised users of a space.	20.1 Access to and through a development shall be safe and efficient. Entrances shall be positioned so that all pedestrian movement is adequately lit and directly visible from a public space. Access to and from car parking areas and building entrances shall be adequately sign-posted with provision of good lighting to enable safe out of hours use.	Access to and from the properties is clearly visible from Macrae Road with internal movement being safe and well lit. The windows have been positioned to address common property to improve safety and surveillance.	Yes

Development should promote the safety and security of the public environment. Buildings should overlook streets and other public spaces to promote natural supervision. Blank walls onto streets, or large distances between the footpath and openings are discouraged. In addition, access to daylight should be maximised and a high level of lighting should be provided in all public areas.	20.2	To maximise visibility and surveillance of the public environment, the incorporation of active edge uses, including those at ground level that spill out onto public space and those located at the front of a building on the first floor that enable overlooking into public space, are encouraged. Windows can be positioned to overlook pedestrian routes, provided that privacy concerns are met.	Surveillance to the public realm has been incorporated through the integration of major openings to habitable rooms along the communal street.	Yes
	20.3	Development shall clearly define private and public space responsibilities. The function and ownership of an area can be clarified by paving, lighting and planting. Planting shall not create concealed spaces near paths and lighting shall allow clear lines of visibility.	The development clearly defines areas of private open space through fencing. There are no proposed areas of communal open space within the site. The proposed landscaping does not result in any concealed spaces allowing clear lines of visibility within the site and the public domain	Yes
	20.5	Lighting proposed for all development shall be designed so as to limit the possibility of dark shadows in adjacent private and public open spaces.	The proposed lighting will limit the possibilities of concealment and ensure that private and public areas are well lit.	Yes

5.0 Conclusion

The application is proposing the construction of five four-storey dwellings comprising of 3 bedrooms and 2 bathrooms, which have been designed by Plus Architecture. The proposed dwellings have been designed responding to the features of the site and complying with the State and Local Planning framework.

The design has been reviewed by the City of Melville's Design Review Panel where it was universally praised for offering a different housing typology in the area and providing the ability to support aging in place. The panel also made comments on the bulk and scale of the development being sympathetic to the existing and future urban fabric of the locality. The recommendations from that meeting have also been incorporated into the final design.

The variations to the Requirements of the Design Guidelines (section 7 of the CBACP) have been addressed and adequately justified against the Desired Outcomes as demonstrated in the planning assessment. The Development Approval of this proposal would be a welcome addition to the Canning Bridge Activity Centre area. We therefore respectfully request that the City of Melville assess this application in a favourable manner.

Should you have any questions or queries regarding the proposed development plans please do not hesitate to contact our office at planning@developedproperty.com.au or (08) 6119 9175.

Yours sincerely,

Ryan Djanegara
Planning Consultant
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Appendix 1 – Architects Design Statement

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5 MACRAE ROAD

APPLECROSS, WA

DEVELOPMENT APPLICATION AND 10 PRINCIPLES REPORT

PREPARED FOR HUB PROPERTY GROUP

29 OCTOBER 2021

plus architecture

CONTENTS

PRINCIPLE 1

CONTEXT & CHARACTER

Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.

CONNECTIVITY

SITE LOCATION

- Located within the Canning Bridge Activity Centre in The Kintail Quarter (Q1);
- A highly desirable location within walking distance to amenities such as the river and Raffles hotel;
- Surrounded by a mix of one and two storey houses and townhouses, and small scale boutique apartments.

DEVELOPMENT CONTROL

Zone: Centre
R-Code: R-AC0

LOCAL AREA POLICY

City of Melville Planning Scheme No. 6
Canning Bridge Activity Centre Plan

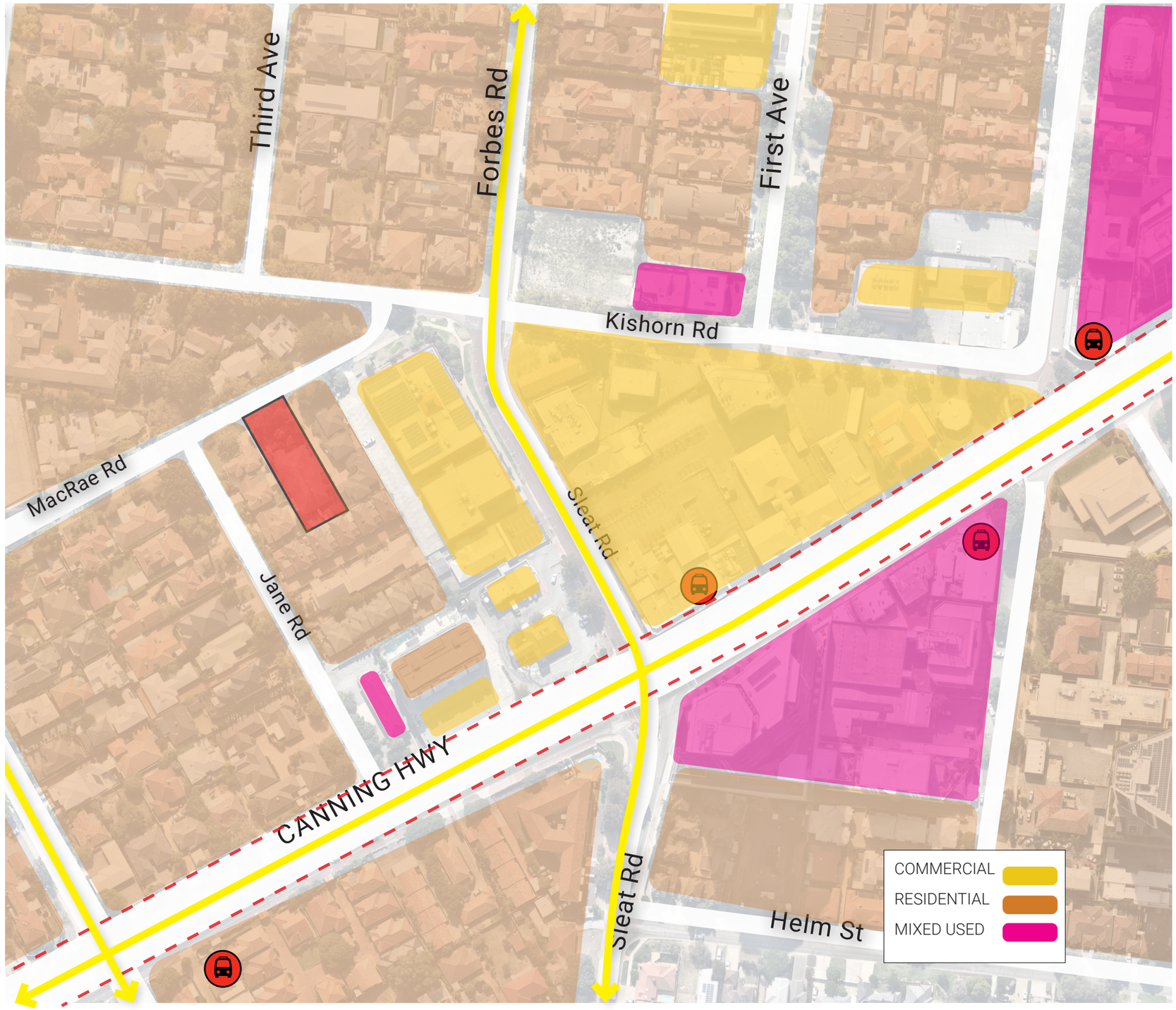
PERMITTED BUILDING HEIGHT

6-8 Storeys, 26m

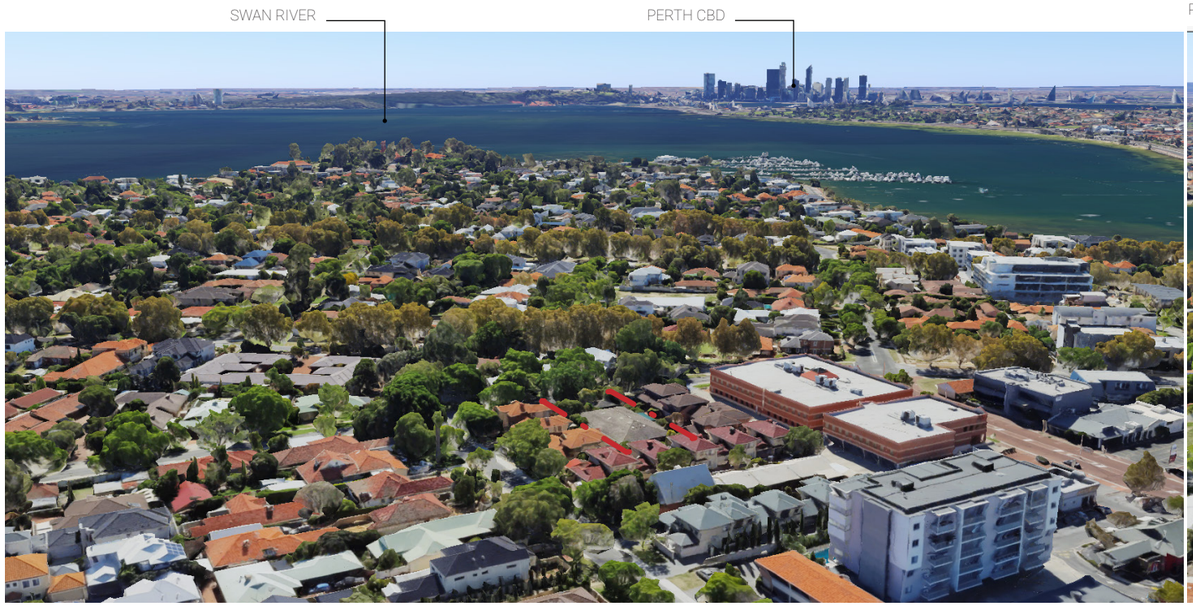
SETBACKS

- Rear and side setbacks – 3m for any lot which ls less than or equal to 14m in width
- Rear and side setbacks – 3.5m for any lot which is greater than 14m in width but less than 16m
- Rear and side setback – 4m for any lot which is equal to or greater than 16m in width.

The site is surrounded by a mix of one and two storey houses and townhouses, and small scale boutique apartments.



SITE CONTEXT



VIEWS OF PERTH CBD + SWAN RIVER

VIEWS OF CANNING RIVER

VIEWS OF MOUNT PLEASANT

VIEWS OF SWAN RIVER + APPLECROSS

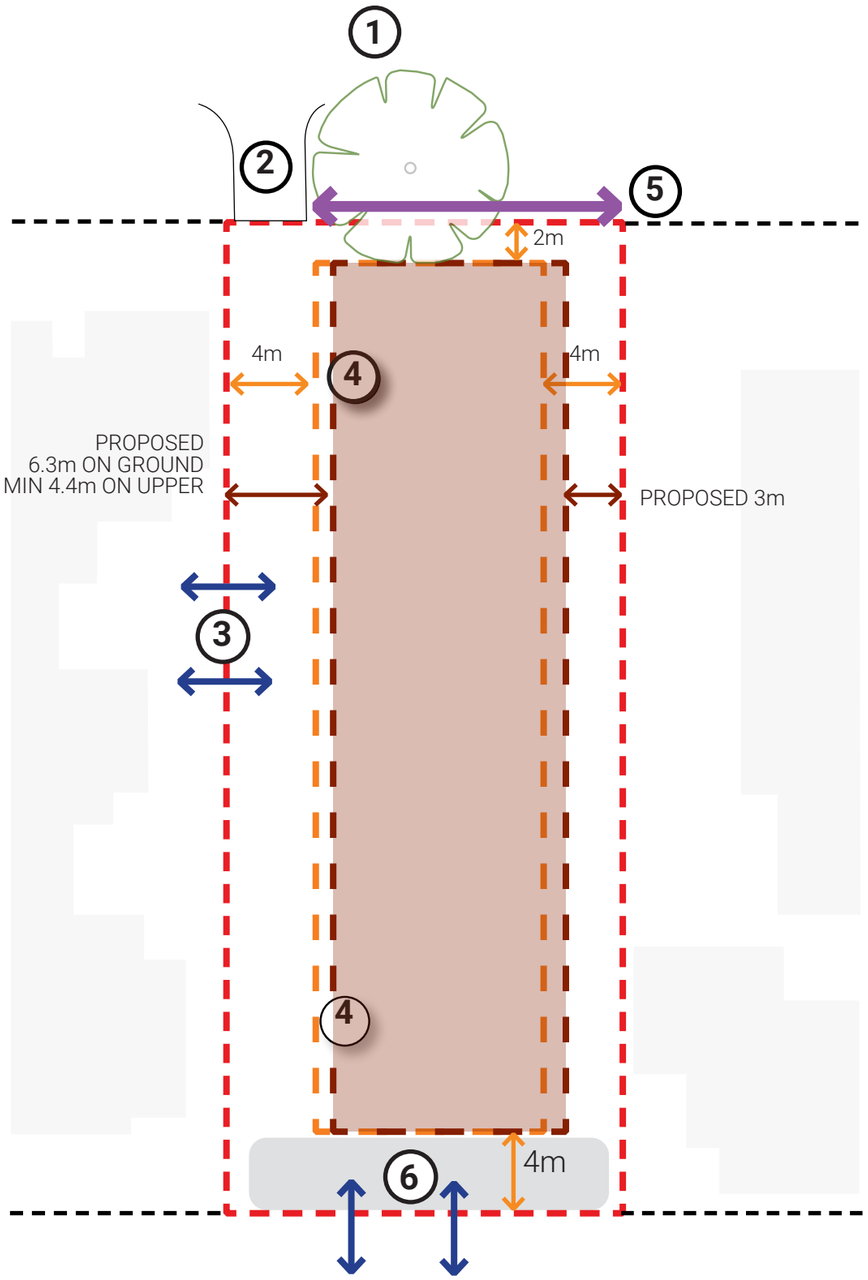
EXISTING SITE CONDITIONS

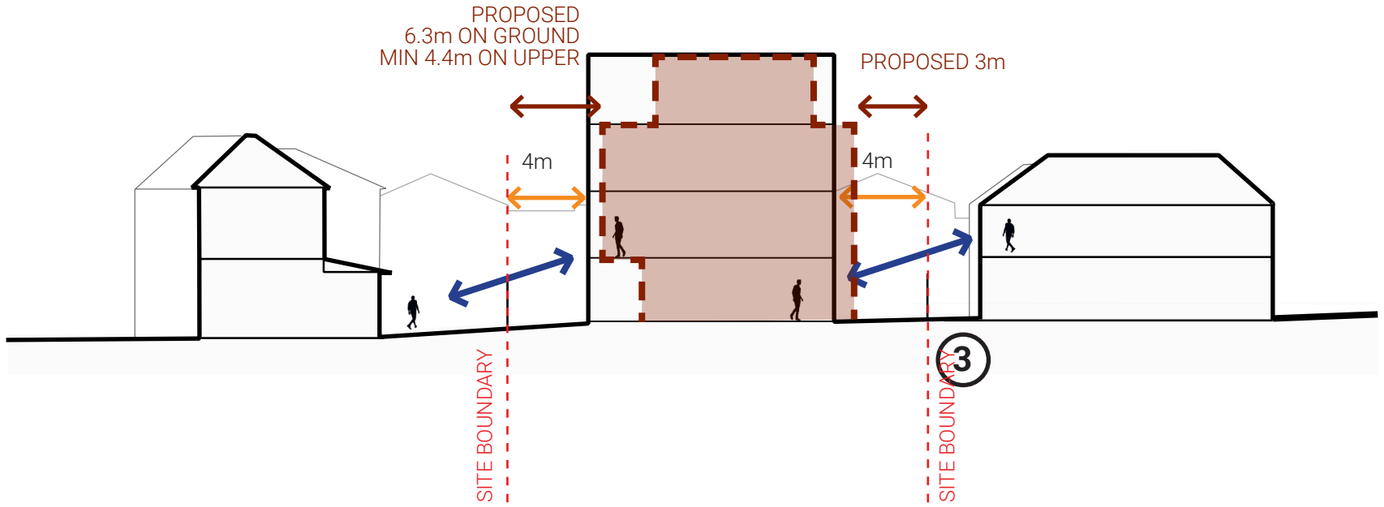
• The existing site has an established tree (Jacaranda) along the verge, which would be retained and protected in accordance with AS4970 - 2009 Protection of Trees on Development Sites as per the recommendation in Preliminary Tree Survey Report by Westworks Consultancy (dated 09.09.2021).

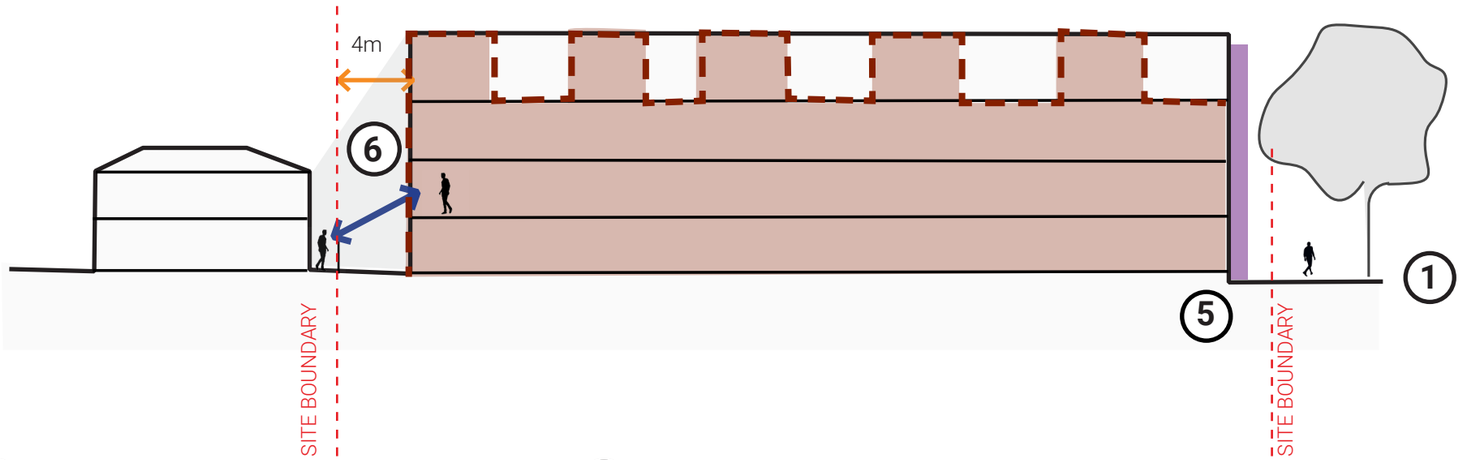
• Macrae Rd is characterized by one and two storey buildings with a brick finished and open planted front yards.

• Site has an existing single storey brick and tile house, and currently has two crossovers, this is reduced to one in the proposed scheme.

SITE CONSTRAINTS

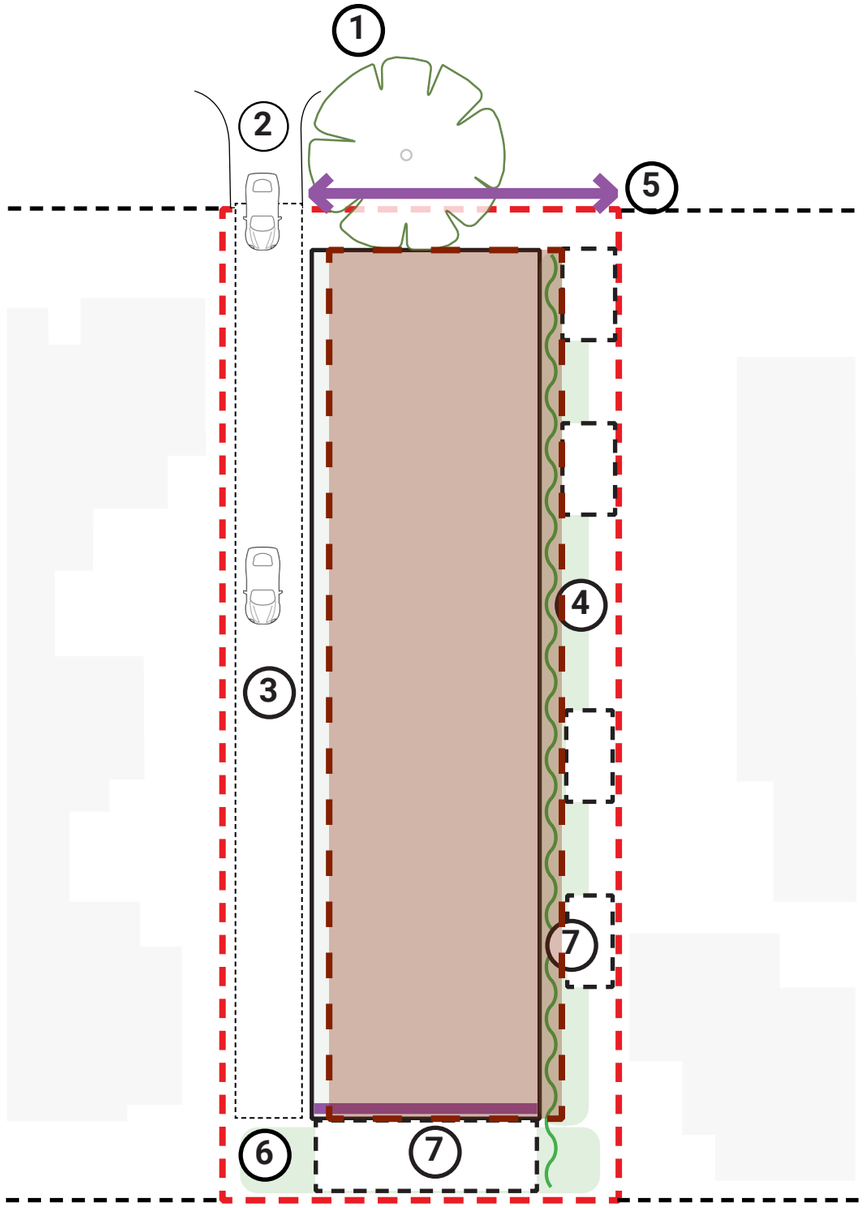


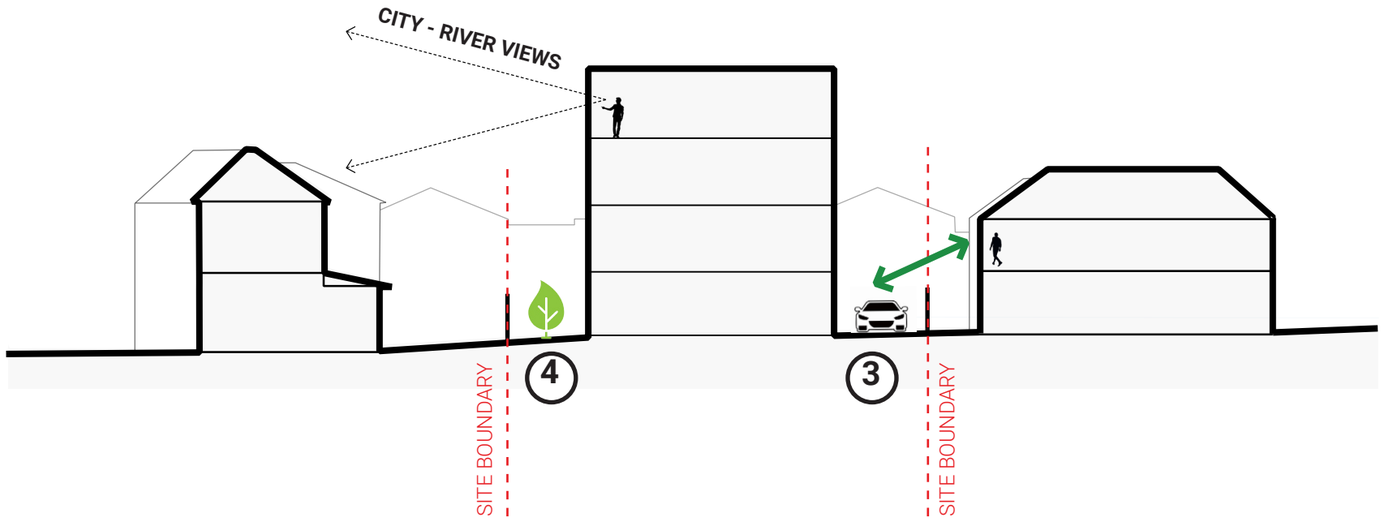


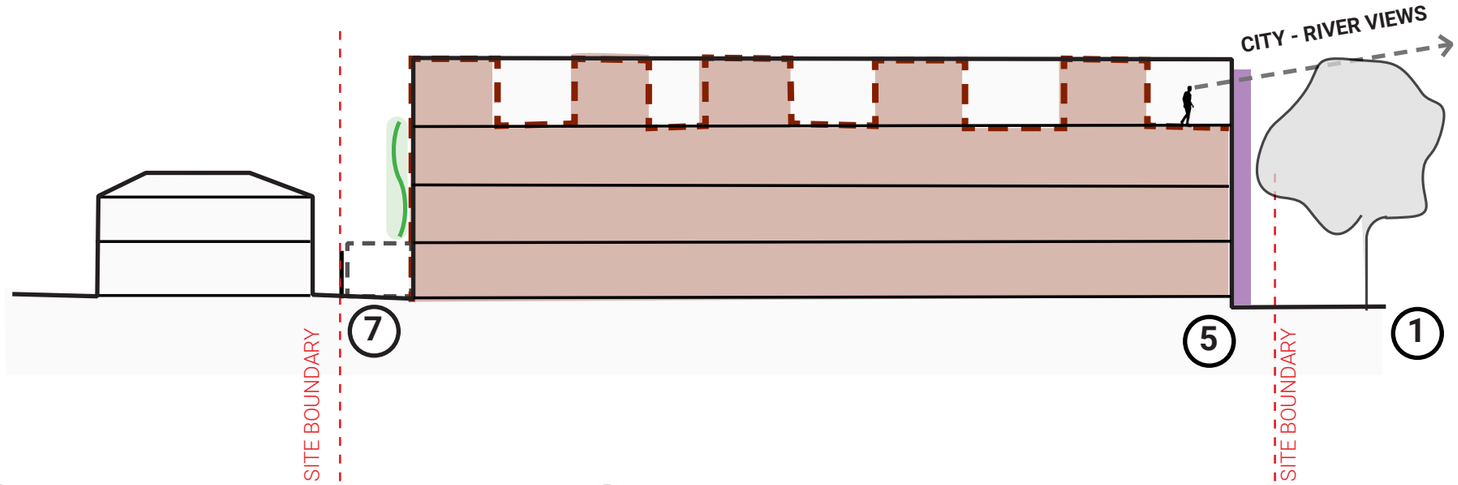


1. Established street tree
2. Crossover
3. Backyards Overlooking / Lack of privacy
4. Site Setback for building (4m)
5. Providing Streetfront quality
6. Overlooking + Shadow

SITE OPPORTUNITIES



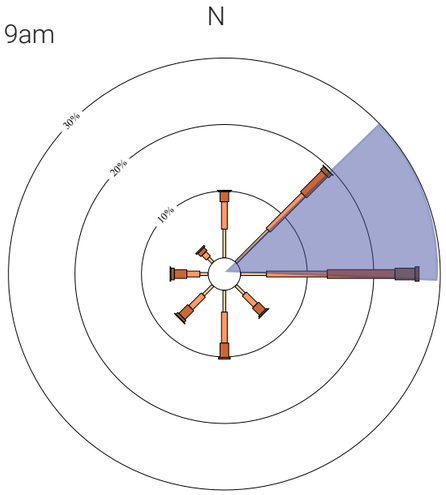




1. Celebrate existing tree
2. High quality driveway and crossover
3. Driveway creates separation from existing backyards
4. Opportunity for open space & planting
5. Improving Facade and streetscape
6. Articulate/ Improve neighbouring aspect
7. Potential for single storey extension

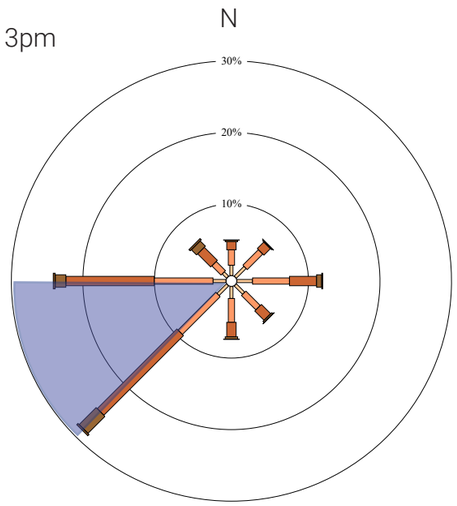
SITE ANALYSIS - WIND, SUN AND VIEW

9am

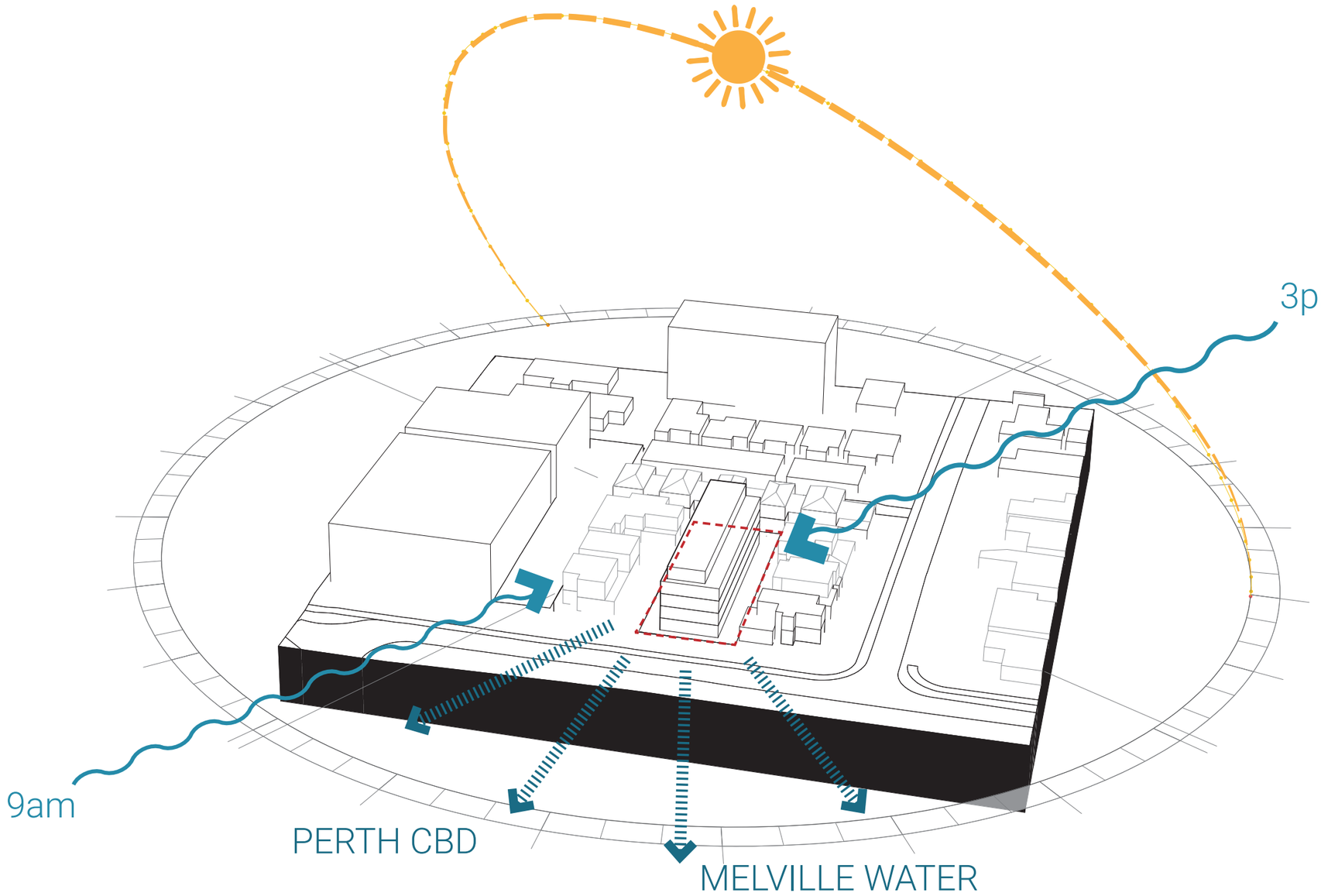


LIGHT MORNING BREEZE

3pm



COOL AFTERNOON BREEZE CAN BE USED
TO PURGE THE BUILDING



PRINCIPLE 2

LANDSCAPE QUALITY

Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context.

5 MACRAE ROAD, APPLECROSS

DEVELOPMENT APPLICATION PACKAGE

LANDSCAPE DESIGN

ISSUE FOR REVIEW

TDL
BEYOND GREEN

LANDSCAPE MASTERPLAN

GROUND FLOOR
SCALE 1:200

LEVEL 01
SCALE 1:200

LEVEL 02
SCALE 1:200

LANDSCAPE DESIGN NOTES

1. Pedestrian access to the front unit.
2. Reinstated grass verge.
3. Existing street tree *Jacaranda mimosifolia* to be retained.
4. Proposed groundcovers and flowering shrubs on the verge to create a welcoming frontage and also soften the building boundary. Shade tolerant groundcover to be planted under existing street tree.
5. Private courtyard with concrete slab steppers, small trees, a mix of flowering shrubs and groundcovers to create seasonal colour and interests.
6. Proposed pool and deck.
7. Permeable paving with smoother texture for pedestrian use and to break up the long driveway while guiding entry to each unit.
8. South west garden to be filled with a medium tree (*Jacaranda mimosifolia*) shade tolerant groundcovers and low shrubs.
9. Planter with flowering shrubs, climbers and trailing shrubs to provide some shade interest to the adjacent room.
10. Herbs and vegetable garden.
11. Proposed small trees, hedges and climbers along driveway.
12. Proposed cobblestone paving to slow down vehicular movement.

PRELIMINARY TREE SELECTION


Pyrus calleryana


Tristaniopsis luscious


Jacaranda mimosifolia

PRELIMINARY PLANT SELECTION


Acacia saligna prostrate


Anigozanthos manglesii


Casuarina Glauca 'Cousin It'


Kennedia coccinea


Damperia diversifolia


Dianella revoluta


Dichondra argentea


Eremophila glabra prostrata


Grevillea gin gin gem


Hibertia scandens


Lomandra longifolia 'Tanika'


Murraya paniculata


Liriope muscari


Thryptomene baeckeacea


Trachelospermum jasminoides

TDL BEYOND GREEN

AUTHOR: QY Q.A: GD
SCALE: 1:200@A3

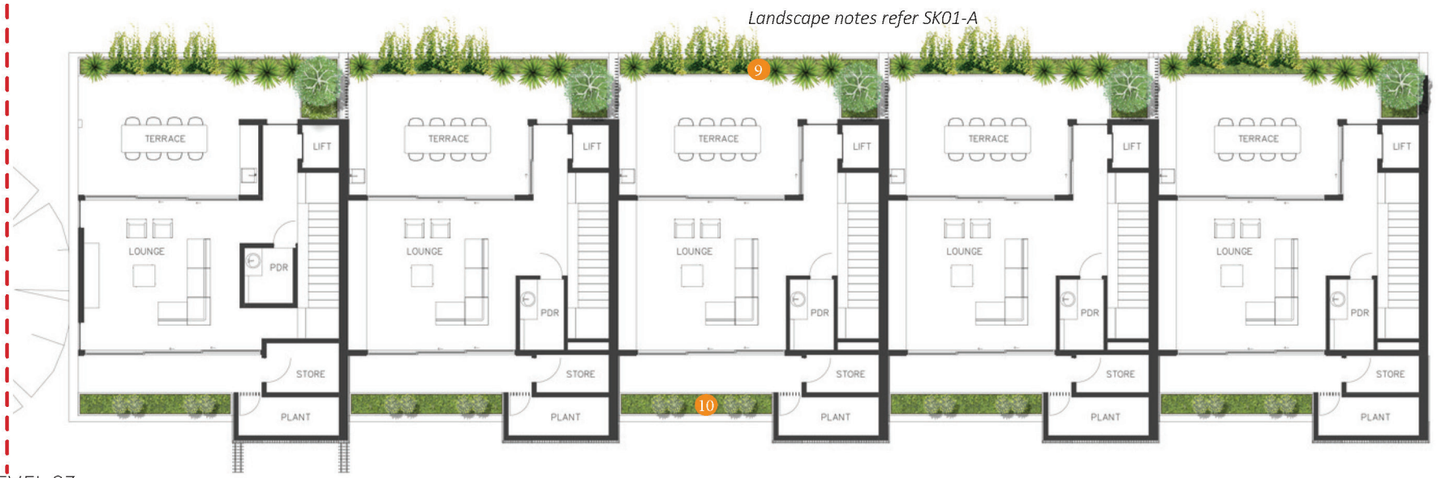
PROJECT #: 13068
DATE: OCTOBER 2021

5 MACRAE ROAD, APPLECROSS
LANDSCAPE DESIGN

SK01-C

LANDSCAPE MASTERPLAN (CONTINUED)

Landscape notes refer SK01-A



LEVEL 03
SCALE 1:200

LANDSCAPE STANDARDS

GROUND FLOOR
DSA(in ground): 188m2
Permeable Paving: 113.5m2

LEVEL 02
DSA(planter): 0m2

LEVEL 01
DSA(planter): 0m2

LEVEL 03
DSA(planter): 45m2

DEVELOPMENT PROVISIONS

CRITERIA	DEVELOPMENT PROPOSAL
Site Area	1012m2
DSA	188m2 (in ground) + 158.5m2 (planter/permeable paving) = 267.3m2 (26.4%)
Min. Trees	1 medium tree (compliant) 6 small trees (compliant) 14 small trees (non-compliant)

LANDSCAPE DESIGN INTENT

All planting beds are to be fully irrigated and operated off a timed controller with rain sensor shut-off.

Irrigation design to comply with waterwise design principles and the City's tree policy. Detailed irrigation plan to be provided at building license stage.

Water efficient irrigation system to be installed to best WSUD practice, using hydro-zoning and water harvesting principals where appropriate.

Additional waterwise design principles employed:
> Low water use plant selection suited to the local soil complex.
> Complete omission of water intensive turf areas.
> Water retention soil preparation.
> Reduction in soil water loss through perscribing course mulch.

Proposed plant distribution rate 4 per m2.

Proposed plant pot sizes:
> Small Tree 100L
> Medium 200L
> Large Tree 500L
> Shrubs/groundcovers 140mm-200mm

LEGEND

- Planter / Permeable Paving
- Planting in ground/Planter/Permeable Paving (under canopy cover)
- DSA in ground
- Proposed medium tree
- Proposed small tree

TDL BEYOND GREEN

AUTHOR: QY Q.A: GD
SCALE: 1:200@A3

PROJECT #: 13068
DATE: OCTOBER 2021

5 MACRAE ROAD, APPLECROSS
LANDSCAPE DESIGN

SK02-C

PRINCIPLE 3

BUILT FORM + SCALE

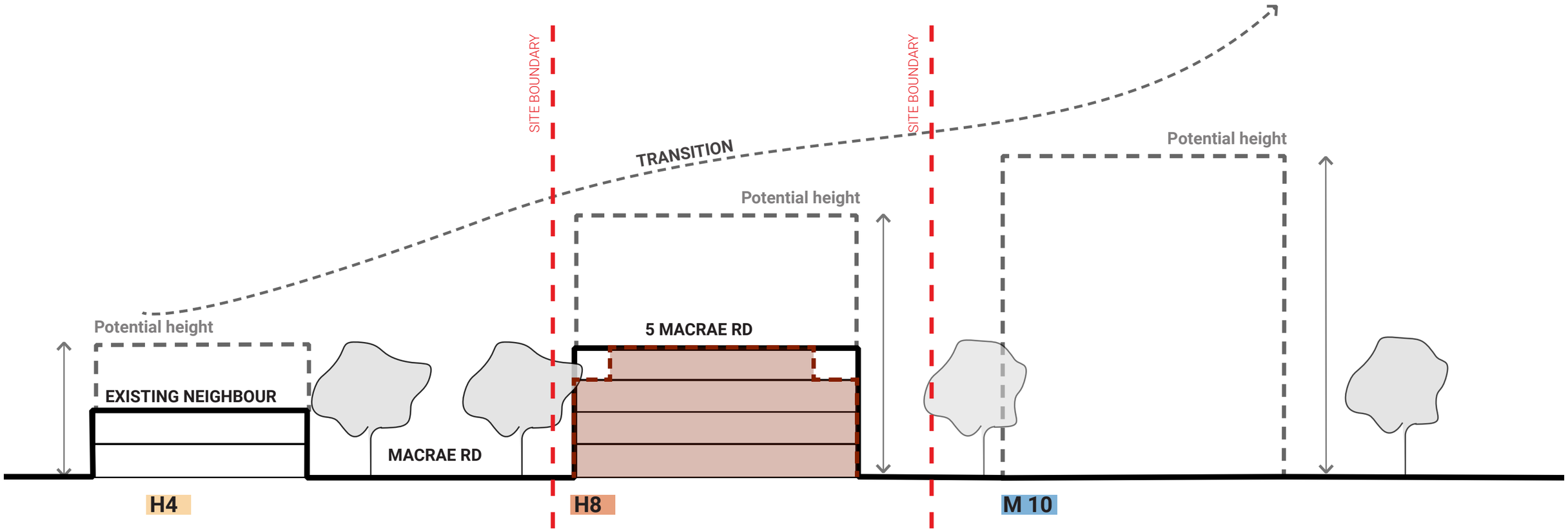
Good design ensures that the massing and height of development is appropriate to its setting and successfully negotiates between existing built form and the intended future character of the local area.

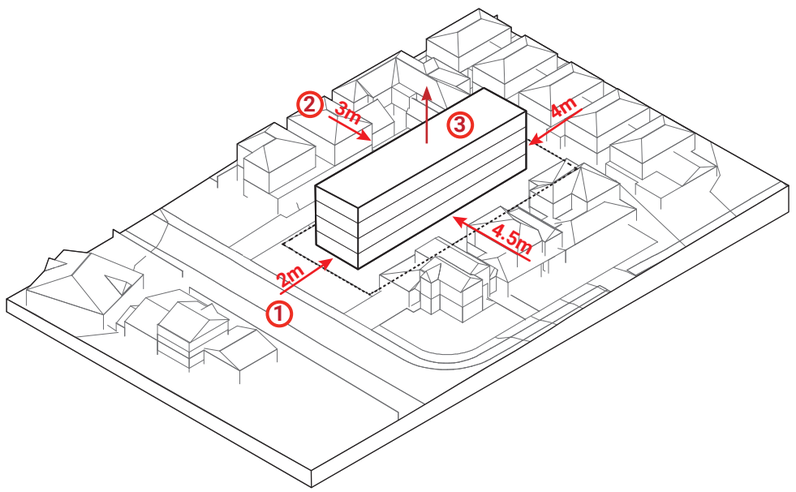
HEIGHT TRANSITION

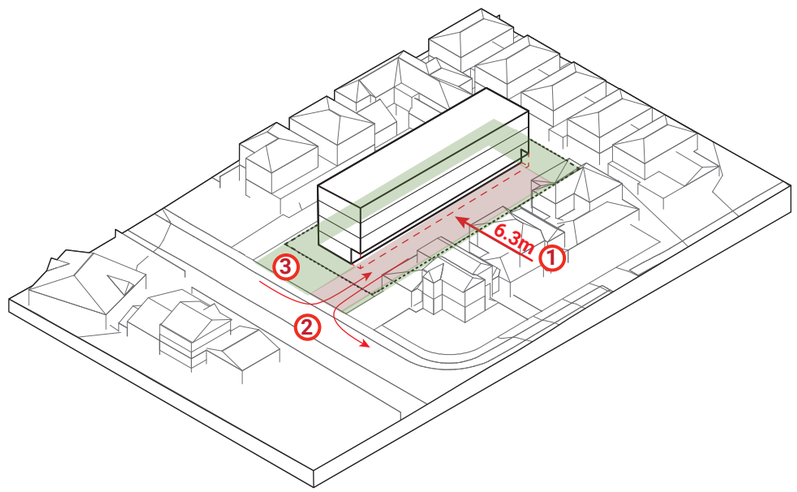
H4 Residential Up to 4 Storeys

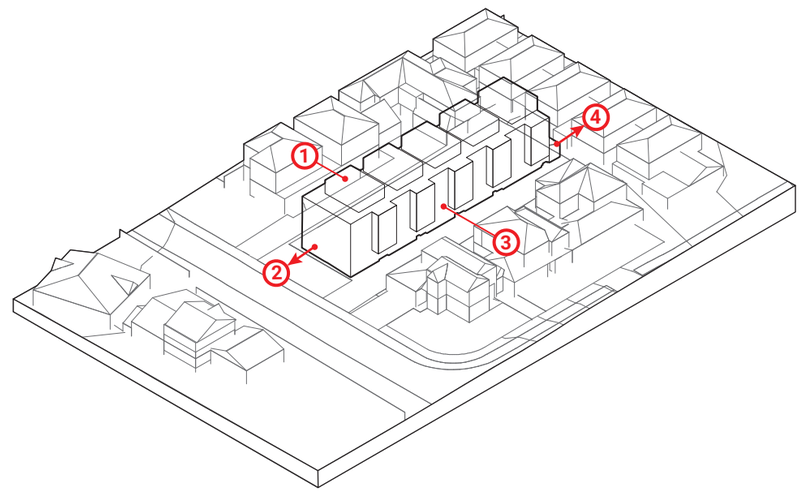
H8 Residential Up to 6-8 Storeys

M10 Mixed Used Up to 10 Storeys









BUILDING ENVELOPE SETBACK

1. Massing constrained by the development controls: min 2m to the front setback, 4m to the rear and side setbacks.
2. North-east setback is 3m in lieu of min 4m; South-west setback is 6m on Ground Floor and 4.5m on Upper Floors in lieu of min 4m.
3. Development controls allows 6-8 storeys or up to 26m in height.

GROUND FLOOR AMENITIES

1. Ground Floor driveway is setback to allow for passing by easement for two-way movement and landscaping areas.
2. Increasing the amenities along the streetscape:reducing the existing double crossovers to a single crossover.
3. Integrating landscaping on the verge and front garden to address the streetscape

BUILDING VOLUME AND ARTICULATIONS

1. Reducing the bulk of the roof terrace
2. Multiple openings to address the streetscape
3. Further setback the facade to breakdown the singular facade plane and minimise the bulk towards SW boundary.
4. Introducing additional living space to breakdown the large SE facade.

PRINCIPLE 4

FUNCTIONALITY + BUILD QUALITY

Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full life-cycle.

Dwelling Typology and Functionality

> The proposed dwellings are a mix of 3 and 4 bedroom townhouses with additional multipurpose rooms that can be converted into an additional bedroom with ensuite, gym, home office, etc.

> The ground floor provides individual vehicle and pedestrian access to each dwelling along with a multipurpose room.

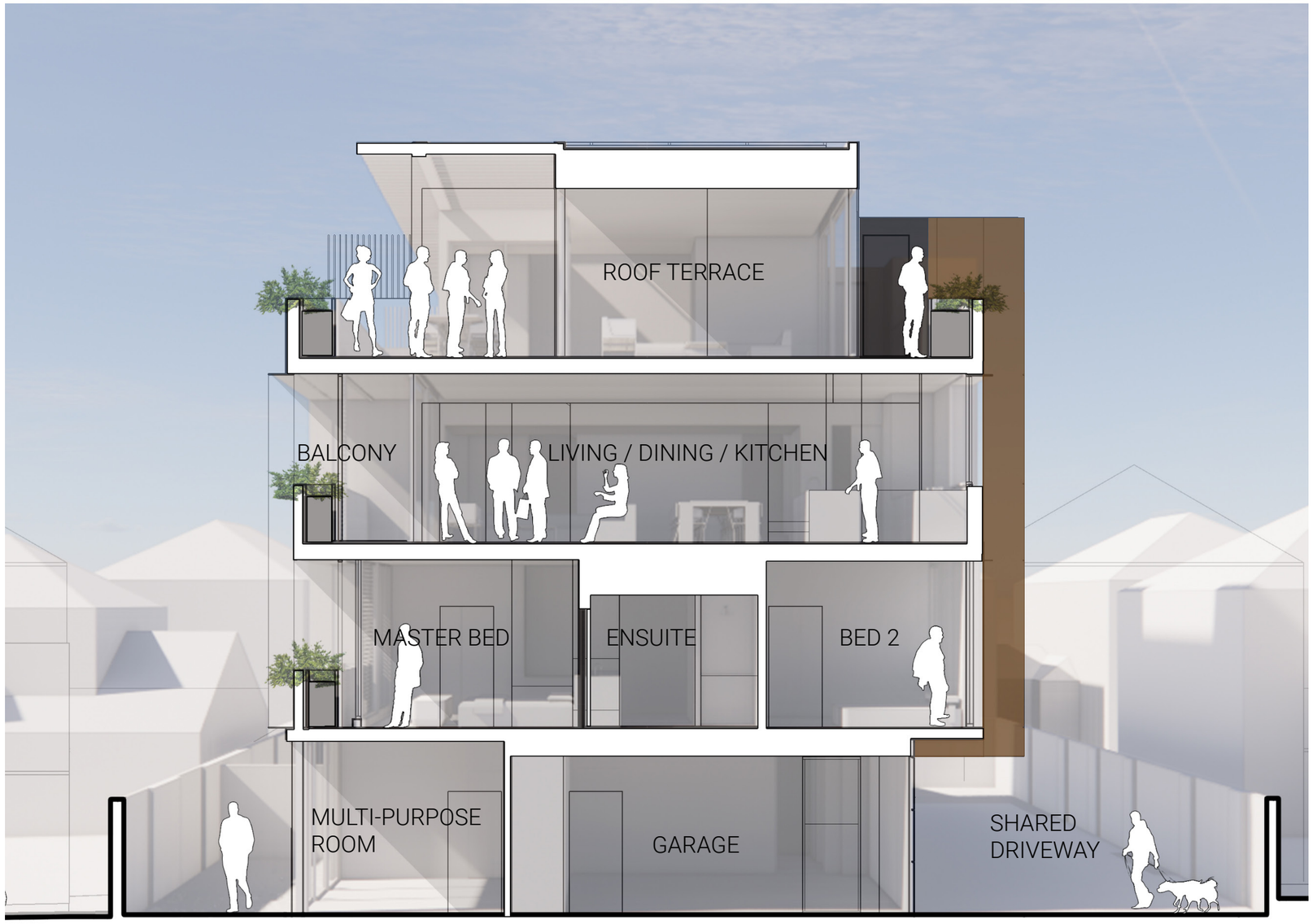
> Bedrooms and private spaces are contained to the first floor and living spaces utlilise the top two floors for outdoor living areas to maximise access to views.

> The program allows for variety of people to living in the townhouses: young professionals, families, retired professionals, etc, and allow functional flexibility or convertion when required.

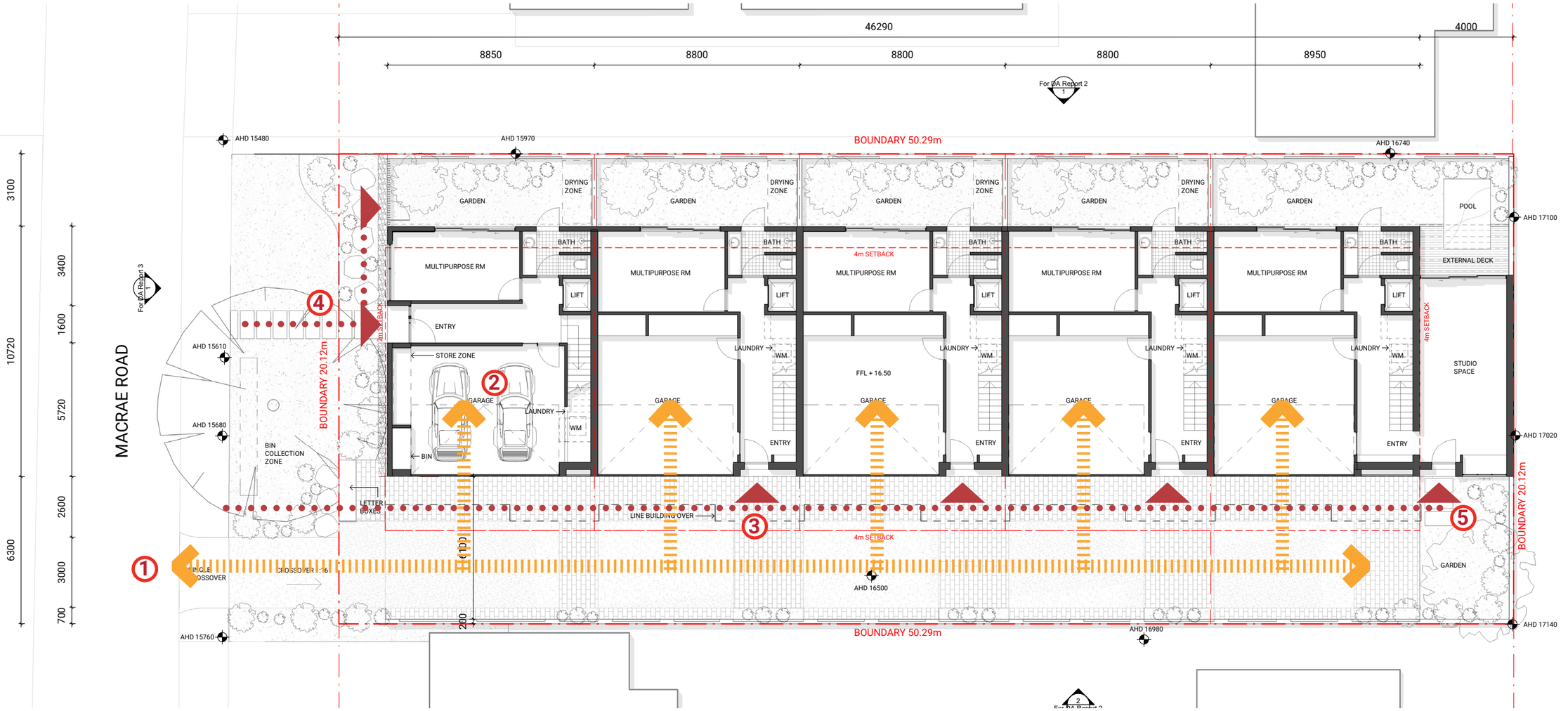
Build Quality

> Building materiality are designed to be consistent throughout the townhouses.

> The construction methodology incorporate both load-bearing and lightweight elements that allows spatial flexibility for alteration in the future.



ACCESS AND PARKING



VEHICULAR ACCESS

1. Single vehicular crossover into site for all dwelling reduces impact on street and improves legibility from the street (in lieu of the existing double crossover)

2. Vehicle access has been sited to provide privacy to the residents to the west where gardens and courtyards are located along the boundary line. Each dwelling has an individual garage.

PEDESTRIAN ACCESS AND ENTRIES

3. Each dwelling has a dedicated entry adjacent to the garage. The entries are designed to be distinguishable from the garage door plane.

4. The dwelling to Macrae Street has an additional pedestrian access from the street.

5. The last dwelling on the south has additional gate and screen for a private garden.

WASTE MANAGEMENT AND SERVICES

WASTE MANAGEMENT

Each garage contains space to house three bins and a tap for wash down. Clear pathway is provided through the driveway for ease of moving. The collection of the bins will be from the street in the location shown.

SERVICE METERS

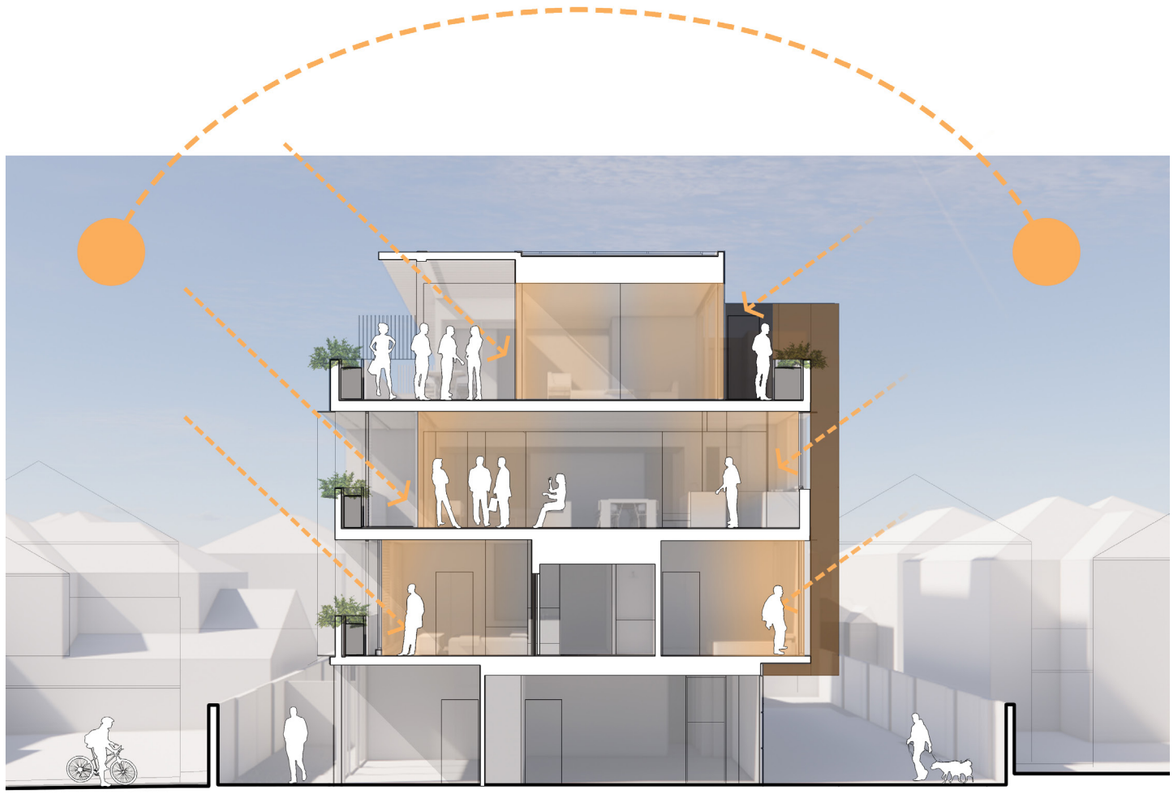
Service meters are located adjacent to individual entries and fully accessible from the driveway.

The service meter enclosures are designed to be integrated to be part of the facade design.

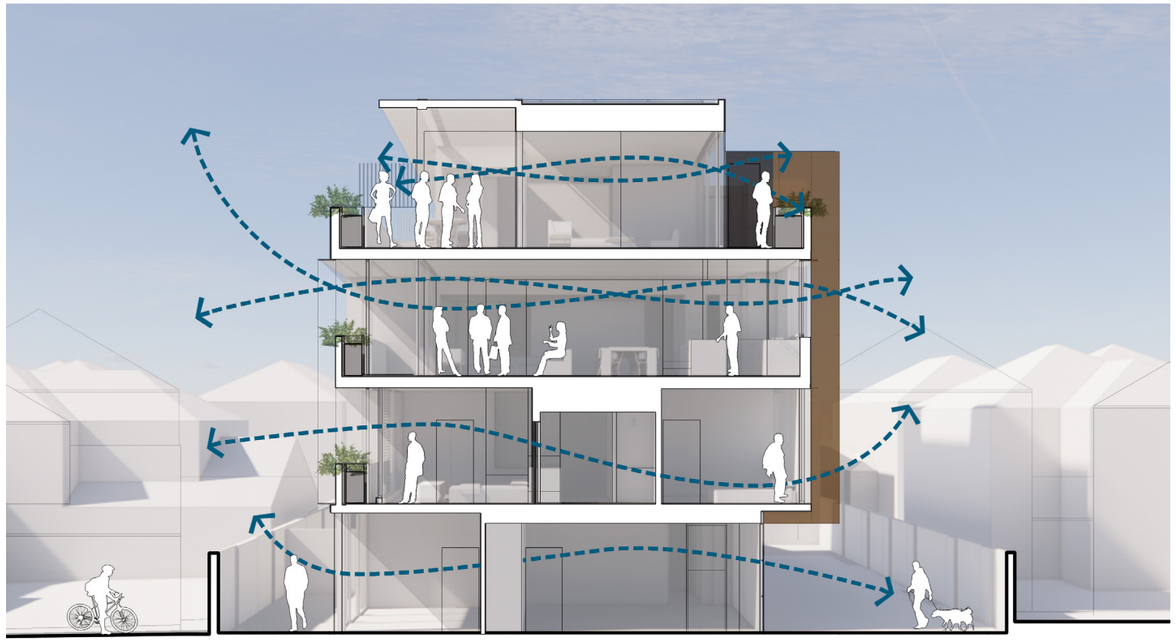
PRINCIPLE 5

SUSTAINABILITY

Good design optimises the sustainability of the built environment, delivering positive, environmental, social and economic outcomes.



SUNLIGHT AND DAYLIGHT



NATURAL CROSS VENTILATION

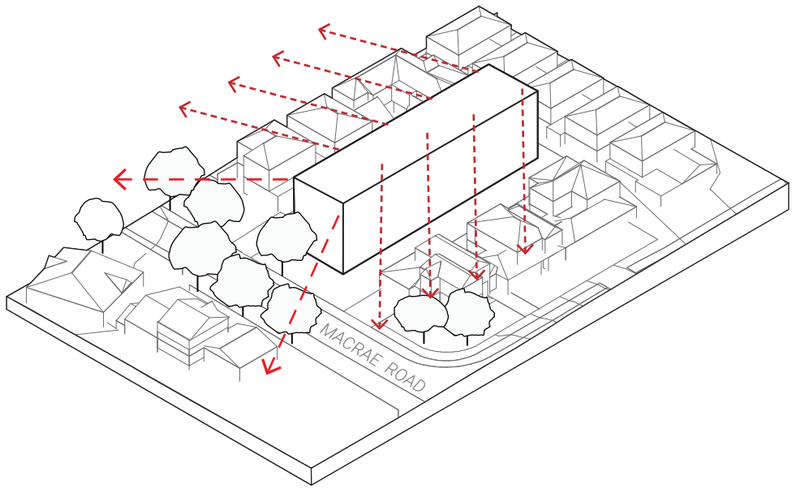
TYPICAL FLOOR PLAN

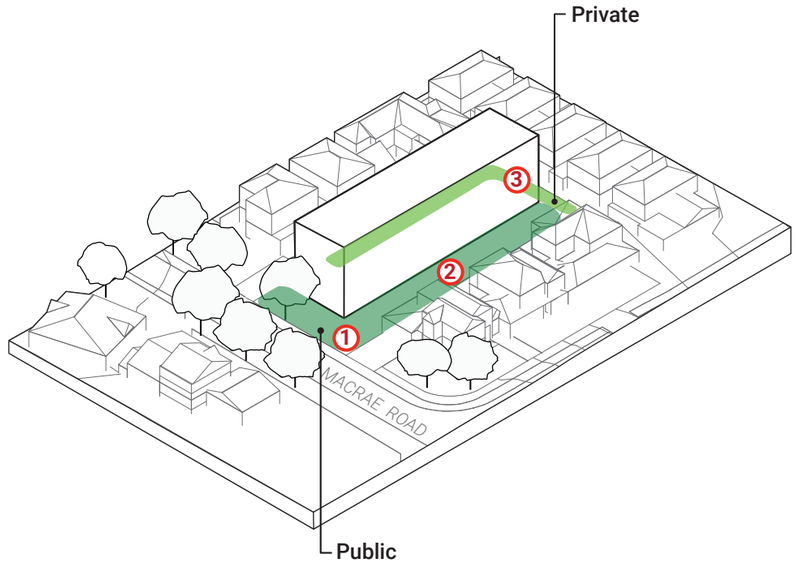
PRINCIPLE 6

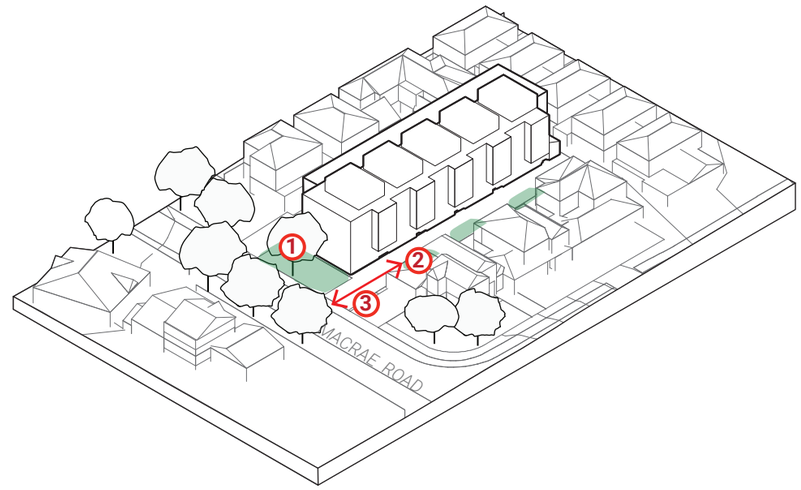
AMENITY

Good design provides successful places that offer a variety of uses and activities while optimising internal and external amenity for occupants, visitors and neighbours, providing environments that are comfortable productive and healthy.

AMENITY STRATEGY







VIEWS

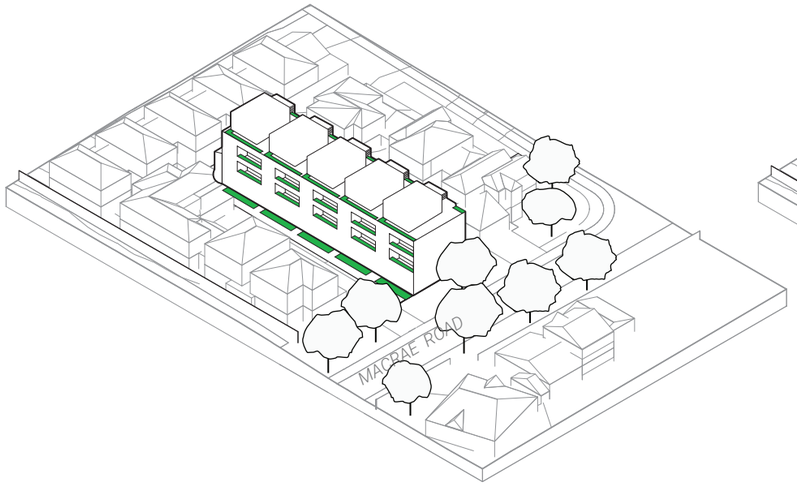
All townhouses benefits from the views to the city.
Upper level terraces and balconies are oriented to maximise the view to the city skyline and swan river

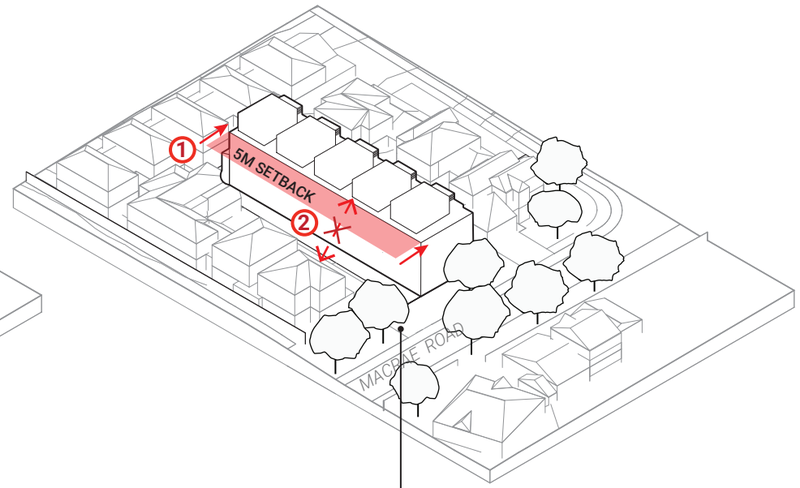
PUBLIC AND PRIVATE AMENITY

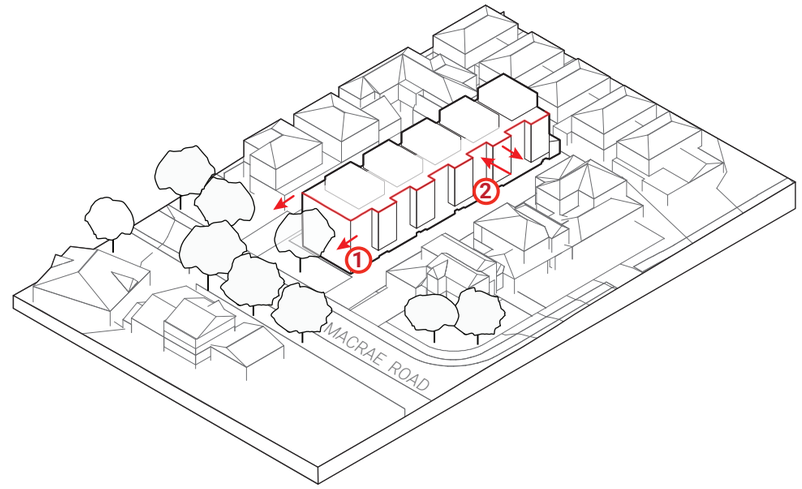
1. Retained mature street tree and single crossover to the driveway to address both Macrae Rd streetscape and private entries to the individual townhouses.
2. Shared driveway incorporates finish which encourage shared movement between pedestrian and vehicular access.
3. Maximising landscaping zone within the private amenities.

LANDSCAPE DESIGN

1. Retaining the existing Jacarandah tree at the site verge.
2. Improving the public amenities by integrating landscaping zone along Macrae Rd and the shared driveway.
3. Single crossover in lieu of the existing double cross over.







MULTIPLE GARDEN ZONES

Green wall to North-east facade as integrated sustainable design.

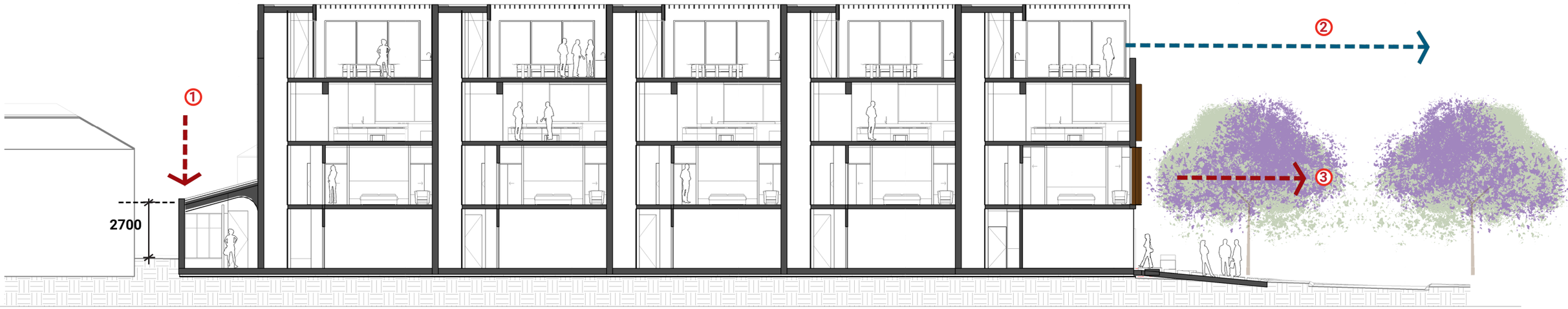
PRIVACY AND OVERLOOKING

1. Balconies and roof teraces are setback to minimise the impact of the massing of the structure to the neighbouring houses.
2. Setting back balconies and terraces with vertical garden to minimise or eliminate overlooking between properties.

MASSING AND ARTICULATION

1. Element of lightweight verandah to address Macrae Rd streetscape and minimising bulk of the building.
2. Further setback to reduce the massing of the building to minimise overshadowing, overlooking while creating individuality to each Townhouse.

FRONT AND REAR BOUNDARIES



SOUTH-EAST BOUNDARY

1. Roof shape lowered at the boundary to address the south-east neighbouring courtyard.

NORTH-WEST BOUNDARY

2. Roof terrace orientation is aligned to Macrae Rd to maximise the view towards the city and the river.
3. Multiple openings to the Living, Bed, and Multipurpose Spaces to address the streetscape.

SIDE BOUNDARIES

1. MINIMISING OVERLOOKING

Setting back balconies and roof terraces to minimise overlooking between proposed townhouses and the neighbouring driveway

2. MAXIMISING THE VIEWS

Planning and orientation of outdoor roof terrace and balconies are designed to maximise the view to the city skyline and swan river.

3. LARGE OUTDOOR LIVING SPACE

Incorporating roof terrace as outdoor living space with shading device.

4. OPEN PLAN AND DUAL-ASPECT LIVING SPACE

Open plan to living, dining, and kitchen areas with dual-aspect living space to maximise natural light and cross ventilation.

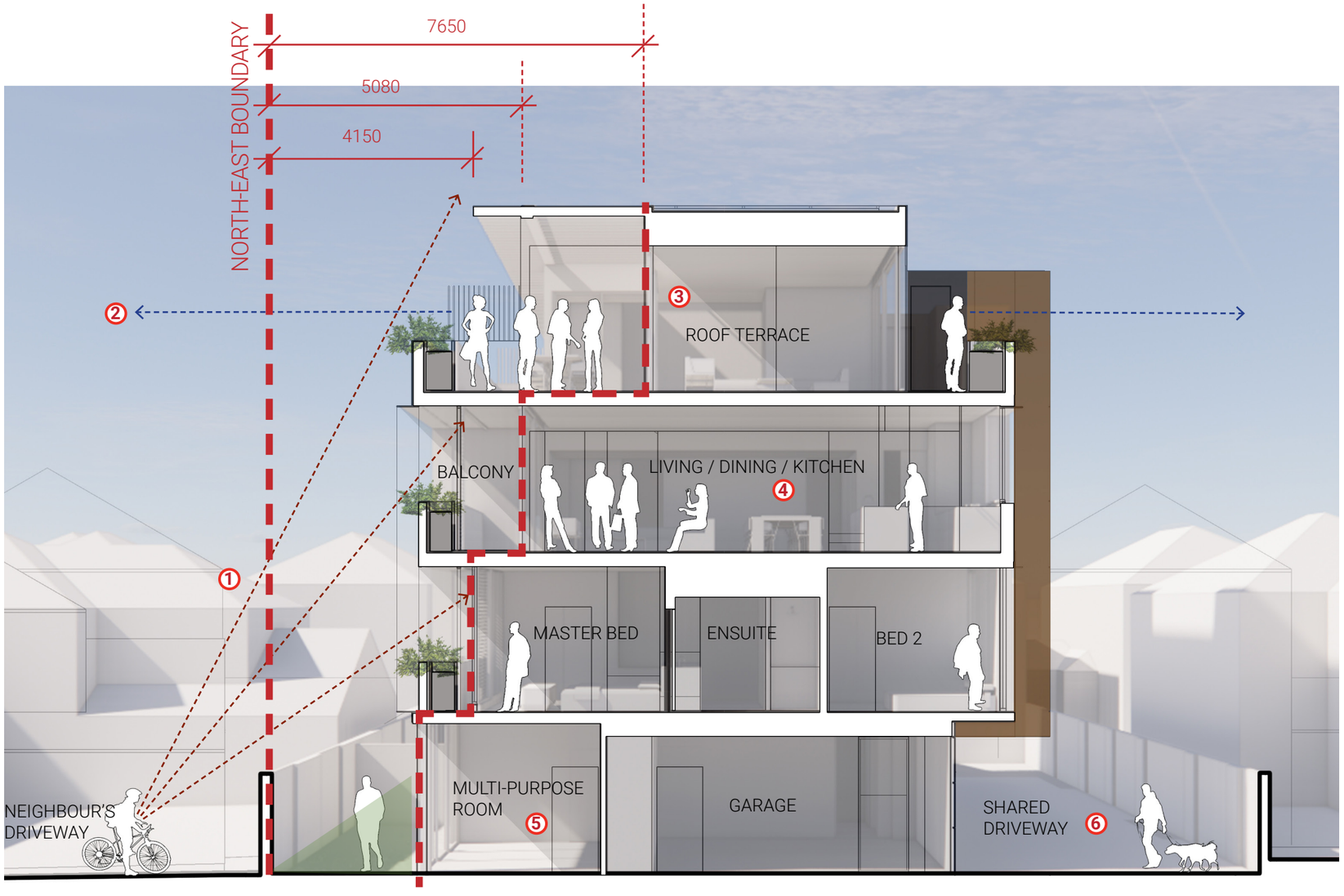
5. MULTI-PURPOSE ROOM

Incorporating flexible multi-purpose room that can be converted into an additional bedroom with ensuite, gym room, home office, library, etc to accommodate variety of people (families, young professionals, retired professionals, athlete, etc).

6. SHARED DRIVEWAY

Shared driveway incorporates finish which encourage shared movement between pedestrian and vehicular access.

Landscape and lighting zone integrated to the driveway to further improve the experience and security.



PRINCIPLE 7

LEGIBILITY

Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.

PUBLIC DOMAIN INTERFACE

1. RECESS AND MATERIALITY

Entry doors are recessed and cladded in contrasting material.

2. LIGHTING, LANDSCAPE

Landscaping extent and driveway surface finish transition is aligned to the entries to improve legibility and security.

3. GARAGE DOORS

Flush-mounted garage doors to minimise indentation on the facade, highlighting the main pedestrian entries of individual townhouses.

4. LETTERBOXES AND SECURITY

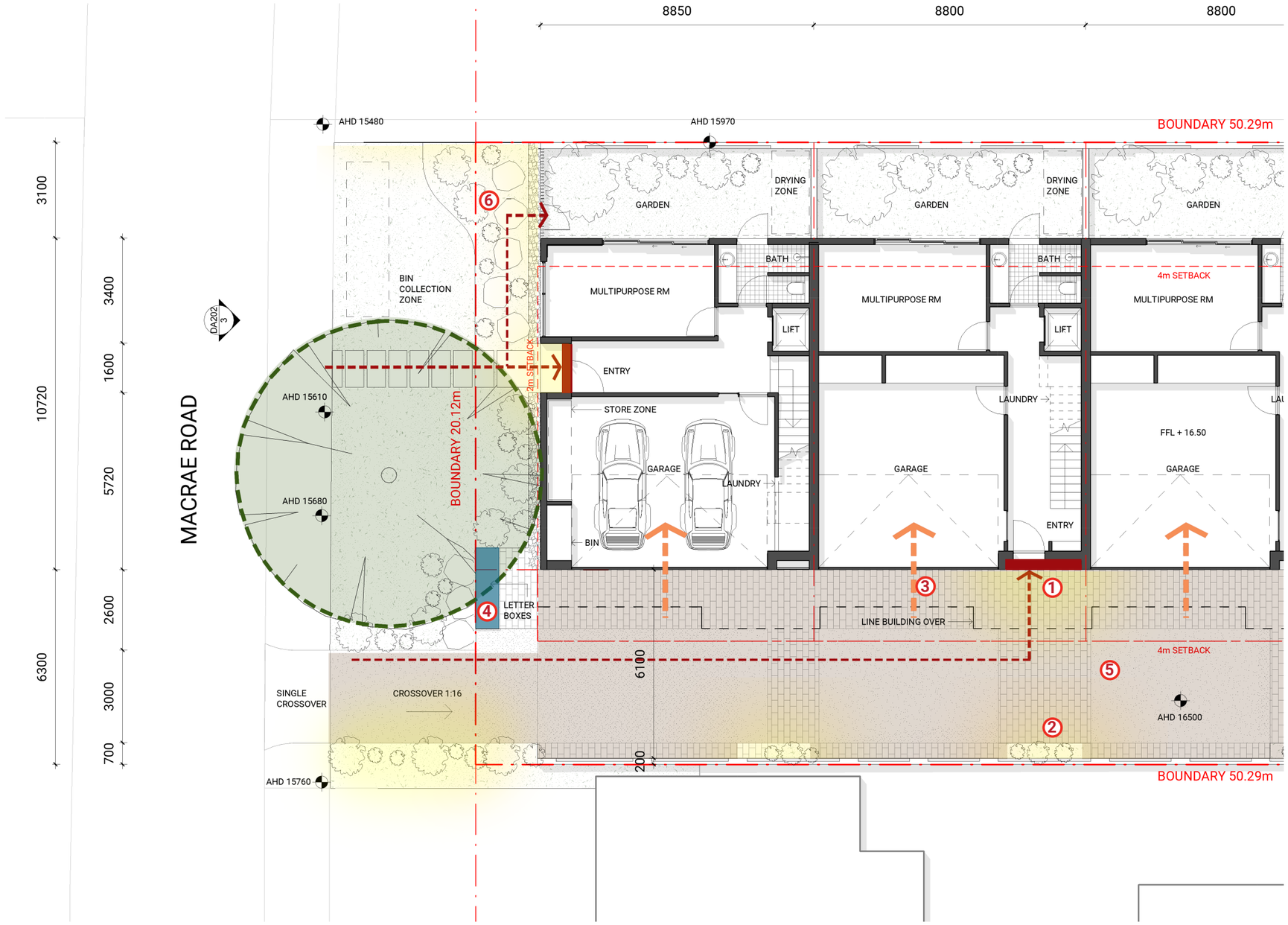
Letterboxes location adjacent to the main crossover with security scanning device integrated.

5. DRIVEWAY FINISH

Shared driveway finish to incorporate high quality pavers and other landscape-integrated finish to encourage shared pedestrian-vehicle movement.

5. ALTERNATIVE ENTRY

Alternative pedestrian entry for Townhouse 1 directly from street front to address Macrae Rd streetscape.



PRINCIPLE 8

SAFETY

Good design optimises safety and security, minimising the risk of personal harm and supporting safe behavior and use.

1. PASSIVE SURVEILLANCE TO MACRAE RD

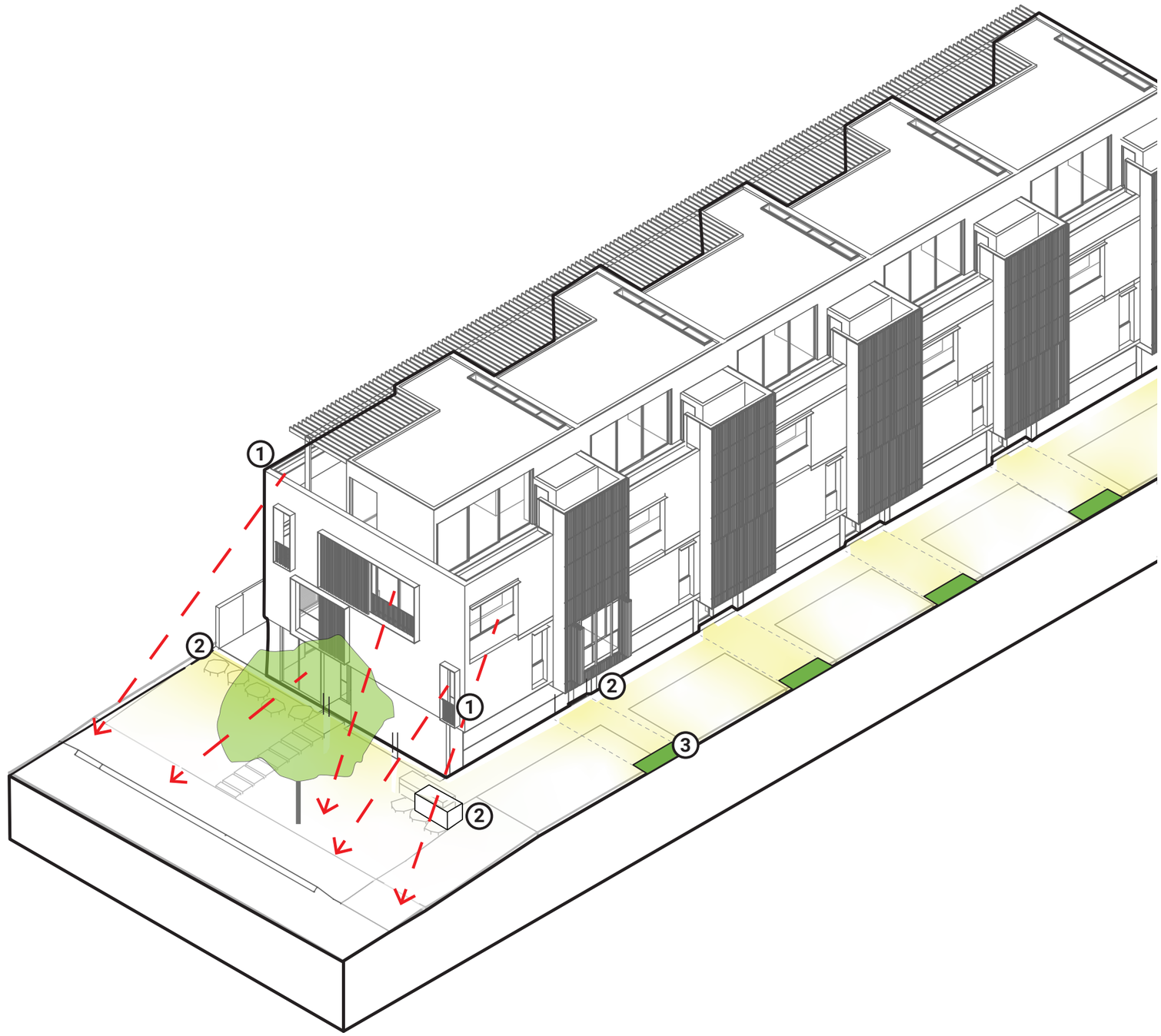
Bedroom, garage, and terraces views to Macrae Rd assists with passive surveillance to the public areas.

2. SECURITY MONITORING DEVICE

Integrated smart security monitoring device to all townhouse entry doors and letter boxes.

3.LANDSCAPE LIGHTING

Lighting to be integrated to the landscape design to assist with the sense of security and surveillance.



PRINCIPLE 9

COMMUNITY

Good design responds to local community needs as well as the wider social context, providing environments that support a diverse range of people and facilitate social interaction.

1. ADAPTABILITY OF USE

The ground floor of each dwelling has a multi-purpose room that can be converted into an additional bedroom with ensuite, gym room, home office, library, etc to accommodate variety of people (families, young professionals, retired professionals, athlete, etc).

2. LIFT SERVING FOUR STOREYS

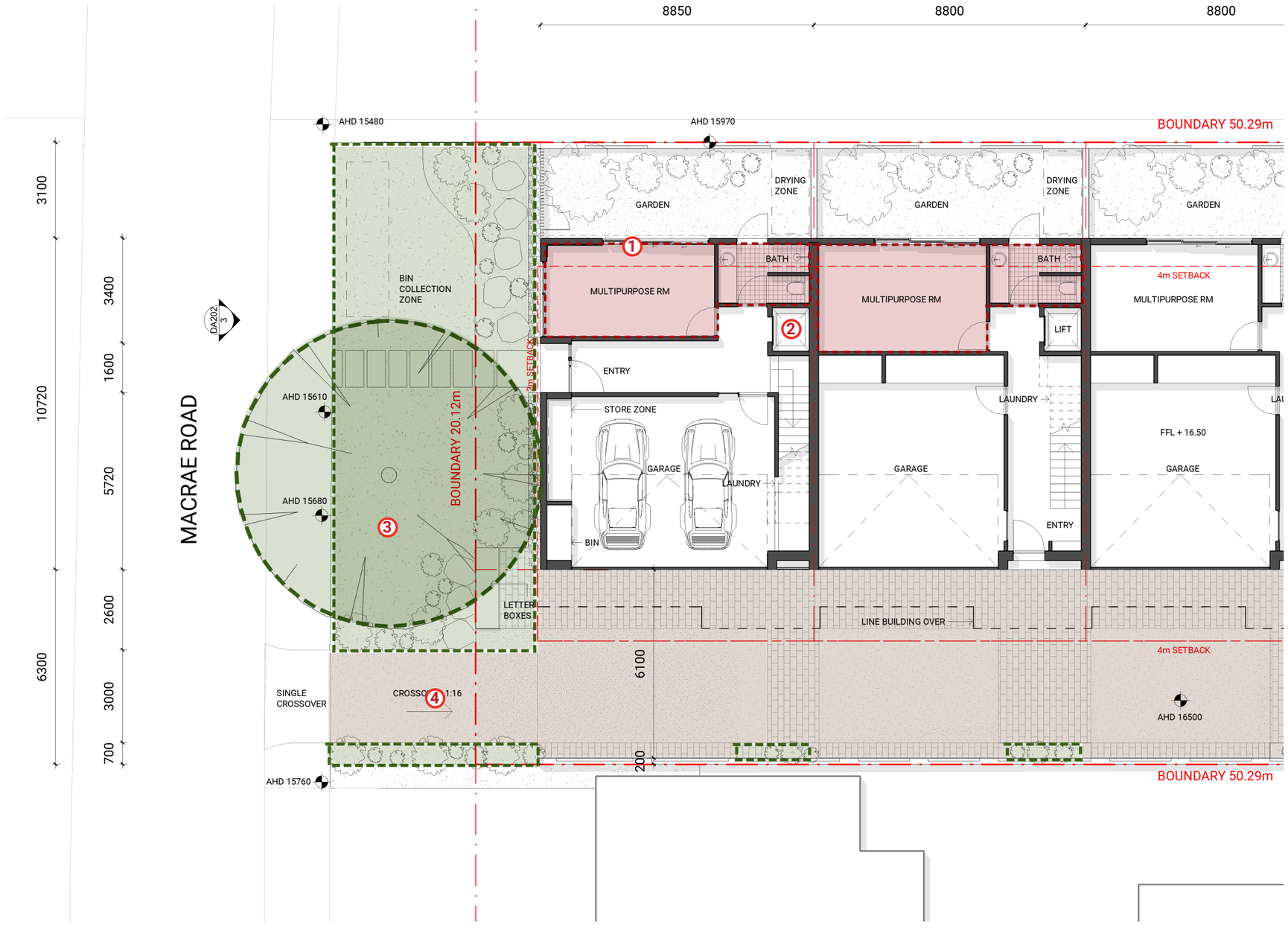
Each townhouse has a lift that serves all storeys to cater for all ages of residents as well as for high quality lifestyle.

3.TREE RETENTION AND SHARED GARDEN

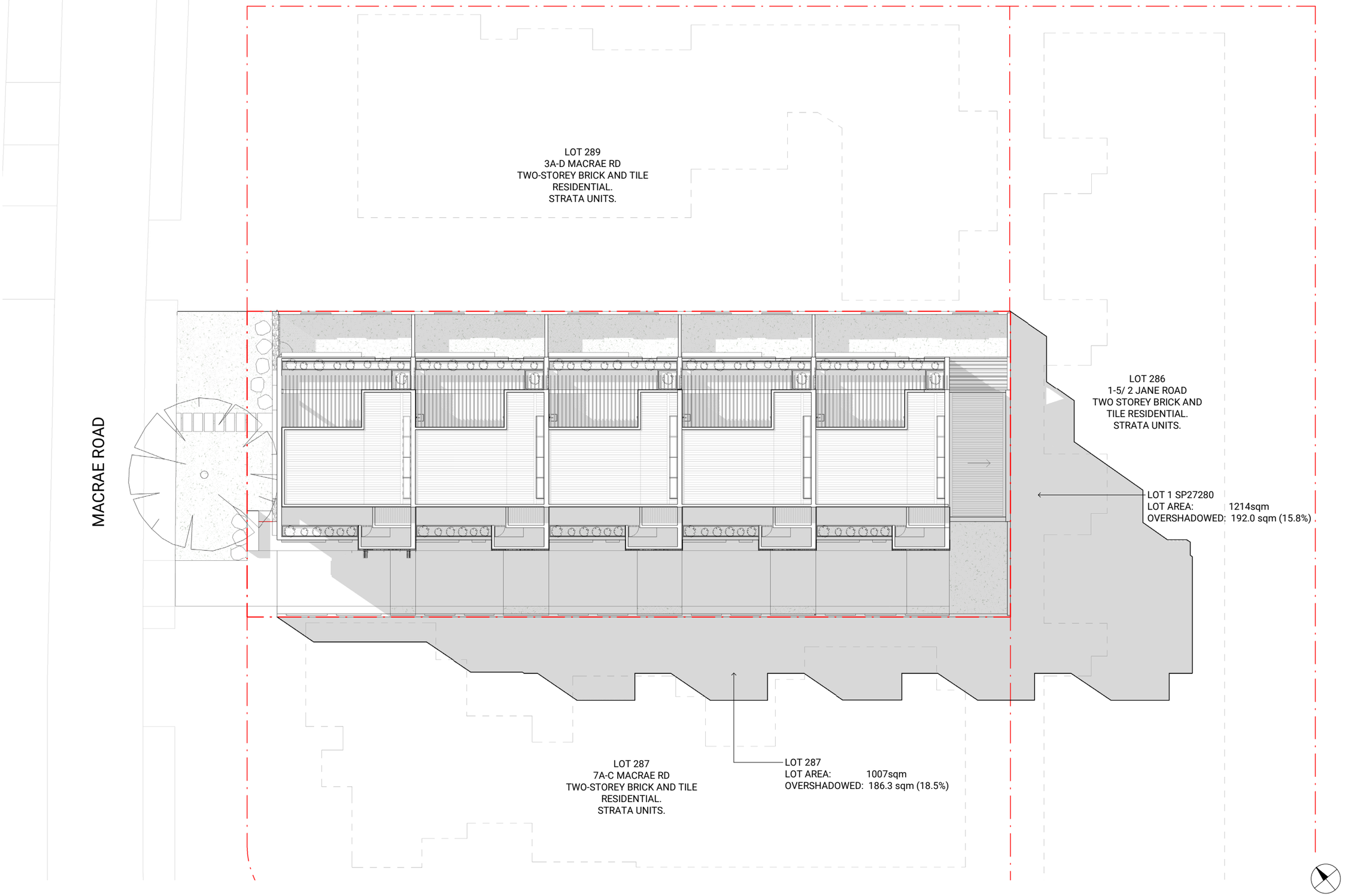
Existing Jacarandah tree along Macrae Rd will be retained to maintain the existing streetscape and aesthetic synonymous with Applecross suburb.
Creation of shared garden to address both Macrae Rd streetscape and private entries to the individual townhouses.

4. SINGLE CROSSOVER

Single crossover in lieu of existing double crossover.



OVERSHADOWING - JUNE 21 @ 12pm



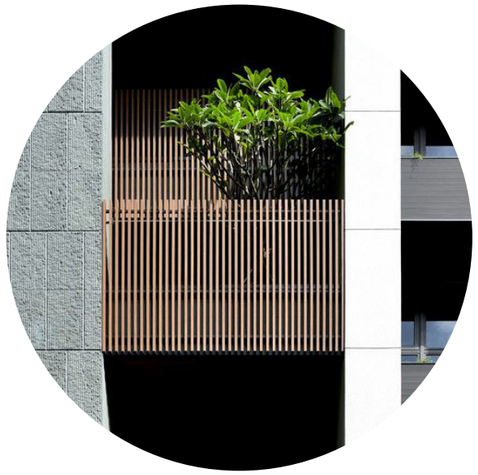
PRINCIPLE 10

AESTHETICS

Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.

MATERIAL CONCEPT

SIMPLE VOLUMES



OPENINGS PUNCTUATED
BY LANDSCAPE

PERMEABLE

OPEN AND SHUT

WIDE VIEW

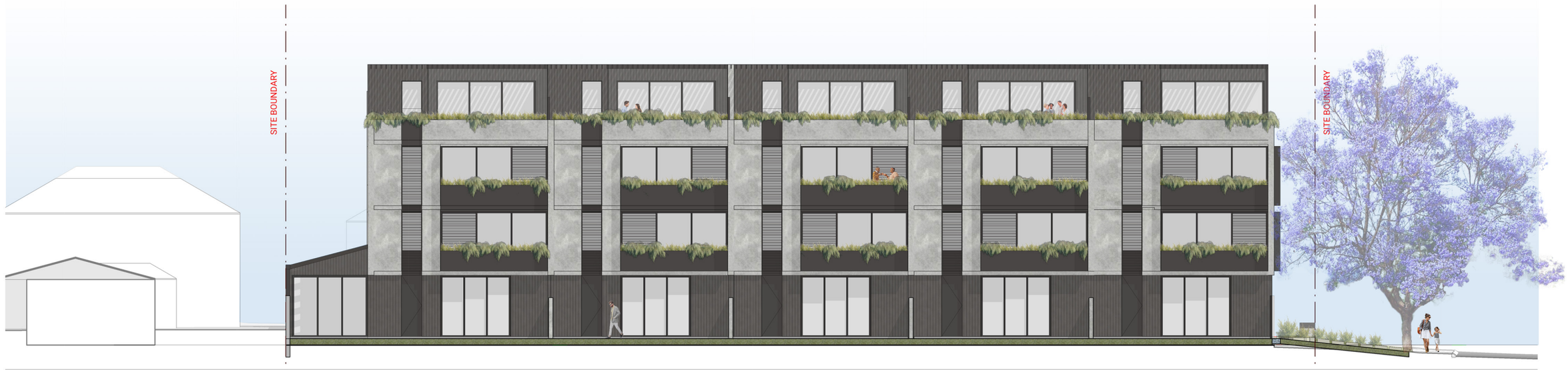
MINIMAL / FUNCTIONAL

REFINED

CONSISTENCY

TOWNHOUSE ELEVATIONS

SOUTH-WEST ELEVATION



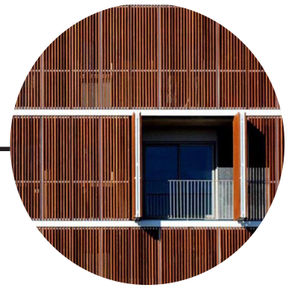
NORTH-EAST ELEVATION

STREET ELEVATION

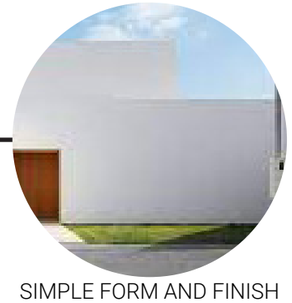
TYPICAL TOWNHOUSE FACADE

TEXTURED FINISH

INTEGRATED GREEN PLANTERS



SCREENING DEVICE



SIMPLE FORM AND FINISH

FLUSH-MOUNT GARAGE DOOR

FULL HEIGHT GLAZED ENTRY DOOR

STREETSCAPE VIEW

STREETSCAPE VIEW

DESIGN RESPONSE TO DESIGN REVIEW PANEL'S RECOMMENDATIONS

Introductory Comments		
Design quality evaluation		
		Supported
		Pending further attention
		Not yet supported
		Yet to be addressed
Strengths of the Proposal		• Panel support for a valuable 4 storey townhouse typology offering diversity in residential offering. • Good daylight access to primary living areas and the kitchens. • Bulk and scale well managed throughout the mews/laneway through a modulated form incorporating volumetric setbacks and reveals. • Incorporation of ground floor bedroom and ensuite to facilitate future ageing in place flexibility. • Incorporation of lifts to further facilitate ageing in place and accessibility. • All garaging accessed off the mews laneway and away from the street thereby minimising the number of cross-overs. • Front town house capitalises on the opportunity to have a street front entry. • Functional and well-arranged units • High quality roof terrace amenity. • ESD professional and associated commitment to 4 Star Green Star equivalence. • AC and plant allocation accommodated in a purpose designed and fully screened location. • Tree retention in the set back. • Servicing and waste management strategy considered early in the process. • Garden courtyard at the termination of the laneway and with the capacity to host a tree.
Principle 1 **Context and character**		*Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.*
		a) Whilst direct street access to the street-facing unit is supported the pathway to the front door from the public domain is convoluted and counter intuitive. b) The proposed screened pergola across the front facing unit serves to emphasize the bulk of the front elevation and compromise the ability for the front facing unit to engage with the public domain. c) The façade behind the screened pergola has the capacity to incorporate more openings and engage more emphatically with the adjoining streetscape. d) Whilst the mews laneway is fully supported there remain opportunities to enhance the design characteristics of the laneway finishes to emphasize pedestrian priority over vehicular priority.
Recommendations		**1. Consider incorporating a more direct and intuitive pathway approach to the front door of the street facing unit.**

Refer Principle 2 (Landscape Quality) for updated Landscape Design Drawings
The pathway has been updated to have more direct and intuitive approach to the front door of the street facing unit. The landscape design has also been updated to complement the proposed pathway.

		2. Consider omitting the screened pergola and enhancing upper-level engagement with the adjoining public domain. This may include additional window openings and/or Juliette balconies. **3. Consider further hard and soft surface landscape design initiatives that seek to emphasize the primacy of pedestrian movement through the laneway over vehicular movement. At present the hard landscape seems to be arranged to amplify the primacy of the garage entries.**
Principle 2 **Landscape quality**		*Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context.*
		a) The proposal benefitted from a landscape presentation on the day of the review. However, it would be beneficial to have the material submitted prior to review if possible. b) The tree retention proposed at the street front is fully supported
Recommendations		**1.** Consider locating a tree in the landscaped courtyard at the termination of the laneway. **2.** Consider appointing an arborist to assist with ensuring the retained street tree has the best potential to survive the construction process.
Principle 3 **Built form and scale**		*Good design ensures that the massing and height of development is appropriate to its setting and successfully negotiates between existing built form and the intended future character of the local area.*
		a) The proposed built form and scale is considered appropriate within this context.
Recommendations		**1. Supported**
Principle 4 **Functionality and build quality**		*Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full life-cycle.*
		a) The proposal is generally functional and well planned.
Recommendations		**1. None**
Principle 5 **Sustainability**		*Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes.*
		a) Not discussed in any detail. An ESD report did not form a part of the material submitted prior to review.
Recommendations		**1. Consider engaging an ESD professional to establish a coherent and considered sustainable design strategy and proposal.**
Principle 6 **Amenity**		*Good design optimises internal and external amenity for occupants, visitors and neighbours, providing environments that are comfortable, productive and healthy.*
		a) The proposal is generally considered to provide adequate resident and occupant amenity.
Recommendations		**1. Consider an operable roof light over the stair to facilitate light in the centre of the plan and ventilation though the stack effect.** **2. Consider reorganising the WC at the roof top terrace to facilitate greater levels of separation and privacy from the adjoining living area.**
Principle 7 **Legibility**		*Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.*
		a) Entry legibility for individual entrances within the mews remains a challenge.
Recommendations		**1. Consider hard and soft landscape treatment around the individual entrances that might enhance visual legibility.** **2. Consider extending a nib wall modestly to present more obviously when viewed obliquely from the mews laneway approach. This may incorporate unit number and/or lighting and a canopy.**

Refer Principle 2 (Landscape Quality) for updated Landscape Design Drawings and Principle 10 (Aesthetics)
The screened pergola is omitted. Multiple openings to Multipurpose Room, Bedrooms, Balconies and Living spaces integrated into the facade design to enhance engagement with the streetscape and adjoining public domain.

Refer Principle 2 (Landscape Quality) for updated Landscape Design Drawings
Permeable paving with smoother texture for pedestrian use are incorporated onto the driveway design to emphasize the primacy of pedestrian movement through the laneway over vehicular movement. Additional landscape lighting, planter beds, small trees, hedges, greenery on the boundary wall are also integrated to improve the visual quality of the common amenities and the entry/exit experience.

Refer Principle 2 (Landscape Quality) for updated Landscape Design Drawings
A medium tree (Jacaranda mimosifolia) shade tolerant groundcovers and low shrubs are incorporated onto the south-west garden where the laneway terminates to improve the visual quality of the driveway and the amenities of Townhouse 5

Arborist will be engaged to assist with ensuring the retained Jacaranda tree has the best potential to survive during construction process.
Also refer to Tree Survey prepared by Westworks Consultancy dated 9 September 2021.

Refer Principle 5 (Sustainability) for Updated Sustainability Report

Refer DA106 Roof Plan
Skylight over the stair and larger void to the stair zone to allow for natural light penetration at Level 2 and Level 3.

Refer DA105 Level 03 Plan
Rooftop terrace layout have been redesigned to facilitate larger and more efficient indoor and outdoor living spaces.

Refer Principle 2 (Landscape Quality) for updated Landscape Design Drawings and Principle 7 (Legibility)
Permeable paving with smoother texture for pedestrian use are incorporated onto the driveway design at and around the individual entrances. Landscape lighting, planter beds, small trees, hedges, greenery on the boundary wall are integrated to

Refer Principle 7 (Legibility) and DA102 Ground Floor Plan
A full-height fixed panel are integrated adjacent to typical entry door for design, lighting and signage customisation. The upper levels are cantilevering to provide shelter to the entries

Principle 8 **Safety**		*Good design optimises safety and security, minimising the risk of personal harm and supporting safe behaviour and use.*
		a) None.
Recommendations		**1. Supported**
Principle 9 **Community**		*Good design responds to local community needs as well as the wider social context, providing environments that support a diverse range of people and facilitate social interaction.*
		a) In a project of this scale the greatest contribution to the community is in the way that the proposal engages with the streetscape to provide active and occupied frontages that bring life, vitality and passive surveillance to the public domain. b) Whilst direct street access to the street-facing unit is supported the pathway to the front door from the public domain is convoluted and counter intuitive. c) The proposed screened pergola across the front facing unit serves to emphasize the bulk of the front elevation and compromise the ability for the front facing unit to engage with the public domain. d) The façade behind the screened pergola has the capacity to incorporate more openings and engage more emphatically with the adjoining streetscape.
Recommendations		**1. Consider incorporating a more direct and intuitive pathway approach to the front door of the street facing unit.** **2. Consider omitting the screened pergola and enhancing upper-level engagement with the adjoining public domain. This may include additional window openings and/or Juliette balconies.**
Principle 10 **Aesthetics**		*Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.*
		a) The aesthetic approach is supported. b) A successful aesthetic outcome will be largely contingent on the adoption of high quality and durable materials.
Recommendations		**1. Supported**

Refer Principle 2 (Landscape Quality) for updated Landscape Design Drawings
The pathway has been updated to have more direct and intuitive approach to the front door of the street facing unit. The landscape design has also been updated to complement the proposed pathway.

Refer Principle 2 (Landscape Quality) for updated Landscape Design Drawings and Principle 10 (Aesthetics)
The screened pergola is omitted. Multiple openings to Multipurpose Room, Bedrooms, Balconies and Living spaces integrated into the facade design to enhance engagement with the streetscape and adjoining public domain.

Appendix 2 – Sustainable Development Assessment Report

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Address:
71 Allnutt Street Mandurah WA 6210
Postal:
PO Box 4160 Mandurah North WA 6210

Sustainable Design Assessment – DA Stage

Date: 29th October 2021
Our Reference: 21-10213

Project Address: Lot 288 (#5) Macrae Road, Applecross WA
BCA Climate Zone: 5
Building Class: 1a

Report Commissioned By: Hub Property Group

Report Details		
Report Author: Nathan Peart	GBCA Acc. No.: 49264	Signature:
Revision Date: -	Reason for Revision	

Phone: 08 9555 9444 FAX: 08 9200 5654 Email: rate@s-wa.com.au Web: www.s-wa.com.au

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SustainabilityWA

Contents

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1. Project Information

This report has been commissioned to give preliminary feedback on the proposal at Lot 288 (#5) Macrae Road, Applecross WA against the sustainability objectives contained in the City of Melville town planning scheme number 6, as detailed in the Canning Bridge Activity Centre Plan, Design Guideline 11. The proposal is on an existing developed site with a land area of 1012m². The proposed development contains 5 residential townhouse each of 4 storeys.

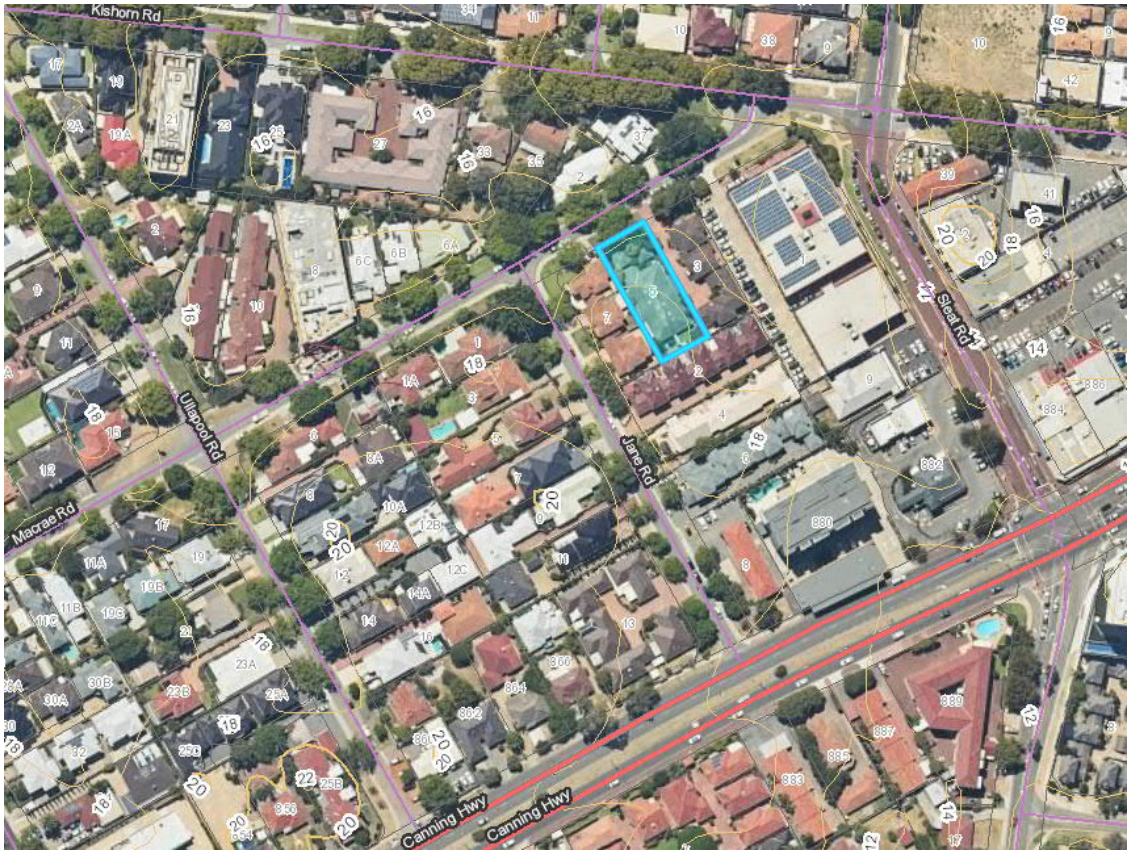

Figure 1: Site Location

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2. Compliance overview

The property is within the Kintail Quarter of the Canning Bridge Activity Centre Plan and must therefore comply with Design Guidelines, Element 11 – Sustainability. This element contains five prescriptive clauses that are required to be satisfied to demonstrate the developments compliance.

Clauses 11.1 through to 11.4 only apply to non-residential developments. All levels of the development are residential, or for the use of the residents, therefore these clauses do not apply.

Clause 11.5 states: All new development shall be designed to maximise passive solar principles for heating, cooling, ventilation and energy conservation. East and west facing glazing shall be minimised and shading devices shall be employed to reduce heat loads within buildings and reduce the need for air-conditioning systems. All buildings shall be designed to enable access to natural light and cross ventilation.

All apartments have north facing living areas, to the extent possible considering the orientation of the lot. West or east facing glazing has been minimized. Where there is west facing glazing (on the upper level) it is well shaded. Shading devices are included over all northern windows. Cross ventilation is provided to the extent possible (Assuming all windows are operable). All apartments have good access to natural light.

Additionally, Clause 11.5 calls for the development to achieve a rating that is equivalent to a 4-star green star rating.

This will be demonstrated through the use of the Green Building Council of Australia(GBCA) design and as built tool. The GBCA design and as built tool uses points to classify the development into a star rating using the following:

Table 1: Green Star Rating Scale

% of available points	Rating	Outcome
Less than 10	Zero Star	Assessed
10-19	One Star	Minimum Practice
20-29	Two Star	Average Practice
30-44	Three Star	Good Practice
45-59	Four Star	Australian Best Practice
60-74	Five Star	Australian Excellence
75+	Six Star	World Leadership

Source: Green Star – Design & As Built v1.2 Submission Guidelines

The key objective is to obtain as a minimum, an assessment which is equivalent to four stars, or minimum of 45 points using the GBCA design and as built calculator.

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3. Green Star overview

The following changes/inclusions are required to ensure compliance with this report and the Green Star requirements.

For a full list of points claimed please see Green Star Design and As Built Scorecard attached as Appendix A. Table 2 is a summary of actions required and comments on how they relate to this project. Inclusion in Table 2 does not guarantee point is claimed or claimable. Further information on each of these requirements is available from GBCA submission guidelines or by contacting the author.

The nominated systems have been defined as:

- HVAC System
- Lighting

Nominated areas have been defined as:

Primary Spaces:

- Living Areas
- Bedrooms

Secondary Spaces:

- Kitchen
- Bathrooms

Tertiary Spaces:

- Passages
- Store Rooms

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Table 2: Actions required to obtain a five-star equivalent green star rating.

GBCA Design and as Built Clause	Action Required	Comments on point viability.
1.0	Accredited Professional	Sustainability WA contracted for Green Star review.
2.0	Environmental Performance Targets	Environmental Performance Targets to be set by the design team including functions, operations and maintenance of the building systems, setting of targets for energy and water consumption, description and diagram of energy and water metering.
2.1	Services and Maintainability Review	Services and Maintainability Review and report by the head contractor during design stage and prior to construction to review commission ability, controllability, maintainability, operability and safety of nominated systems.
2.2	Building Commissioning	Building Commissioning to be performed as per approved standards and guidelines.
2.3	Building Systems Tuning	Building systems will required to be tuned by lead contractor for electrical and hydraulic systems.
2.4	Independent Commissioning Agent	Not viable for this size project.
3.1	Implementation of a Climate Adaptation Plan	Not viable for this size project.
4.1	Building Information	Building Information – Comprehensive operations and maintenance information to be developed and made available to the facilities management team; and Relevant and current building user information to be developed and made available to all relevant stakeholders.
5.1	Environmental Building Performance	Not viable for this size project.
5.2	End of Life Waste Performance	Residential building assumed compliant.
6.1	Monitoring Systems – Incorporate an automated monitoring system for Electricity, Gas and Water that shows where the resources are being used and estimated energy consumption.	N/A
7.0	Environmental Management Plan	Pre-requisite – not required
7.1	Formalised Environmental Management System	Not viable for this size project.
8.0	Operational Waste – Nomination of waste area on architectural plans that includes General Waste, General Recycling and one other recycling component prepared by waste management consultant	Waste to be managed by council.
9.1	Ventilation System Attributes – Verification that the system has been designed to ensure, entry of outdoor pollutants is mitigated; system is designed for ease of maintenance and cleaning; and specification states system to be cleaned prior to occupation and use	Ventilation system to comply with GBCA requirements. Air conditioning to be split systems. Exhaust fans to be externally flued.
9.2	Provision of Outdoor Air at a rate 50% to 100% greater than the minimum required by AS 1668.2:2012	Naturally ventilated – openings comply.
9.3	Exhaust or Elimination of Pollutants- Ensure kitchens and photocopy/print rooms are exhausted separately to AS1668.2:2012.	Exhaust fans to be externally flued.
10.1	Internal Noise Levels	Acoustic consultant not engaged.
10.2	Reverberation	Not Targeted.
10.3	Acoustic Separation – Internal partitions between offices, meeting rooms etc. to have a sound reduction of R_W45 for partitions without a door or R_W35 for partitions with a door.	Not Targeted.
11.0	Minimum Lighting Comfort – All lights to primary and secondary nominated spaces to have light sources must have flicker free lighting and a minimum Colour Rendering Index (CRI) of 80	Electrician/Lighting contractor to ensure compliance

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11.1	General Illuminance and Glare Reduction – Lighting to comply with relevant table of AS/NZS1680.2 demonstrating best practice. All bare light sources must be fitted with baffles, louvers, translucent diffusers, or other means that obscures the direct light source from all viewing angles of occupants.	Electrician/Lighting contractor to ensure compliance
11.2	Surface Illuminance - surface reflectance for ceilings of at least 0.75(0.75 = matte white), ceiling area to have an average surface illuminance of at least 30% of the lighting levels on the working plane.	Electrician/Lighting contractor to ensure compliance
11.3	Localised Lighting Control – occupants must have the ability to turn the lights on and off and adjust light levels in their immediate environment.	Assumed compliant in residential buildings.
12.0	Glare Reduction – Glazing in all primary spaces to have blinds, screens, fixed devices to reduce glare	Assumed compliant in residential buildings.
12.1	Daylight – Calculator to be completed by Sustainability WA	-
12.2	Views - Calculator to be completed by Sustainability WA	-
13.1	Paints, Adhesives, Sealants and Carpets - At least 95% of all internally applied paints, adhesives, sealants (by volume) or carpets (by area) meet the total VOC limits (See appendix B and C)	Specification to be updated to ensure compliance.
13.2	Engineered Wood Products at least 95% (by area) of all engineered wood products meet the formaldehyde emission limits specified by in Appendix D.	Specification to be updated to ensure compliance
14.1	Thermal Comfort	-
14.2	Advanced Thermal Comfort	-
15	Calculator by Sustainability WA	Lighting to be max. 4.5 watts/m² AC systems to be min. 5 Star rated. Any electrical equipment installed (EG. Dishwasher/Dryer) to be within 1 star of maximum star rating available
16A	Prescriptive Pathway – On-site Energy Generation - on-site renewable energy or on-site generation sources reduces the peak electricity demand by at least 15%. Alternatively, Accredited Green power option can be used. See Table 2 15.6A option 1.	-
17B.1	Access by Public Transport – Calculator by Sustainability WA	Transit Score TBC
17B.2	Reduced Car Parking Provision	Not Targeted
17B.3	Low Emission Vehicle Infrastructure – Motorcycle bays and Dedicated fuel-efficient vehicle bays to be provided.	Not Targeted
17B.4	Active Transport Facilities	Private residences comply.
17B.5	Walkable Neighbourhoods – Calculator by Sustainability WA	Walk score of 80
18B.1	Sanitary Fixture Efficiency – Water efficiency fixtures to be specified as per 18B.1 in Table 4	Fixtures as per Appendix E
18B.2	Rainwater Reuse. Water to be reused in garden or other on site use.	Not Targeted
18B.3	Heat Rejection – Confirm HVAC system specified does not use water for heat rejection	No Water will be used in HVAC systems
18B.4	Landscape Irrigation - either drip irrigation with moisture sensor override specified, or where no potable water is used for irrigation.	Landscape design to include requirements.
18B.5	Fire System Test Water – Specify fire protection system does not expel water for testing or includes temporary storage and shut off valves for each floor.	No water to be used in fire testing, or each floor to have cut off valves to allow independent floor testing.
19B.1	Concrete	Not Targeted.
19B.2	Steel	5% reduction in steel compared to common practice
19B.3	Building Reuse	Not applicable
19B.4	Structural Timber	Not applicable – No structural timber in walls.
20.1	Structural and Reinforcing Steel	Specify steel to be sourced from a Responsible Steel Maker (RSI) and 60% is produced using energy reducing processes
20.2	Timber Products	Not Claimed

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20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables – Specify no PVC to be used or PVC used meets the GBCA Best Practice Guidelines for PVC	PVC products used on project to be registered at: http://www.vinyl.org.au/in-greenstar/best-practice-pvc-product-register
21.1	Product Transparency and Sustainability	
22A	Waste - Construction	Waste contractor contracted to dispose of construction waste in a manner that complies with Green Star requirements.
23.0	Endangered, Threatened or Vulnerable Species	None on site
23.1	Ecological Value	Not Targeted
24.0	Conditional Requirement	Complies
24.1	Reuse of Land	Applies
24.2	Contamination and Hazardous Materials	Not Applicable.
25.0	Heat Island Effect Reduction	Light coloured roof to be specified.
26.1	Stormwater Peak Discharge. Confirm post-development peak Average Recurrence Interval (ARI) event discharge from the site does not exceed the pre-development peak ARI event discharge	Not Targeted
26.2	Stormwater Pollution Targets.	Only rainwater from roofs therefore met.
27.0	Light Pollution to Neighbouring Bodies –	Electrical consultant/contractor to ensure that outdoor light of project complies with S 4282:1997 Control of the obtrusive effects of outdoor lighting
27.1	Light Pollution to Night Sky	Electrical consultant/contractor to ensure no external luminaire on the project has a ULOR that exceeds 5%, relative to its actual mounted orientation
28.0	Legionella Impacts from Cooling Systems - Cooling system to have waterless heat-rejection systems or a water-based heat rejection systems that includes measures for Legionella control and Risk Management	No water to be used in cooling system
29.0	Refrigerants Impacts – HVAC system to comply with TSDEI targets or, meet ODP and GWP targets or, have no refrigerants used.	Split systems should comply with this requirement. Require size of systems to be used and refrigerant charge to perform calculations.
30A	Innovative Technology or Process	Services and maintainability review to cover all fit-out items in addition to base building systems.
30B	Market Transformation	-
30C	Improving on Green Star Benchmarks	-
30D	Innovation Challenge	-
30E	Global Sustainability	-

4. Conclusion

It is the view of Sustainability WA that this project can meet the requirements of City of Melville town planning scheme number 6 however will require the design team to incorporate Green Star 4-star requirements into the design.

Additionally, the builder and all consultants involved with the project would need to incorporate the requirements and recommendations of the formal review into their documentation, seek clarification from the author where required, and ensure the building is constructed in accordance with the Green Building Council of Australia requirements.

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Appendix A: Green Star Design and As Built Scorecard (next pages)

Green Star - Design & As Built Scorecard

Project:	**5 Townhouses - 5 Macrae Road, Applecross WA 6153**
Targeted Rating:	4 Star - Best Practice

Core Points Available	Total Score Targeted
100	46.9

CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Management				**14**	
Green Star Accredited Professional	To recognise the appointment and active involvement of a Green Star Accredited Professional in order to ensure that the rating tool is applied effectively and as intended.	1.0	Accredited Professional	1	1
Commissioning and Tuning	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential.	2.0	Environmental Performance Targets	-	Complies
		2.1	Services and Maintainability Review	1	1
		2.2	Building Commissioning	1	1
		2.3	Building Systems Tuning	1	1
		2.4	Independent Commissioning Agent	1	
Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.1	Implementation of a Climate Adaptation Plan	2	
Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance.	4.1	Building Information	1	1
Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.	5.1	Environmental Building Performance	1	
		5.2	End of Life Waste Performance	1	1
Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering	-	Complies
		6.1	Monitoring Systems	1	
Responsible Building Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan	-	
		7.1	Formalised Environmental Management System	1	
		7.2	High Quality Staff Support	1	
Operational Waste	Prescriptive Pathway	8A	Performance Pathway - Specialist Plan	-	
		8B	Prescriptive Pathway - Facilities	1	1
Total				**14**	**7**

Indoor Environment Quality				**17**	
Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes	1	1
		9.2	Provision of Outdoor Air	2	2
		9.3	Exhaust or Elimination of Pollutants	1	1
Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels	1	
		10.2	Reverberation	1	
		10.3	Acoustic Separation	1	

Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort	-	Complies
		11.1	General Illuminance and Glare Reduction	1	1
		11.2	Surface Illuminance	1	1
		11.3	Localised Lighting Control	1	1
Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction	-	Complies
		12.1	Daylight	2	2
		12.2	Views	1	1
Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1	Paints, Adhesives, Sealants and Carpets	1	1
		13.2	Engineered Wood Products	1	1
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	1	
		14.2	Advanced Thermal Comfort	1	
Total				**17**	**12**

Energy				**22**	
Greenhouse Gas Emissions	B. NatHERS Pathway	15A.0	Conditional Requirement: Prescriptive Pathway	-	Complies
		15A.1	Building Envelope	-	
		15A.2	Glazing	-	
		15A.3	Lighting	-	
		15A.4	Ventilation and Air-conditioning	-	
		15A.5	Domestic Hot Water Systems	-	
		15A.6	Accredited GreenPower	-	
		15B.0	Conditional Requirement: NatHERS Pathway	-	Complies
		15B.1	NatHERS Pathway	16	5.9
		15C.0	Conditional Requirement: BASIX Pathway	-	
		15C.1	BASIX Pathway	-	
		15D.0	Conditional Requirement: NABERS Pathway	-	
		15D.1	NABERS Energy Commitment Agreement Pathway	-	
		15E.0	Conditional Requirement: Reference Building Pathway	-	Complies
		15E.1	Comparison to a Reference Building Pathway	-	
Peak Electricity Demand Reduction	Prescriptive Pathway	16A	Prescriptive Pathway - On-site Energy Generation	1	
		16B	Performance Pathway - Reference Building	-	
Total				**17**	**5.9**

Transport						10	
Sustainable Transport	Prescriptive Pathway	17A.1	Performance Pathway			0	
		17B.1	Access by Public Transport			3	3
		17B.2	Reduced Car Parking Provision			1	
		17B.3	Low Emission Vehicle Infrastructure			1	1
		17B.4	Active Transport Facilities			1	1
		17B.5	Walkable Neighbourhoods			1	1
Total						**7**	**6**

Water						12	
Potable Water	Prescriptive Pathway	18A.1	Potable Water - Performance Pathway			0	
		18B.1	Sanitary Fixture Efficiency			1	1
		18B.2	Rainwater Reuse			1	
		18B.3	Heat Rejection			2	2
		18B.4	Landscape Irrigation			1	1
		18B.5	Fire System Test Water			1	
Total						**6**	**4**

Materials						14	
Life Cycle Impacts	Prescriptive Pathway - Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment			0	
		19A.2	Additional Life Cycle Impact Reporting			4	
		19B.1	Concrete			3	
		19B.2	Steel			1	1
		19B.3	Building Reuse			4	
		19B.4	Structural Timber			4	
Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	20.1	Structural and Reinforcing Steel			1	1
		20.2	Timber Products			1	
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables			1	1
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Product Transparency and Sustainability			3	
Construction and Demolition Waste	Fixed Benchmark	22A	Fixed Benchmark			1	1
		22B	Percentage Benchmark			-	

Total				**12**	**4**

Land Use & Ecology				**6**	
Ecological Value	To reward projects that improve the ecological value of their site.	23.0	Endangered, Threatened or Vulnerable Species	-	Complies
		23.1	Ecological Value	3	
Sustainable Sites	To reward projects that choose to develop sites that have limited ecological value, re-use previously developed land and remediate contaminate land.	24.0	Conditional Requirement	-	Complies
		24.1	Reuse of Land	1	1
		24.2	Contamination and Hazardous Materials	1	
Heat Island Effect	To encourage and recognise projects that reduce the contribution of the project site to the heat island effect.	25.0	Heat Island Effect Reduction	1	1
Total				**6**	**2**

Emissions				**5**	
Stormwater	To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure.	26.1	Stormwater Peak Discharge	1	
		26.2	Stormwater Pollution Targets	1	1
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies	-	Complies
		27.1	Light Pollution to Night Sky	1	1
Microbial Control	To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems.	28.0	Legionella Impacts from Cooling Systems	1	1
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.0	Refrigerants Impacts	1	1
Total				**5**	**4**

Innovation				**10**	
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process		2
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in	30B	Market Transformation		
Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	30C	Improving on Green Star Benchmarks	10	
Innovation Challenge	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30D	Innovation Challenge		
Global Sustainability	Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of this Green Star	30E	Global Sustainability		
Total				**10**	**2**

TOTALS	**AVAILABLE**	**TARGETED**
CORE POINTS	**100**	**44.9**
CATEGORY PERCENTAGE SCORE		**44.9**
INNOVATION POINTS	**10**	**2.0**

TOTAL SCORE TARGETED	46.9

Address:
71 Allnutt Street Mandurah WA 6210
Postal:
PO Box 4160 Mandurah North WA 6210

Appendix B: Table 13.1.1: Maximum TVOC Limits for Paints, Adhesives and Sealants

Product Category	Max TVOC content in grams per litre (g/L) of ready to use product.
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100

Appendix C: Carpet Test Standards and TVOC Emissions Limits

Compliance option	Test Protocol	Limit
ASTM D5116	ASTM D5116 - Total VOC limit*	0.5mg/m2 per hour
	ASTM D5116 - 4-PC (4-Phenylcyclohexene)*	0.5mg/m2 per hour
ISO 16000 / EN 13419	ISO 16000 / EN 13419 - TVOC at three days	0.5mg/m2 per hour
ISO 10580 / ISO/TC 219 (Document N238)	ISO 10580 / ISO/TC 219 (Document N238) - TVOC at 24 hours	0.5mg/m2 per hour

*Both limits should be met when testing against ASTM D5116

Address:
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Appendix D: Table 13.2B: Formaldehyde Emission Limit Values for Engineered Wood Products

Test Protocol	Emission Limit/Unit of Measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1mg/ L
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5 mg/L
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1mg/ L
AS/NZS 4357.4 - Laminated Veneer Lumber (LVL)	≤1mg/ L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤1mg/ L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/m²hr
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m²hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m²hr (at 3 days)
ASTM D6007	≤0.12mg/m³**
ASTM E1333	≤0.12mg/m³***
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m³
EN 717-1 (also known as DIN EN 717-2)	≤0.12mg/m³

*mg/m²hr may also be represented as mg/m²/hr.

**The test report must confirm that the conditions of Table 3 comply for the particular wood product type, the final results must be presented in EN 717-1 equivalent (as presented in the table) using the correlation ratio of 0.98.

***The final results must be presented in EN 717-1 equivalent (as presented in the table), using the correlation ratio of 0.98.

Address:
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Appendix E: Water Fixtures

All fixtures are within one star of the WELS rating stated below:

Fixture/Equipment Type	WELS Rating
Taps	6 Star
Urinals	6 Star
Toilet	5 Star
Showers	3 Star (> 4.5 but <= 6.0)**
Clothes Washing Machines	5 Star
Dishwashers	6 Star

** The 3 star (>4.5 but <=6.0) requirement relates to Range F which is specified for both High Pressure and Low Pressure Showers as per Table 3.1 and Table 3.2 respectively of the AS NZS 6400-2016 Water Efficient Products standard. For showers, within one star of this Category F WELS rating means showers must be either 3 star (6.0 but <=7.5), 3 Star (> 4.5 but <= 6.0), 4 Star (>6.0 but <=7.5) or 4 Star (> 4.5 but <= 6.0).

Appendix F: Table 26.2 Pollution Reduction Targets

Pollutant	Reduction Target (% of the typical urban annual load)		
	A	B	C
Total Suspended Solids (TSS)1	80%	80%	90%
Gross Pollutants	85%	90%	95%
Total Nitrogen (TN)2	30%	45%	60%
Total Phosphorus (TP)2	30%	60%	70%
Total Petroleum Hydrocarbons3	60%	90%	90%
Free Oils	90%	90%	98%

Appendix 3 – Waste Management Plan

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DEVELOPED

The Art And Science Of People And Property

Waste Management Plan
5A and 5B Macrae Road, Applecross
5x Grouped Dwellings

Prepared for: City of Melville
On Behalf of: Landowner of 5 Macrae Road
Date: 10/11/2021

DEVELOPED

The Art And Science Of People And Property

Our Reference: DP21751
Address: 5 Macrae Road
Enquiries: Ryan Djanegara
Date 10/11/2021

Developed Property Pty Ltd
ABN: 62 624 180 310
Office: 315 Rokeby Road
Subiaco WA 6008
Postal: PO Box 662
Subiaco WA 6008
planning@developedproperty.com.au
www.developedproperty.com.au

Dear Sir / Madam,

Developed Property Pty ltd acts on behalf of the proponents of 5A and 5B Macrae Road, in preparing the attached Waste Management Plan for your consideration. This waste management plan is to accompany a development application for 5 grouped dwellings.

Should you have any questions or queries regarding the proposed management plan please do not hesitate to contact me on planning@developedproperty.com.au or (08) 6119 9175.

Yours sincerely,

Ryan Djanegara
Planning Consultant
B.UrbRegPlan (Hons), MPIA(Assoc.)

Table of Contents

1.0 Introduction

This management plan has been prepared by Developed Property Pty Ltd on behalf of the landowners of 5 Macrae Road, Applecross. The waste management plan has been prepared in support of a Grouped Dwelling application to address the provisions of Clause 19.3 and 19.4 of the Canning Bridge Activity Centre Plan. The Waste Management Plan has been prepared with consideration to the provisions and guidelines set out by the City's Local Planning Policy for Waste and Recyclables Collection for Multiple Dwellings, Mixed Use Developments and Non-Residential Developments (LPP1.3).

1.1 Background

The subject site has an area of 1,012m^2. The site has a zoning of 'Urban' by the City of Melville's Local Planning Scheme No.6 and has an R-Coding of R-AC0. The current use is a Residential Use and is located within the Canning Bridge Activity Centre Plan. Based on this plan, 5 Macrae Road is located within the Kintail Quarter (Q1) and is zoned to be Residential 6-8 Stories (H8).

1.2 Objective

The overall objective of this Waste Management Plan is to support a five grouped dwelling development application at 5 Macrae Road, Applecross. The plan essentially ensures that waste management for the proposed lots is undertaken effectively, efficiently and sustainably. Its purpose is to minimise the effects on the community and the environment during occupancy. Key criteria that are addressed in this plan relate to:

- Achieving a development that is functionally designed and effectively managed in terms of waste and recycling management and collection; and
- Promoting Waste minimisation

The Waste Management Plan also provides clarity on how the proposed development complies with the following provisions of the Canning Bridge Activity Centre Plans:

Clause 19.3 – 'Developments within the H8 Zones shall provide for all management of waste wholly within the development site, including the ability for service vehicles to circulate within the development. No on-street waste collection areas are permitted within the H8 Zone.'

Clause 19.4 – 'Applicants within the H8 Zones shall provide a Movement Summary in their Written Statement which provides the design intent behind the development of the site in relation to pedestrian access points, access to parking and cycling, pedestrian and cyclist pathways and waste management'.

2.0 Bin System and Selection

The City's LPP 1.3 sets out provisions relating to the waste requirement for different types of development within the City of Melville. The city has adopted a three-bin system, which provides residential households organic recycling to complement the existing general waste and recyclables services.

Based on this 3-bin system each grouped dwelling development will require the following bins:

- 1x General Waste Bin (140L)
- 1x Recycling Waste Bin (240L)
- 1X FOGO Waste Bin (240L)

3. 0 Waste Collection Process

This section relates to the waste collection process of the site and relates to bin storages, collection process and maintenance.

3.1 Bin Storage

The storage of the 3x waste bins will be wholly within each individual allotment's boundaries. These bins will be located within each dwellings garage as depicted in the development plans. This ensures that the storage of the bins is adequately screened from the primary and proposed communal street, so the bins do not detract from the amenity of the area.

Based on the City's LPP 1.3 Clause 7, there is a requirement for the bin storage areas to be of a sufficient storage and manoeuvrability. Table 1 provides a break down of the bin compound requirements:

Table 1: Bin Compound Requirements

Bin type	Length (m)	Width (m)	Height (m)	Area (m^2)
General Waste (140L)	0.62	0.54	0.9	0.33
Recycling Waste (240L)	0.73	0.59	1.1	0.43
FOGO Waste (240L)	0.73	0.59	1.1	0.43
Total	0.73	1.72	1.1	1.19

The measurements are in accordance with industry standards as shown in Figure 2

Based on Table 1, each dwelling is required to have a bin compound area within the garage that is of the dimensions of 0.73m (L) x 1.72m (w). This has been adequately provided and shown on the development plans.

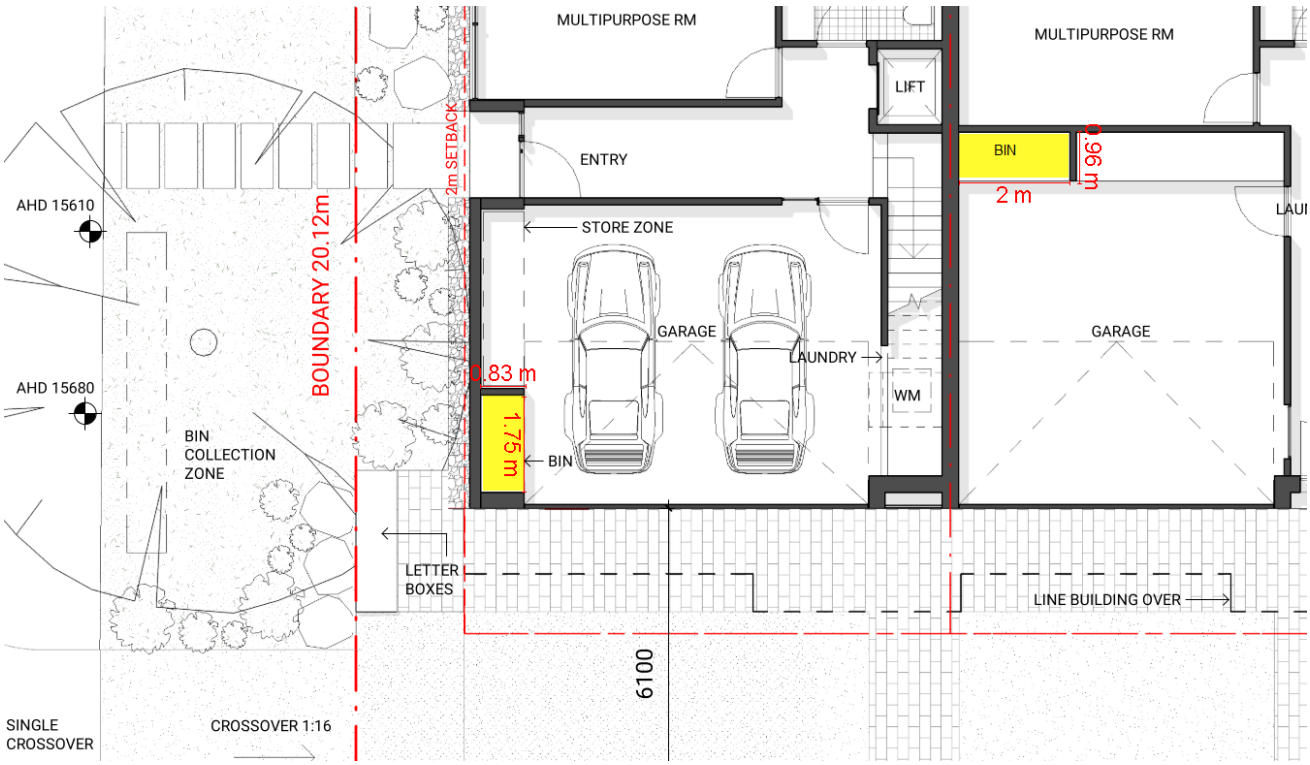
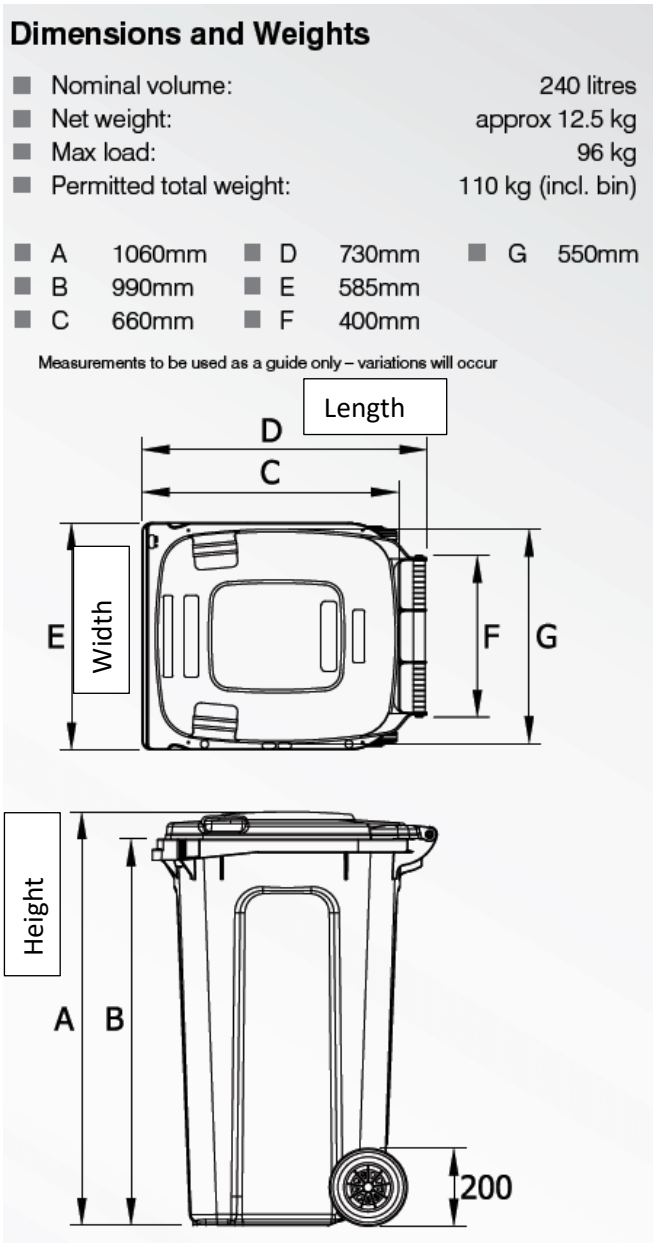


Figure 1: Extract of ground floor plan showing bin storage areas within the garage (highlighted yellow)



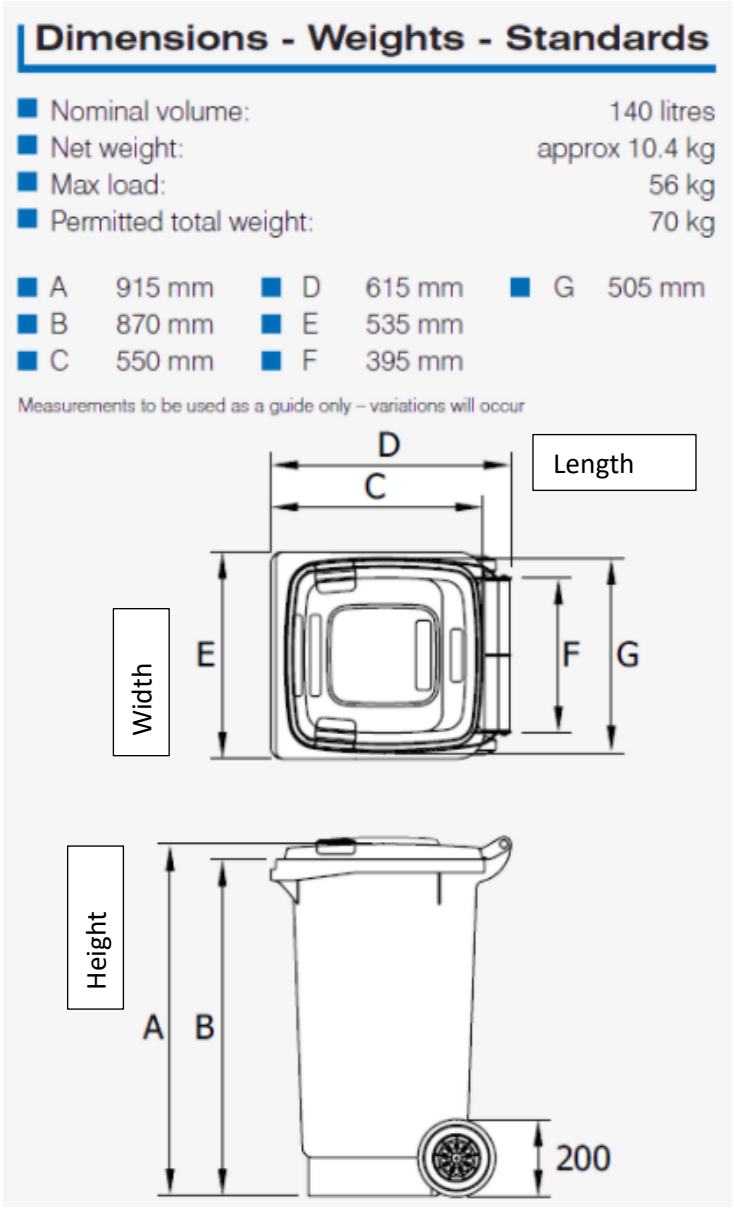


Figure 2: Standard dimensions of a 240L Bin (left), Standard dimensions of a 140L Bin (right)

Source: https://sulo.com.au/products/two-wheeled-2-wheelie-bin-mgb/240-litre-container/

Source: https://sulo.com.au/products/two-wheeled-2-wheelie-bin-mgb/140-litre-kompakt-container/

3.2 Collection Point

Clause 19.3 of the Canning Bridge Activity Centre Plan states that bin collection is to be contained wholly within the site with no on street collection occurring. This proposal is seeking council's discretion on having the waste collection off the primary street and is considerate of the matters for which this is appropriate by the City of Melville's Waste Management LPP (LPP1.3).

This LPP states that street collection can occur where:

a) On- street collection is proposed, a flat area of sufficient size to contain all the waste and recycling bins on collection day is required to be available within the verge. This may be required to be in the form of a concrete bin pad.
b) The bins are to be able to be lined up adjacent to the kerb and are not to be stacked.
c) The location of the bin collection point is to consider all the following.
    a. Proximity to crossovers and intersections to ensure that there is no vehicle sightline impairment.
    b. Location of footpaths, to ensure pedestrian access along the street will not be impacted.
    c. Location of existing street trees
    d. Location of any on-street public car parking bays.
    e. Location of any street signs and other street furniture.
d) Where there is no suitable bin collection point.

The proposed development would be consistent with the above provisions for the following reasons:

- The verge abutting Macrae Road is relatively flat and does not have any obstructions that would hinder the waste collection process.
- The bins will be lined up adjacent to the kerb and will not be stacked with adequate space on the verge for all bins.
- The bin collection point will not result in any vehicle sightline impairment and the bin collection point will be located north of the crossover.
- Whilst there is a footpath located adjacent to the road, the collection process will not impact the safety of the pedestrians that utilise this pathway.
- The collection process will not impact any existing street trees with the proposed development ensuring that the existing tree is retained.
- The on-street collection of bins will not result in any impacts to on street parking bays as there is no designated-on street parking bays in front of the property. There is however, a 2-hr parking sign outside the front of the property which ensures informal parking does not prohibit waste collection.
- The existing 2-hour parking street sign will not hinder on-street waste collection services.
- On-street waste collection is the City's preferred option for Macrae Road with this servicing being within the context of the existing grouped dwellings on Macrae and Jane Road.
- On-street waste collection is requested as there is no suitable arrangement for on-site collection that will enable a waste truck to enter the property in forward gear and leave the site in a forward gear.
- Should on-site collection occur there would be safety concerns relating to pedestrians' access and the waste vehicle entering and existing the site.

The proposed-on street collection point will be located along Macrae Road and will have a total length of 0.73m and a width of 5.9m to adequately service the collection of 10 bins from the verge as shown on the development plans and Figure 3. The width of the bin collection point is based on the combined width of the FOGO bin (collected weekly) and Recycling bin (collected every alternative fortnight) for 5 grouped dwellings. The calculation would be as follows: 0.59m + 0.59m x 5 = 5.9m

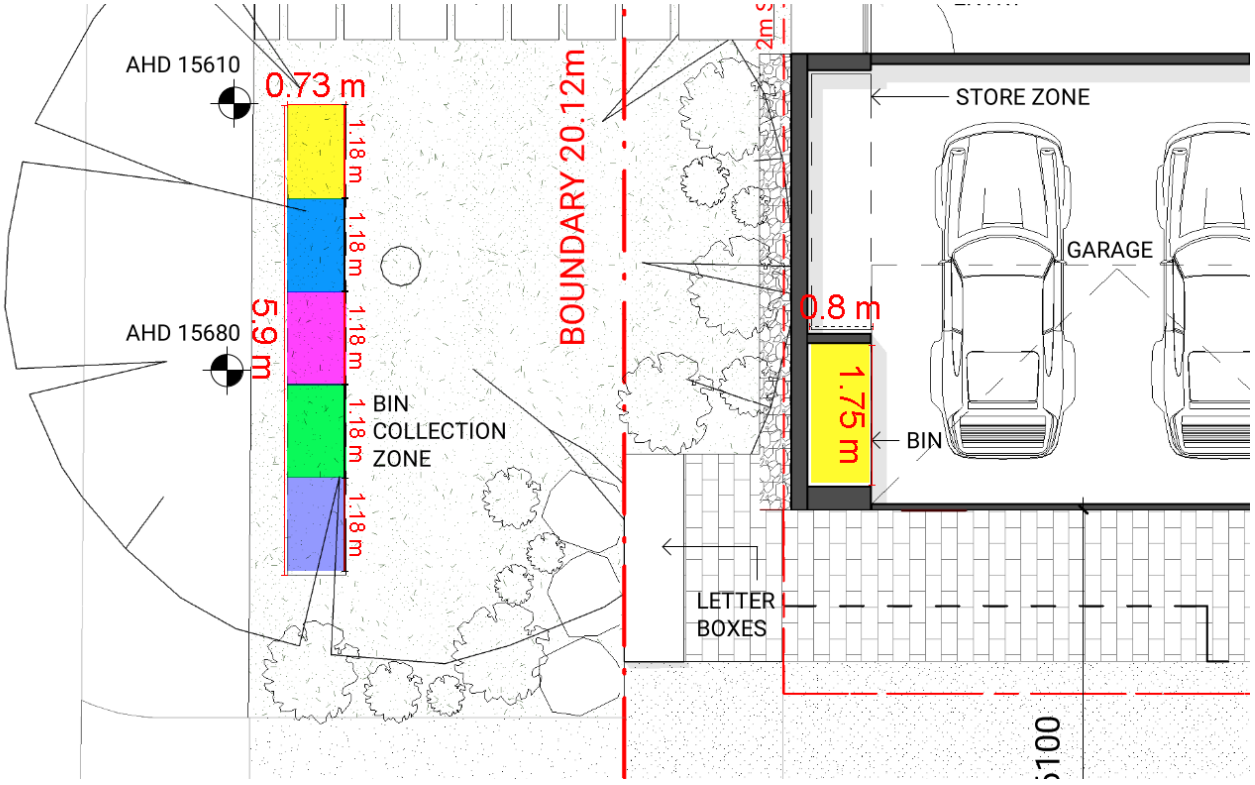


Figure 3: Extract of ground floor plan showing waste collection point from Macrae Road (highlighted)

3.3 Collection Frequency

The City's LPP 1.3 advises waste collection frequencies for each bin type with a summary provided below:

Table 2: Waste Collection Frequency

Bin Type	Frequency	Collection Days
General Waste	Alternating Fortnight	Monday
Recycling	Alternating Fortnight	Monday
FOGO	Weekly	Monday

Note: Collection Days are as per the City's website as of June 2021

Based on Table 2 and the proposed development, there will be a total of 10 bins located at the proposed on-street collection point every week with collection occurring every Monday.

It will be the responsibility of each landowner/occupier to wheel the required bins out to the designated bin collection point as shown on the development plans. It will also be the landowner/occupier's responsibility to return the bins to the bin storage area within each garage.

3.4 Bin Maintenance

It will be the responsibility of each landowner/occupier to wheel their bins back and forward from the designated on-street waste collection point on the designated bin collection date.

Each dwelling will have a tap available that will enable the landowners/ occupiers to maintain and wash their bins when needed. This tap will be in each garage or at the front of each dwelling to ensure bins are well maintained. This area will consist of an impervious flooring.

4.0 Housing Design Considerations

The kitchen design for each dwelling has taken into consideration the 8L kitchen caddy liners that are provided to residents for the collection and transfer of organic material into the FOGO bins.

The kitchen design has incorporated an under-bench kitchen caddy that accommodates the 8L kitchen caddy liners as shown on the proposed floor plans. This has been done in accordance with Clause 3 of the City's LPP.

5.0 Conclusion:

This waste management plan has been prepared to provide guidance on how waste services will operate and service a proposed 5x grouped dwelling development application at 5 Macrae Road Applecross. The report has addressed the relevant provisions of the Canning Bridge Activity Centre Plan and has referred to other relevant Local Planning Policies the City of Melville have in relation to waste management.

The report has provided justification as to why on-street waste servicing would be appropriate for this type of development. Key reasons on-street collection has been requested are provided below:

- The servicing of on-site waste collection would not enable a waste truck to enter and exit the property in forward gear.
- There is not enough vehicular manoeuvrability for a waste truck to service the proposed lots within the site.
- The on-street collection of waste will not result in any hinderances to vehicular sightlines, pedestrian access, existing street trees, defined public parking bays and any street signs.
- The proposed on-street collection would be consistent with the on-street waste collection services already occurring in Macrae Road.
- On street servicing will be consistent with the established group dwelling context on Macrae Road and the adjoining grouped dwelling developments on Jane Road.

Based on the above, it is considered that waste generation and servicing from the proposal will be able to be managed in accordance with this management plan.

Appendix 4 – Traffic Impact Statement

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urbii

Sustainable Transport. Safe Solutions

5 Macrae Road, Applecross

Proposed Residential Development

TRANSPORT IMPACT STATEMENT

Prepared for:

Hub Property Group

October 2021

5 Macrae Road, Applecross

Prepared for: Hub Property Group
Prepared by: Paul Ghantous
Date: 29 October 2021
Project number: U21.069

Version control

Version No.	Date	Prepared by	Revision description	Issued to
U21.069.r01	28/10/21	Paul Ghantous	FINAL	Hub Property Group

Scan me

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Contents

Figures

Tables

Appendices

1. Introduction

This Transport Impact Statement has been prepared by Urbii on behalf of Hub Property Group with regards to the proposed residential development, located at 5 Macrae Road, Applecross.

The subject site is situated on the southern side of Macrae Road, between Jane Road and Kishorn Road, as shown in Figure 1. The site is bound by residential properties on three sides and Macrae Road to the north.

The subject site presently accommodates a residential dwelling (Figure 2). The site is surrounded by a mix of residential and commercial uses.

It is proposed to develop the site into a grouped dwelling development with five (5) residential townhouses.

The key issues that will be addressed in this report include the traffic generation and distribution of the proposed development, access and egress movement patterns, car parking and access to the site for alternative modes of transport.

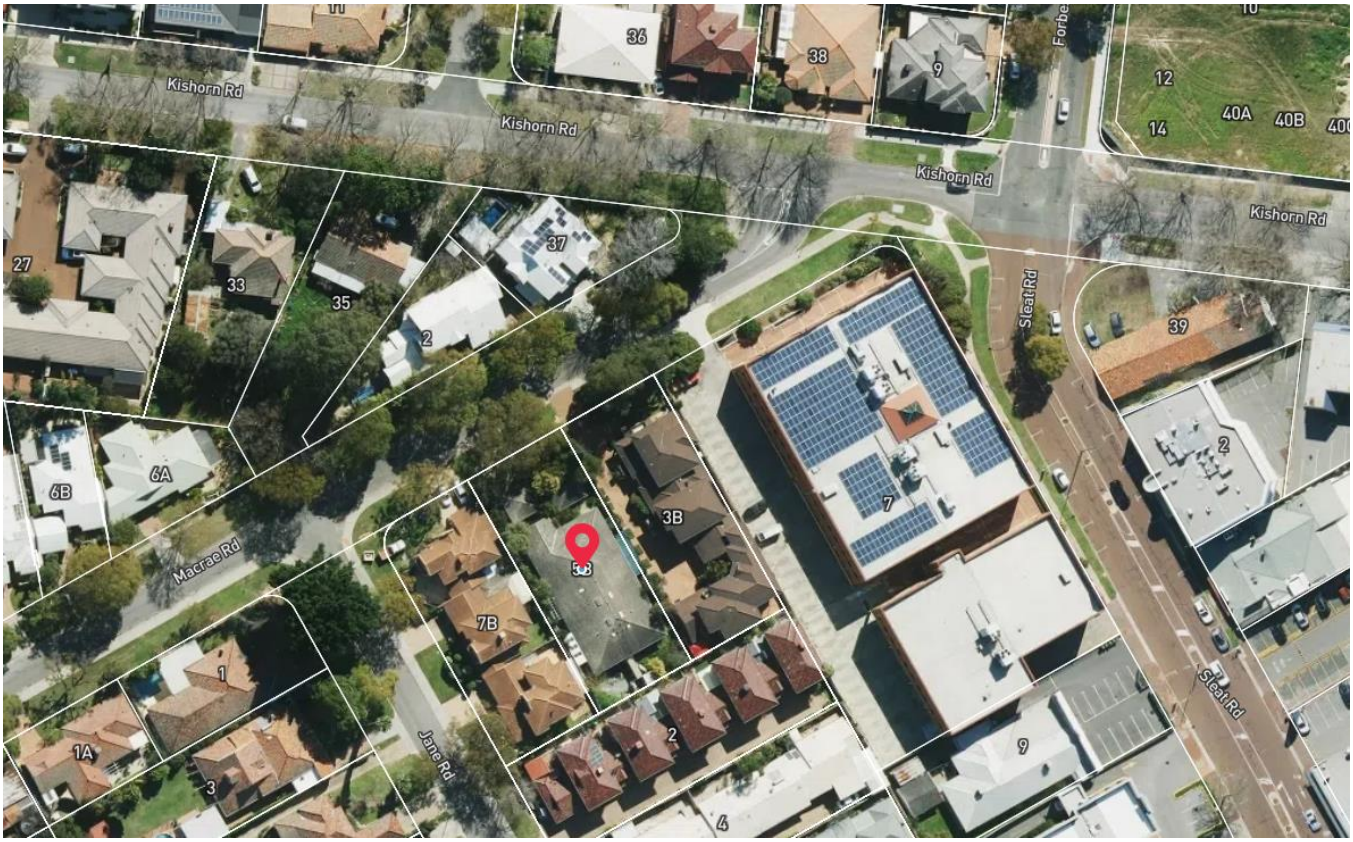


Figure 1: Subject site

Figure 2: Existing site

2. Proposed development

The proposal for the subject site is for a grouped dwelling residential development, comprising:

- A total of 5 residential dwellings configured as townhouses;
- Individual parking garages providing two bays per dwelling (total of 10 residential parking bays); and,
- Individual bin stores located within parking garages.

Vehicle access to the site is proposed via a single crossover on Macrae Road. Bins will be wheeled out for kerbside waste collection from the street.

Pedestrians and cyclists will access the development from the external path network abutting the site.

The proposed development plans are included for reference in Appendix A.

3. Vehicle access and parking

Vehicle access

The proposed vehicular access arrangements have been reviewed for efficient and safe traffic circulation.

Existing vehicular access to the site is via two crossovers on Macrae Road (Figure 2).

As detailed in the proposed development plans and in Figure 3, it is proposed to reconfigure vehicle access via one crossover at the western end of the site.

The proposed development crossover is 3.0m in width within the verge and widens to 6.3m within the site. The internal roadway width is sufficient to allow passing opportunities for vehicles and to allow for vehicle entry and exit manoeuvres in and out of parking spaces.

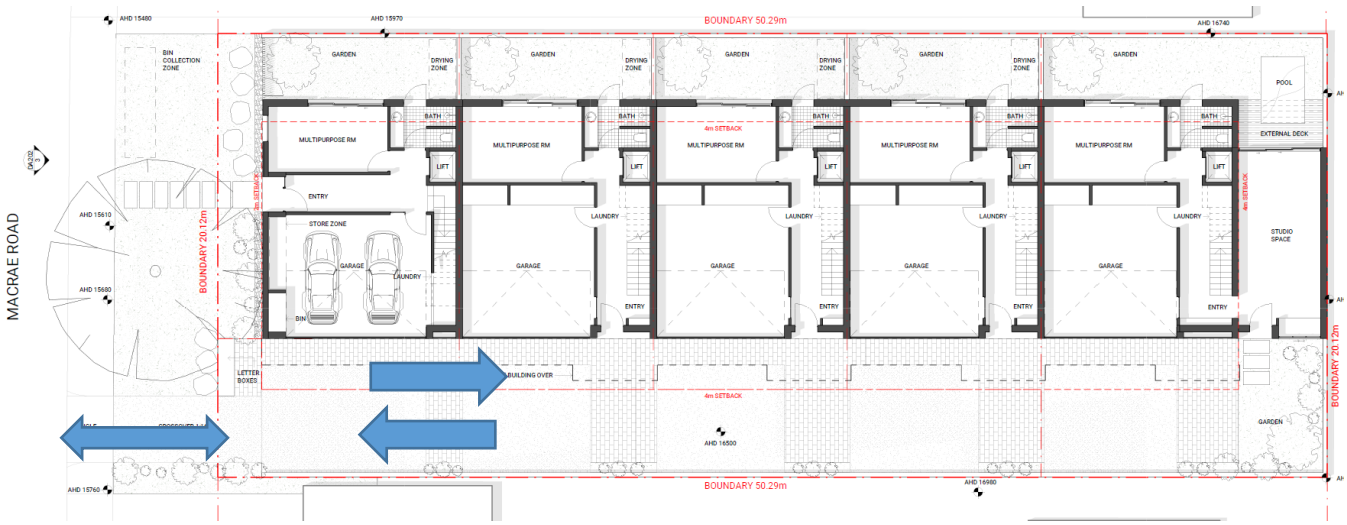


Figure 3: Proposed vehicle access

Crossover width

The technical standards or guidelines referenced in assessing the crossover and driveway width include:

- AS2890.1-2004 - Off-street Car Parking Facilities;
- WALGA *Guidelines and Specifications for Residential Crossovers* 2017; and,
- State Planning Policy 7.3 Residential Design Codes (R-Codes) Volume 1.

The R-Codes (Vol 1) provides the following guidance on the width and location of driveways:

C5.2 Driveways to primary or secondary street provided as follows:

- *driveways serving four dwellings or less not narrower than 3m at the street boundary;*
- *no driveway wider than 6m at the street boundary and driveways in aggregate no greater than 9m for any one property.*

C5.3 Driveways shall be:

- *no closer than 0.5m from a side lot boundary or street pole;*
- *no closer than 6m to a street corner as required under AS2890.1 Parking Facilities: Off street Parking (as amended);*
- *aligned at right angles to the street alignment;*
- *located so as to avoid street trees, or, where this is unavoidable, the street trees replaced at the applicant's expense or re-planting arrangements to be approved by the decision-maker; and*
- *adequately paved and drained.*

In summary, the R-Codes generally encourage keeping the width of residential driveways to a minimum, to reduce visual impact and conflicts with pedestrians and cyclists. The absolute minimum driveway width permitted at the street boundary is 3m and the maximum is 6m.

AS2890.1 classifies the proposed development driveway as *Category 1*. A *Category 1* access driveway can be a minimum of 3m in width and a maximum of 5.5m in width, as demonstrated in Appendix B. Furthermore, Clause 3.2.2 of AS2890.1 provides the following advice regarding the width requirements at low volume (Category 1) access driveways and connecting roadways:

"Where the circulation roadway leading from a Category 1 access driveway is 30m or longer, or sight distance from one end to the other is restricted, and the frontage road is an arterial or sub-arterial road, both the access driveway and the circulation roadway for at least the first 6m from the property boundary shall be a minimum of 5.5m wide. In other cases, subject to consideration of traffic volumes on a case by case basis, lesser widths, down to a minimum of 3.0m at a domestic property, may be provided. As a guide, 30 or more movements in a peak hour (in and out combined) would usually require provision of two vehicles to pass on the driveway…. On long driveways, passing opportunities should be provided at least every 30m."

The proposed development crossover and driveway is less than 10m in length before a passing opportunity is provided within the site. The proposed development will generate traffic which is well below the 30vph threshold quoted in AS2890.1 for two-way traffic flow.

Based on the above guidance from the R-Codes and AS2890.1, it is considered that the proposed development crossover width of 3m is satisfactory for five residential dwellings.

Parking supply and demand

Reference was made to *State Planning Policy 7.3 Residential Design Codes Volume 1* for appropriate rates of car parking provision. Based on the parking ratios in Table 1, the subject site is within 250m of a high-frequency bus stop and requires the following residential parking:

- 5 car bays for residents; and,
- 1 car bay for visitors;

The proposed development provides 10 garaged car bays for residents. Visitors can park on street within walking distance of the site. Parking is permitted on Macrae Road adjacent to the site.

Table 1: SPP 7.3 R-Codes: Parking ratios

Deemed-to-comply

Development *satisfies the following* ***deemed-to-comply*** *requirements* (C)

5.3 Site planning and design

C3.1 The following minimum number of on-site car parking spaces is to be provided for each **single house**, **grouped dwelling** and **special purpose dwelling** comprising the following number of bedrooms:

Type of dwelling	Car parking spaces	
	Location A	Location B
1 bedroom dwelling	1	1
2 + bedroom dwelling	1	2
Aged persons' dwelling	1	1
Ancillary dwelling	nil	1

A = within:

- 800m of a train station on a **high frequency** rail **route**, measured in a straight line from the pedestrian entry to the train station platform to any part of a **lot**; or
- 250m of a **high frequency** bus **route**, measured in a straight line from along any part of the bus route to any part of a lot.

B = not within the distances outlined in A above.

C3.2 On-site visitors car parking spaces for **grouped** and **multiple dwelling developments** provided at a rate of one space for each four **dwellings**, or part thereof in excess of four dwellings, served by a common access.

4. Provision for service vehicles

The proposed development is residential in nature and will not generate significant delivery and other service vehicle traffic. Bins will be wheeled out to Macrae Road for kerbside waste collection on designated days.

5. Hours of operation

For most residential developments, the peak traffic hours typically coincide with the weekday AM and PM peak hours on the surrounding road network.

As detailed in Figure 4, the weekday AM peak hour for the adjacent road network occurs between 7am to 8am and the weekday PM peak hour occurs between 5pm to 6pm. The peak hours for the proposed development are anticipated to coincide at around these times.

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-11
Site: Macrae Rd - 04.0.1WE
Description: **!Macrae Rd 50m West of Glenelg St (No 19)**
Filter time: **16:58 Tuesday, 9 February 2021 => 10:53 Wednesday, 17 February 2021**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	0.0	0.0	0.5	0.0	0.0	2.0	0.0	0.2	0.4
0100-0200	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
0200-0300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0300-0400	0.0	1.0	0.5	0.0	0.0	0.0	2.0	0.3	0.5
0400-0500	0.0	0.0	0.5	0.0	0.0	2.0	0.0	0.2	0.4
0500-0600	2.0	13.0	6.0	9.0	3.0	6.0	2.0	6.5	5.9
0600-0700	29.0	29.0	27.5	17.0	19.0	11.0	13.0	24.8	21.6
0700-0800	**49.0**	**57.0**	**37.0**	**28.0**	**27.0**	12.0	13.0	**39.2**	**32.5**
0800-0900	31.0	32.0	31.0	21.0	23.0	22.0	9.0	28.2	25.0
0900-1000	9.0	6.0	10.5	10.0	10.0	33.0	**19.0**	9.3	13.5
1000-1100	10.0	2.0	11.0	10.0	16.0	**44.0**	9.0	10.0	14.1
1100-1200	5.0	13.0	5.0	7.0	12.0	6.0	9.0	8.4	8.1
1200-1300	8.0	10.0	15.0	11.0	3.0	9.0	10.0	9.4	9.4
1300-1400	13.0	8.0	6.0	4.0	3.0	10.0	13.0	6.8	8.1
1400-1500	2.0	2.0	3.0	9.0	15.0	10.0	3.0	6.2	6.3
1500-1600	10.0	13.0	10.0	14.0	20.0	10.0	13.0	13.4	12.9
1600-1700	19.0	11.0	20.0	15.0	18.0	6.0	22.0	15.7	15.3
1700-1800	**53.0**	**50.0**	**36.0**	**38.0**	**28.0**	3.0	**25.0**	**42.5**	**35.4**
1800-1900	30.0	18.0	24.0	13.0	17.0	9.0	5.0	20.0	16.8
1900-2000	5.0	9.5	2.0	8.0	8.0	**10.0**	11.0	7.0	7.9
2000-2100	0.0	3.5	5.0	6.0	3.0	5.0	2.0	3.5	3.5
2100-2200	1.0	0.0	3.0	1.0	7.0	2.0	1.0	2.0	1.9
2200-2300	0.0	0.0	0.0	1.0	4.0	3.0	2.0	0.8	1.3
2300-2400	1.0	0.5	1.0	0.0	2.0	2.0	0.0	0.8	0.9
Totals									
0700-1900	239.0	222.0	208.5	180.0	192.0	174.0	150.0	209.0	197.4
0600-2200	274.0	264.0	246.0	212.0	229.0	202.0	177.0	246.4	232.2
0600-0000	275.0	264.5	247.0	213.0	235.0	207.0	179.0	248.0	234.4
0000-0000	278.0	278.5	254.5	222.0	238.0	217.0	183.0	255.4	241.6
AM Peak	0700	0700	0700	0700	0700	1000	0900		
	49.0	57.0	37.0	28.0	27.0	44.0	19.0		
PM Peak	1700	1700	1700	1700	1700	1900	1700		
	53.0	50.0	36.0	38.0	28.0	10.0	25.0		

Figure 4: Hourly traffic flow profile on typical weekdays near the subject site[1]

[1] Source: City of Melville traffic counts

6. Daily traffic volumes and vehicle types

Traffic generation

The traffic volume that will be generated by the proposed development has been estimated using trip generation rates derived with reference to the following sources:

- Roads and Traffic Authority of New South Wales *Guide to Traffic Generating Developments (2002);* and
- RTA TDT 2013/ 04a.

The trip generation rates adopted are detailed in Table 2.

Table 2: Adopted trip rates for traffic generation

Land use	Trip rate source	Daily rate	AM rate	PM rate	AM-in	AM-out	PM-in	PM-out
Residential	RTA NSW - Medium density residential building	5	0.5	0.5	25%	75%	65%	35%

The estimated traffic generation of the proposed development is detailed in Table 3. The proposed development is estimated to generate a total of 25 vehicles per day (vpd), with 3 vehicles per hour (vph) generated during the AM and PM peak hours, respectively.

These trips include both inbound and outbound vehicle movements. It is anticipated that most of the vehicle types would be passenger cars and SUVs.

Table 3: Traffic generation – Weekday AM and PM peak hours

Land use	Quantity	Daily Trips	AM Trips	PM Trips	AM Peak Trips		PM Peak Trips	
					IN	OUT	IN	OUT
Residential	5	25	3	3	1	2	2	1

Impact on surrounding roads

The WAPC Transport Impact Assessment Guidelines for Developments (2016) provides the following guidance on the assessment of traffic impacts:

"As a general guide, an increase in traffic of less than 10 percent of capacity would not normally be likely to have a material impact on any particular section of road but increases over 10 percent may. All sections of road with an increase greater than 10 percent of capacity should therefore be included in the analysis. For ease of assessment, an increase of 100 vehicles per hour for any lane can be considered as equating to around 10 percent of capacity. Therefore, any section of road where development traffic would increase flows by more than 100 vehicles per hour for any lane should be included in the analysis."

The proposed development will not increase traffic flows on any roads adjacent to the site by the quoted WAPC threshold of +100vph to warrant further analysis. Therefore, the impact on the surrounding road network is minor.

7. Traffic management on the frontage roads

Information from online mapping services, Main Roads WA, Local Government, and/or site visits was collected to assess the existing traffic management on frontage roads.

Macrae Road

Macrae Road near the subject site is a 6m wide, two-lane undivided road. A footpath is provided on both sides of the road.

Macrae Road is classified as an access road in the Main Roads WA road hierarchy (Figure 7) and operates under a built-up area speed limit of 50km/h (Figure 8). Access roads are the responsibility of Local Government and are typically for the provision of vehicle access to abutting properties (Figure 9). Traffic data provided by the City of Melville indicates that Macrae Road carried 255 vehicles per day in February 2021.

Photos of Macrae Road are included in Figures 5 & 6.

Figure 5: Macrae Road looking east

Figure 6: Macrae Road looking west

Parking time restrictions apply on the southern side of Macrae Road between 8am to 6pm, MON-FRI and 8am to 12pm on SAT. No parking is permitted on the northern side of the road.

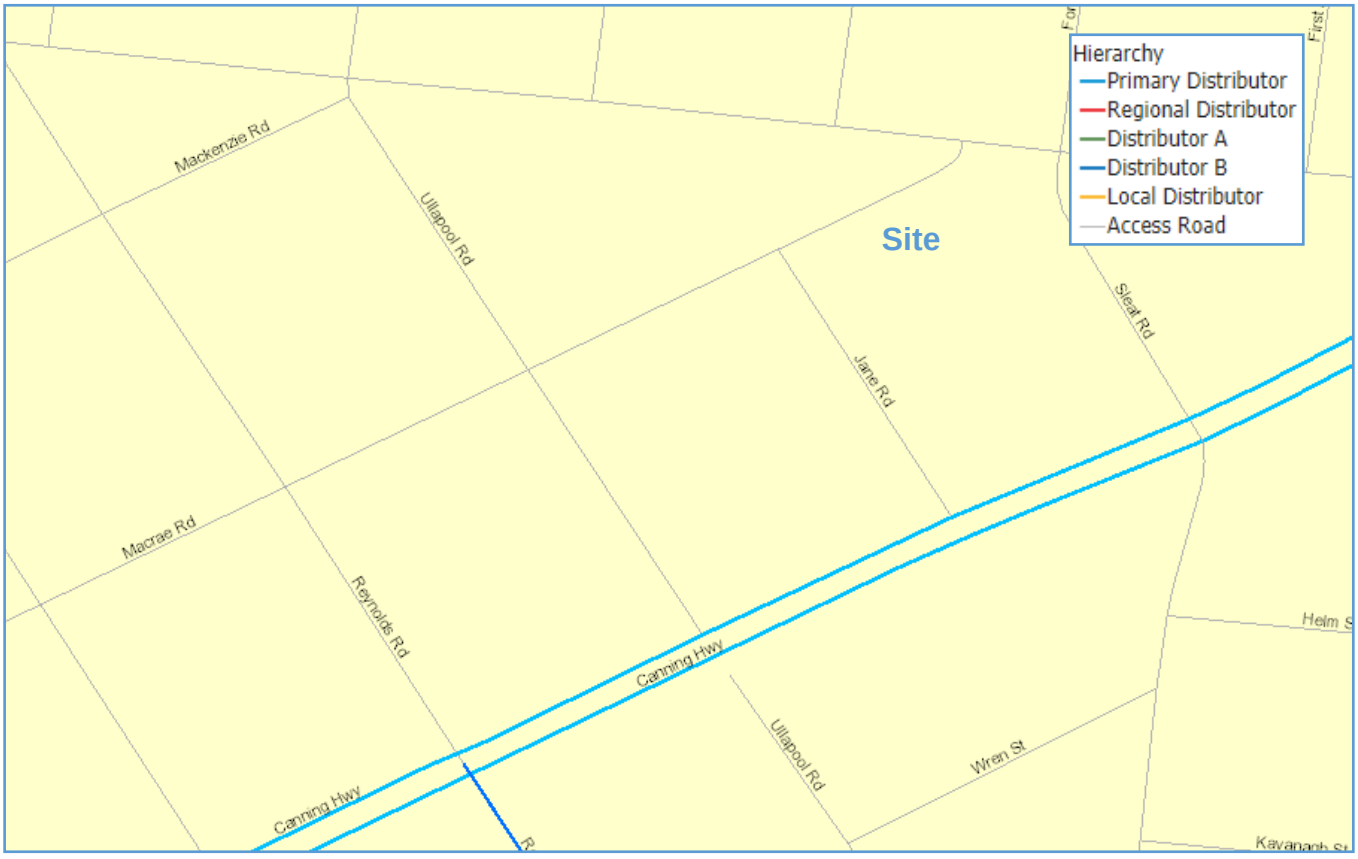


Figure 7: Main Roads WA road hierarchy plan

Source: Main Roads WA Road Information Mapping System (RIM)

Figure 8: Main Roads WA road speed zoning plan

Source: Main Roads WA Road Information Mapping System (RIM)

ROAD HIERARCHY FOR WESTERN AUSTRALIA
ROAD TYPES AND CRITERIA (see Note 1)

CRITERIA	PRIMARY DISTRIBUTOR (PD) (see Note 2)	DISTRICT DISTRIBUTOR A (DA)	DISTRICT DISTRIBUTOR B (DB)	REGIONAL DISTRIBUTOR (RD)	LOCAL DISTRIBUTOR (LD)	ACCESS ROAD (A)
Primary Criteria						
1. Location (see Note 3)	All of WA incl. BUA	Only Built Up Area.	Only Built Up Area.	Only Non Built Up Area. (see Note 4)	All of WA incl. BUA	All of WA incl. BUA
2. Responsibility	Main Roads Western Australia.	Local Government.	Local Government.	Local Government.	Local Government.	Local Government.
3. Degree of Connectivity	High. Connects to other Primary and Distributor roads.	High. Connects to Primary and/or other Distributor roads.	High. Connects to Primary and/or other Distributor roads.	High. Connects to Primary and/or other Distributor roads.	Medium. Minor Network Role Connects to Distributors and Access Roads.	Low. Provides mainly for property access.
4. Predominant Purpose	Movement of inter regional and/or cross town/city traffic, e.g. freeways, highways and main roads.	High capacity traffic movements between industrial, commercial and residential areas.	Reduced capacity but high traffic volumes travelling between industrial, commercial and residential areas.	Roads linking significant destinations and designed for efficient movement of people and goods between and within regions.	Movement of traffic within local areas and connect access roads to higher order Distributors.	Provision of vehicle access to abutting properties
Secondary Criteria						
5. Indicative Traffic Volume (AADT)	In accordance with Classification Assessment Guidelines.	Above 8 000 vpd	Above 6 000 vpd.	Greater than 100 vpd	Built Up Area - Maximum desirable volume 6 000 vpd. Non Built Up Area – up to 100 vpd.	Built Up Area - Maximum desirable volume 3 000 vpd. Non Built Up Area – up to 75 vpd.
6. Recommended Operating Speed	60 – 110 km/h (depending on design characteristics).	60 – 80 km/h.	60 – 70 km/h.	50 – 110 km/h (depending on design characteristics).	Built Up Area 50 - 60 km/h (desired speed) Non Built Up Area 60 – 110 km/h (depending on design characteristics).	Built Up Area 50 km/h (desired speed). Non Built Up Area 50 – 110 km/h (depending on design characteristics).
7. Heavy Vehicles permitted	Yes.	Yes.	Yes.	Yes.	Yes, but preferably only to service properties.	Only to service properties.
8. Intersection treatments	Controlled with appropriate measures e.g. high speed traffic management, signing, line marking, grade separation.	Controlled with appropriate measures e.g. traffic signals.	Controlled with appropriate Local Area Traffic Management.	Controlled with measures such as signing and line marking of intersections.	Controlled with minor Local Area Traffic Management or measures such as signing.	Self controlling with minor measures.
9. Frontage Access	None on Controlled Access Roads. On other routes, preferably none, but limited access is acceptable to service individual properties.	Prefer not to have residential access. Limited commercial access, generally via service roads.	Residential and commercial access due to its historic status Prefer to limit when and where possible.	Prefer not to have property access. Limited commercial access, generally via lesser roads.	Yes, for property and commercial access due to its historic status. Prefer to limit whenever possible. Side entry is preferred.	Yes.
10. Pedestrians	Preferably none. Crossing should be controlled where possible.	With positive measures for control and safety e.g. pedestrian signals.	With appropriate measures for control and safety e.g. median/islands refuges.	Measures for control and safety such as careful siteing of school bus stops and rest areas.	Yes, with minor safety measures where necessary.	Yes.
11. Buses	Yes.	Yes.	Yes.	Yes.	Yes.	If necessary (see Note 5)
12. On-Road Parking	No (emergency parking on shoulders only).	Generally no. Clearways where necessary.	Not preferred. Clearways where necessary.	No – emergency parking on shoulders – encourage parking in off road rest areas where possible.	Built Up Area – yes, where sufficient width and sight distance allow safe passing. Non Built Up Area – no. Emergency parking on shoulders.	Yes, where sufficient width and sight distance allow safe passing.
13. Signs & Linemarking	Centrelines, speed signs, guide and service signs to highway standard.	Centrelines, speed signs, guide and service signs.	Centrelines, speed signs, guide and service signs.	Centrelines, speed signs and guide signs.	Speed and guide signs.	Urban areas – generally not applicable. Rural areas - Guide signs.
14. Rest Areas/Parking Bays	In accordance with Main Roads' *Roadside Stopping Places Policy*.	Not Applicable.	Not Applicable.	Parking Bays/Rest Areas. Desired at 60km spacing.	Not Applicable.	Not Applicable.

Figure 9: Road types and criteria for Western Australia

Source: Main Roads Western Australia D10#10992

Midblock road capacity

The post development midblock capacity of the frontage roads was assessed against the thresholds in Table 4.

Level of Service (LOS) (A) represents a free flow condition where drivers can choose their preferred speed and are not affected by other vehicles. LOS (F), on the other hand, represents a congested traffic situation where drivers have no choice of speed and are frequently forced to stop. Anything above the LOS (E) is LOS (F) which is the point of forced traffic flows where congestion occurs.

All frontage roads are expected to operate under conditions below their maximum midblock operating capacity at a good level of service A in the post development situation.

Table 4: Upper limits of daily traffic volumes per lane for each level of service

Road type	Upper limits of daily traffic volumes per lane for level of service				
	A	B	C	D	E
2-lane undivided road	5 100	5 950	6 800	7 650	8 500
2-lane divided road	5 700	6 650	7 600	8 550	9 500
4-lane undivided road	5 250	6 125	7 000	7 875	8 750
4-lane divided road	6 600	7 700	8 800	9 900	11 000
6-lane divided road	6 600	7 700	8 800	9 900	11 000
4-lane expressway	7 800	9 100	10 400	11 700	13 000
4-lane freeway	6 000	10 000	14 000	18 000	20 000
6-lane freeway	6 000	10 000	14 000	18 000	20 000
8-lane freeway [1]	6 000	10 000	14 000	18 000	20 000

Source: Review of Major Roads in the South West Metropolitan Corridor: Traffic congestion Technical Paper, Local Impacts Committee, December 2004

8. Public transport access

Information was collected from Transperth and the Public Transport Authority to assess the existing public transport access to and from the site.

The subject site has access to the following bus services within walking distance:

- Bus Route 111: Perth - Fremantle Stn via Kwinana Fwy & Canning Hwy;
- Bus Route 114: Perth - Perth - Munster via Booragoon Bus Station;
- Bus Route 115: Perth - Hamilton Hill via Booragoon Bus Stn; and,
- Bus Route 910: Perth - Fremantle Stn via Canning Hwy.

Public transport services provide a viable alternative mode of transport for residents and visitors of the proposed development. There is a bus stop located on Canning Highway, less than 400m walk or 5 minutes from the site. Bus services provide excellent coverage and connectivity to the rail network.

The public transport network plan is shown in Figure 10.

Figure 10: Transperth public transport plan

Source: Transperth

9. Pedestrian access

Information from online mapping services, Main Roads WA, Local Government, and site visits was collected to assess the pedestrian access for the proposed development.

Walk score

The Walk Score online service was checked to measure the walkability of the site based on the distance to nearby places and pedestrian friendliness. The site achieved a walk score of 79 which means it is very walkable, with most errands accomplished on foot. The score by category for different activities is detailed in Figure 11. It is noted that the site scores favourably for categories relevant to the proposed development, such as nearby access to parks, schools and dining.

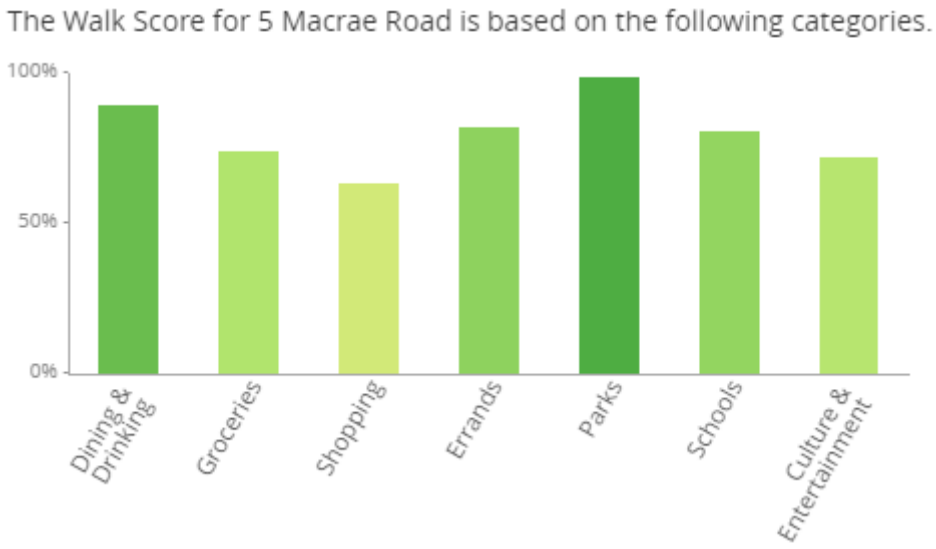


Figure 11: Subject site walk score by category

Source: www.walkscore.com – accessed 28 October 2021

Pedestrian facilities and level of service

Footpaths are provided along both sides of Macrae Road.

The WAPC Transport Impact Assessment Guidelines for Developments (2016) provide warrants for installing pedestrian priority crossing facilities. This is based on the volume of traffic as the key factor determining if pedestrians can safely cross a road. The guidelines recommend pedestrian priority crossing facilities be considered once the peak hour traffic exceeds the volumes detailed in Table 5.

The traffic volumes in this table are based on a maximum delay of 45 seconds for pedestrians, equivalent to Level of Service E. Traffic volumes on the road network adjacent to the site are below the threshold for safe pedestrian crossing. Therefore, pedestrian crossing level of service is satisfactory on the adjacent road network.

Table 5: Traffic volume thresholds for pedestrian crossings

Road cross-section	Maximum traffic volumes providing safe pedestrian gap
2-lane undivided	**1,100 vehicles per hour**
2-lane divided (with refuge)	2,800 vehicles per hour
4-lane undivided*	700 vehicles per hour
4-lane divided (with refuge)*	1,600 vehicles per hour

10. Bicycle access

Information from online mapping services, Department of Transport, Local Government, and/or site visits was collected to assess bicycle access for the proposed development.

Bicycle network

The Department of Transport Perth Bicycle Network Map (see Figure 12) shows the existing cyclist connectivity to the subject site. Nearby access to the Freeway PSP is available for cyclists commuting to and from the site. The riverside PSP is accessible to the north.

Figure 12: Perth bicycle network plan

11. Site specific issues

No additional site-specific issues were identified within the scope of this assessment.

12. Safety issues

The Main Roads WA crash mapping facility was used to check the past 5 years of crash records on Macrae Road near the site. As depicted in Figure 13, there was only one crash in the study area which resulted in major property damage. The crash data is summarised in Table 6.

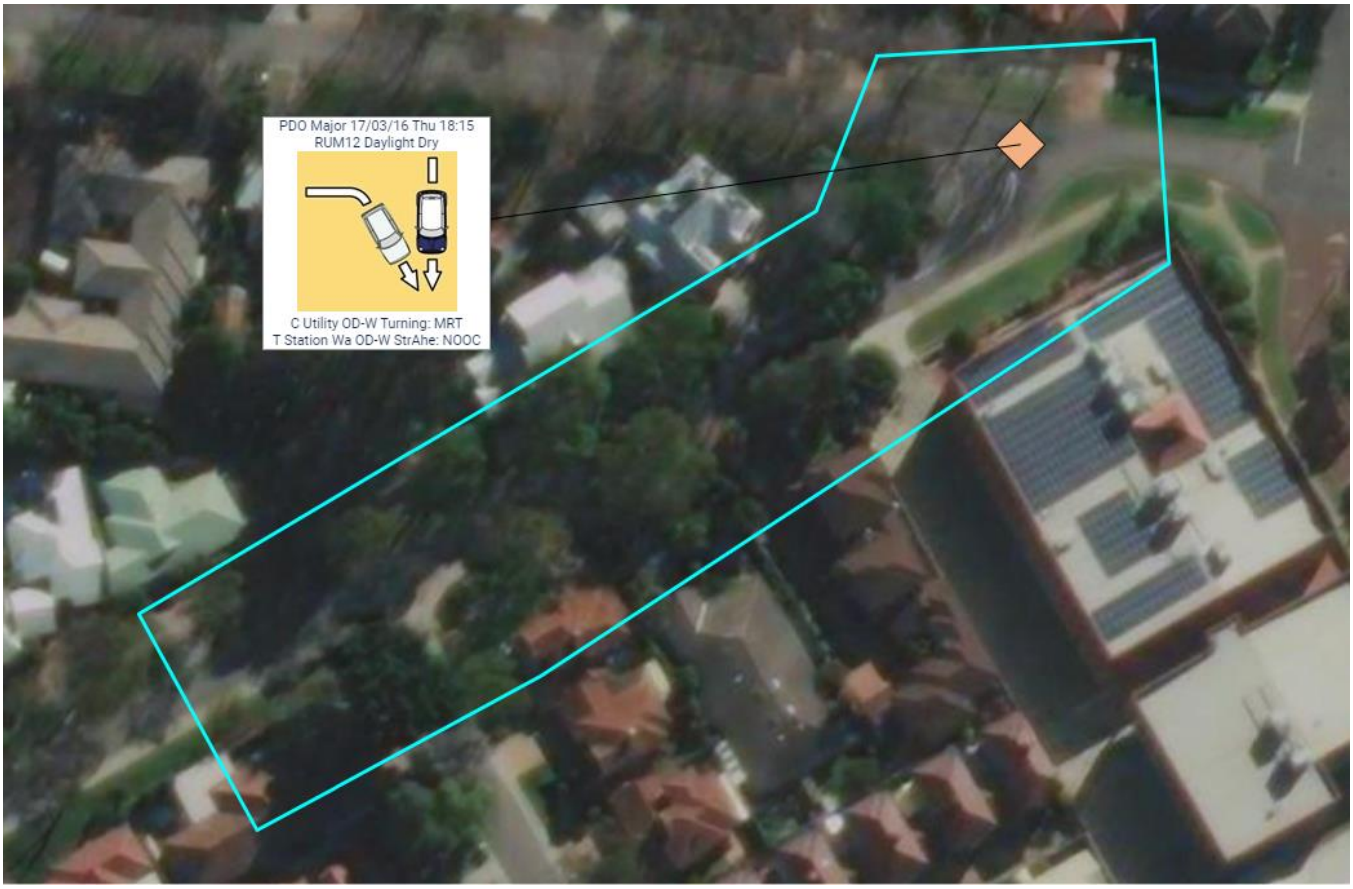


Figure 13: 5-year crash history map (2016 to 2020)

Source: Main Roads WA crash map

Table 6: 5-year crash history summary

Severity	No.	%
Fatal	0	0
Hospital	0	0
Medical	0	0
PDO Major	1	100.00
PDO Minor	0	0

Year	No.	%
2016	1	100.00

Nature	No.	%
Head On	0	0
Hit Animal	0	0
Hit Object	0	0
Hit Pedestrian	0	0
Non Collision	0	0
Not Known	0	0
Rear End	0	0
Right Angle	1	100.00
Right Turn Thru	0	0
Sideswipe Opposite Dirn	0	0
Sideswipe Same Dirn	0	0

Light	No.	%
Dark - Street Lights Not Provided	0	0
Dark - Street Lights Off	0	0
Dark - Street Lights On	0	0
Dawn Or Dusk	0	0
Daylight	1	100.00
Not Known	0	0

Conditions	No.	%
Dry	1	100.00
Not Known	0	0
Wet	0	0

Alignment	No.	%
Curve	0	0
Not Known	0	0
Straight	1	100.00

Total		1

Period: 2016 to 2020

13. Conclusion

This Transport Impact Statement has been prepared by Urbii on behalf of Hub Property Group with regards to the proposed residential development, located at 5 Macrae Road, Applecross.

It is proposed to develop the site into a grouped dwelling development with five (5) residential townhouses.

The site features good connectivity with the existing road and pedestrian network. There is good public transport coverage through nearby bus services and access to the rail network.

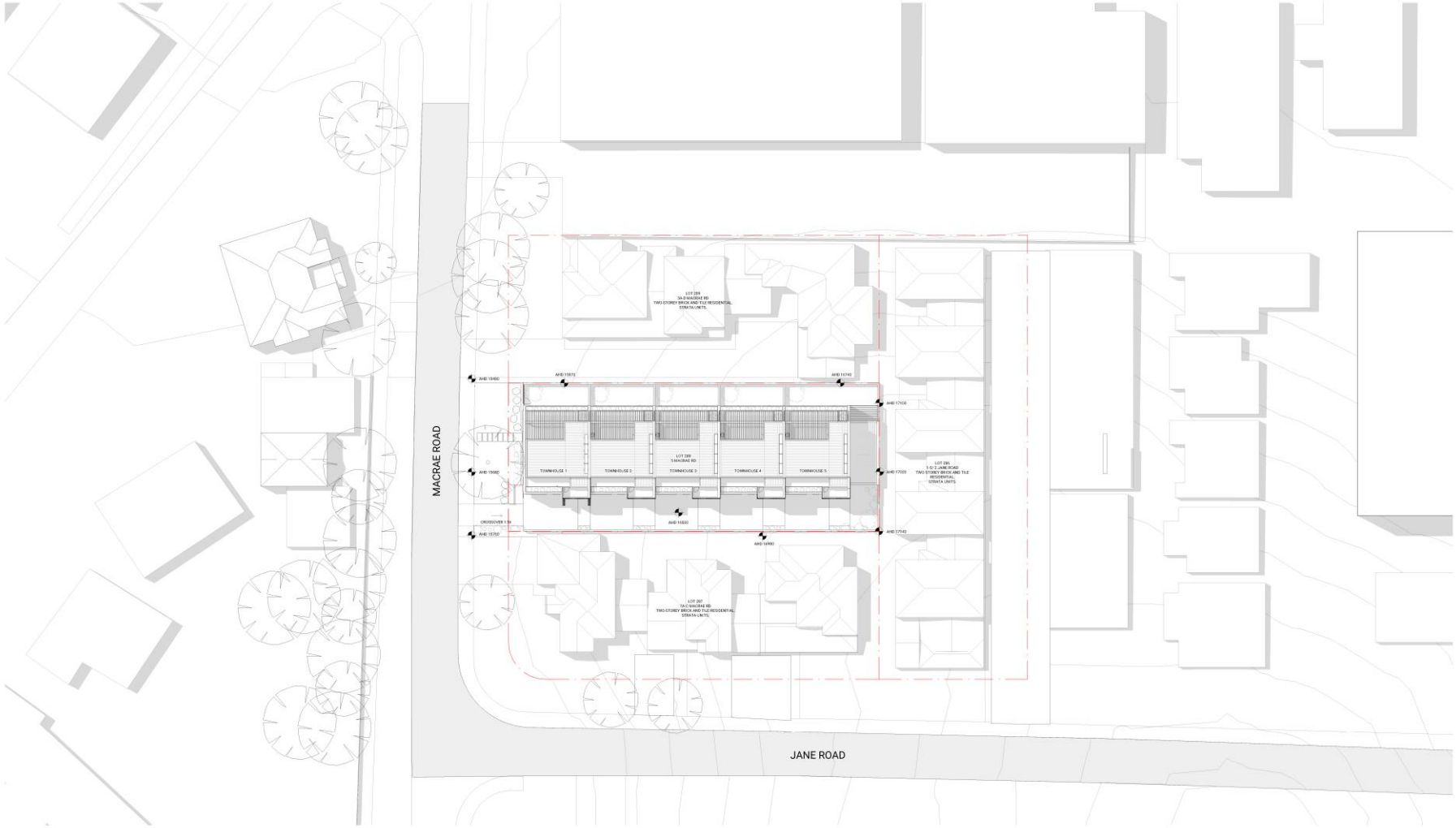
The traffic analysis undertaken in this report shows that the traffic generation of the proposed development is minimal (less than 100vph on any lane) and as such would have insignificant impact on the surrounding road network.

The car parking supply is satisfactory and can accommodate the car parking demand of the proposed development.

It is concluded that the findings of this Transport Impact Statement are supportive of the proposed development.

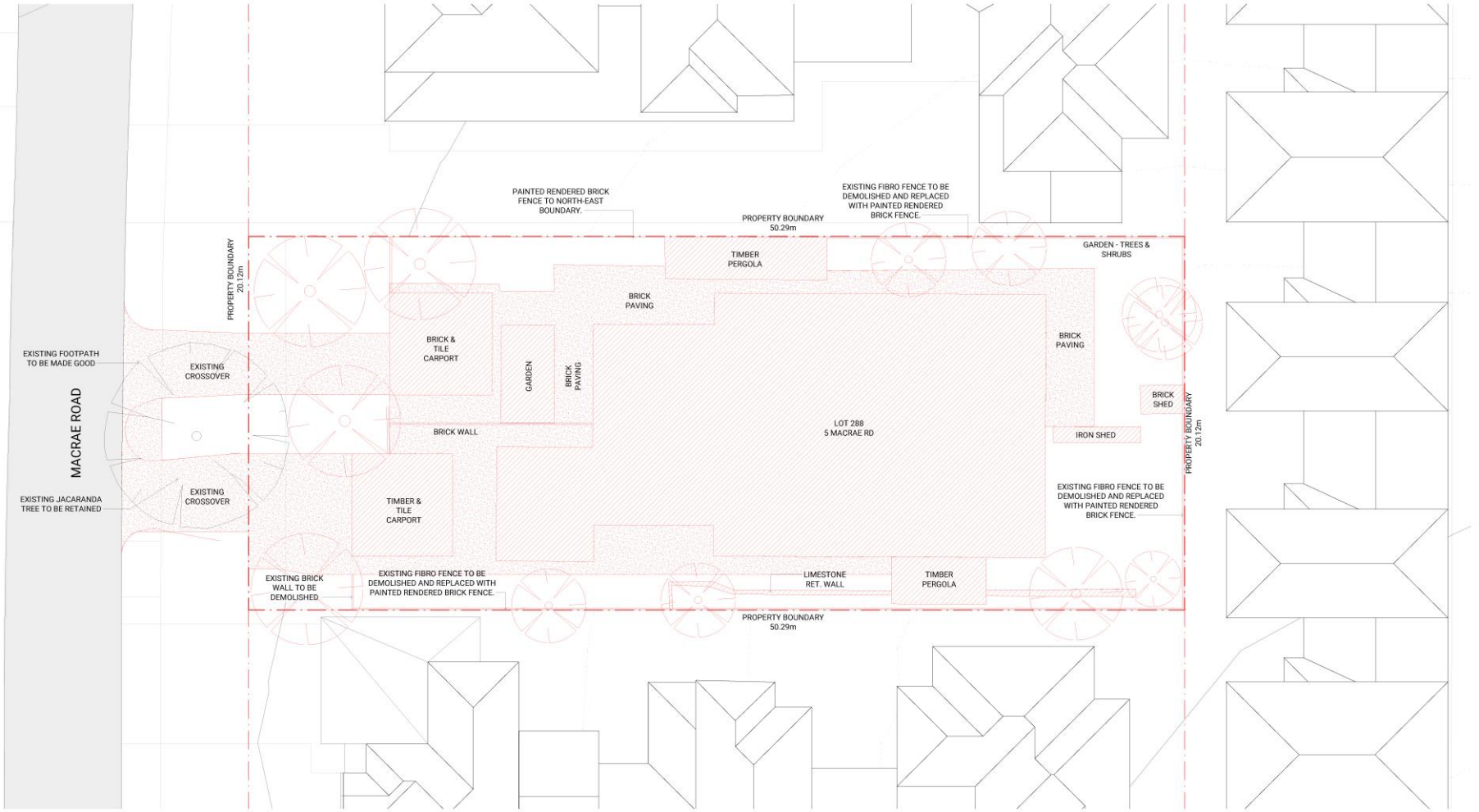
Appendices

Appendix A: Proposed development plans



PROJECT	JOB NUMBER	DATE	DRAWING No.	DRAWING	NORTH	SCALE
MACRAE RD TOWNHOUSES 5 MACRAE RD, APPLECROSS WA 6153	80377	21/10/2021	**DA100**	**SITE PLAN**		1 : 250 @A1

DEVELOPMENT APPLICATION

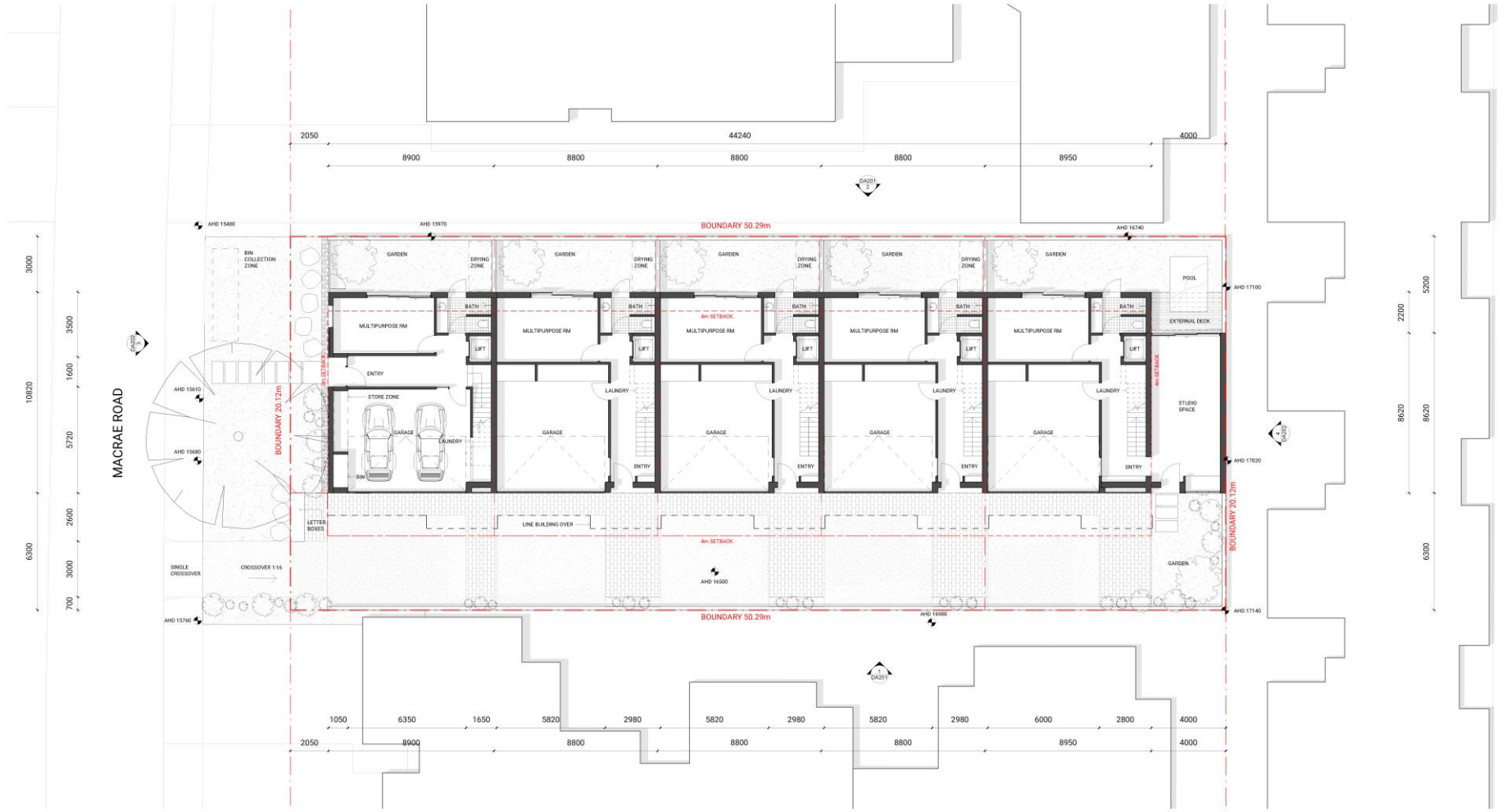


PROJECT	JOB NUMBER	DATE	DRAWING No.	DRAWING	NORTH	SCALE
MACRAE RD TOWNHOUSES 5 MACRAE RD, APPLECROSS WA 6153	80377	21/10/2021	**DA101**	**DEMOLITION PLAN**		1 : 100 @A1

DEVELOPMENT APPLICATION

plus architecture

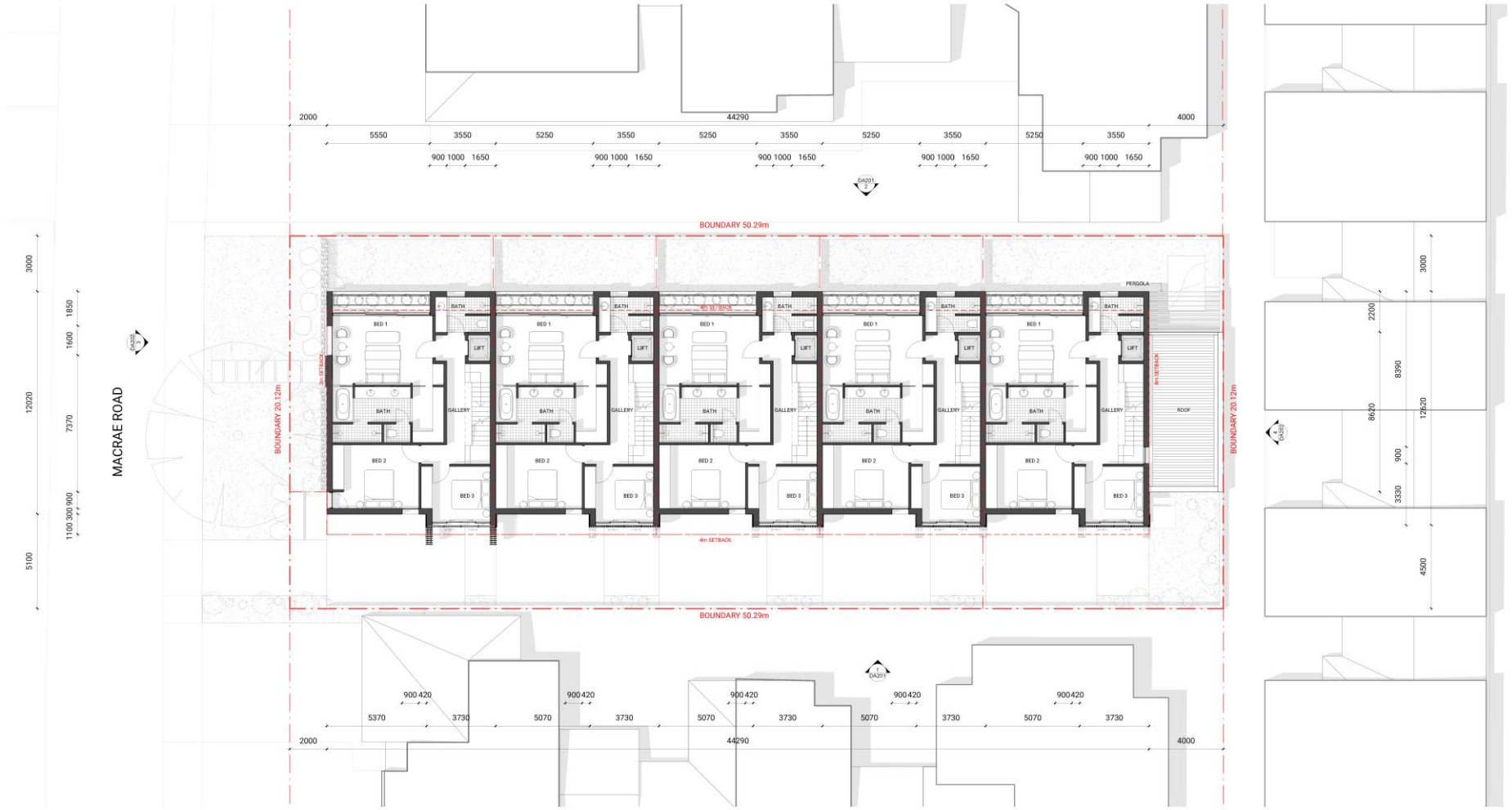
PENDING UPDATES:
LANDSCAPING (FROM TDL)



PROJECT	JOB NUMBER	DATE	DRAWING No.	DRAWING	NORTH	SCALE
MACRAE RD TOWNHOUSES 5 MACRAE RD, APPLECROSS WA 6153	80377	21/10/2021	DA102	GROUND FLOOR PLAN		1 : 100 @A1

plus architecture

DEVELOPMENT APPLICATION



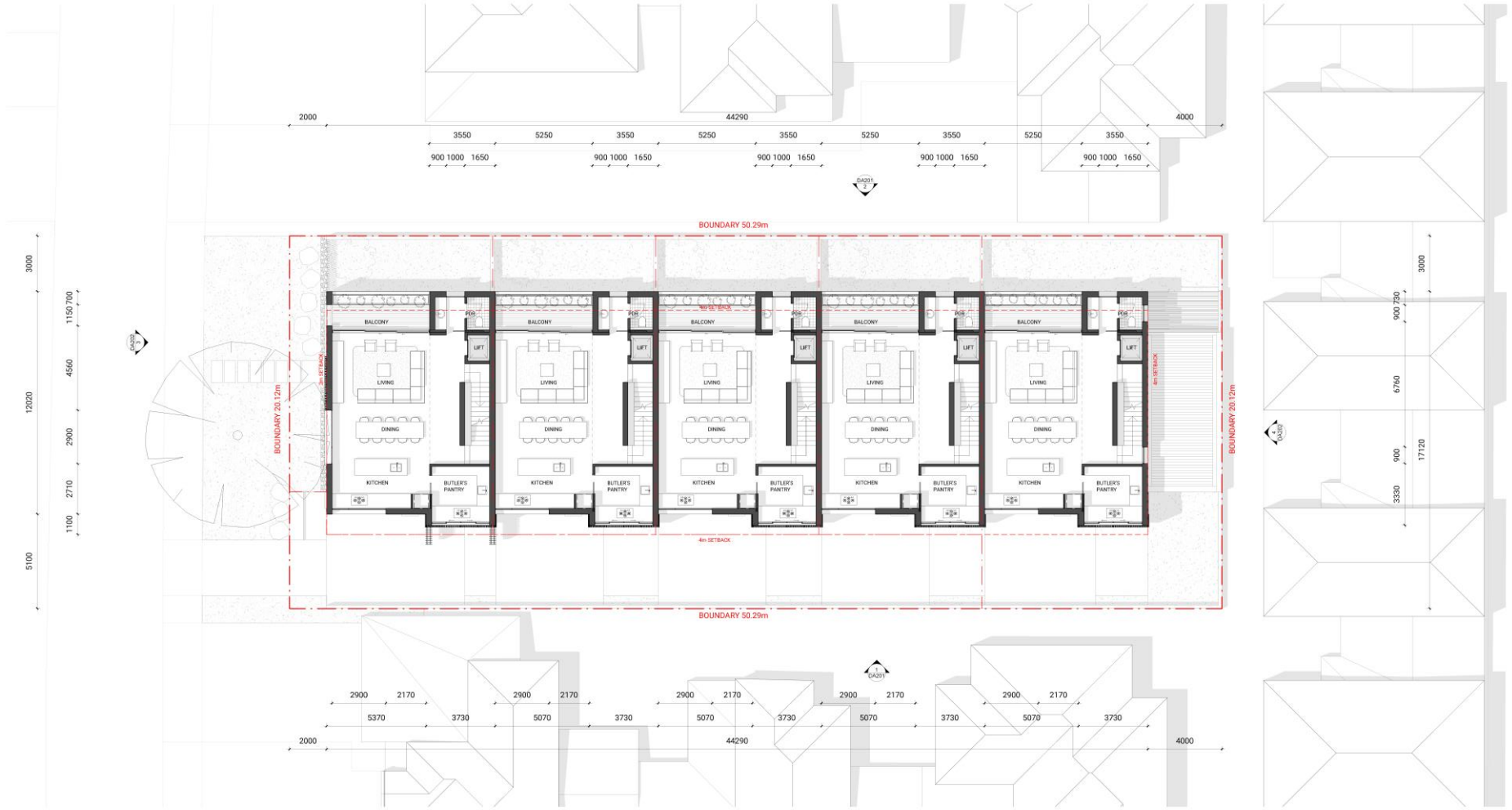
PROJECT	JOB NUMBER	DATE	DRAWING No.	DRAWING
MACRAE RD TOWNHOUSES 5 MACRAE RD, APPLECROSS WA 6153	80377	21/10/2021	DA103	LEVEL 01 FLOOR PLAN

NORTH

SCALE 1 : 100 @A1

plus architecture

DEVELOPMENT APPLICATION



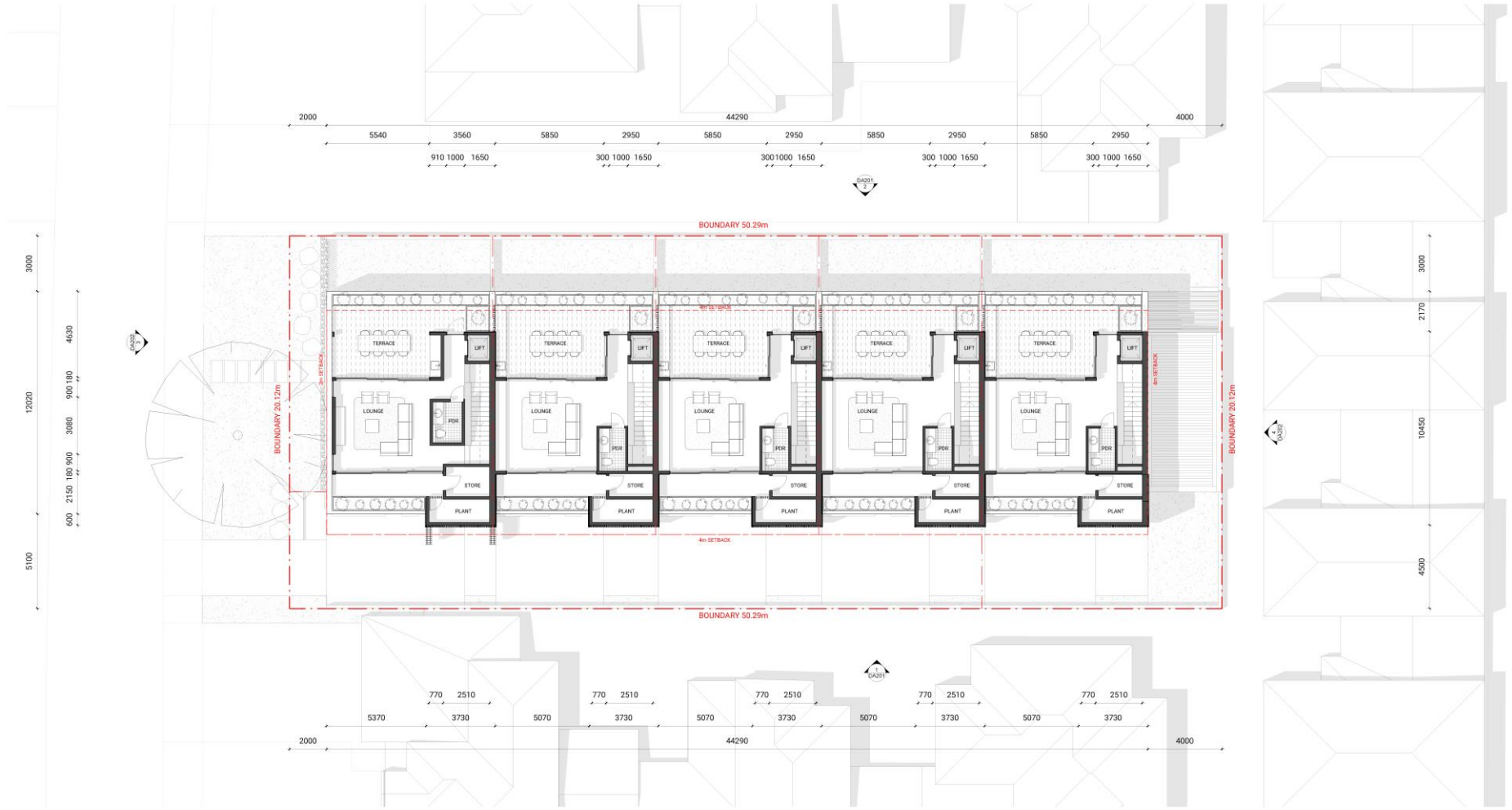
PROJECT	JOB NUMBER	DATE	DRAWING No.	DRAWING
MACRAE RD TOWNHOUSES 5 MACRAE RD, APPLECROSS WA 6153	80377	21/10/2021	DA104	LEVEL 02 FLOOR PLAN

NORTH

SCALE 1 : 100 @A1

plus architecture

DEVELOPMENT APPLICATION



PROJECT: **MACRAE RD TOWNHOUSES**
5 MACRAE RD, APPLECROSS WA 6153

JOB NUMBER: 80377

DATE: 21/10/2021

DRAWING No.: **DA105**

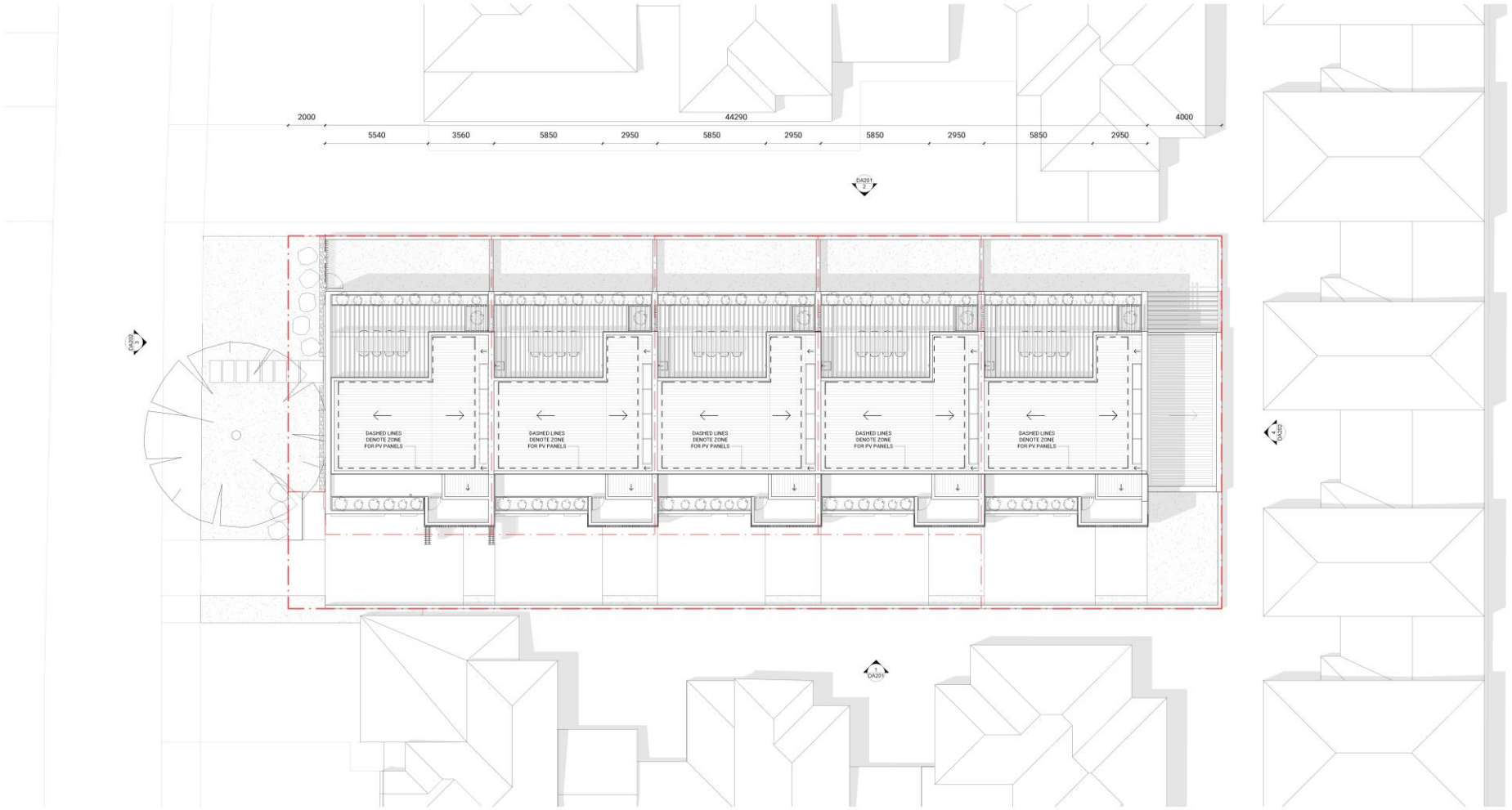
DRAWING: **LEVEL 03 FLOOR PLAN**

NORTH

SCALE: 1 : 100 @A1

plus architecture

DEVELOPMENT APPLICATION



PROJECT	JOB NUMBER	DATE	DRAWING No.	DRAWING	NORTH	SCALE
MACRAE RD TOWNHOUSES 5 MACRAE RD, APPLECROSS WA 6153	80377	21/10/2021	**DA106**	**ROOF PLAN**		1 : 100 @A1

DEVELOPMENT APPLICATION

plus architecture

Appendix B: Extract from AS2890.1 – Access driveway widths

TABLE 3.1
SELECTION OF ACCESS FACILITY CATEGORY

Class of parking facility (see Table 1.1)	Frontage road type	Access facility category — Number of parking spaces (Note 1)				
		<25	25 to 100	101 to 300	301 to 600	>600
1.1A	Arterial	1	2	3	4	5
	Local	1	1	2	3	4
2	Arterial	2	2	3	4	5
	Local	1	2	3	4	4
3.3A	Arterial	2	3	4	4	5
	Local	1	2	3	4	4

NOTES:

1 When a car park has multiple access points, each access should be designed for the number of parking spaces effectively served by that access.

2 This Table does not imply that certain types of development are necessarily suitable for location on any particular frontage road type. In particular, access to arterial roads should be limited as far as practicable, and in some circumstances it may be preferable to allow left-turn-only movements into and out of the access driveway.

TABLE 3.2
ACCESS DRIVEWAY WIDTHS

metres

Category	Entry width	Exit width	Separation of driveways
1	3.0 to 5.5	(Combined) (see Note)	N/A
2	6.0 to 9.0	(Combined) (see Note)	N/A
3	6.0	4.0 to 6.0	1 to 3
4	6.0 to 8.0	6.0 to 8.0	1 to 3
5	To be provided as an intersection, not an access driveway, see Clause 3.1.1.		

NOTE: Driveways are normally combined, but if separate, both entry and exit widths should be 3.0 m min.

Appendix 5 – Arborist Method Statement

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Preliminary Tree Survey

Location: 5 Macrae Road, Applecross

Report Prepared for:

Jon Cheesbrough of HUB Property Group

Date: 9 September 2021

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Contents

1.0 Introduction

A tree survey was undertaken within the property of 5 Macrae Street, Applecross on the 9th of September 2021 in order to identify trees that may be worthy of retention within the subject site

2.0 Methodology

This tree survey consisted of a walk-through assessment to collect the following details of nominated trees within the site:

- Age,
- Height (in meters),
- Canopy spread
- Diameter of the trunk at breast height and ground level (for determining TPZ and SRZ)
- Health and structure,
- Useful Life Expectancy
- Photograph of each tree.

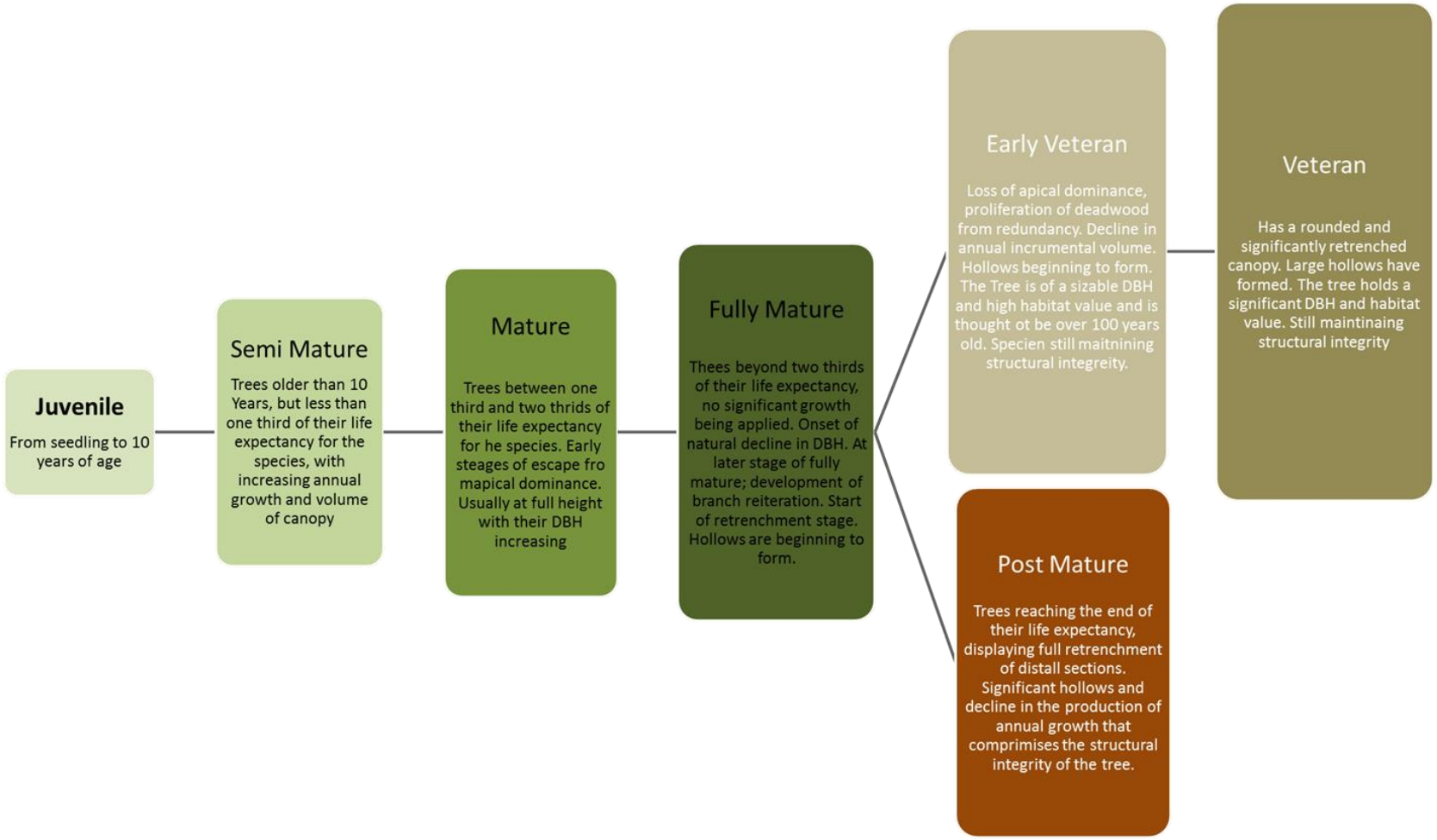
An aerial assessment and Soil or tissue sampling was not undertaken during this assessment.

2.1 Methodology – Tree Health and Structure

- **Good:** The tree will show good to excellent vigour throughout the tree for the species. The tree will exhibit a full and healthy canopy of foliage with only minimal pest or diseases evident.
- **Fair:** The tree is growing in a reasonable condition and shape with adequate canopy foliage for the species. Minor dead wood may be present throughout the crown, with reasonable colour and density when compared to a typical healthy specimen of that species.
- **Poor:** The tree appears stunted and not growing to its full capability with the canopy potentially visibly showing signs of openness and thinning with excessive amounts of dead or dying limbs. Evidence of established pest and disease issues will be evident or symptoms of stress indicating the tree is in decline.
- **Very poor:** The tree is in a state of decline with the canopy visibly open with considerable deadwood with pest and diseases being present throughout the tree as it enters the final stages of senescing.
- **Dead:** No more living tissue evident.

2.2 Methodology – Age Assessment

The age of the subject was assessed against the following categories.



2.3 Useful Life Expectancy

(A) Very Long (Greater than 40 + years)
Very high quality and high value, these trees would hold such a condition that make them a valuable part of the environment/ landscape, would be considered to hold a Useful Life Expectancy (ULE) of greater than 40 years, thus allowing them to make a substantial contribution for a long period of time.

(B). Long (Greater than 20 to 40 years)
High quality and high value, these trees would hold such a condition that make them a valuable part of the environment/ landscape, would be considered to hold a Useful Life Expectancy (ULE) of 40 years of greater, thus allowing them to make a substantial contribution.

(C). Medium (Between 11 and 20 years)
Medium quality and medium value, trees of this category are thought of as making a significant contribution to the area they dwell in and would be considered to hold a ULE of a minimum of 20 years.

(D). Short (Between 6 and 10 years)
Low quality and low value. These trees would be regarded as being in an adequate condition that would see them being retained for a period that would allow new plantings to establish. They would be considered as having a ULE of 5 to 10 years.

(E). Transient (Less than 5 years)
Very Low quality and very low value, these trees would be regarded as having a poor form, displaying a low vitality and may be exhibiting initial signs of structural decline. They would be considered to have a ULE of less than 5 years and are to be included in a plan for replacement.

(R). Dead or hazardous (no remaining ULE).
Trees in this category would be considered to hold such a condition that would potentially hold no value or in their current state it would be reasonable to undertake their removal for reasons of sound Arboricultural management, due to a high level of risk.

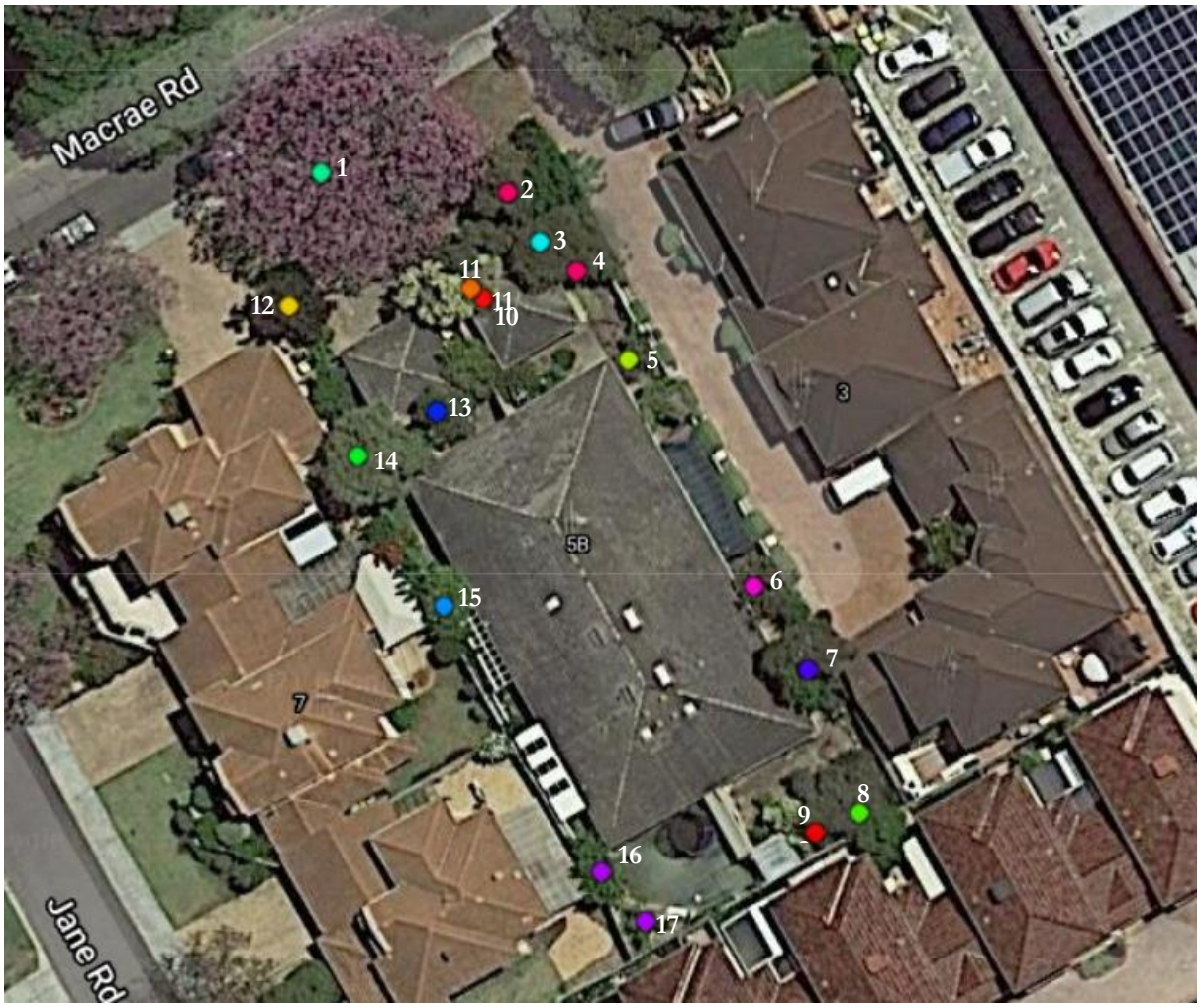
2.4 Habitat (Nesting) Value

H = High value. Trees in this category will have a DBH of 500mm or greater, with hollows of 120mm in diameter or greater.

M = Medium value. Trees with a DBH of up to 500mm but not greater then 300mm with hollows of up to 120mm in diameter this also relates to the potential for future significant nesting hollows.

L = Trees with no hollows, holding low nesting values.

3.0 Location of Subject Tree(s)



4.0 Tree Assessments – Tree 1

Tree Details	
Latin Name:	Jacaranda mimosifolia
Common Name:	Jacaranda
Tree Age:	Mature
Health:	Fair
Structure:	Fair
Tree Height (Estimated) [m]:	12
Canopy Spread N/S [m]:	11
Canopy Shape:	Asymmetrical
DBH [cm]:	57
DBH Range:	46-60cm
Diameter at Root Flare (DRF) [m]:	0.68
Tree Protection Zone (TPZ) [m]:	6.84
Structural Root Zone (SRZ) [m]:	2.81
Useful Life Expectancy:	40+ years
Observation Comments:	

Tree Location	
Longitude:	115.845085
Latitude:	-32.012793
Land Use:	Street Verge
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.1 Tree 2

Tree Details	
Latin Name:	Callistemon viminalis
Common Name:	Weeping Bottlebrush
Tree Age:	Mature
Health:	Fair
Structure:	Poor
Tree Height (Estimated) [m]:	5
Canopy Spread N/S [m]:	5
Canopy Shape:	Asymmetrical
DBH [cm]:	19
DBH Range:	16-30cm
Diameter at Root Flare (DRF) [m]:	0.38
Tree Protection Zone (TPZ) [m]:	2.28
Structural Root Zone (SRZ) [m]:	2.2
Useful Life Expectancy:	6-10 years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845213
Latitude:	-32.012805
Land Use:	Residential Home
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.2 Tree 3

Tree Details	
Latin Name:	Brachychiton populneus
Common Name:	Kurrajong
Tree Age:	Juvenile
Health:	Good
Structure:	Good
Tree Height (Estimated) [m]:	7
Canopy Spread N/S [m]:	2
Canopy Shape:	Symmetrical
DBH [cm]:	21
DBH Range:	16-30cm
Diameter at Root Flare (DRF) [m]:	0.32
Tree Protection Zone (TPZ) [m]:	2.52
Structural Root Zone (SRZ) [m]:	2.05
Useful Life Expectancy:	40+ years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845235
Latitude:	-32.012833
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.3 Tree 4

Tree Details	
Latin Name:	Callistemon viminalis
Common Name:	Weeping Bottlebrush
Tree Age:	Semi mature
Health:	Fair
Structure:	Fair
Tree Height (Estimated) [m]:	5
Canopy Spread N/S [m]:	5
Canopy Shape:	Asymmetrical
DBH [cm]:	27.79
DBH Range:	16-30cm
Diameter at Root Flare (DRF) [m]:	46
Tree Protection Zone (TPZ) [m]:	3.33
Structural Root Zone (SRZ) [m]:	16.52
Useful Life Expectancy:	11-20 years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845259
Latitude:	-32.012851
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

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4.4 Tree 5

Tree Details	
Latin Name:	Fraxinus griffithii
Common Name:	Evergreen Ash
Tree Age:	Juvenile
Health:	Fair
Structure:	Poor
Tree Height (Estimated) [m]:	0
Canopy Spread N/S [m]:	2
Canopy Shape:	Asymmetrical
DBH [cm]:	5.18
DBH Range:	0-8cm
Diameter at Root Flare (DRF) [m]:	0.016
Tree Protection Zone (TPZ) [m]:	2
Structural Root Zone (SRZ) [m]:	0.58
Useful Life Expectancy:	11-20 years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845295
Latitude:	-32.012902
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

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4.5 Tree 6

Tree Details	
Latin Name:	Grevillea banksii
Common Name:	Red Silky Oak
Tree Age:	Mature
Health:	Fair
Structure:	Poor
Tree Height (Estimated) [m]:	3
Canopy Spread N/S [m]:	4.5
Canopy Shape:	Asymmetrical
DBH [cm]:	18
DBH Range:	16-30cm
Diameter at Root Flare (DRF) [m]:	0.18
Tree Protection Zone (TPZ) [m]:	2.16
Structural Root Zone (SRZ) [m]:	1.61
Useful Life Expectancy:	1-5 years
Observation Comments:	Termite activity observed
Notes:	

Tree Location	
Longitude:	115.845380
Latitude:	-32.013033
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.6 Tree 7

Tree Details	
Latin Name:	Eucalyptus nicholii
Common Name:	Narrow Leaved Peppermint
Tree Age:	Juvenile
Health:	Fair
Structure:	Very Poor
Tree Height (Estimated) [m]:	4
Canopy Spread N/S [m]:	3
Canopy Shape:	
DBH [cm]:	34
DBH Range:	30-45cm
Diameter at Root Flare (DRF) [m]:	0.37
Tree Protection Zone (TPZ) [m]:	4.08
Structural Root Zone (SRZ) [m]:	2.18
Useful Life Expectancy:	1-5 years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845417
Latitude:	-32.013080
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.7 Tree 8

Tree Details	
Latin Name:	Acacia iteaphylla
Common Name:	Flinders Ranges Wattle
Tree Age:	Mature
Health:	Fair
Structure:	Poor
Tree Height (Estimated) [m]:	4
Canopy Spread N/S [m]:	3.5
Canopy Shape:	
DBH [cm]:	8.44
DBH Range:	8-16cm
Diameter at Root Flare (DRF) [m]:	0.1
Tree Protection Zone (TPZ) [m]:	2
Structural Root Zone (SRZ) [m]:	1.26
Useful Life Expectancy:	1-5 years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845452
Latitude:	-32.013163
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.8 Tree 9

Tree Details	
Latin Name:	Melaleuca armillaris
Common Name:	bracelet Honey-myrtle, needle-leaved Honey-myrtle
Tree Age:	Mature
Health:	Fair
Structure:	Very Poor
Tree Height (Estimated) [m]:	3
Canopy Spread N/S [m]:	2
Canopy Shape:	
DBH [cm]:	21
DBH Range:	16-30cm
Diameter at Root Flare (DRF) [m]:	0.23
Tree Protection Zone (TPZ) [m]:	2.52
Structural Root Zone (SRZ) [m]:	1.79
Useful Life Expectancy:	1-5 years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845421
Latitude:	-32.013175
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.9 Tree 10

Tree Details	
Latin Name:	Melaleuca armillaris
Common Name:	bracelet Honey-myrtle, needle-leaved Honey-myrtle
Tree Age:	Semi mature
Health:	Fair
Structure:	Poor
Tree Height (Estimated) [m]:	5
Canopy Spread N/S [m]:	3
Canopy Shape:	Asymmetrical
DBH [cm]:	25.61
DBH Range:	16-30cm
Diameter at Root Flare (DRF) [m]:	35
Tree Protection Zone (TPZ) [m]:	3.07
Structural Root Zone (SRZ) [m]:	14.73
Useful Life Expectancy:	6-10 years
Observation Comments:	Phototropism caused be adjacent tree
Notes:	

Tree Location	
Longitude:	115.845196
Latitude:	-32.012865
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.10 Tree 11

Tree Details	
Latin Name:	Melaleuca quinquenervia
Common Name:	Broad-leaved Paperbark
Tree Age:	Semi mature
Health:	Fair
Structure:	Poor
Tree Height (Estimated) [m]:	5
Canopy Spread N/S [m]:	3
Canopy Shape:	Asymmetrical
DBH [cm]:	23
DBH Range:	16-30cm
Diameter at Root Flare (DRF) [m]:	0.31
Tree Protection Zone (TPZ) [m]:	2.76
Structural Root Zone (SRZ) [m]:	2.02
Useful Life Expectancy:	6-10 years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845188
Latitude:	-32.012860
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.11 Tree 12

Tree Details	
Latin Name:	Hibiscus tiliaceus
Common Name:	Cotton Tree
Tree Age:	Semi mature
Health:	Fair
Structure:	Fair
Tree Height (Estimated) [m]:	5
Canopy Spread N/S [m]:	5
Canopy Shape:	
DBH [cm]:	15
DBH Range:	8-16cm
Diameter at Root Flare (DRF) [m]:	0.22
Tree Protection Zone (TPZ) [m]:	2
Structural Root Zone (SRZ) [m]:	1.75
Useful Life Expectancy:	6-10 years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845063
Latitude:	-32.012870
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.12 Tree 13

Tree Details	
Latin Name:	Mangifera cultivar
Common Name:	Mango
Tree Age:	Juvenile
Health:	Fair
Structure:	Fair
Tree Height (Estimated) [m]:	2
Canopy Spread N/S [m]:	2
Canopy Shape:	Symmetrical
DBH [cm]:	17
DBH Range:	16-30cm
Diameter at Root Flare (DRF) [m]:	0.2
Tree Protection Zone (TPZ) [m]:	2.04
Structural Root Zone (SRZ) [m]:	1.68
Useful Life Expectancy:	20-40 years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845165
Latitude:	-32.012932
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.13 Tree 14

Tree Details	
Latin Name:	Melaleuca sp.
Common Name:	
Tree Age:	Mature
Health:	Fair
Structure:	Poor
Tree Height (Estimated) [m]:	6
Canopy Spread N/S [m]:	7
Canopy Shape:	Asymmetrical
DBH [cm]:	30
DBH Range:	30-45cm
Diameter at Root Flare (DRF) [m]:	0.35
Tree Protection Zone (TPZ) [m]:	3.6
Structural Root Zone (SRZ) [m]:	2.13
Useful Life Expectancy:	6-10 years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845110
Latitude:	-32.012957
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.14 Tree 15

Tree Details	
Latin Name:	Citrus × limon
Common Name:	lemon
Tree Age:	Mature
Health:	Poor
Structure:	Very Poor
Tree Height (Estimated) [m]:	2
Canopy Spread N/S [m]:	2
Canopy Shape:	Asymmetrical
DBH [cm]:	15.62
DBH Range:	8-16cm
Diameter at Root Flare (DRF) [m]:	20
Tree Protection Zone (TPZ) [m]:	2
Structural Root Zone (SRZ) [m]:	11.65
Useful Life Expectancy:	11-20 years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845169
Latitude:	-32.013043
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.15 Tree 16

Tree Details	
Latin Name:	Morus rubra
Common Name:	Red Mulberry
Tree Age:	Mature
Health:	Fair
Structure:	Poor
Tree Height (Estimated) [m]:	6
Canopy Spread N/S [m]:	5
Canopy Shape:	Asymmetrical
DBH [cm]:	25.34
DBH Range:	16-30cm
Diameter at Root Flare (DRF) [m]:	30
Tree Protection Zone (TPZ) [m]:	3.04
Structural Root Zone (SRZ) [m]:	13.81
Useful Life Expectancy:	20-40 years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845276
Latitude:	-32.013197
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

4.16 Tree 17

Tree Details	
Latin Name:	Morus rubra
Common Name:	Red Mulberry
Tree Age:	Juvenile
Health:	Fair
Structure:	Fair
Tree Height (Estimated) [m]:	3
Canopy Spread N/S [m]:	2
Canopy Shape:	Asymmetrical
DBH [cm]:	5
DBH Range:	0-8cm
Diameter at Root Flare (DRF) [m]:	0.1
Tree Protection Zone (TPZ) [m]:	2
Structural Root Zone (SRZ) [m]:	1.26
Useful Life Expectancy:	40+ years
Observation Comments:	
Notes:	

Tree Location	
Longitude:	115.845307
Latitude:	-32.013226
Land Use:	
Address:	5A Macrae Road
City:	Applecross
Land Type:	
Location on Site:	

Photos Street View Map View

5.0 Conclusion

16 trees were identified within the property, none were found to be especially significant, with most either being in poor condition or structure as a result of poor maintenance practices, or age.

One Jacaranda on the verge was noted and was found to be maintaining a good condition and structure for the species. Should any development take place at the property, measures pursuant with AS 4970 – 2009 Protection of Trees on Development Sites should be implemented to protect this tree

6.0 Glossary of Arboricultural Terminology

Abscission - The shedding of a leaf or other short-lived part of a woody plant, involving the formation of a corky layer across its base; in some tree species twigs can be shed in this way.

Abiotic - Pertaining to non-living agents; e.g. environmental factors.

Absorptive roots - Non-woody, short-lived roots, generally having a diameter of less than one millimetre, the primary function of which is uptake of water and nutrients.

Adaptive growth - In tree biomechanics, the process whereby the rate of wood formation in the cambial zone, as well as wood quality, responds to gravity and other forces acting on the cambium. This helps to maintain a uniform distribution of mechanical stress.

Adaptive roots - The adaptive growth of existing roots; or the production of new roots in response to damage, decay or altered mechanical loading.

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree.

Axil - The place where a bud is borne between a leaf and its parent shoot.

Bacteria - Microscopic single-celled organisms, many species of which break down dead organic matter, and some of which cause diseases in other organisms.

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem.

Basidiomycotina (Basidiomycetes) - One of the major taxonomic groups of fungi.

Bolling - A term sometimes used to describe pollard heads.

Bottle-butt - A broadening of the stem base and buttresses of a tree, in excess of normal and sometimes denoting a growth response to weakening in that region, especially due to decay.

Bracing - The use of rods or cables to restrain the movement between parts of a tree.

Branch:

- **Primary** - A first order branch arising from a trunk or stem
- **Lateral** - A second order branch, subordinate to a primary branch
- **Sub-lateral** - A third order branch, originating from lateral branch

Branch bark ridge - The raised arc of bark tissues that forms within the acute angle between a branch and its parent stem.

Branch-collar - A visible swelling formed at the base of a branch.

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified.

Buckling - An irreversible deformation of a structure subjected to a bending load.

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions.

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally.

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria.

Canopy species - Tree species that mature to form a closed forest canopy.

Cleaning out - The removal of dead, crossing, weak, and damaged branches, where this will not damage or spoil the overall appearance of the tree.

Compartmentalisation - The chemical confinement of disease, decay or other dysfunction within a trees tissue, due to passive and/or active defences operating at the boundaries of the affected region.

Compression fork - An acute angled fork that is mechanically optimised for the growth pressure that two or more adjacent stems exert on each other.

Compression strength - The ability of a material or structure to resist failure when subjected to compressive loading; measurable in trees with special drilling devices.

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading.

Tree Protection Zone - Area from which access is prohibited for the duration of the project to prevent damage to a tree.

Crown/Canopy - The main foliage bearing section of the tree.

Crown lifting - The removal of limbs and small branches to a specified height above ground level.

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure.

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape.

Crown reduction/thinning - Reduction of the canopy volume by thinning to remove selected branches whilst preserving the natural tree shape.

Deadwood - Branch or stem wood bearing no live tissues.

Decurrent - A system of branching in which the crown is borne on a number of major widely spreading limbs of similar size.

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment.

Delamination - The separation of wood layers along their length, visible as longitudinal splitting.

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips.

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused pathogens.

Distal - In the direction away from the main body of a tree or subject organism (cf. proximal)

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also, the tendency of a tree to maintain a taller crown than its neighbours.

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so.

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood.

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified.

Endophytes - Micro-organisms that live inside plant tissues without causing overt disease, but in some cases capable of causing disease if the tissues become physiologically stressed.

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first-year shoot.

Excrescence - Any abnormal outgrowth on the surface of tree or other organism.

Excurrent - In trees, a system of branching in which there is a well-defined central main stem, bearing branches which are limited in their length, diameter and secondary branching (cf. decurrent).

Fastigiate - Having upright, often clustered branches.

Flush cut - A pruning cut which removes part of the branch bark ridge and or branch-collar.

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue.

Habit - The overall growth characteristics, shape of the tree and branch structure.

Haloing - Removing or pruning trees from around the crown of another (usually mature or post-mature) tree to prevent it becoming supressed.

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth, prone to longitudinal splitting.

Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood.

Heave - The lifting of pavements and other structures by root diameter expansion; also, the lifting of one side of a wind-rocked root-plate.

High canopy tree species - Tree species having potential to contribute to the closed canopy of a mature forest.

Incipient failure - In wood tissues, a mechanical failure which results only in deformation or cracking, and not in the fall or detachment of the affected part.

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact.

Infection - The establishment of a parasitic micro-organism in the tissues of a tree or other organism.

Internode - The part of a stem between two nodes; not to be confused with a length of stem which bear nodes but no branches.

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or individual branch.

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification.

Lions tailing - When a branch of a tree that has few if any side branches except at its end and is thus liable to snap due to end-loading.

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure.

Longitudinal - Along the length (of a stem, root or branch).

Lopping - A term often used to describe the removal of large branches from a tree, but also used to describe other forms of cutting

Minor deadwood - Deadwood of a diameter less than 25mm and or unlikely to cause significant harm or damage upon impact with a target.

Mulch - Material laid down over the rooting area of plants to help conserve moisture; mulch may consist of organic matter, or artificial material.

Mycelium - The body of a fungus, consisting of branched filaments (hyphae).

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it.

Pathogen - A micro-organism which causes disease in another organism.

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products.

Phytotoxic - Toxic to plants.

Pollarding - The removal of the tree canopy, back to the stem or primary branches, usually to a point just outside that of the previous cutting.

Primary branch - A major branch, generally having a basal diameter greater than 0.25 x stem diameter.

Probability - A statistical measure of the likelihood that a particular event might occur.

Pruning - The removal or cutting back tree parts to growth points.

Rams-horn - In connection with wounds on trees, a roll of occluding tissues which has a spiral structure as seen in cross section.

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical or external loading.

Residual wall - The amount of non-decayed wood remaining following decay of internal wood

Rib - A ridge of wood that has usually developed because of locally increased mechanical loading. Often associated with internal cracking in the wood of the stem, branch or root.

Ring-barking (girdling) - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates above or below the area of damage.

Ripewood - The older central wood of those tree species in which sapwood gradually ages without being converted to heartwood.

Root-collar - The transitional area between the stem/s and roots.

Root zone - Area of soils containing absorptive roots of the tree/s described. The Primary root zone is that which we consider of primary importance to the physiological well-being of the tree.

Sapwood - Living xylem tissues.

Selective delignification - A kind of wood decay (white-rot) in which lignin is degraded faster than cellulose.

Shedding - In woody plants, the normal abscission, rotting off or sloughing of leaves, floral parts, twigs, fine roots and bark scales.

Shrub species - Woody perennial species forming the lowest level of woody plants in a forest or garden and not normally considered to be trees.

Simultaneous white rot - A kind of wood decay in which lignin and cellulose are degraded at about the same rate.

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cells,

Spores - Propagules of fungi; most spores are microscopic and dispersed in air or water.

Sporophore - The spore bearing structure of fungi.

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches.

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature: In mechanics, the application of a external force to an object.

Stringy white-rot - The kind of wood decay produced by selective delignification.

Structural roots - Roots, generally having a diameter greater than 50 millimetres, and contributing significantly to the structural support and stability of the tree.

Structural root zone (ZRZ) - The zone of the root plate most likely to contain roots that are critical for anchorage and the stability of the tree.

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots.

Subsidence - In relation to branches of trees, a term that can be used to describe a progressive downward bending due to increasing weight.

Taper - In stems and branches, the degree of change in girth along a given length.

Targets - In tree risk assessment persons or property or other things of value which might be harmed or damaged by falling parts of a tree

Topping/ Lopping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it.

Torsional stress - Mechanical stress applied by a twisting force.

Translocation - In plant physiology, the movement of water and dissolved materials through the body of the plant.

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells.

Tree Protection Zone (TRZ) - This is an area left around a tree to ensure protection of the above and below ground parts of the tree during construction works. It will usually include the SRZ and is usually recommended to be fenced off for the period of the works.

Understorey - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions.

Understorey tree species - Tree species not having potential to attain a size at which they can contribute to the closed high canopy of a forest or garden.

Vascular wilt - A type of plant disease in which water-conducting cells become dysfunctional.

Vessels - Water-conducting cells in plants, usually wide and long for hydraulic efficiency; generally, not present in coniferous trees.

Vigour - The expression of carbohydrate expenditure to growth (in trees).

Vitality - A measure of physiological condition.

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded.

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity.

Windthrow - The blowing over of a tree at its roots.

Woundwood - Wood with atypical anatomical features, formed in the vicinity of a wound.

7.0 References

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