Planned Focus

Structure Plan

Lot 1119 Prinsep Street North, Collie

PF1130 / 30 August 2025

Kanella Hope Pty Ltd trading as
Planned Focus ACN 630 552 466

DOCUMENT CONTROL

ISSUE	DATE	ISSUE DETAILS	APPROVED
Draft	June 2025	Client review	KH
Original	30 August 2025	Lodged to Shire of Collie	KH

This structure plan is prepared under the provisions of the Shire of Collie Local Planning Scheme Number 6.

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

[DATE]

_____

Signed for and on behalf of the Western Australian Planning Commission:

An officer of the Commission duly authorised by the Commission pursuant to section 16 of the Planning and Development Act 2005 for that purpose, in the presence of:

_____ Witness

_____ Date

_____ Date of Expiry

Table of Amendments

Amendment No.	Summary of the Amendment	Amendment Type	Date approved by the WAPC

Executive Summary

Planned Focus has been engaged by the landowners, Marc and Richelle Pike to prepare a Structure Plan for their property at Lot 1119 Prinsep Street North, Collie. The subject land comprises a single lot which is located approximately 2.0 kilometres north-east of the Collie town centre.

This Structure Plan provides the planning framework to guide and facilitate the subdivision and development of this land for residential purposes and has been prepared in accordance with the provisions of the Shire of Collie Local Planning Scheme No. 6 and the strategic recommendations of the Shire of Collie Local Planning Strategy 2020.

The Structure Plan includes two stages. The short term and initial stage will facilitate a 2-lot subdivision, and a long-term proposal provides for a minimum 18 dwellings plus a grouped dwelling lot.

The longer-term outlook relies upon the availability of infill sewerage to the area. It broadly aligns with the Shire of Colllie Local Planning Strategy that recommends a residential density of R15.

The site is vacant now but Stage 1 anticipates a single house on each lot. These dwellings will be serviced by onsite wastewater and located to avoid impact on the long-term subdivision potential, avoiding indicative future roads and lot boundaries.

This Structure Plan supersedes the North Collie Structure Plan as it presently applies to this land and forms part of the future residential growth area of Collie. This Structure Plan is cognisant of the residential development potential of the adjoining landholdings.

Table 1: Summary

Item	Data		Structure Plan Ref (section no.)
Total area covered by the structure plan	1.5593 hectares		
Estimated number of dwellings	Short term (onsite wastewater) Long term (with reticulated sewer)	2 dwellings 19+ dwellings	
Estimated residential site density	11.5 dwellings per hectare (minimum 18 lots created, excluding additional grouped dwellings)		
Estimated population (at 2.5 persons /dwelling)	45 persons (Minimum 18 lots created + grouped dwellings)		

CONTENTS

PART 1 IMPLEMENTATION

1. Structure Plan Area and Operation

This Structure Plan applies to Lot 1119 Prinsep Street North, Collie as shown in *Figure 1*, Structure Plan map.

The plan is in effect from the date stated on the cover and for a period of 10 years (or any other period approved by the Western Australian Planning Commission.

2. Staging

The subject land will be developed in stages, dependent on landowner aspiration, and ultimately future availability of reticulated sewer.

Short term

In the immediate short term, it is the intention of the Structure Plan to facilitate the subdivision of the subject land into 2 lots.

It is expected that a new residence with its associated outbuildings and effluent disposal system will be capable of development within a specified Building Envelope on each lot after the subdivision process has been completed.

The subdivision of the subject land into 2 lots with onsite effluent disposal is supported by the Soil and Site Evaluation and Geotechnical Report contained in Appendix 2.

Long term

The long-term outlook is further residential subdivision, yielding approximately 19+ residential lots, including a Grouped Dwelling lot.

To achieve the lot yield in the long-term outlook, the R15 density code shall apply.

This long-term outlook is contingent upon the ability to connect to reticulated sewerage, which is unlikely to become available in the short or even medium term and hence triggered the need for a phased subdivision approach.

Development of the subject land in the short term can proceed as set out without impacts or reliance upon the adjoining properties, (such as necessity to create shared roads) noting that the provision of reticulated sewer is effectively contingent on broader Government funding and other development advancing first.

The Public Open Space contribution resulting from the long-term subdivision proposal is likely to be by way of a cash contribution.

3. Subdivision and development requirements

Residential

The subject land is zoned Urban Development under the Shire's Local Planning Scheme No 6 and in accordance with the strategic recommendations of the Shire of Collie Local Planning Strategy.

The initial stage of the Structure Plan will facilitate the subdivision of 2 lots and include the development of two dwellings and associated outbuildings with effluent disposal system, positioned within Building Envelopes as depicted on the Structure Plan.

With consent of the Responsible Authority, the Development Envelopes can be varied.

The Structure Plan provides an indicative final subdivision outcome of at least 18 lots, noting potentially more dwellings on the indicative lot identified as a Grouped Housing site.

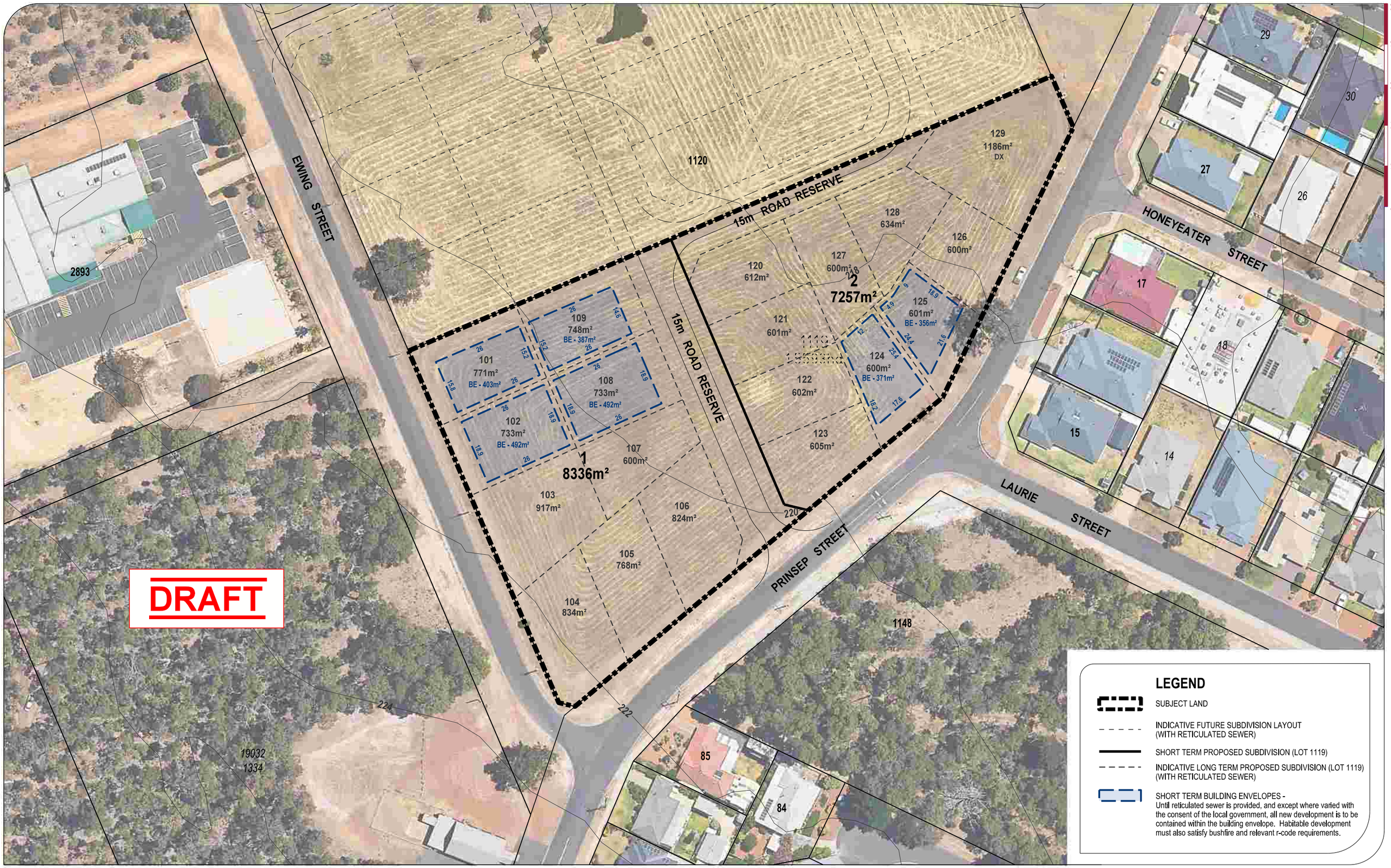
The subject land has road frontage and sufficient width to enable separate vehicular access to each lot from Prinsep Street North or Ewing Street.

Longer-term, the subdivision potential of both lots can generally accord with the residential density targets prescribed by the Shire of Collie Local Planning Strategy for land to the North of the Collie town centre as a range of lot sizes and housing options can be achieved.

4. Additional information

The following additional information is required at the subdivision and development stage:

1. Effluent disposal for the short term to satisfy the Government Sewerage policy, to the satisfaction of the Shire of Collie.
2. Any further subdivision beyond the short-term creation of 2 lots, is to be connected to a reticulated sewerage system.
3. Consider provision of public open space (or cash-in-lieu contribution) for any subdivision that occurs after the initial 2-lot subdivision.
4. As required for new habitable development, implement the Bushfire Management plan and ensure SPP3.7 is met.



LEGEND

- SUBJECT LAND
- INDICATIVE FUTURE SUBDIVISION LAYOUT (WITH RETICULATED SEWER)
- SHORT TERM PROPOSED SUBDIVISION (LOT 1119)
- INDICATIVE LONG TERM PROPOSED SUBDIVISION (LOT 1119) (WITH RETICULATED SEWER)
- SHORT TERM BUILDING ENVELOPES - Until reticulated sewer is provided, and except where varied with the consent of the local government, all new development is to be contained within the building envelope. Habitable development must also satisfy bushfire and relevant r-code requirements.

Planned Focus
Town planning & strategy
www.plannedfocus.com.au
Kanella Hope Pty Ltd
ACN: 630 552 466

STRUCTURE PLAN

Lot 1119 Prinsep Street North, Collie

Plan No: 1130-2-001

Date:	31.8.2025
Rev:	A
Scale:	A3 @ 1:1,000
Co-ords:	MGA 50, GDA 94
Aerial:	24/12/2022

N

This plan has been prepared for planning purposes. Areas, contours and dimensions shown are subject to survey.

PART 2 EXPLANATORY REPORT

1. Planning background

1.1 Introduction and purpose

Planned Focus has been engaged by the landowners, Marc and Richelle Pike to prepare a Structure Plan for Lot 1119 Prinsep Street North, Collie.

This Structure Plan provides the planning framework to guide and facilitate the development of this land for residential purposes and has been prepared in accordance with the provisions of the Shire of Collie Local Planning Scheme No. 6 and the strategic recommendations of the Shire of Collie Local Planning Strategy 2020.

1.2 Land Description

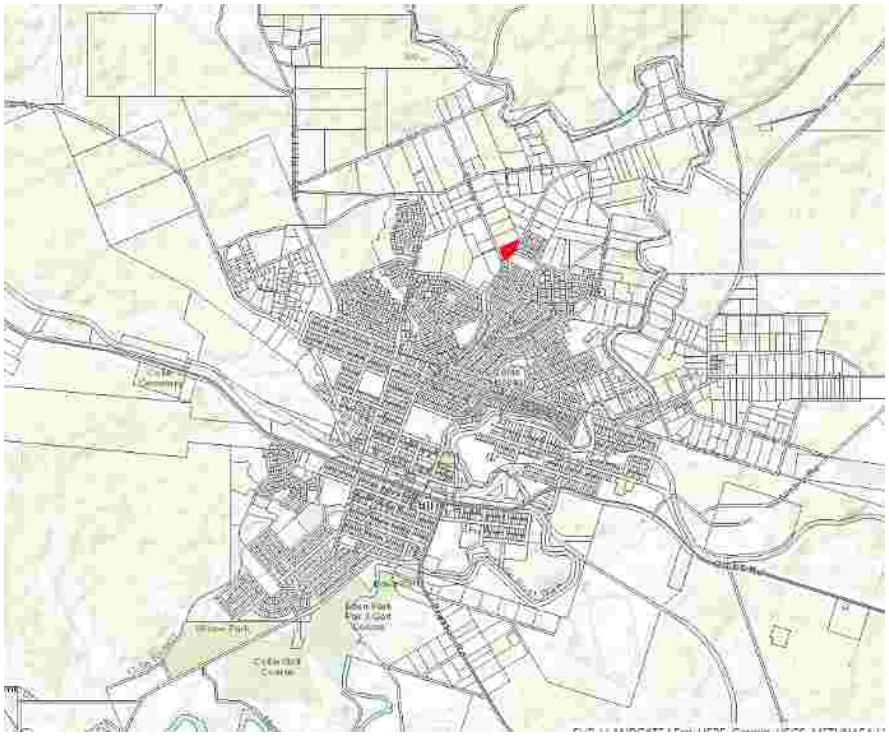
The subject land comprises approximately 1.5593 hectares. The Certificate of Title is provided at Appendix 1, noting there are no notifications listed.

1.2.1 Location

The subject land is located approximately 2.0 kilometres to the north-east of the Collie townsite. The subject land has a 224-metre frontage to Prinsep Street North and a 119-metre frontage to Ewing Street.

The surrounding area north contains Urban Development land of 0.5 hectare lots or greater, and beyond this, Rural Residential land. Land to the south includes residential R15 township development, open space and community purpose land.

Figure 2: Location Plan



Note, subject land identified in red

1.2.2 Area and Land Use

The subject land has historically been cleared for animal grazing and lifestyle purposes. The site is covered by pasture grass and does not contain dwelling, other structures or trees. The only vegetation of note is a tree that appears located within the Prinsep Street North Road reserve.

Access to the site can be obtained from both Prinsep North Street and Ewing Street.

The lot is serviced by a reticulated power and water supply however no reticulated wastewater is currently available. In the short term, an on-site wastewater system will be required for each lot.

2.Planning framework

2.1 Shire of Collie Local Planning Strategy

The Shire of Collie Local Planning Strategy was approved by the Western Australian Planning Commission (WAPC) in April 2020. The Strategy identifies the subject land as Urban Development with recognition of its inclusion within the North Collie Structure Plan.
The Strategy notes that the area was subdivided into mostly 1-hectare rural residential lots, resulting:

> *'…in rural residential land close to the town, which represents an under-utilisation of land which would be more appropriately used for denser residential subdivision (e.g., R15)'.*

Clause 6.2 of the Strategy includes the following planning implications for the subject land:

Land use constraints result in an urban growth front to the north of Collie.

Existing 'Residential Development' zone areas are to be used for Residential (i.e. R15) and not for low density residential or rural residential.

Clause 6.3 of the Strategy includes the following planning response:

> *Support the subdivision/development of land identified as urban development subject to proponent satisfying relevant zoning, structure planning, environmental, fire management and other planning considerations.*

Applicable actions identified by the Strategy are:

> *12. Unless specifically provided for in the Local Planning Strategy, all land identified as Urban shall be zoned and reserved under proposed Local Planning Scheme 6 consistent with its current zoning under existing Local Planning Scheme 5.*
>
> *15. Land zoned in the current Scheme as 'Residential Development' is to be zoned 'Urban Development' in accordance with the Planning and Development (Local Planning Schemes) Regulations 2015.*

This Structure Plan seeks to guide future subdivision and development of the subject land largely at a residential density of R15 in accordance with the strategic recommendations of the Shire of Collie Local Planning Strategy.

Although the initial stage of the Structure Plan is to facilitate the subdivision of the subject land into 2 lots, this will not impact on the future, intended use of the land for residential subdivision at a significantly greater residential density. The Building Envelopes are positioned to avoid future roads and align with a workable future lot layout.

2.2 Shire of Collie Local Planning Scheme No. 6

The subject land is presently zoned Urban Development by the Shire of Collie Local Planning Scheme No. 6. Refer Figure 3: Scheme extract plan

The objectives of the Urban Development zone are:

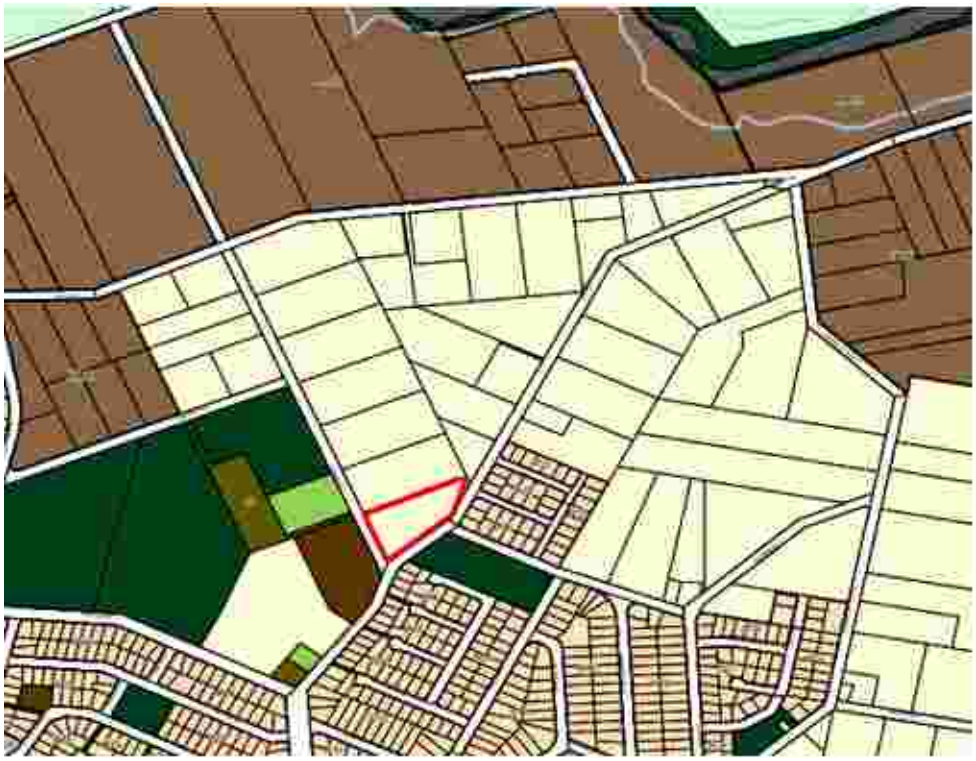
- *To provide an intention of future land use and a basis for more detailed structure planning in accordance with the provisions of this Scheme.*
- *To provide for a range of residential densities to encourage a variety of residential accommodation.*
- *To provide for the progressive and planned development of future urban areas for residential purposes and for commercial and other uses normally associated with residential development.*

Clause 33.7 of the Scheme includes the development and subdivision requirements for land within the Urban Development zone, requiring a structure plan to be prepared and approved in accordance with Part 4 of the Deemed Provisions.

Generally, these scheme provisions do not allow the approval of any substantial development or subdivision unless it is generally in accordance with a Structure Plan that has been prepared and approved pursuant to the Deemed Provisions of the *Planning and Development (Local Planning Schemes) Regulations* 2015.

Furthermore, residential development within the zone shall comply with the requirements of the Residential Design Codes as determined by the provisions of an approved Structure Plan.

Figure 3: Scheme extract plan



2.3 North Collie Structure Plan

The North Collie Structure Plan was endorsed by the WAPC in 2004. The subject land is included within the East section which is mostly unvegetated and provides for lot sizes in the vicinity of 1 hectare. Whilst some lots have been subdivided to the minimum of 1 hectare as indicated by the Structure Plan, it is noted that several are larger.

The subject land is identified within this for a 2-lot subdivision, but not for a more recent desired outcome of R15. This older Structure Plan indicates an equal split down the middle of the subject land, but this is not readily feasible in terms of a workable road and lot layout for a future R15 outcome.

The North Collie Structure Plan refers to future planning to address future road networks, infrastructure, and the provision of public open space, which this new Structure Plan speaks to. Furthermore, it states applications for subdivision within the structure plan area are to be accompanied by a Geotechnical Report demonstrating the capacity of the land to accommodate further development, which likewise, this Structure Plan has also addressed.

The North Collie Structure Plan has provided a framework for future detailed planning of the area for the last 19 years. However, with the endorsement of the more recent Shire of Collie Local Planning Strategy in 2020, the identification of land in this area north of the Collie town centre for future residential expansion at a density of R15 represents a significant shift and therefore the current Structure Plan over the subject land requires updating.

This Structure Plan demonstrates the capability of the site to accommodate 2 lots and associated infrastructure, including onsite effluent disposal in the short term, as well as protecting and demonstrating the potential in the long term for a higher density when reticulated sewer becomes available. The subject land has a street frontage to Prinsep Street North and Ewing Street which allows for the first stage of the Structure Plan to be developed using the existing road network.

From enquiries with the Shire of Collie, there is in principle support for this approach, largely given the absence of reticulated sewer and ability to demonstrate future development potential is not undermined. Were this area not already fragmented and was it not possible to be demonstrate this short-term development will preserve long term potential, the approach may be different.

Pursuit of this and other similar Structure Plans and subdivisions over individual lots does not prevent the Shire from still advancing a more global view of this area concerning future potential for fully serviced residential lots. Other land in vicinity has recently had the same approach applied with a single lot Structure Plan followed by short term subdivision approved by the WAPC.

In this regard, it is assumed:

- Subdivisions of 5 or more lots will attract either a land or cash contribution equivalent to 10%.
- For cash contributions, the WAPC and the Shire will determine where to expend this money to provide an adequate level of Public Open Space infrastructure suited to the Collie North community.
- There is existing public open space in vicinity of Collie North, including 2 large parks, as well as Public Purpose areas on Prinsep Street North (including immediately opposite the subject land), which may well be sufficient to service a future expanded population.
- The existing road reserve and road standard on Prinsep Street North and Ewing Street are ample to cater for an increase of 1 lot. They also appear sufficient to cater for an increase in traffic that may result from further subdivision in the future.
- Other utility servicing will be at the discretion of individual servicing authorities, with reticulated sewer discussed elsewhere in this report.

2.4 State Planning Policies

State Planning Policies that are applicable to the Structure Plan are:

State Planning Policy No. 3.0 – Urban Growth and Settlement

The Structure Plan addresses the objectives of SPP 3.0 through the application of the strategic recommendations of the Shire of Collie's Local Planning Strategy for this area.

Development of land for residential purposes within the northern extent of Collie will enable an existing community to be built upon and concentrate investment into the improvement of services and infrastructure, along with enhancing the quality of life within the community.

Development Control Policy 2.2 – Residential Subdivision

The Structure Plan has regard to DC 2.2, which provides general guidance to subdivision in Western Australia.

The subdivisions in both the short term and long-term subdivision proposals are logical creating new lots of regular shape and a workable road network, which also caters to different landowners advancing towards R15 at different points in time should they so choose.

Due to the extent of existing street frontages of the parent lot, both new lots in the short-term subdivision proposal have ample access to public streets.

With the potential for new street frontages as new roads are introduced into the greater area in the long term, each of the indicative future lots in the long-term subdivision plan can have direct access from a public street without the need for battle-axe access ways. The future plan also caters to a Grouped Dwelling lot and the overall indicative layout has some flexibility for various staged approaches should the sewer arrive.

Draft Liveable Neighbourhoods 2015 and Residential Design Codes (R-Codes)

The indicative future subdivision layout reflects present Liveable Neighbourhood and R-Code expectations for subdivision. Whilst this is predicated around retention of the 2 single houses that could be developed in the short term, the long-term subdivision proposal provides for a residential density slightly less than R15 with a minimum lot size of approximately 600m^2 and an average lot size of approximately 730m^2. This said, the layout does lend itself to increasing this density a little depending on the future landowner's aspirations at that time, within the road layout depicted.

State Planning Policy 3.7: Planning in Bushfire Prone Areas

Most of the site has been identified as being a Bushfire Prone Area 2. The only land that is not deemed to be at risk in the event of a bushfire is a portion of land along the site's northern and eastern boundaries.

This proposed structure plan is therefore supported by a Bushfire Management Plan. Although this plan was prepared in 2021 to support the initial site investigations, the circumstances on and near the site have remained unchanged.

The bushfire risk largely stems from abutting reserves which are public land managed as part of the Shire's open space as well as overarching Bush Fire Risk Management Plan and risk register for the Collie townsite.

It is considered reasonable that the principles of this plan and the earlier investigations remain current and valid for the purposes of this Structure Plan and forthcoming subdivision, but it is acknowledged that any subsequent development application will require an updated Bushfire Management plan ie when a single dwelling is constructed on each lot.

In any event, the Bushfire Management plan has concluded that development of the subject land can achieve BAL29 or lower, which meets expected obligations.

Figure 4: Bushfire Prone land

3 Site conditions and constraints

3.1 Environment

The subject land is predominately cleared and does not contain any existing trees.

The only tree near the site is along Prinsep Street North and this appears to be located within the road reserve. Its removal and the future long term lot layout should avoid impacts on this.

The site is not prone to flooding and is located approximately 1km from the Collie River.

3.2 Site and Soil Evaluation and Geotechnical Report

A Site and Soil Evaluation (SSE) and Geotechnical Report has been undertaken for the subject land.

The field work for the SSE was undertaken in August 2024 and confirms that the subject land can contain onsite wastewater disposal. The WAPC also recently approved a similar Structure Plan at 327 Prinsep Street North and 177 Booth Street, Collie North in similar circumstances.

The Geotechnical report also concluded that the site is capable of development subject to certain requirements at the time of development.

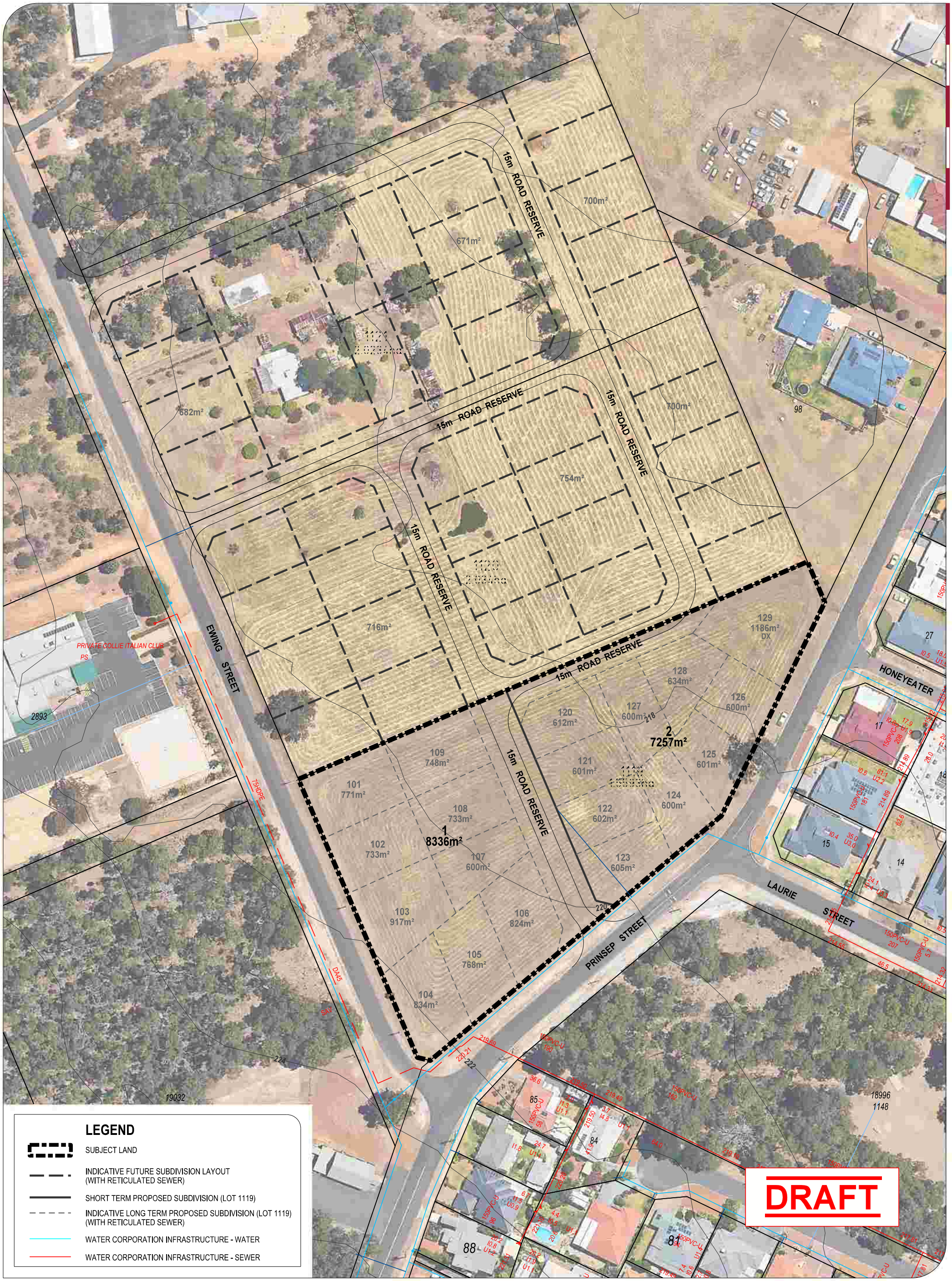
3.3 Impacts on adjoining lots

Figure 5 demonstrates an indicative future development layout for the subject land, and in context of abutting land to the north west.

The land immediately east, at 283 Prinsep Street North, is not considered impacted by this development. Its triangular shape lends to new lots fronting Prinsep Street North, or new road connections in hand with 280 Prinsep Street North, effectively disconnected to the subject land.

There is a logic of connectivity with Lot 1112 and 28 Ewing Street to the north west. The regular shape of these lots, and retaining the existing dwelling at 28 Ewing, up the vegetation at 38 Ewing, presents a logical, orderly and connected future R15 layout.

It will be up to these landowners, including vacant Lot 1112 to pursue their own subdivision or development outcome into the future. Intent of this plan is simply to demonstrate the proposal for the subject land does not disadvantage future R15 potential of abutting land and this is potential is planned for.



Planned Focus

Town planning & strategy

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INDICATIVE FUTURE DEVELOPMENT PLAN

Lot 1119 Prinsep Street North, Collie

Plan No: 1130-1-002

Date:	25.8.2025
Rev:	C
Scale:	A3 @ 1:1,250
Co-ords:	MGA 50, GDA 94
Aerial:	24/12/2022

N

This plan has been prepared for planning purposes. Areas, contours and dimensions shown are subject to survey.

3 Conclusion

The Collie North area is presently a low-density neighbourhood but it is recognised for future development at R15 density subject effectively to reticulated sewer becoming available. In the interim, a subdivision and development pattern is possible that does not negate this potential, where wastewater can be retained on site for single dwellings on larger lots.

This transition from low density development to R15 will result in some compromises around existing development pattern and current landowner aspiration, and a gradual shift north from the Collie town centre as evidenced at the former Drive-In site immediately opposite (Honeyeater, Wagtail and Kingfisher Drive), and further south, as the sewer is extended.

The sewer has a considerable distance to travel to the subject land. The catchment is falls within relies on a sewer downhill nearer to the river, and even if this were built, capacity is not expected to reach the subject land in the short to medium term.

Accordingly, this structure plan adopts a staged approach with a two-lot subdivision in the short to medium term and outlook towards R15 subdivision in the long term, should reticulated sewer becomes available.

This Structure Plan has been prepared within the context of the statutory and strategic planning framework relevant to Collie North.

Overall, noting the site's characteristics, the strategic recommendations of the Shire of Collie Local Planning Strategy, potential layout options, and the conclusions of the supporting Site and Soil Evaluation, Geotechnical report and Bushfire Management Plan, the subject land is considered suitable for the purpose and layouts proposed by the Structure Plan.

APPENDICES

No.	Document title	Approval required or supporting document	Approval agency	Approval status
1	Certificate of Title	Supporting		
2	WML Site and Soil Evaluation	Supporting		
3	Geotechnical Report	Supporting		
4	Collie North Structure Plan	Supporting		
5	Bushfire Management Plan	Supporting		

REFERENCES

Shire of Collie, (2021) Shire of Collie Local Planning Scheme No. 6. Department of Planning Lands and Heritage, Perth Western Australia.

Shire of Collie, (2020) Shire of Collie Local Planning Strategy. Department of Planning Lands and Heritage, Perth, Western Australia.

Shire of Collie (2004) North Collie Structure Plan, Planning South West, Busselton, Western Australia

APPENDIX 1: CERTIFICATE OF TITLE

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1659	**517**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 1119 ON DEPOSITED PLAN 222271

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

MARC WILLIAM PIKE
RICHELLE PIKE
BOTH OF 2 BUNBURY STREET COLLIE WA 6225
AS JOINT TENANTS

(T O594015) REGISTERED 22/12/2020

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. O594016 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA REGISTERED 22/12/2020.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

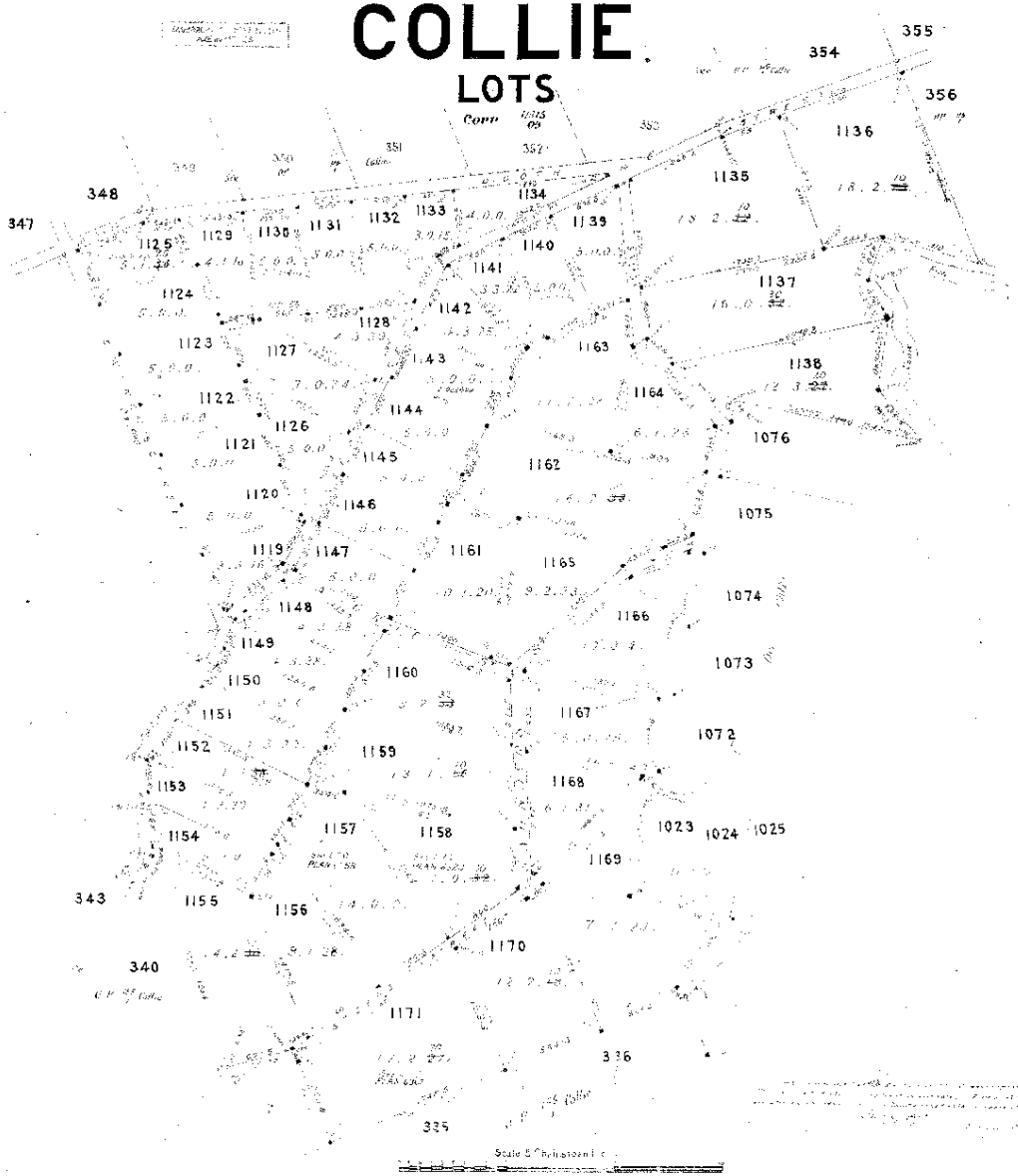
----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	1659-517 (1119/DP222271)
PREVIOUS TITLE:	852-193
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY:	SHIRE OF COLLIE

PLAN OF COLLIE LOTS



REPLACEMENT PLAN
This photograph is approved to replace D.P. COLLIE 155/14 which is damaged and has been withdrawn from use. This is now the official document relating to surveys shown hereon.
SURVEYOR GENERAL
9.7.86

DP 222271

COLLIE 155
14

COLLIE 155/14

APPENDIX 2: SITE & SOIL EVALUATION

Marc & Richelle Pike

1119 PRINSEP STREET NORTH, COLLIE

SITE-AND-SOIL-EVALUATION

October 2024
11589-G-R-002-0 SSE .docx

WML
Consulting Engineers

Document History and Status				
Revision	**Prepared By**	**Reviewed By**	**Purpose of Issue**	**Date**
A	A Hollier	A Gorczynska	Internal Draft	22/10/2024
0	A Hollier	A Gorczynska	Final V0 - Issue to client	23/10/2024

Issued to:	Marc & Richelle Pike
WML Project Number:	11589
Document Name:	11589-G-R-002-0 SSE .docx

WML Consultants Pty Ltd

Angus Hollier
Senior Geotechnical Engineer
Author

Aleksandra Gorczynska
Senior Geotechnical Engineer
Reviewer

For and on behalf of WML Consultants Pty Ltd

CONTENTS

TABLES

FIGURES

NO TABLE OF FIGURES ENTRIES FOUND.

APPENDICES

1 INTRODUCTION

Planned Focus engaged WML Consultants (WML) on behalf of their Client, Marc and Richelle Pike (Client) to undertake a geotechnical investigation and Site-and-Soil Evaluation (SSE) to support the proposed residential subdivision of 1119 Prinsep Street North, Collie, Western Australia (the Site). It is understood that the client intends to subdivide the existing site into up to three individual lots for a single dwelling on each.

The geotechnical report has been prepared as a separate document with the document reference 11589-G-R-001.

This report presents the results of the geotechnical investigation, laboratory testing, and provides a site-and-soil evaluation for the residential development of the Site in accordance with Government Sewerage Policy 2019 (GSP19) and the Australian Standard, AS1547:2012 "*On-site domestic wastewater management*".

1.1 Site description

The proposed subdivision is located at 1119 Prinsep Street North, Collie, Western Australia, approximately 47 km east of Bunbury City Centre. The Site covers an area of approximately 1.55 ha, and at the time of planning the field investigation, no detailed concept plan was available for the proposed lots. However, it is understood that the minimum Lot size will be 5,000 m^2.

Google Earth indicates that the elevation of the site ranges from 217 m AHD in the East and a 222 m AHD in the West, which provides an approximate slope gradient of 2-3% with an eastern aspect. The surface is covered by pasture grass, and historical imagery does not indicate any other historical land use.

A desktop review has been undertaken using the Department of Primary Industries and Regional Development (DPIRD) mapping service, 'Natural Resource Information (NRI)' which indicates that the Site is located within the Darling Plateau System locally consisting of the Dwellingup Ironstone Gravel phase including laterite sandy gravels and loamy gravels.

2 SITE ASSESSMENT

A desktop study of published and available information was undertaken to identify the site's key features in relation to the effective management of effluent at the site. The results of the study are summarised below:

- The site is not located within a sewerage-sensitive area in accordance with GSP19.
- The closest watercourse is the Collie River, which is approximately 1km to the east and north.
- The site is not located within a public drinking water source area or within 100 m of a public drinking water source area. The closest public drinking water source area is the Harris River Dam Catchment Area (P1) which is located approximately 10 km to the North.
- The site is not within 1 in 100 year or 1% Annual Exceedance Probability (AEP) Floodplain Area based on the available DWER published mapping.

Feature	Description	Level of Constraint	Mitigation Measures
Climate	Average annual rainfall 925.7 mm (BOM Collie Climate Station No 009628). Estimated average annual pan evaporation 1500 mm (BOM pan evaporation maps)	Low	Not Needed (NN)
Landform	The Site is located within Darling Range Plateau which consists of low valleys underlain by lateritic sandy gravels and gravelly sands.	Low	NN
Slope gradient	The Site has an approximate 2-3% slope.	Low	NN
Exposure & Aspect	The Site has an eastern aspect with no trees within the Lot boundary or along the perimeter.	Low	NN
Rock Outcrops	No rock outcrops were observed during the site investigation.	Nil	NN
Drainage	No surface water or visible signs of dampness were observed during the August 2024 site investigation. The site investigation indicated that the top 1.4 m are Lateritic Gravels with a moderate drainage potential	Low	NN
Watercourses	The closest watercourse is the Collie River approximately 1km to the north and east.	Low	NN
Surface waters	No surface water was noted during the site investigation on-site or within 100 m of the Site.	Low	NN
Erosion & Landslip	No erosion or landslip was noted during the site investigation.	Low	NN
Flooding	The subdivision is not within a Department of Water 1% AEP floodplain area.	Low	NN

Feature	Description	Level of Constraint	Mitigation Measures
Groundwater	The WML site investigation undertaken in August 2024 encountered groundwater at approximately 1.8 m below ground level.	Low	NN
Run-on & Runoff	Due to the moderate drainage potential of the near surface soils, minimal surface water run-on or run-off are expected.	Low	NN

3 SOIL ASSESSMENT

3.1 Fieldwork

Fieldwork was carried out on the 5th of August 2024 and comprised:

- Drilling of three (3) machine-augered boreholes (BH), designated BH1 to BH3, to a depth of 2.65 m below ground level (mBGL).
- Dynamic cone penetrometer (DCP) tests to a maximum depth of 2.10 mBGL adjacent to each borehole.
- One (1) in-situ permeability test was undertaken adjacent BH3 utlising a Talsma-Hallam permeameter.
- The collection of soil samples from boreholes for laboratory testing.

The site investigation was undertaken in general accordance with Australian Standard AS 1726:2017' *Geotechnical Site Investigations*'. Qualified geotechnical engineers from WML completed the fieldwork, logged the materials encountered in the boreholes, conducted in-situ testing, collected soil samples, and took record photographs. All boreholes were backfilled as close to the original conditions as possible. The approximate test locations are presented on the site map, 11589-G-D-001, and the soil logs are presented in Appendix A.

3.2 Encountered sub-surface profile

Generally, the subsurface conditions of the site can be described as thin topsoil over a 1.4 m thick layer of lateritic Clayey GRAVELS overlying a medium to high plasticity CLAY. The CLAY's are likely the top of the extremely weathered granite and the composition and stiffness of the layer may be variable across the site.

The soils encountered within each borehole indicated that the ground profile is typically consistent across the site and with the geological mapping of the area, therefore a generalised ground profile has been developed and presented in Table 1 below.

Table 1: Sub-surface soil profile

Soil/rock layer	Depth (mBGL)	Description
Topsoil	0.00 – 0.20	**(SM) Sandy SILT**: low plasticity, fine to medium grained sand, with fine to medium sized gravel, dark brown, soft to firm, dry.
Gravel	0.20 – 1.40	**(GC) Clayey GRAVEL**: fine to medium sized, subrounded to subangular, clay is medium to high plasticity, with fine to medium grained sand content varying at depths across the site, dark brown tending pale brown then red brown, medium dense to very dense, dry.
Clay	1.40 – 2.65	**(CI – CH) CLAY**: medium to high plasticity, orange-red brown slightly grey, dry to wet, stiff to hard. Possibly extremely weathered rock (XW)

3.3 Groundwater

Groundwater was observed at 1.8 mBGL within BH3 during the August 2024 investigation. No groundwater was encountered within BH1 or BH2.

Since the CLAY encountered between 1.2 m and 1.6 m below the surface will practically be impermeable, it can be expected that a perched groundwater may be experienced above the clay layer during periods of wet weather (winter months/wet season) or following heavy rainfall, and it should be a consideration for the proposed development.

3.4 Laboratory Testing

Laboratory testing was carried out by NATA-accredited laboratories Western Geotechnics (WGLS) to assist in evaluating geotechnical and geo-environmental soil parameters. The testing comprised the following:

- Particle size distribution on three (1) samples (AS 1289 3.6.1)
- Atterberg limits and linear shrinkage on two (1) samples (AS 1289 3.1.2, 3.2.1, 3.3.1, 3.4.1)

The testing results are summarised in Table 2 below, and the laboratory test certificates are presented in Appendix B.

Table 2: Summary of soil classification testing

Location ID	Depth (m)	PSD			Atterberg Limits's				[1)]Soil Classification (USCS)
		Fines (%)	Sand (%)	Gravel (%)	LL (%)	PL (%)	PI (%)	LS (%)	
BH1	0.5 – 1.0	11	15	74	25	15	10	5.5	**GP, GRVEL**

Notes:

Terminology - PSD = Particle Size Distribution; LL = Liquid Limit; PL = Plastic Limit; PI = Plasticity Index; LS = Linear Shrinkage;

[1)]Soil classifications based on the classification of fine and coarse-grained soils presented in Table 9 and Table 10 of AS1726:2017

3.5 Soil physical characteristics

Based on the sub-surface soil profile presented in Table 1, an assessment of the soils' suitability and capability to manage effluent has been undertaken in accordance with AS/NZS 1547. The assessment is summarised in Table 3 below.

Table 3: Physical soil characteristics

Feature	Assessment	Level of Constraint	Mitigation Measures
Phosphorous retentive ability	Based on the lateritic clayey GRAVELS encountered near the surface, it is expected that due to the iron oxide and clay content that the GRAVELs and the underlying CLAYs will have suitable nutrient retentive capability.	Low	Not needed (NN) The near surface soils have good nutrient-stripping properties.
Dispersive soils	The subsoils should be considered to have a low risk of dispersion	Low	NN
Rock Fragments	No rock fragments or outcrops were observed within the Site boundary.	Nil	NN
Soil depth	Topsoil ~ 0.2 m (with fine roots) Subsoil, GRAVELs: 0.2 – 1.4 m CLAYs (XW rock): 1.4 m+	Low	NN

Feature	Assessment	Level of Constraint	Mitigation Measures
Soil Category	GRAVELs: Category 2, weakly structured CLAY; Category 5	Low	NN
Soil Permeability	Saturated hydraulic conductivity for the GRAVELs was measured using a Talsma-Hallam permeameter. GRAVELs; k_{sat} = 1.0 m/day	Low	NN

NN = Not Needed
**Typical soil category based on soil texture and structure in accordance with AS/NZS 1547 Table 5.1*

4 RECOMMENDATIONS

The following sections provide an overview of the recommended on-site wastewater management system, relevant setback distances, and operation and monitoring recommendations.

The design and installation of the effluent management system should be carried out by a suitably qualified, licensed plumber or drainer experienced with on-site wastewater disposal systems, and an irrigation expert familiar with effluent irrigation equipment shall provide further design advice if required. The irrigation plan must ensure the even application of effluent throughout the entire application area.

4.1 Wastewater management system

Based on the results of the SSE investigation, the site can be considered capable of managing domestically generated effluent with a Primary or Secondary treatment system. It is recommended to utilise a sub-surface application system (irrigation or trenches and beds), however the final selection of the system should be made by the client from the list of Department of Health approved systems.

Defining site constraints:

- The site typically consists of Category 3 clayey GRAVELs, underlain by relatively impermeable clay at approximately 1.4 m below the natural surface.
- The GRAVELs have a permeability of 1.0 m/day.
- Groundwater was encountered at 1.8 m below ground level in August 2024.

Wastewater management system recommendations:

- The location for the Land Application Area (LAA) should meet the setback distances provided in Table 4.
- The installation of a sub-surface irrigation system is preferred, however if a trenches or beds application system is utilised the designer should consider incorporating a larger LAA and lower design loading rates.
- If fill material is required for the installation of the selected application system, this material should be imported and be defined as a Category 2 loamy SAND (SAND with a clay content between 10-20%) and achieve a minimum PRI of 20.
- Section 2 of Schedule 2 of the GSP 2019 has been used to determine the recommended size of the land application area. A generated wastewater load has been assumed based on connection to reticulated water and a maximum 6-person occupancy per dwelling, providing a maximum loading rate of 900 L/day, therefore if:
    - A Primary Treatment System is installed, the recommended LAA size is 340 m^2
    - A Secondary Treatment System is installed, the recommended LAA size is 180 m^2

4.2 Setback distances

Setback buffer distances from effluent land application areas and treatment systems are required to help prevent human contact, maintain public amenities, and protect sensitive environments. The following recommendations have been made in general accordance with GSP19 and AS/NZS 1547:2012. The recommended minimum setback distances have been provided for a Primary and Secondary treatment system based on a sub-surface application system disposing through Category 2 soil.

Table 4: Relevant setback distances in accordance with GSP19 and AS / NZS 1547:2012

Feature	Setback Distances	
	Primary treatment system	Secondary treatment system
Private bore for household/drinking water purposes	30 m	30 m
A drainage system that discharges directly into a waterway or wetland without treatment	100 m	100 m
Waterway/watercourse (measured from the edge of the wetland vegetation)	100 m	100 m
Vertical distance to peak groundwater levels[1)]	1.2 m	1.0 m
Vertical distance Hard pan or bedrock	1.2 m	0.8 m
Property boundary	20 m	2 m
Buildings/houses	4 m	2.0 m
Surface water	30 m	20.0 m
Recreational areas (children's play areas, swimming pools and so on)	8 m	4.0 m
In-ground water tank	9 m	5.0 m
Retaining wall and embankments, escarpments, cuttings	3 m or 45° angle from the toe of the wall (whichever is greatest)	

[1)] *Measured from the lowest discharge point of the application system.*

4.3 Monitoring, operation and maintenance

Maintenance is to be carried out in accordance with the DOH Approval of the selected primary or secondary treatment system and manufacturers' recommendations. The treatment system will only function adequately if appropriately and regularly maintained.

To ensure the treatment system functions adequately, residents must:

- Have a suitably qualified maintenance service technician for the primary or secondary treatment system at the frequency required by the manufacturer under the local government permit to use.
- Use household cleaning products that are suitable for septic tanks or STS's.
- Keep as much fat and oil out of the system as possible, and
- Conserve water (AAA-rated fixtures and appliances are recommended).

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

- Regularly harvest/mow vegetation within the application area to maximise the uptake of nutrients.
- Monitor and maintain the application system following the manufacturer's recommendations, including flushing the drainage lines, and
- Regularly clean in-line filters.

5 CLOSURE

We trust that the information provided within this report satisfies your present requirements and meets with your approval. Should you have any queries, please do not hesitate to contact the author of this report.

We draw your attention to the attached "*Report Limitations*" included with this report. This information sheet is intended to provide additional information about this report and information included within it. This information is provided not to reduce the level of responsibility accepted by WML but to ensure that all parties that rely on this report, and the information contained herein, are aware of the responsibilities that each assumes in so doing.

6 REFERENCES

1. Bureau of Meteorology (BoM), Climate Data Online, 'Monthly rainfall for Collie WA Monitoring station 009628', (Accessed October 2024), http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=136&p_display_type=dailyDataFile&p_startYear=&p_c=&p_stn_num=009628
2. Government of Western Australia (2019) 'Government Sewerage Policy'
3. Standard Australia / Standards New Zealand. 2012. '*On-site domestic-wastewater management.*' AS/NZS 1547:2012. SAI Global.
4. Standards Australia. 2017. *Geotechnical Site Investigations*. AS 1726:2017. SAI Global.

LIMITATIONS

REPORT LIMITATIONS

This geotechnical report is provided for the sole use by the Client. This report must not be applied for any other purpose or project except the one originally contemplated without written authorisation from WML. WML accepts no responsibility for the use of this report / document, in whole or in part, in other contexts or for any other purpose.

WML have undertaken investigations, performed consulting services, and prepared this report based on the Client's specific requirements, documents and information supplied, and previous experience. If changes occur in the nature or design of the project, however minor, it is recommended WML review this report to assess their impacts and provide additional recommendations, if any. WML does not assume any responsibility or liability for problems that arise due to developments on site of which we were not informed.

This report utilises data and information provided by third parties, including, but not limited to sub-consultants, published data, and the Client. This information has been assumed to be correct unless otherwise stated. WML assumes no responsibility for assessments made partly or entirely based on information provided by third parties or for the adequacy, incompleteness, inaccuracies, or reliability of any data provided by third parties.

It is the responsibility of the Client to transmit the information, recommendations, and limitations of this report to the appropriate organisations or people involved in design of the project, including, but not limited to developers, builders, owners, buyers, architects, engineers, and designers.

WML's opinions are based on upon information that existed at the time of the production of this report and ground conditions encountered at the time the site study was performed. This geotechnical report should not be relied upon if its adequacy has been affected by: the passage of time, by man-made events, such as construction on or adjacent to the site, or by natural events, such as floods, earthquakes, or groundwater fluctuations. In the event of the above changes, WML should be contacted to determine if this report is still reliable or whether additional testing is required.

The subsurface conditions identified within this report are based only upon investigation locations where subsurface tests have been conducted and / or samples obtained, which are explicitly representative of the specific sample or test location. Interpretation of conditions between such points cannot be assumed to represent actual subsurface information and unknowns or variations in ground conditions between test locations that cannot be inferred or predicted. Actual subsurface conditions may differ significantly from those indicated in this report. Specific warning is also given that many factors, either natural or artificial, may render ground conditions different from those which pertained at the time of the investigation. WML does not accept any responsibility for any variance in the ground conditions that may exist across the site. If unexpected subsurface conditions are encountered, WML shall be notified immediately to review those conditions and provide additional and/or modified recommendations, as necessary.

This geotechnical assessment is based upon judgment of the investigation data, visual observations of the site and materials encountered, along with the proposed land use and project specifications. The findings and recommendations presented within this report represent professional opinions and estimates and should not be taken as fact unless explicitally stated. In general, statements of fact are are limited to what was done and / or what was observed on site.

The recommendations provided in this report are preliminary only; final recommendations can only be given after observing the actual subsurface conditions revealed during construction. WML does not assume responsibility or liability for the recommendations in this report if construction observation has not been performed by a WML geotechnical engineer.

Our services did not include any contamination or environmental assessment of the site or adjacent sites. The equipment and techniques used to perform a geoenvironmental study differ from those used to perform a geotechnical investigation. If you require any geoenvironmental information for your project, WML can advise on further steps to be undertaken.

WML have performed our professional services in accordance with generally accepted geotechnical engineering principles and practices currently employed in the area; no warranty, expressed or implied, is made as to the professional advice included in this report.

DRAWINGS

SCALE

NOTE: *INDICATES SIGNATURES ON ORIGINAL ISSUE OF DRAWING OR LAST REVISION OF DRAWING.

A4

REVISIONS				
N°.	DESCRIPTION	APPROVED	DATE	DRAWN

WML Consulting Engineers

CLIENT
Marc & Richelle Pike

PROJECT
1119 Prinsep Street, North Collie, WA

DRAWING TITLE
Site map

DRAWING NUMBER
11589-G-D-001

APPROVED Jierong Liang

DATE 11/08/24

APPENDIX A

LOGS AND PHOTOGRAPHS

REPORT OF BOREHOLE: BH1

Job No	: 11589	Latitude	: -33.342171	Sheet	: 1 OF 1
Client	: Marc & Richelle Pike	Longitude	: 116.161635	Logged	: Jierong Liang
Project	: 1119 Prinsep St, North Collie	UTM	: 50H	Logged Date	: 05/08/2024
Location	: 1119 Prinsep St N, Collie WA, Australia	Drill Rig	: Drillman GT10	Checked	: Angus Hollier
Contractor	:	Inclination	:	Checked Date	: 11/08/2024

METHOD	WATER	DEPTH (m)	GRAPHIC LOG	USCS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY/ DENSITY	IN-SITU TESTING SV (kPa)	SAMPLE
	Not encountered	0.3		ML	Gravelly sandy SILT ML: low plasticity, fine to medium sized gravel, fine to medium grained sand, trace medium plasticity clay, trace roots up to 50 mm, dark brown, soft to firm, dry.	D	S-F		
		1		GC	Clayey GRAVEL GC: fine to medium sized, sub-rounded to sub-angular, medium to high plasticity clay, with fine to medium grained sand, red brown slightly mottle orange, very dense, dry.	D	VD		D: 0.5-1 m:
		1.6		CI-CH	CLAY CI-CH: medium to high plasticity, trace fine to medium sized gravel, orange slightly mottled red brown, very stiff to hard, dry.	D	VSt-H		
		2			**BH1 Terminated at 2.65m (Target depth)**				

PSP TEST
0 5 10 15 20 25 30 35 40

DCP TEST
0 5 10 15 20 25 30 35 40

REPORT OF BOREHOLE: BH2

Job No	: 11589	Latitude	: -33.341693	Sheet	: 1 OF 1
Client	: Marc & Richelle Pike	Longitude	: 116.162160	Logged	: Jierong Liang
Project	: 1119 Prinsep St, North Collie	UTM	: 50H	Logged Date	: 05/08/2024
Location	: 1119 Prinsep St N, Collie WA, Australia	Drill Rig	: Drillman GT10	Checked	: Angus Hollier
Contractor	:	Inclination	:	Checked Date	: 11/08/2024

METHOD	WATER	DEPTH (m)	GRAPHIC LOG	USCS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY/ DENSITY	IN-SITU TESTING SV (kPa)	SAMPLE
	Not encountered	0.2		SM	Sandy SILT SM: low plasticity, fine to medium grained sand, with fine to medium sized gravel, trace roots up to 50 mm, dark brown, soft to firm, dry.	D	S-F		
		0.6		GC	Clayey GRAVEL GC: fine to medium sized, sub-rounded to sub-angular, medium to high plasticity clay, with fine to medium grained sand, dark brown tending pale brown, medium dense to dense, dry.	D	MD-D		
		1		GC	Clayey GRAVEL GC: fine to medium sized, sub-rounded to sub-angular, medium to high plasticity clay, trace fine to medium grained sand, red brown slightly mottled orange, dense to very dense, dry.	D	D-VD		
		1.2		CI-CH	CLAY CI-CH: medium to high plasticity, trace fine to medium sized gravel, trace fine to medium grained sand, orange slightly mottled grey, very stiff to hard, dry.	D	VSt-H		
		1.8		CI-CH	CLAY CI-CH: medium to high plasticity, red brown mottled grey, very stiff to hard, dry.	D	VSt-H		
		2			**BH2 Terminated at 2.65m (Target depth)**				

PSP TEST
0 5 10 15 20 25 30 35 40

DCP TEST
0 5 10 15 20 25 30 35 40

REPORT OF BOREHOLE: BH3

Job No	: 11589	Latitude	: -33.341278	Sheet	: 1 OF 1
Client	: Marc & Richelle Pike	Longitude	: 116.162804	Logged	: Jierong Liang
Project	: 1119 Prinsep St, North Collie	UTM	: 50H	Logged Date	: 05/08/2024
Location	: 1119 Prinsep St N, Collie WA, Australia	Drill Rig	: Drillman GT10	Checked	: Angus Hollier
Contractor	:	Inclination	:	Checked Date	: 11/08/2024

METHOD	WATER	DEPTH (m)	GRAPHIC LOG	USCS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY/ DENSITY	IN-SITU TESTING SV (kPa)	SAMPLE
		0.2		SM	Sandy SILT SM: low plasticity, fine to medium grained sand, with fine to medium sized gravel, dark brown, soft to firm, dry.	D	S-F		
		0.5		GC	Clayey GRAVEL GC: fine to medium sized, sub-rounded to sub-angular, medium plasticity clay, trace fine to medium grained sand, dark brown tending pale brown, medium dense to dense, dry.	D	MD-D		
		1		GC	Clayey GRAVEL GC: fine to medium sized, sub-rounded to sub-angular, medium to high plasticity clay, red brown, dense to very dense, dry.	D	D-VD		
		1.4		CI-CH	CLAY CI-CH: medium to high plasticity, trace fine to medium grained sand, red brown, stiff, dry.	D	St		
	▽	1.6		CI-CH	CLAY CI-CH: medium to high plasticity, pale yellow, organic, dry tending to wet, stiff.	W	St		
		2		CI-CH	CLAY CI-CH: medium to high plasticity, red brown, stiff, wet.	W	St		
					BH3 Terminated at 2.65m (Target depth)				

PSP TEST

0 5 10 15 20 25 30 35 40

DCP TEST

0 5 10 15 20 25 30 35 40

PHOTOGRAPHIC RECORD

Client:	Marc & Richelle Pike
Job Number:	11589
Job Description:	1119 Prinsep Street North, Collie
Date:	05/08/2024

Figure 1: Photograph from BH1 facing east.

Figure 2: Photograph from BH1 facing north west.

APPENDIX B

LABORATORY TESTING

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

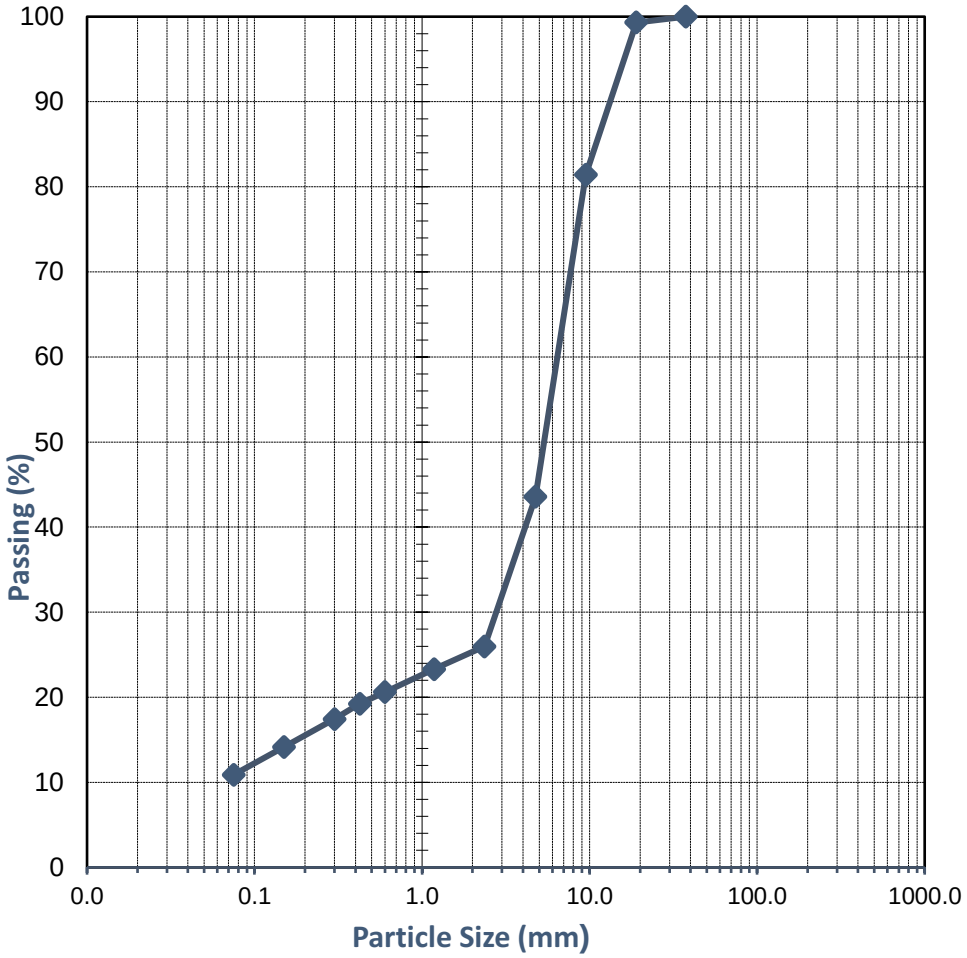
TEST REPORT - AS 1289.3.6.1

Client:	WML Consultants	*Ticket No.*	S14109
Client Address:	Level 2/91 Havelock Street, West Perth WA 6005	*Report No.*	WG24.12465_1_PSD
Project:	1119 Prinsep Street, North Collie	*Sample No.*	WG24.12465
Location:	1119 Prinsep Street, North Collie	*Date Sampled:*	5/08/2024
Sample Identification:	BH1 Red Brown Gravel	*Date Tested:*	13/08 - 14/08/2024

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	100
19.0	99
9.5	81
4.75	44
2.36	26
1.18	23
0.600	21
0.425	19
0.300	17
0.150	14
0.075	11



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 15/August/2024

Accreditation No. 20599
Accredited for compliance with ISO/IEC 17025 - Testing

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	WML Consultants	*Ticket No.*	S14109
Client Address:	Level 2/91 Havelock Street, West Perth WA 6005	*Report No.*	WG24.12465_1_PI
Project:	1119 Prinsep Street, North Collie	*Sample No.*	WG24.12465
Location:	1119 Prinsep Street, North Collie	*Date Sampled:*	5/08/2024
Sample Identification:	BH1 Red Brown Gravel	*Date Tested:*	14/08/2024

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50^{o}C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**25**
AS 1289.3.2.1	**Plastic Limit (%)**	**15**
AS 1289.3.3.1	**Plasticity Index (%)**	**10**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**5.5**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Linda Chiu

Date: 15/August/2024

NATA

Accreditation No. 20599

Accredited for compliance with ISO/IEC 17025 - Testing

APPENDIX 3: GEOTECHNICAL REPORT

Marc & Richelle Pike

1119 PRINSEP STREET, NORTH COLLIE

GEOTECHNICAL REPORT

October 2024
11589-G-R-001-0.docx

WML
Consulting Engineers

Document History and Status				
Revision	**Prepared By**	**Reviewed By**	**Purpose of Issue**	**Date**
A	J. Liang	A. Hollier	Internal draft for review	11/08/2024
B	A. Hollier	A. Gorczynska	Internal draft for review	22/10/2024
0	A. Hollier	A. Gorczynska	Final V0 - Issue to Client	23/10/2024

Issued to:	Marc & Richelle Pike
WML Project Number:	11589
Document Name:	11589-G-R-001-0.docx

WML Consultants Pty Ltd

Angus Hollier
Senior Geotechnical Engineer
Author

Aleksandra Gorczynska
Senior Geotechnical Engineer
Reviewer

For and on behalf of WML Consultants Pty Ltd

CONTENTS

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

WML Consultants Pty Ltd (WML) was engaged by Marc and Richelle Pike (the Client) to undertake a geotechnical investigation for the proposed residential subdivision on 1119 Prinsep Street, North Collie, WA. This report presents the results of the geotechnical investigation and provides recommendations for site suitability, a preliminary bearing capacity and settlement assessment, and site preparation. Based on the client-supplied information, it is understood that the site is proposed to be subdivided into 2 or 3 residential lots, each of which is to be developed for a single dwelling.

The report and information presented herein must be read in conjunction with the attached *"Report Limitations"*.

1.1 Site description

The site is located at 1119 Prinsep Street North, in Collie, approximately 47 km east of the Bunbury CBD, Western Australia. At the time of the investigation fieldwork the site was a vacant lot covered by relatively dense low-height grass. . The historical aerial imagery and current condition of the lot indicate that it may have been used for agricultural purposes however, it has remained undeveloped since 1983. The available topographical information indicates that the lot slopes gently towards the east with an elevation ranging from 217 mAHD to 222 mAHD.

1.2 Objectives of this report

The objectives of the detailed geotechnical investigation were to:

- Assess the sub-surface soil conditions across the site.
- Provide a preliminary site classification in accordance with AS 2870.
- Undertake a preliminary bearing capacity and settlement analysis for typical shallow foundations.
- Provide site preparation and remediation recommendations.
- Provide geotechnical advice that could affect the design.

2 FIELD PROGRAMME

2.1 Fieldwork

Fieldwork was carried out on the 5th of August 2024 and comprised:

- Drilling of three (3) machine-augered boreholes (BH), designated BH1 to BH3, to a depth of 2.65 m below ground level (mBGL).
- Dynamic cone penetrometer (DCP) tests to a maximum depth of 2.10 mBGL adjacent to each borehole.
- The collection of soil samples from boreholes for laboratory testing.

The site investigation was undertaken in general accordance with Australian Standard AS 1726:2017' *Geotechnical Site Investigations*'. Qualified geotechnical engineers from WML completed the fieldwork, logged the materials encountered in the boreholes, conducted in-situ testing, collected soil samples, and took record photographs. All boreholes were backfilled as close to the original conditions as possible. The approximate test locations are presented on the site map, 11589-G-D-001, and the soil logs are presented in Appendix A.

Each location for intrusive ground investigation was checked for underground services against Dial-Before-You-Dig plans before any excavation works were conducted. The borehole locations were cleared using a Vivax MetroTech vScan locator before any intrusive investigation.

Table 1: Summary of fieldwork

Location ID	Equipment	Coordinates		Surface elevation (RL m AHD)	Termination Depth (m)	Date Completed
		Latitude	Longitude			
BH1	Solid flight auger	-33.342171	116.161635	221	2.65	05/08/2024
BH2		-33.341693	116.162160	220		
BH3		-33.341278	116.162804	218		

2.2 Dynamic cone penetrometer (DCP) testing

The Dynamic cone penetrometer (DCP) tests were completed in general accordance with AS 1289.6.3.2 *"Determination of Penetration Resistance of a Soil – Dynamic Cone Penetrometer Test"*. The DCPs were undertaken adjacent to each borehole location. The results are included on the borehole logs provided in Appendix A, and a summary of the results is presented in Table 2 below.

The DCP undertaken adjacent to BH2 was terminated at 1.35 mBGL due to no penetration at a high blow count, indicating that the clay encountered at 1.35 mBGL is in a hard state. However, the DCP's undertaken adjacent to BH1 and BH3 indicate that the encountered clay is stiff and the clayey gravel is in a very dense state.

Table 2: Summary of DCP tests

Start Depth (mBGL)	End Depth (mBGL)	BH1	BH2	BH3
0.00	0.15	3	1	2
0.15	0.30	4	5	3
0.30	0.45	8	4	2
0.45	0.60	20	5	9
0.60	0.75	22	16	24
0.75	0.90	55	20	31
0.90	1.05	50	26	44
1.05	1.20	25	37	40
1.20	1.35	15	50R	24
1.35	1.50	12	-	9
1.50	1.65	25	-	13
1.65	1.80	45	-	13
1.80	1.95	46	-	17
1.95	2.10	50	-	15

2.3 In-situ permeability test

One (1) in-situ permeability test was carried out at BH3 using the constant head Talsma-Hallam method per AS/NZS 1547:2012. A borehole of 90 mm in diameter was excavated to a depth of 0.9 mBGL and filled with water to saturate the surrounding soil. A constant head of water was applied within the borehole, and a known volume of water was timed to dissipate.

A summary of the test result is presented below in Table 3 which indicates that the clayey GRAVEL encountered on site has relatively moderate permeability.

Table 3: In-situ permeability test results

Location ID	Test Depth (mm BGL)	Test Material	In-situ Permeability Test	
			m/s	m/day
BH3	250 – 460	(GC) Clayey GRAVEL	1.29E-05	1.12

3 LABORATORY TESTING

To assist in the evaluation of geotechnical design parameters and for confirmation of the visual classification of the soils, laboratory testing was carried out by the NATA-accredited laboratory Western Geotechnics (WGLS). The testing comprised the following:

- Particle size distribution on one (1) sample (AS 1289 3.6.1)
- Atterberg limits and linear shrinkage on one (1) sample (AS 1289 3.1.2, 3.2.1, 3.3.1, 3.4.1)

The results of the testing are presented in the table below, and the laboratory test certificates are presented in Appendix B.

Table 4: Summary of soil classification testing

Location ID	Depth (m)	PSD			Atterberg Limits's				[1]Soil Classification (USCS)
		Fines (%)	Sand (%)	Gravel (%)	LL (%)	PL (%)	PI (%)	LS (%)	
BH1	0.5 – 1.0	11	15	74	25	15	10	5.5	**GP, GRAVEL**

Notes:
Terminology - PSD = Particle Size Distribution; LL = Liquid Limit; PL = Plastic Limit; PI = Plasticity Index; LS = Linear Shrinkage
[1]Soil classifications based on the classification of fine and coarse grained soils presented in Table 9 and Table 10 of AS1726:2017

4 SUBSURFACE CONDITIONS

4.1 Published geology

The 1:50,000 scale Geological Map 'Collie' indicates that the site is underlain by; G_2: GRAVEL – yellow-brown to dark reddish-brown, ferruginous or bauxitic, pisolitic and irregular shape poorly sorted, variable amounts of sand and silt in matrix and LA_1: Laterite – massive, friable to strongly indurated occasionally vesicular, iron rich, developed on granite.

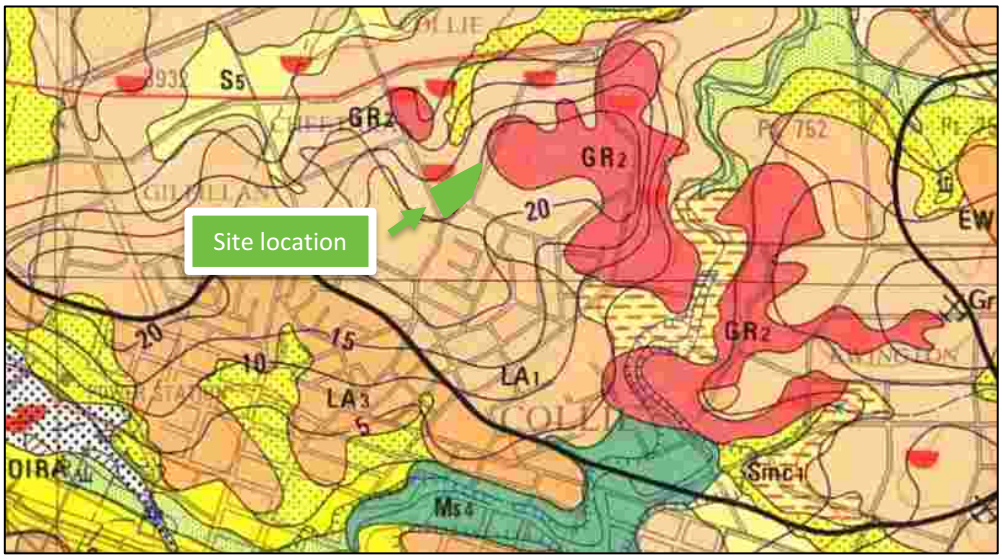


Figure 1: Extract from the 1:50,000 scale Geological Map "Collie"

4.2 Groundwater

Groundwater was observed at 1.8 mBGL within BH3 during the August 2024 investigation. No groundwater was encountered within BH1 or BH2.

Since the CLAY encountered between 1.2 m and 1.6 m below the surface will practically be impermeable, it can be expected that perched groundwater may be experienced above the CLAY layer during periods of wet weather (winter months/wet season) or following heavy rainfall, and it should be a consideration for the proposed development.

4.3 Interpreted subsurface profile

Based on the soils encountered during the site investigation, a generalised ground profile has been developed to characterise the site. This subsurface profile is presented in Table 5 below and is typically consistent across the site and with the geological mapping of the area.

This ground profile has been used as the basis for the geotechnical analysis and recommendations presented within this report.

Table 5: Sub-surface soil profile

Soil/rock layer	Depth (mBGL)	Description
Topsoil	0.00 – 0.20	**(SM) Sandy SILT**: low plasticity, fine to medium grained sand, with fine to medium sized gravel, dark brown, soft to firm, dry.
Gravel	0.20 – 1.40	**(GC) Clayey GRAVEL**: fine to medium sized, subrounded to subangular, clay is medium to high plasticity, with fine to medium grained sand content varying at depths across the site, dark brown tending pale brown then red brown, medium dense to very dense, dry.
Clay	1.40 – 2.65	**(CI – CH) CLAY**: medium to high plasticity, orange-red brown slightly grey, dry to wet, stiff to hard.

5 GEOTECHNICAL ASSESSMENT

WML considers that the site is geotechnically capable of supporting the proposed development founded on shallow footings, and the recommendations provided within this section shall remain relevant provided that the site preparation and remediation measures included in Section 6 are adopted.

5.1 Site classification

The site may be classified in accordance with AS 2870:2011 - "Residential Slabs and Footings", which requires an estimation of the expected surface movement due to the wetting and drying of a foundation. Due to the approximately 1.4 m thick layer of GRAVELs with a slightly reactive clay content overlying high plasticity CLAYs, a site classification of "**S**" is deemed suitable for each Lot. Final site classification should be confirmed at the completion of the bulk earthworks.

CLASSIFICATION BY CHARACTERISTIC SURFACE MOVEMENT (y_s)

Characteristic surface movement (y_s) mm	Site classification in accordance with Table 2.1
$0 < y_s \leq 20$	S
$20 < y_s \leq 40$	M
$40 < y_s \leq 60$	H1
$60 < y_s \leq 75$	H2
$y_s > 75$	E

Figure 2: Extract from AS2870:2011 (Table 2.3)

Sites with inadequate bearing strength or where ground movement may be significantly affected by factors other than reactive soil movements due to normal moisture conditions shall be classified as Class P. Class P sites include: the site contains uncontrolled or controlled fill as identified in AS 2870 Clause 2.5.3, soft or unstable foundations such as soft clay or silt or loose sands, landslip, mine subsidence, collapsing soils and soils subject to erosion, reactive sites subject to abnormal moisture conditions and sites that cannot be classified in accordance with AS 2870 Clause 2.1.2.

5.2 Bearing capacity and settlement

It is assumed that footings of the proposed residential developments will not carry significant eccentric loading, and groundwater has been assumed to be located at a depth of at least 1.4 m below the natural surface.

Pad and strip footings may be designed for an allowable bearing pressure of 100 kPa with an elastic settlement of up to 20 mm for isolated footings for a minimum embedment depth of 0.5 m. This recommendation is restricted to pad footings with widths between 0.3 m and 1.5 m and strip footings between 0.3 m and 1 m wide. If a larger applied bearing capacity or different sized footings are required, WML must be contacted to undertake additional assessments.

6 CONSTRUCTION CONSIDERATIONS

The earthworks should be constructed in accordance with AS 3798:2007 – Earthworks for Residential and Commercial Developments. The below construction and site preparation recommendations are considered minimum requirements; however, this report is not intended to be used as a specification for construction.

6.1 Site preparation

The following items should be considered when designing the earthwork levels and tendering the construction:

- The bearing characteristics of the ground and the recommended allowable bearing capacity rely on the adequate maintenance of the existing surface conditions, which is the responsibility of the contractor (during construction) and the owner (long-term). Remedial works should be expected during construction after periods of wet weather, following any significant rainfall or if surface water is present in the vicinity of the site at any time. If water is observed at the site during the construction works, or any other unexpected changes in the ground conditions are observed on site, WML must be notified immediately to verify the assessments provided in this report.
- Permanent embankment/cutting slopes (<3 high) should be no steeper than 1V:3H unless specific stability analysis is undertaken.
- Temporary slope angles such as trenches (<3 m high and open for no longer than two weeks) in in-situ gravel or imported granular fill should be no steeper than 1V:2.5H, and in clay should be no steeper than 1V:2H, provided groundwater is below the base of the trench. If groundwater is present, additional geotechnical advice should be sought.

The below construction and site preparation recommendations are considered minimum requirements for shallow foundations:

- Where topsoil/vegetation is encountered within the development footprint, stripping of vegetation, topsoil, and organics should be undertaken to a depth of 200 mm (including grubbing tree roots and root zones). Depressions formed by removing vegetation and tree roots should have all disturbed soil cleaned out and be backfilled with similar subgrade material to maintain layer consistency.
    - Any material recovered from topsoil stripping works should **not** be considered suitable for structural use unless otherwise approved. Stripped topsoil may be suitable for non-structural fill (e.g. landscaping) where waste materials do not contaminate the material.
    - If trees are removed within the building footprints, WML recommend grubbing out the root ball and all large roots up to 50 mm in diameter. The root ball should be backfilled using site won materials, recompacted and tested to the full depth of the disturbance zone, achieving the minimum compaction compliance stated below.
- Following removal of the topsoil, the base of the excavations shall be proof-rolled to identify any soft/loose areas.
    - Each area should be given several passes with suitable compaction equipment to idenfity any soft/loose areas.
    - Any loose/soft areas identified should be removed and replaced with suitable fill. Over-excavation and replacement of loose materials may be required where the minimum dry density ratios cannot be achieved.
- Any imported fill (if required for the building pads) shall be a free draining SAND with a fines content (<0.075 mm) and organic content less than 5% and 2% respectively, and should not contain particles greater than 50 mm.
- Imported fill shall be placed in even lifts with a maximum loose thickness of 300 mm.
- In-situ materials and imported fill prepared for supporting foundations should achieve the compaction compliance and testing frequency specified in Section 6.2.

6.2 Compaction compliance

As detailed in Table 8.1 of AS 3798:2007, the site can be considered to fall under the ***"Type 2"*** classification, and therefore, testing shall be carried out at the following frequency (whichever results in the most tests):

1. 1 test per layer per 1,000 m^2;
2. 1 test per 200 m^3 distributed reasonably evenly throughout full depth and area; or
3. 1 test per residential lot per layer.

The in-situ clayey GRAVEL shall meet a minimum compaction of 95% **MMDD** and ±2% OMC. Field density tests shall be used to check the compliance of the compacted material in accordance with methods presented within AS 1289.

For imported clean sand fill, a Perth Sand Penetrometer (PSP) may be used for compaction control. The following blow counts must be met as a minimum (if calibrated PSP test results indicate higher blows are required to meet the compaction requirements, then the higher blow counts are to be adopted).

Table 6: Minimum PSP blow counts for imported sand fill.

Depth	Blow count/300mm
150 – 450mm	8
450mm – 750mm	10
750mm – 1,050mm	12
1,050mm – 1,350mm	12+

6.3 Drainage

For the purpose of drainage design, the site should be considered to have an approximately 1.4 m thick layer of gravelly soils with a moderate permeability above practically impermeable CLAY. The in-situ permeability results for the clayey GRAVELS indicate that a hydraulic conductivity of 1m/day can be used as a basis for the drainage design.

The potential effect of the impermeable clays below the gravels must be taken in to consideration when designing on-site drainage. The design engineer shall take into account any variability of foundation conditions around the perimeter of the building structure. Drainage around the building should be adequate to redirect excess surface water away from the building.

7 CLOSURE

An assessment for the presence of historical underground mining activities has not been undertaken within the scope of this report. If advice regarding the potential for the voids or historical mine workings is, further study will be required.

We trust that the information provided within this report satisfies your present requirements and meets with your approval. Should you have any queries, please do not hesitate to contact the author of this report.

We draw your attention to the attached "*Report Limitations*" included with this report. This information sheet is intended to provide additional information about this report and information included within it. This information is provided not to reduce the level of responsibility accepted by WML but to ensure that all parties that rely on this report, and the information contained herein, are aware of the responsibilities that each assumes in so doing.

8 REFERENCES

1. Geological Series Map 1:250,000 Scale ‘Collie’
2. Standards Australia. 2017. *Geotechnical Site Investigations*. AS 1726:2017. SAI Global.
3. Standards Australia. 2011. *Residential Slabs and Footings*. AS 2870:2011. SAI Global.
4. Standards Australia. 2007. *Earthworks for Residential and Commercial Developments*. AS 3798:2007. SAI Global.
5. Standards Australia. 2007. Earth Retaining Structures. AS 4678:2002. SAI Global.
6. Carter M., Bentley S. P., Correlations of Soil Properties, 1991.

LIMITATIONS

REPORT LIMITATIONS

This geotechnical report is provided for the sole use by the Client. This report must not be applied for any other purpose or project except the one originally contemplated without written authorisation from WML. WML accepts no responsibility for the use of this report / document, in whole or in part, in other contexts or for any other purpose.

WML have undertaken investigations, performed consulting services, and prepared this report based on the Client's specific requirements, documents and information supplied, and previous experience. If changes occur in the nature or design of the project, however minor, it is recommended WML review this report to assess their impacts and provide additional recommendations, if any. WML does not assume any responsibility or liability for problems that arise due to developments on site of which we were not informed.

This report utilises data and information provided by third parties, including, but not limited to sub-consultants, published data, and the Client. This information has been assumed to be correct unless otherwise stated. WML assumes no responsibility for assessments made partly or entirely based on information provided by third parties or for the adequacy, incompleteness, inaccuracies, or reliability of any data provided by third parties.

It is the responsibility of the Client to transmit the information, recommendations, and limitations of this report to the appropriate organisations or people involved in design of the project, including, but not limited to developers, builders, owners, buyers, architects, engineers, and designers.

WML's opinions are based on upon information that existed at the time of the production of this report and ground conditions encountered at the time the site study was performed. This geotechnical report should not be relied upon if its adequacy has been affected by: the passage of time, by man-made events, such as construction on or adjacent to the site, or by natural events, such as floods, earthquakes, or groundwater fluctuations. In the event of the above changes, WML should be contacted to determine if this report is still reliable or whether additional testing is required.

The subsurface conditions identified within this report are based only upon investigation locations where subsurface tests have been conducted and / or samples obtained, which are explicitly representative of the specific sample or test location. Interpretation of conditions between such points cannot be assumed to represent actual subsurface information and unknowns or variations in ground conditions between test locations that cannot be inferred or predicted. Actual subsurface conditions may differ significantly from those indicated in this report. Specific warning is also given that many factors, either natural or artificial, may render ground conditions different from those which pertained at the time of the investigation. WML does not accept any responsibility for any variance in the ground conditions that may exist across the site. If unexpected subsurface conditions are encountered, WML shall be notified immediately to review those conditions and provide additional and/or modified recommendations, as necessary.

This geotechnical assessment is based upon judgment of the investigation data, visual observations of the site and materials encountered, along with the proposed land use and project specifications. The findings and recommendations presented within this report represent professional opinions and estimates and should not be taken as fact unless explicitally stated. In general, statements of fact are are limited to what was done and / or what was observed on site.

The recommendations provided in this report are preliminary only; final recommendations can only be given after observing the actual subsurface conditions revealed during construction. WML does not assume responsibility or liability for the recommendations in this report if construction observation has not been performed by a WML geotechnical engineer.

Our services did not include any contamination or environmental assessment of the site or adjacent sites. The equipment and techniques used to perform a geoenvironmental study differ from those used to perform a geotechnical investigation. If you require any geoenvironmental information for your project, WML can advise on further steps to be undertaken.

WML have performed our professional services in accordance with generally accepted geotechnical engineering principles and practices currently employed in the area; no warranty, expressed or implied, is made as to the professional advice included in this report.

DRAWINGS

SCALE

NOTE: *INDICATES SIGNATURES ON ORIGINAL ISSUE OF DRAWING OR LAST REVISION OF DRAWING.

A4

REVISIONS				
N°.	DESCRIPTION	APPROVED	DATE	DRAWN

WML Consulting Engineers

CLIENT
Marc & Richelle Pike

PROJECT
1119 Prinsep Street, North Collie, WA

DRAWING TITLE
Site map

DRAWING NUMBER
11589-G-D-001

APPROVED Jierong Liang

DATE 11/08/24

APPENDIX A

LOGS AND PHOTOGRAPHS

REPORT OF BOREHOLE: BH1

Job No	: 11589	Latitude	: -33.342171	Sheet	: 1 OF 1
Client	: Marc & Richelle Pike	Longitude	: 116.161635	Logged	: Jierong Liang
Project	: 1119 Prinsep St, North Collie	UTM	: 50H	Logged Date	: 05/08/2024
Location	: 1119 Prinsep St N, Collie WA, Australia	Drill Rig	: Drillman GT10	Checked	: Angus Hollier
Contractor	:	Inclination	:	Checked Date	: 11/08/2024

METHOD	WATER	DEPTH (m)	GRAPHIC LOG	USCS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY/ DENSITY	IN-SITU TESTING SV (kPa)	SAMPLE
	Not encountered	0.3		ML	Gravelly sandy SILT ML: low plasticity, fine to medium sized gravel, fine to medium grained sand, trace medium plasticity clay, trace roots up to 50 mm, dark brown, soft to firm, dry.	D	S-F		
		1		GC	Clayey GRAVEL GC: fine to medium sized, sub-rounded to sub-angular, medium to high plasticity clay, with fine to medium grained sand, red brown slightly mottle orange, very dense, dry.	D	VD		D: 0.5-1 m:
		1.6		CI-CH	CLAY CI-CH: medium to high plasticity, trace fine to medium sized gravel, orange slightly mottled red brown, very stiff to hard, dry.	D	VSt-H		
		2			**BH1 Terminated at 2.65m (Target depth)**				

PSP TEST
0 5 10 15 20 25 30 35 40

DCP TEST
0 5 10 15 20 25 30 35 40

REPORT OF BOREHOLE: BH2

Job No	: 11589	Latitude	: -33.341693	Sheet	: 1 OF 1
Client	: Marc & Richelle Pike	Longitude	: 116.162160	Logged	: Jierong Liang
Project	: 1119 Prinsep St, North Collie	UTM	: 50H	Logged Date	: 05/08/2024
Location	: 1119 Prinsep St N, Collie WA, Australia	Drill Rig	: Drillman GT10	Checked	: Angus Hollier
Contractor	:	Inclination	:	Checked Date	: 11/08/2024

METHOD	WATER	DEPTH (m)	GRAPHIC LOG	USCS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY/ DENSITY	IN-SITU TESTING SV (kPa)	SAMPLE
	Not encountered	0.2		SM	Sandy SILT SM: low plasticity, fine to medium grained sand, with fine to medium sized gravel, trace roots up to 50 mm, dark brown, soft to firm, dry.	D	S-F		
		0.6		GC	Clayey GRAVEL GC: fine to medium sized, sub-rounded to sub-angular, medium to high plasticity clay, with fine to medium grained sand, dark brown tending pale brown, medium dense to dense, dry.	D	MD-D		
		1		GC	Clayey GRAVEL GC: fine to medium sized, sub-rounded to sub-angular, medium to high plasticity clay, trace fine to medium grained sand, red brown slightly mottled orange, dense to very dense, dry.	D	D-VD		
		1.2		CI-CH	CLAY CI-CH: medium to high plasticity, trace fine to medium sized gravel, trace fine to medium grained sand, orange slightly mottled grey, very stiff to hard, dry.	D	VSt-H		
		1.8		CI-CH	CLAY CI-CH: medium to high plasticity, red brown mottled grey, very stiff to hard, dry.	D	VSt-H		
		2			**BH2 Terminated at 2.65m (Target depth)**				

PSP TEST
0 5 10 15 20 25 30 35 40

DCP TEST
0 5 10 15 20 25 30 35 40

REPORT OF BOREHOLE: BH3

Job No	: 11589	Latitude	: -33.341278	Sheet	: 1 OF 1
Client	: Marc & Richelle Pike	Longitude	: 116.162804	Logged	: Jierong Liang
Project	: 1119 Prinsep St, North Collie	UTM	: 50H	Logged Date	: 05/08/2024
Location	: 1119 Prinsep St N, Collie WA, Australia	Drill Rig	: Drillman GT10	Checked	: Angus Hollier
Contractor	:	Inclination	:	Checked Date	: 11/08/2024

METHOD	WATER	DEPTH (m)	GRAPHIC LOG	USCS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY/ DENSITY	IN-SITU TESTING SV (kPa)	SAMPLE
		0.2		SM	Sandy SILT SM: low plasticity, fine to medium grained sand, with fine to medium sized gravel, dark brown, soft to firm, dry.	D	S-F		
		0.5		GC	Clayey GRAVEL GC: fine to medium sized, sub-rounded to sub-angular, medium plasticity clay, trace fine to medium grained sand, dark brown tending pale brown, medium dense to dense, dry.	D	MD-D		
		1		GC	Clayey GRAVEL GC: fine to medium sized, sub-rounded to sub-angular, medium to high plasticity clay, red brown, dense to very dense, dry.	D	D-VD		
		1.4		CI-CH	CLAY CI-CH: medium to high plasticity, trace fine to medium grained sand, red brown, stiff, dry.	D	St		
	▽	1.6		CI-CH	CLAY CI-CH: medium to high plasticity, pale yellow, organic, dry tending to wet, stiff.	W	St		
		2		CI-CH	CLAY CI-CH: medium to high plasticity, red brown, stiff, wet.	W	St		
					BH3 Terminated at 2.65m (Target depth)				

PSP TEST

0 5 10 15 20 25 30 35 40

DCP TEST

0 5 10 15 20 25 30 35 40

PHOTOGRAPHIC RECORD

Client:	Marc & Richelle Pike
Job Number:	11589
Job Description:	1119 Prinsep Street North, Collie
Date:	05/08/2024

Figure 1: Photograph from BH1 facing east.

Figure 2: Photograph from BH1 facing north west.

APPENDIX B

LABORATORY TESTING

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

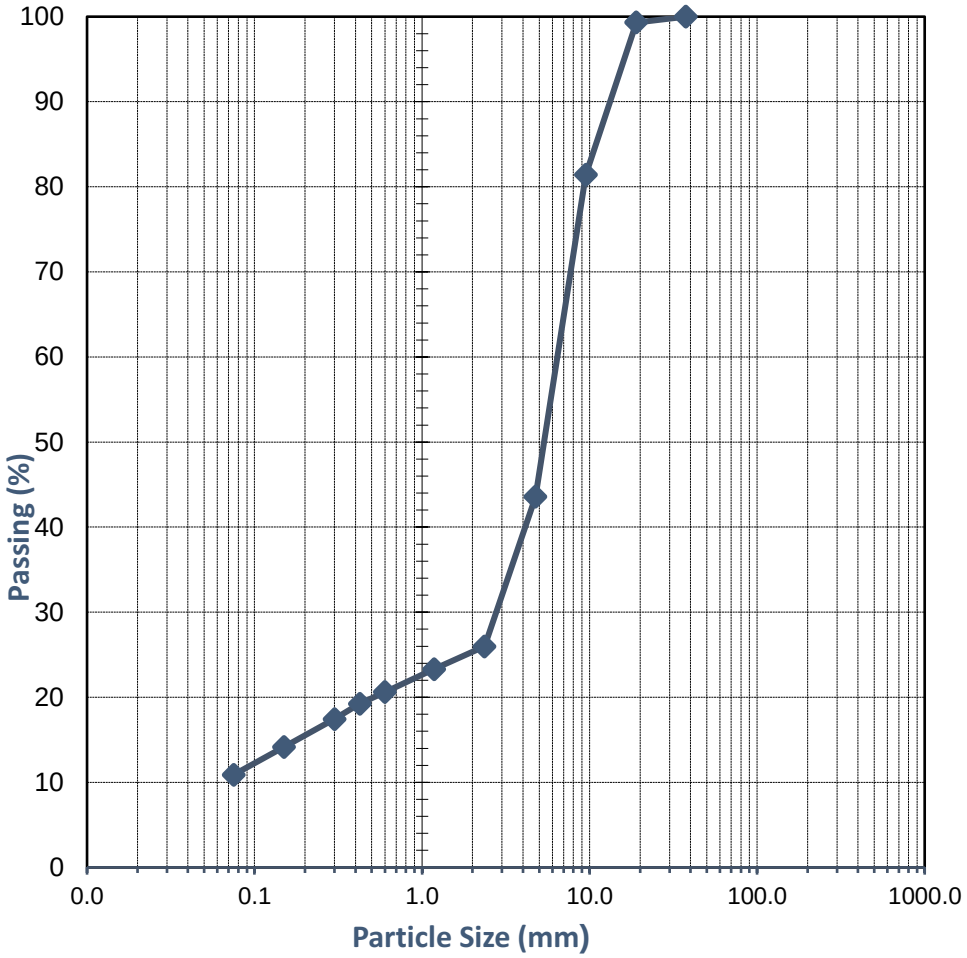
TEST REPORT - AS 1289.3.6.1

Client:	WML Consultants	*Ticket No.*	S14109
Client Address:	Level 2/91 Havelock Street, West Perth WA 6005	*Report No.*	WG24.12465_1_PSD
Project:	1119 Prinsep Street, North Collie	*Sample No.*	WG24.12465
Location:	1119 Prinsep Street, North Collie	*Date Sampled:*	5/08/2024
Sample Identification:	BH1 Red Brown Gravel	*Date Tested:*	13/08 - 14/08/2024

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	100
19.0	99
9.5	81
4.75	44
2.36	26
1.18	23
0.600	21
0.425	19
0.300	17
0.150	14
0.075	11



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 15/August/2024

Accreditation No. 20599
Accredited for compliance with ISO/IEC 17025 - Testing

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	WML Consultants	*Ticket No.*	S14109
Client Address:	Level 2/91 Havelock Street, West Perth WA 6005	*Report No.*	WG24.12465_1_PI
Project:	1119 Prinsep Street, North Collie	*Sample No.*	WG24.12465
Location:	1119 Prinsep Street, North Collie	*Date Sampled:*	5/08/2024
Sample Identification:	BH1 Red Brown Gravel	*Date Tested:*	14/08/2024

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50^{o}C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**25**
AS 1289.3.2.1	**Plastic Limit (%)**	**15**
AS 1289.3.3.1	**Plasticity Index (%)**	**10**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**5.5**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Linda Chiu

Date: 15/August/2024

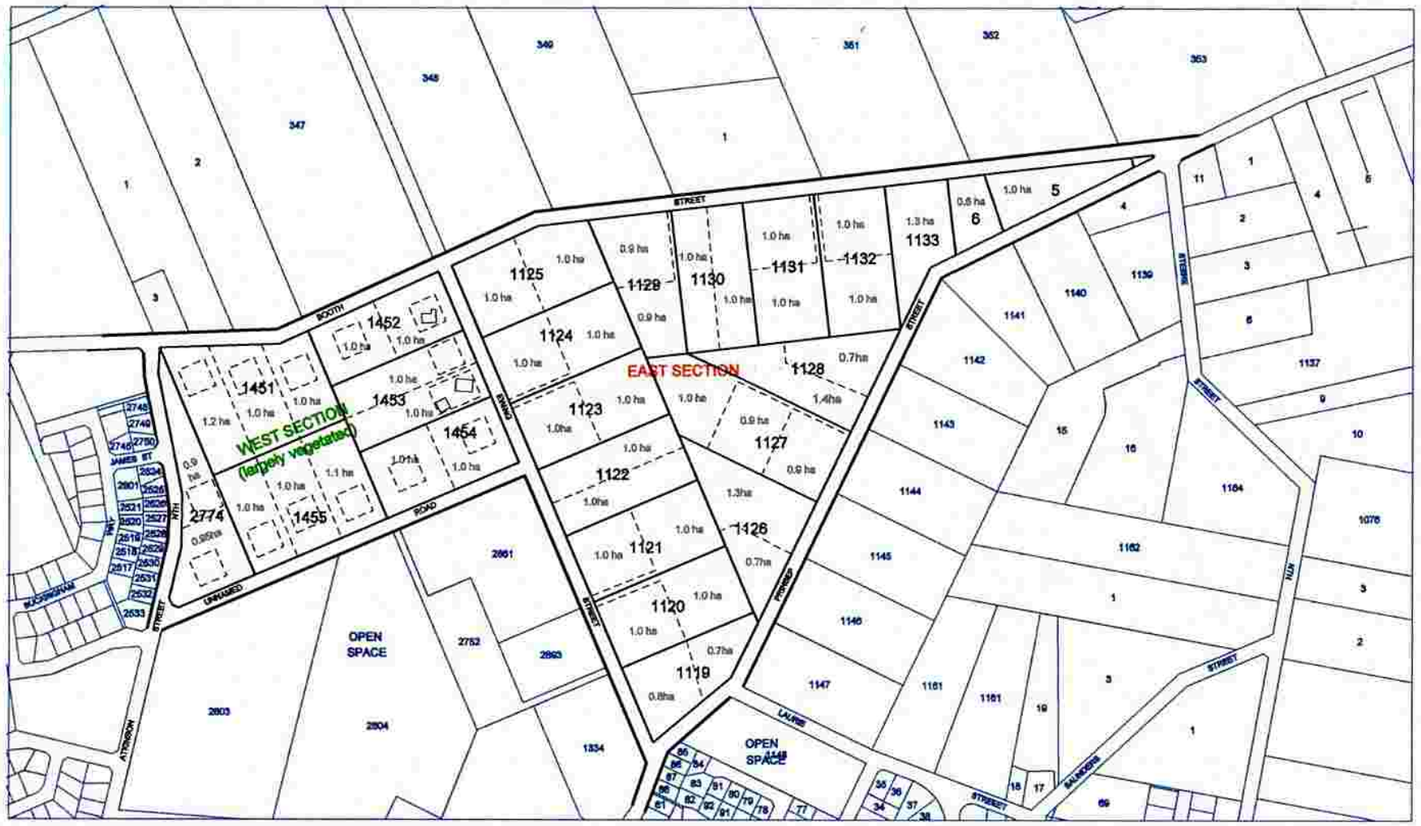
NATA

Accreditation No. 20599

Accredited for compliance with ISO/IEC 17025 - Testing

APPENDIX 4: COLLIE NORTH STRUCTURE PLAN

NORTH COLLIE STRUCTURE PLAN



SCHEDULE OF PLANNING PROVISIONS

The Structure Plan provides a framework for future detailed planning at the subdivision and development stage.

The Structure Plan and Schedule of Planning Provisions, provide planning criteria for the purposes of development control under the operative Town Planning Scheme.

1. Building Envelopes
All development on lots containing significant vegetation within the western portion of the plan is to be contained within Building Envelopes depicted on this plan.

Building Envelopes may be varied at the approval of the Shire of Collie and can be approved with out the need to vary this Structure Plan.

2. Fire Management
Applications for Subdivision are to be submitted with a Fire Management Plan compliant with FESWA and WAPC guidelines - 'Planning for Bush Fire Protection"

3. Vegetation Protection
The WA Planning Commission may at the subdivision stage impose a condition of approval a Section 70A notification to be lodged on the new titles to protect existing vegetation worthy of protection.

4.Geotechnical Analysis
Applications for subdivision within the Structure Plan Area are to be submitted with a Geotechnical Report demonstrating the capacity of the land to accommodate further development.

5. Future Planning
Subdivision at a density higher than that depicted by this Structure Plan will require comprehensive structure planning to address future road networks, infrastructure, and provision of Public Open Space.

6. Development Approvals
The issue of planning consent and building licences within the structure plan area are to be issued by Council with regard to the proposed subdivision boundaries depicted on this plan and should not be located to prejudice the further subdivision of any lot. The building setbacks for those lots east of Ewing Street shall be as per the R2 Code standards of the Residential Design Codes (2002). However, Council may approve a reduced setback where it is satisfied that the reduced setback will not prejudice the further subdivision of any lot or the future road network as depicted on figure 2: 'North Collie Structure Plan Possible Future Road Layouts'.

7. Subdivision Approvals:
This plan depicts possible subdivision boundaries and should not be construed as subdivision approval. Applications for subdivision approval are required to be lodged with the WA Planning Commission.

8. Full Scheme Contributions
Lots proposed to be 1ha or greater in area will be subject to the full cost of connecting to Water Corporation Services.

9. Road Construction
At the subdivision stage, landowners of lots 1455 and 1454 will be required to contribute towards the construction of the unmade road reserve in order to provide the newly created lots with frontage to a constructed road. Road construction is to be of a standard to the satisfaction of the Shire Engineer.

10. Battleaxe Lots
Alternative lot configurations to those shown on this Structure Plan which obviate the need for the creation of battleaxe lots will be encouraged. Consideration should be given at the subdivision stage to providing road frontage to lots via potential subdivision stage to providing road frontage to lots via potential subdivisional roads shown on Figure 2 - 'Possible Future Road Layouts' to eliminate the reliance upon battleaxe lot configurations.

ADOPTED BY COUNCIL ON 25/3/2003

CHIEF EXECUTIVE OFFICER ENDORSED

DATE 31/8/2004

WA PLANNING COMMISSION ENDORSED

DATE

ENDORSED STRUCTURE PLAN
To provide a framework for future detailed planning at the subdivision and development stage.

Date 23/8/04

Delegated under s.20 of WAPC Act 1985

N

Designer :	Simon Hall
Drawn :	Simon Hall
E Reference :	nthcolliesp5.dgn

Planning South West
Telephone (08) 9754 1244
Facsimile (08) 9754 1678
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8 Fairbairn Road
Busselton W.A.

NORTH COLLIE STRUCTURE PLAN
SHIRE OF COLLIE

COUNCIL REF: LUP/005
WAPC REF : 801-6-8-2

A 2	SCALE 1:1200
Level Datum N/A Horizontal Datum ASSUMED	
JOB NUMBER 0405.012	REV 5

APPENDIX 5: BUSHFIRE MANAGEMENT PLAN

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BUSHFIRE MANAGEMENT PLAN

Lot 1119 Prinsep Street N, Collie

Project Number: #XXXXXX-FMP

Project Name: L1119 Prinsep Street N, Collie

GPS Address: -33.34185449,116.16187297

Project Purpose: Subdivision

Author: Natasha Smirnova

Accreditation No: BPAD 43924

Accreditation Expiry Date: 31/10/2021

Review and Approval Roderick Cameron – Bushfire Perth PTY LTD

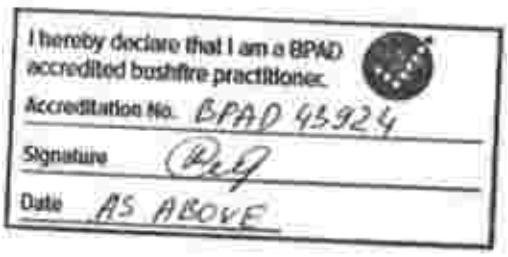
Accreditation No: BPAD37279

Accreditation Expiry Date: 30/4/2022

Accreditation level: BPAD level 2

Version: 1.0

Date of issue: 14 May 2021



Author: Natalia Smirnova

In signing the above, the author declares that this Bushfire Management Plan meets the requirements of State Planning Policy 3.7. This report supersedes all previous Bushfire Management Plans for the site.

DISCLAIMER AND LIMITATION

This report is prepared solely for (the 'proponent') and any future landowners of the subject lot(s)and is not for the benefit of any other person and may not be relied upon by any other person.

The mitigation strategies contained in this Bushfire Management Plan are considered to be prudent minimum standards only, based on the writer's experience as well as standards prescribed by relevant authorities. It is expressly stated that Bushfire Perth.Pty.Ltd and the writer do not guarantee that if such standards are complied with or if a property owner exercises prudence, that a building or property will not be damaged or that lives will not be lost in a bush fire.

Fire is an extremely unpredictable force of nature. Changing climatic factors (whether predictable or otherwise) either before or at the time of a fire can also significantly affect the nature of a fire and in a bushfire prone area it is not possible to completely guard against bushfire.

Further, the growth, planting or removal of vegetation; poor maintenance of any fire prevention measures; addition of structures not included in this report; or other activity can and will change the bushfire threat to all properties detailed in the report. Further, the achievement of the level of implementation of fire precautions will depend on the actions of the landowner or occupiers of the land, over which Bushfire Perth.Pty.Ltd has no control. If the proponent becomes concerned about changing factors then a new Fire Risk Management Plan should be requested.

To the maximum extent permitted by the law, Bushfire Perth.Pty.Ltd and the writer excludes all liability whatsoever for:

1. claim, damage, loss or injury to any property and any person caused by fire or as a result of fire or indeed howsoever caused;
2. errors or omissions in this report except where grossly negligent; and

the proponent expressly acknowledges that they have been made aware of this exclusion and that such exclusion of liability is reasonable in all the circumstances.

If despite the provisions of the above disclaimer Bushfire Perth.Pty.Ltd and/or the writer is found liable then liability is limited to the lesser of the maximum extent permitted by the law and the proceeds paid out by Bushfire Perth.Pty.Ltd professional or public liability insurance following the making of a successful claim against such insurer.

Bushfire Perth.Pty.Ltd and/or the writer accept no liability or responsibility whatsoever for or in respect of any use or reliance upon this report and its supporting material by any third party.

This report is valid for a period of three years only from the date of its issue.

Bushfire Perth.Pty.Ltd

Contents Page

1.0 Summary

This Bushfire Management Plan (the Plan) has been prepared to accompany the application for Lot 1119 Prinsep Street N, Collie, Shire of Collie, located in the Shire of Collie authority area.

The site has direct access to Prinsep Street N. The site is within a designated bushfire prone area and the Proposal requires the application of State Planning Policy No. 3.7: Planning in Bushfire Prone Areas (SPP3.7).

The assessed bushfire risk is considered to be manageable and will be achieved by the identified stakeholders implementing and maintaining the bushfire risk management measures that are presented in this Plan. It has been determined that a maximum radiant heat level of 29KW/m2 or lower is achievable. The Proposal, as set out in this Plan, has addressed all applicable bushfire legislation, policy, standards and guidelines including the four elements of the Bushfire Protection Criteria as follows:

1.1 Aims and Objectives

The aim of this Bushfire Management Plan is to identify issues, requirements and provide bushfire risk mitigation measures for the proposed development. Aims for this site include:

- avoid increasing the threat to people, property and infrastructure
- reduce the developments vulnerability from extreme bushfire behaviour
- allow ingress and egress for fire and emergency services
- consider and minimize environmental impacts.

The objectives of this Bushfire Management Plan are to:

- demonstrate suitability for development
- display bushfire risk levels, fuels, vegetation types and the impact before and after
- show Bushfire management strategies recommended for the site
- demonstrate compliance with the bushfire protection criteria and the use of acceptable solutions for the site.

Key management responsibilities

Developer – Install asset protection zones

Landowner/Occupier – Maintain asset protection zone, comply with local firebreak notices,

Local government – Enforcement of firebreak notices

2.0 Proposal Details

2.1 Subject Site

The site the subject of this report is located on for Lot 1119 Prinsep Street N, Collie, located in the Shire of Collie authority area. Figure 2A illustrates the plan for the subject site. Figure 2B illustrates the subject site and immediate surrounds.

The site is identified as being Bushfire Prone on the Map of Bush Fire Prone Areas 2019 (OBRM, 2019), as illustrated in Figure 2C. This can be confirmed by viewing the state bushfire prone area map at https://maps.slip.wa.gov.au/landgate/bushfireprone/

2.2 Description

The assessed bushfire risk is considered manageable and will be achieved by the identified stakeholders implementing and maintaining the bushfire risk management measures that are presented in this Plan.

The Proposal, as set out in this Plan, has addressed all applicable bushfire legislation, policy, standards and guidelines including the four elements of the Bushfire Protection Criteria.

2.3 Previous Bushfire Assessments

No previous BAL assessments have been completed at this location.

This assessment has not taken into consideration any other reports or plans when undertaking this application.

Figure 2A: *Site Plan*

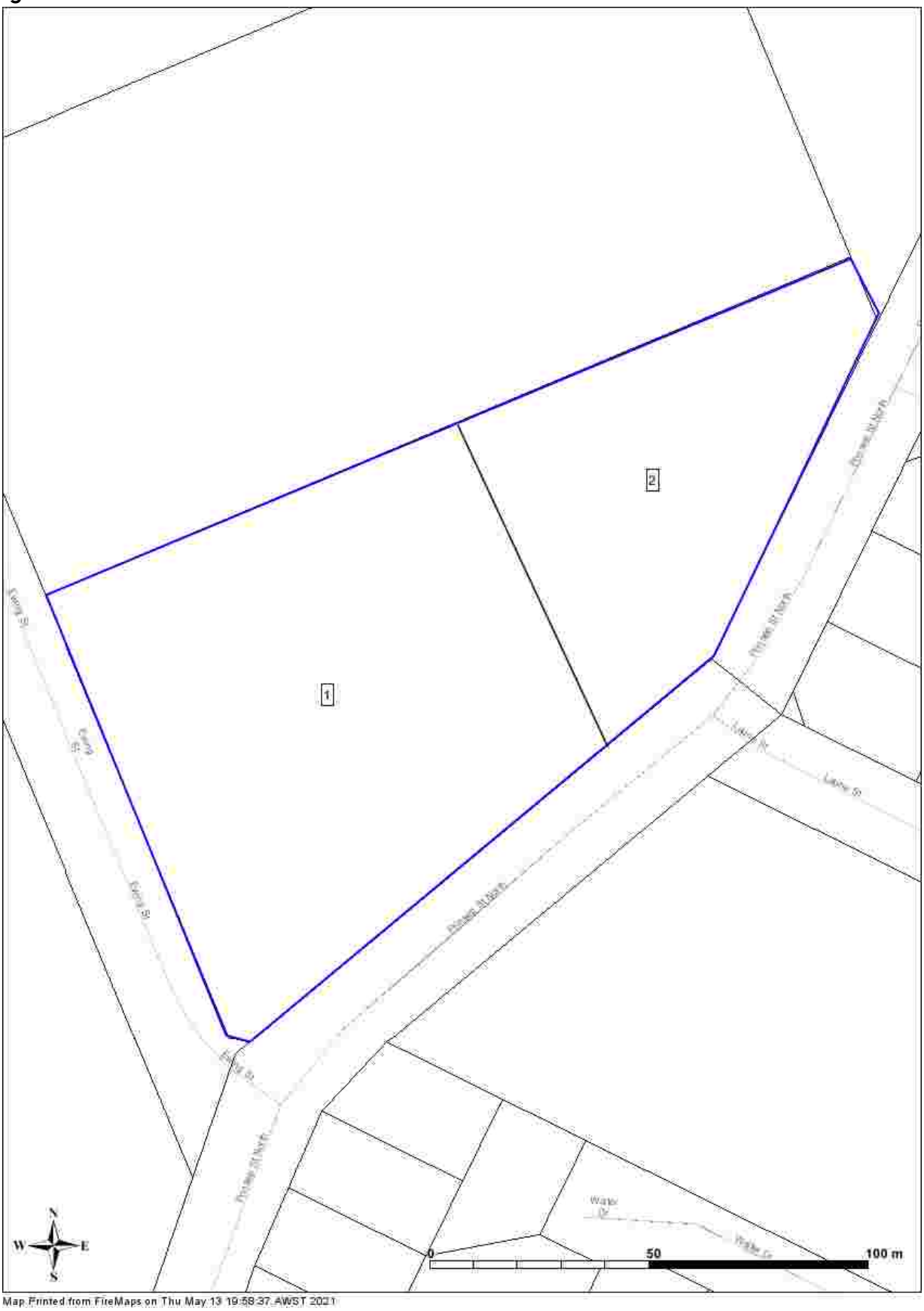


Figure 2B: *Subject site and immediate surrounds.*

Figure 2C: *Designated Bushfire Prone Area (2020) Landgate / SLIP | Landgate/SLIP/OBRM (https://maps.slip.wa.gov.au/landgate/bushfireprone/)*

Designated bush fire prone areas (coloured pink on the map) have been identified by the Fire and Emergency Services Commissioner as being subject, or likely to be subject, to bushfire attack. This site has been in a designated bush fire prone area for longer than four months.

3.0 Environmental Considerations

The following environmental considerations have been addressed with the aid of the WALGA Environmental Planning Tool.

On site vegetation clearing will be required to install asset protection zones. (Grassland only)

Figure 3A illustrates the identified environmental considerations for the application. The proponent has not identified any additional environmental considerations located within the site or potentially affected by the subdivision.

3.1 Native Vegetation

The site is not within an area designated as a Native Vegetation (DPIRD-005).

3.2 Environmentally Sensitive Areas

The subject site is not located within an environmental sensitive area as per the national map - https://nationalmap.gov.au/

3.3 Re-vegetation & Landscaping

Aside from the installation and maintenance of Asset Protection Zones, no areas of the proposed Lots are known to not require re-vegetation or landscaping that may potentially impact the future bushfire threat.

The following databases have been reviewed for environmental considerations

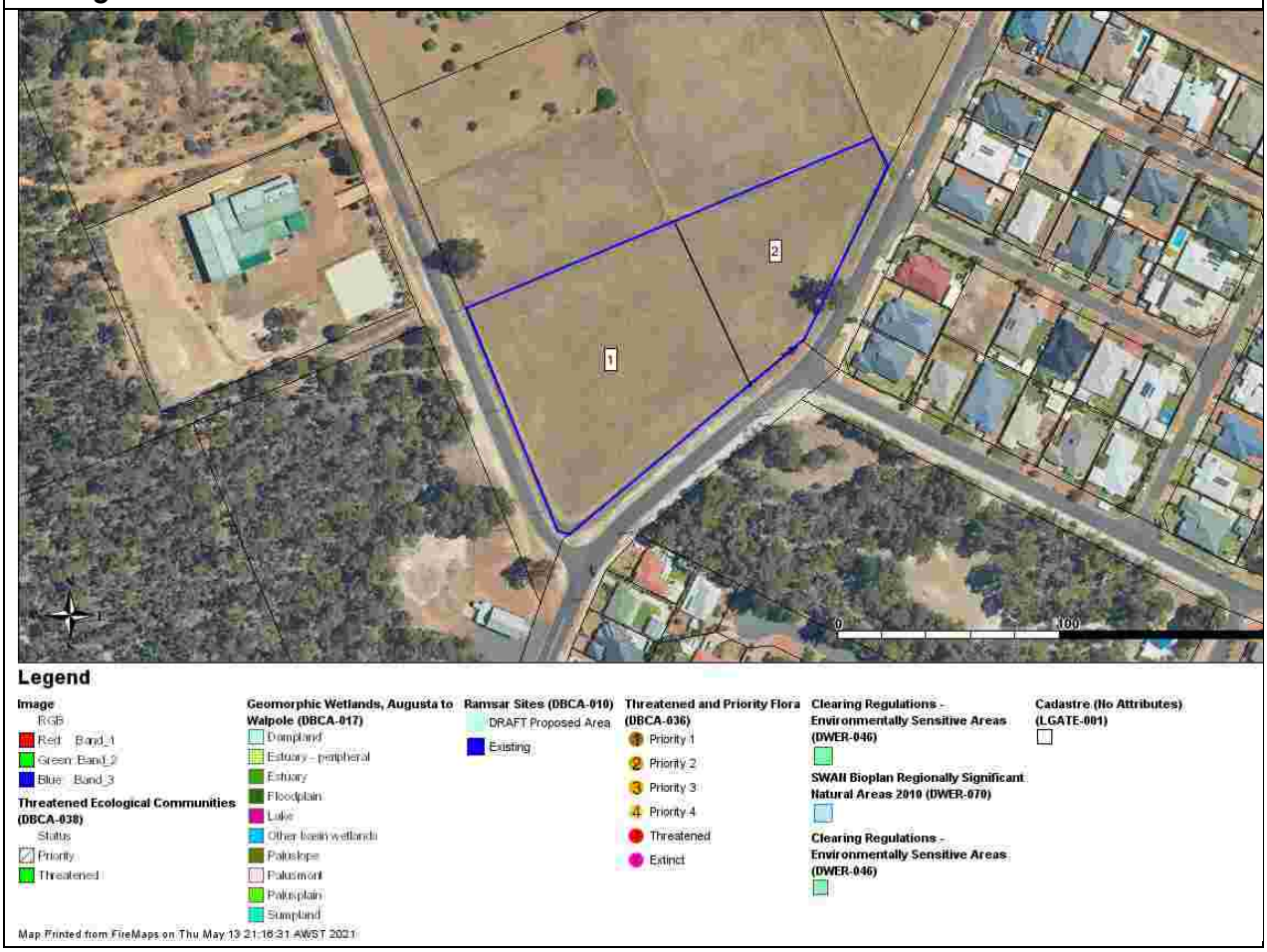
Department of Biodiversity, Conservation and Attractions	Known issues
RAMSAR wetlands (DBCA-010)	n/a
Threatened and priority flora (DBCA-036)	n/a
Threatened Ecological Communities (DBCA-038)	n/a

Department of Planning, Lands and Heritage	Known issues
Bush Forever areas 2000 (DOP-071)	n/a

Department of Water and Environmental Resources (DWER)	Known issues
Clearing regulations – Environmentally Sensitive Areas (DWER-046)	n/a
Swan Bioplan Regionally Significant Natural Areas 2010 (DWER-070)	n/a
Threatened Ecological Communities (DBCA-038)	n/a

Department of Primary Industries and Regional Development (DPIRD)	Known issues
Conservation Covenants Western Australia (DPIRD-023)	n/a

Figure 3A: *Environmental Considerations*



4.0 Bushfire Threat Assessment

4.1 Effective Slope

Effective slope under each vegetation plot was assessed in accordance with the methodology detailed in AS 3959-2018 Construction of buildings in bushfire prone areas (AS 3959) (Standards Australia, 2018.

The effective slope of each vegetation plot is listed in the tables provided in Table 5A below.

4.2 Bushfire Fuels

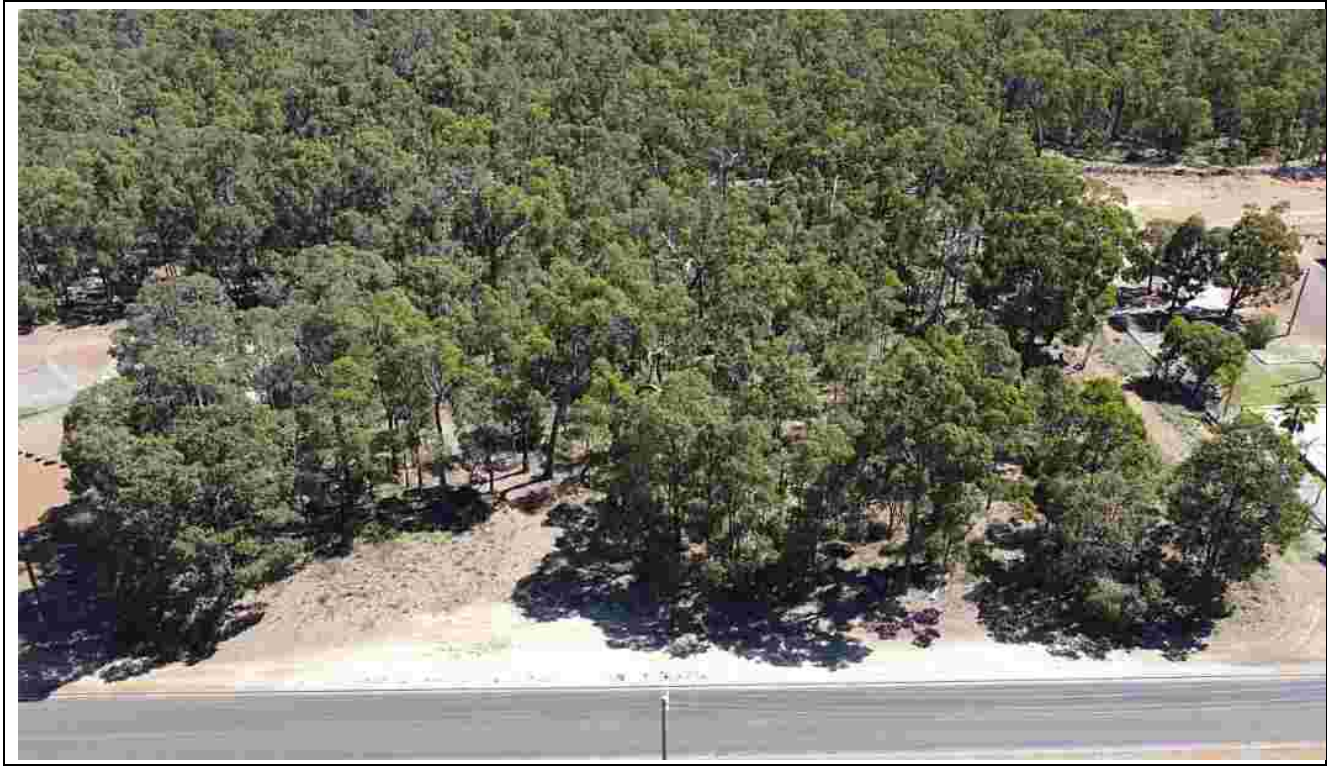
The location and extent of AS 3959-2018 vegetation structures, including Clause 2.2.3.2 exclusions, within 150 metres of the site are mapped in Figures 4A & 4B and illustrated in the photos below. All bushfire structures and fuel loads are assessed in their mature states (including revegetation and rehabilitation areas) unless otherwise identified. The areas of classified vegetation are summarised in Table 4A.
Where relevant, the requirements of the Shire of Collie Annual Firebreak and Fuel Load Notice have been referenced to support the classification and/or Exclusion of vegetation as a bushfire threat. A copy of the 2020/21 Annual Firebreak and Fuel Load Notice is included in Appendix 2.

Figure 4A: Photo Locations

Plot 1	
Existing	Class A Forest
Post Development	Class A Forest
Effective Slope	Upslope/0
Photo ID	1a
Trees 10-30 m high; 30-70% foliage cover (may include understorey of sclerophyllous low trees and tall scrubs or grass). Typically dominated by eucalypts.	

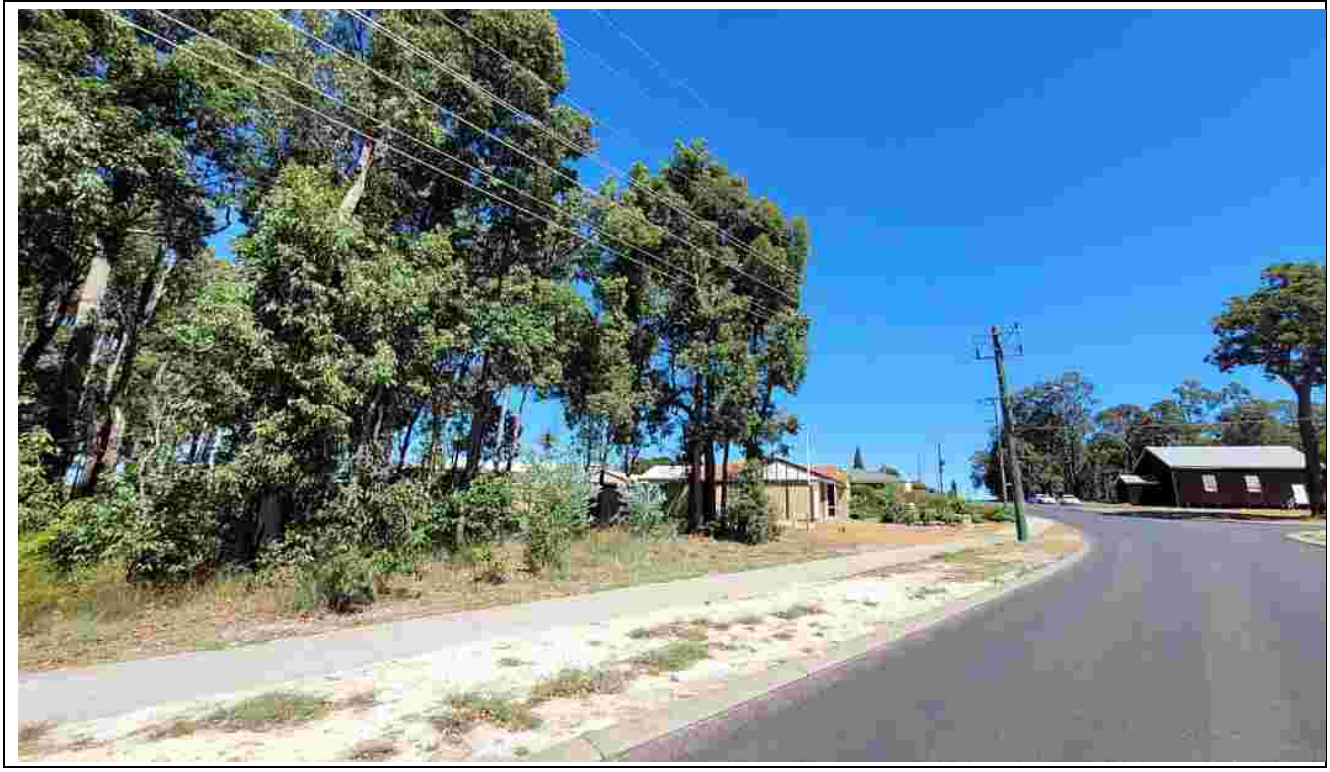
Plot 1	
Existing	Class A Forest
Post Development	Class A Forest
Effective Slope	Upslope/0
Photo ID	1b

Trees 10-30 m high; 30-70% foliage cover (may include understorey of sclerophyllous low trees and tall scrubs or grass). Typically dominated by eucalypts.



Plot 2	
Existing	Class A Forest
Post Development	Class A Forest
Effective Slope	Upslope/0
Photo ID	2a

Trees 10-30 m high; 30-70% foliage cover (may include understorey of sclerophyllous low trees and tall scrubs or grass). Typically dominated by eucalypts.



Plot 3	
Existing	Class G Grassland
Post Development	Class G Grassland
Effective Slope	Upslope/0
Photo ID	3a

Trees 10-30 m high; 30-70% foliage cover (may include understorey of sclerophyllous low trees and tall scrubs or grass). Typically dominated by eucalypts.
Grassland over 100mm in height at the time of the assessment, this area was not maintained and is therefore classified as grassland to allow for re-growth.

Plot 3	
Existing	Class G Grassland
Post Development	Class G Grassland
Effective Slope	Upslope/0
Photo ID	3b

Trees 10-30 m high; 30-70% foliage cover (may include understorey of sclerophyllous low trees and tall scrubs or grass). Typically dominated by eucalypts.
Grassland over 100mm in height at the time of the assessment, this area was not maintained and is therefore classified as grassland to allow for re-growth.

Plot 4	
Existing	Class G Grassland
Post Development	Class G Grassland
Effective Slope	Upslope/0
Photo ID	4a

Trees 10-30 m high; 30-70% foliage cover (may include understorey of sclerophyllous low trees and tall scrubs or grass). Typically dominated by eucalypts.
Grassland over 100mm in height at the time of the assessment, this area was not maintained and is therefore classified as grassland to allow for re-growth.

Plot 4	
Existing	Class G Grassland
Post Development	Class G Grassland
Effective Slope	Upslope/0
Photo ID	4b

Trees 10-30 m high; 30-70% foliage cover (may include understorey of sclerophyllous low trees and tall scrubs or grass). Typically dominated by eucalypts.
Grassland over 100mm in height at the time of the assessment, this area was not maintained and is therefore classified as grassland to allow for re-growth.

Table 4A *Areas of classified vegetation (post-development):*

Vegetation Plot	Vegetation Classification	Effective Slope
Plot 1	Class A Forest	Upslope/0
Plot 2	Class A Forest	Upslope/0
Plot 3	Class G Grassland	Upslope/0
Plot 4	Class G Grassland	Upslope/0

* Asset protection zone to be installed to standard stated in this fire management plan

Figure 4A: *Vegetation Classifications (post-development)*

Figure 4B: *Vegetation Classifications – including Photo Points*

5.0 Bushfire Hazard Issues

5.1 Potential Bushfire Impact

Potential bushfire impact analysis was undertaken in accordance with AS 3959-2018 Methodology 1 (Basic BAL assessment) to determine the potential worst-case scenario radiant heat impact on habitable buildings within each of the lots in the proposed subdivision.

In accordance with SPP 3.7, BAL Contour Maps have been prepared to illustrate the potential radiant heat impacts and associated BAL ratings for the assessment area after the subdivision is completed (see Figures 5A & 5B). The resulting ***maximum*** BAL ratings for each proposed lot are presented in the following table (Table 5A).

Table 5A: *Maximum BAL rating assessed at the proposed lot boundaries (AS3959-2018 Method 1)*

Lot	Vegetation Classification	Effective Slope	Vegetation Separation	Maximum BAL
1	Class A Forest	Upslope/0	20m	BAL-40
2	Class A Forest	Upslope/0	20m	BAL-29

Bushfire attack level (BALs) have been assessed using method 1 as per AS3959-2018. All lots within the proposed development site can achieve BAL-29 or lower.

Lot 1

Plot	Vegetation Classification	Effective slope	Required Setback	Separation	Achievable BAL
1	Class A Forest	Upslope/0	1m	21m	BAL-29
2	Class A Forest	Upslope/0	1m	21m	BAL-29
3	Exclusion 2.2.3.2 (F)	n/a	n/a	n/a	BAL-LOW
4	Class Grassland	Upslope/0	8m	8m	BAL-29
				Determined BAL	**BAL-29**

Lot 2

Plot	Vegetation Classification	Effective slope	Required Setback	Separation	Achievable BAL
1	Class A Forest	Upslope/0	125m	125m	BAL-LOW
2	Class A Forest	Upslope/0	1m	21m	BAL-29
3	Exclusion 2.2.3.2 (F)	n/a	n/a	n/a	BAL-LOW
4	Class Grassland	Upslope/0	8m	8m	BAL-29
				Determined BAL	**BAL-29**

As indicated above, habitable buildings on the proposed lots can achieve ratings of BAL-29 as required by SPP3.7, subject to appropriate siting with Asset Protection Zones. Plan 1A confirms areas that are higher than BAL-29.

** Asset protection zone to be installed as detailed in this fire management plan – Please refer figure 6a.*

Plan 1A: *No build area*

Figure 5A: *BAL Contour Map (overview)*

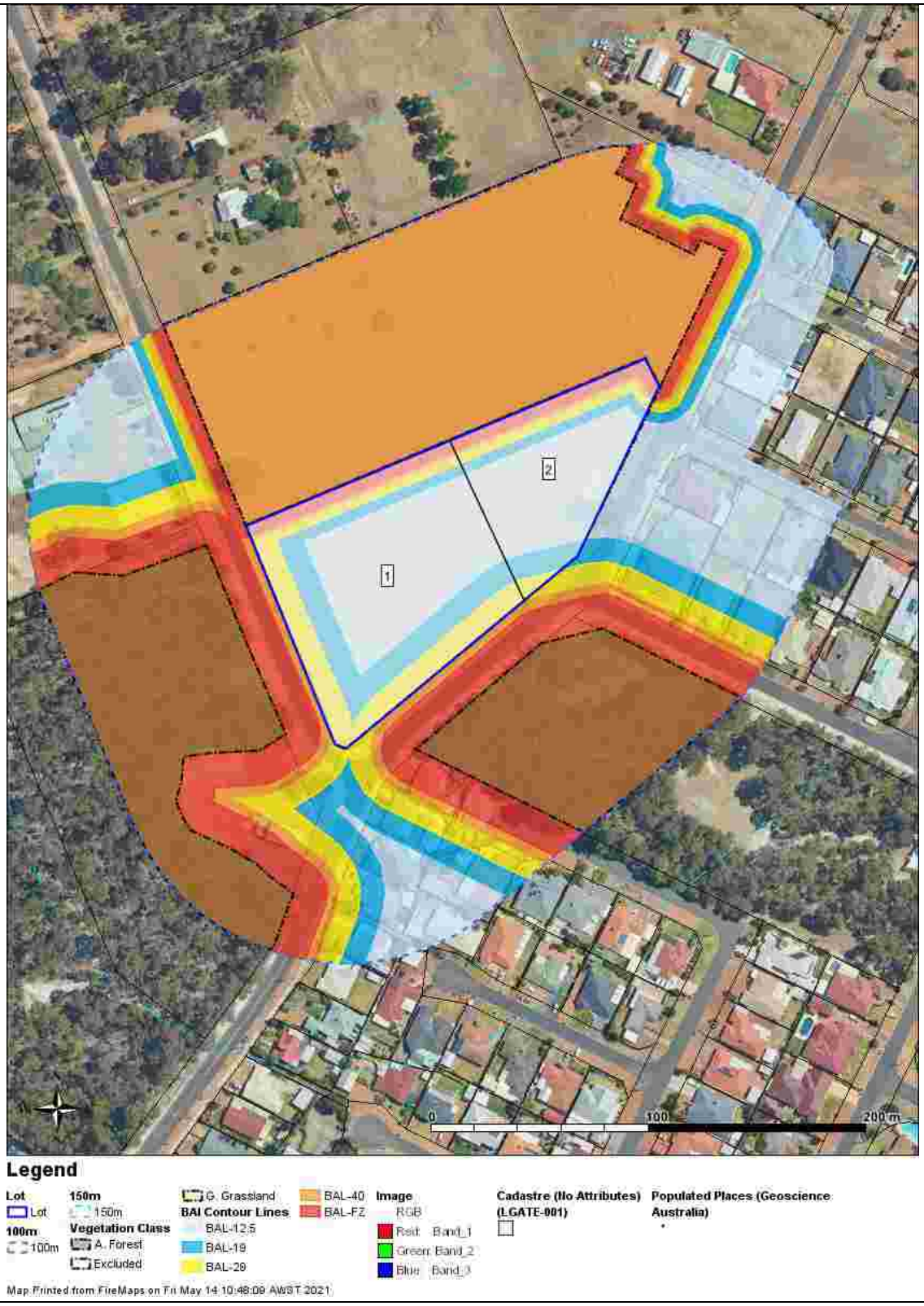
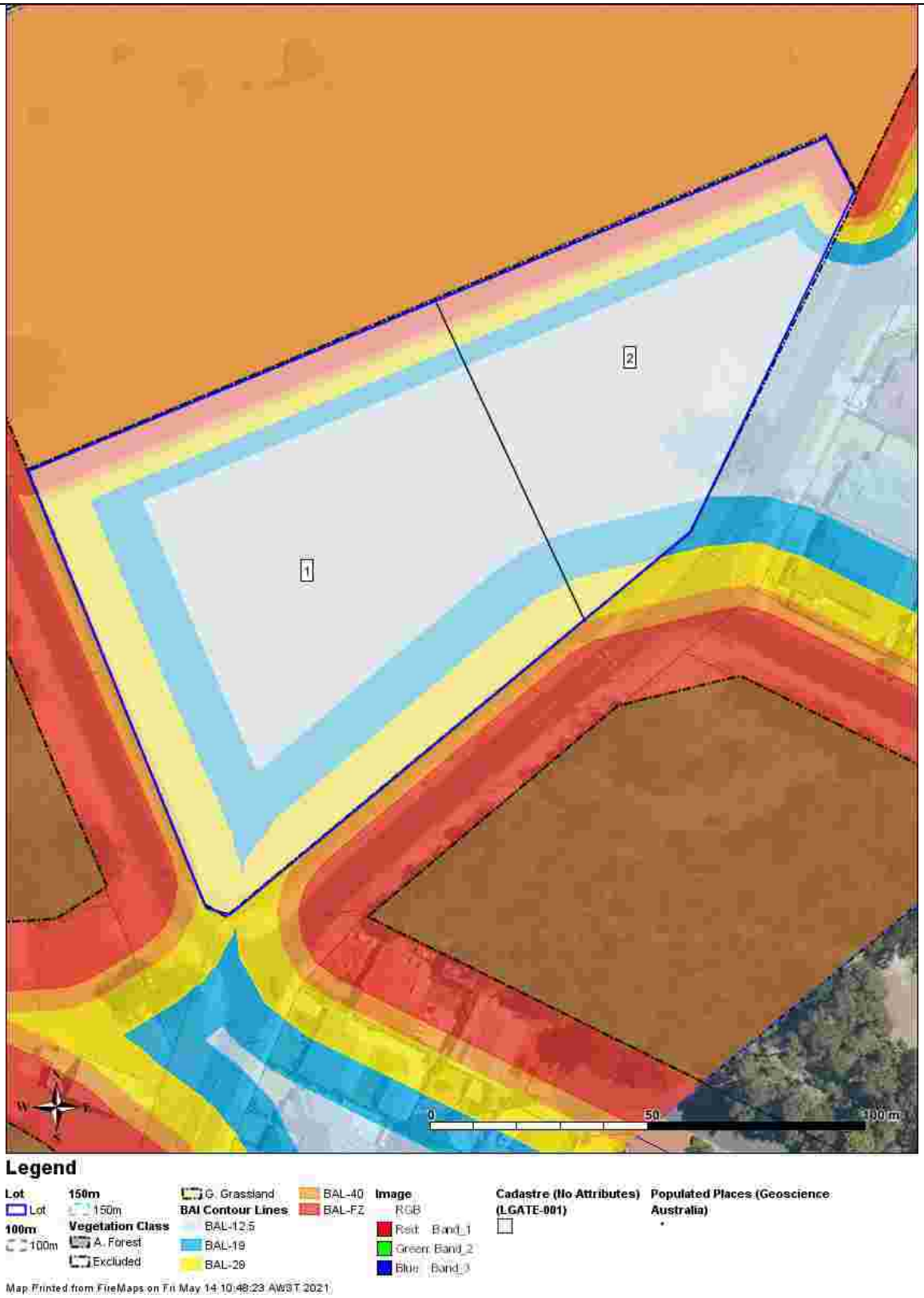


Figure 5B: *BAL Contour Map (detailed view)*



5.2 Bushfire Hazard Issues

The intent of State Planning Policy (SPP) 3.7 Planning in Bushfire Prone Areas (Department of Planning and Western Australian Planning Commission, 2015) is to ensure that bushfire risks are considered in a timely manner and that planning documents demonstrate the appropriate application of the various policy measures. Table 3 summarises the intent and objectives of SPP 3.7 and provides evidence of how the site complies.

From the BAL Assessment and BAL Contour Maps, the following bushfire hazard issues have been identified:

- The proposed lots are subject to a rating of BAL-29 when assessed subject to appropriate siting.
- Asset Protection Zones are required to be maintained to ensure the BAL ratings for future applicable buildings are not impacted by any onsite vegetation. This is addressed in Section 6 of this report.
- The BAL ratings provided in the BAL Contour Maps and associated tables are indicative only and are for the purposes of demonstrating compliance with the bushfire protection criteria of SPP 3.7. Individual BAL assessments are required to determine the final BAL ratings for applicable buildings prior to the issuance of building permits.
- Future residential buildings and any associated Class 10a buildings are to be constructed to the applicable construction standard of AS 3959.
- Due to the proposed subdivision being subject to a rating above BAL-LOW the relevant bushfire protection criteria apply and are addressed in Section 6 of this report.

6.0 Bushfire Protection Criteria

6.1 Guidelines for Planning in Bushfire Prone Areas Version 1.3 (the Guidelines)

The Guidelines apply to subdivision applications located within designated bushfire prone areas. The Guidelines provide supporting information for implementation of SPP 3.7. Specifically, they provide the Bushfire Protection Criteria to be address for all applications.

6.2 Proposal Assessment

Table 6A provides an assessment against the bushfire protection criteria detailed in Appendix 4 of the Guidelines, including the applicable Acceptable Solutions for each element.

Table 6A: *Assessment against the bushfire protection criteria of the Guidelines*

Element	Acceptable Solution (A)	Compliance	Notes
1. Location	A1.1 Development location	YES	The development location is assessed as capable of achieving a BAL rating of BAL-29 for proposed lots subject to appropriate siting.
2. Siting of Development	A2.1 Asset Protection Zone	YES	APZs to be implemented prior to the clearance of subdivision is issued for affected lots in accordance with Figure 6A and is to be maintained in accordance with the specifications detailed in Appendix 1.
3. Vehicular Access	A3.1 Two access routes	YES	Both lots can be directly accessed from Prinsep St to the South of the lots that connects to the greater area public road network providing access in multiple directions
	A3.2 Public road	N/A	Public roads are existing do not form part of this subdivision application.
	A3.3 Cul-de-sac	N/A	No cul-de-sacs are part of this subdivision application.
	A3.4 Battle-axe	N/A	Battle-axe are not required as part of this subdivision.
	A3.5 Private driveways longer than 50m	YES	Any Driveways over 50m will need to comply with appendix 3
	A3.6 Emergency access way	N/A	No emergency access ways are required.

Element	Acceptable Solution (A)	Compliance	Notes
	A3.7 Fire service access routes	N/A	No fire service access routes are required.
	A3.8 Firebreak widths	N/A	Firebreaks are not required to be installed.
4. Water	A4.1 Reticulated areas	YES	The lot is located in a reticulated area.
	A4.2 Non-reticulated areas	N/A	Water tanks for firefighting purposes with a hydrant or standpipe are to be provided (50,000 litres capacity tank).
	A4.3 Individual lots within non-reticulated areas	N/A	A dedicated water tank for firefighting is not required.

6.3 Bushfire Management Strategies

The required risk management measures, as detailed in Table 6A, are illustrated in the following Bushfire Management Strategies Map (Figure 6A)

Figure 6A: *Bushfire Management Strategies Map*

7.0 Implementation and Management

Table 7A: *Schedule of Required Works*

Developer	
No.	**Management Action**
1	Maintain the Asset Protection Zone (APZ) to the standards stated in the Bushfire Management Plan
2	Make this report available to all new land owners
3	Install Driveway access

Landowner/Occupier	
No.	**Management Action**
1	On an ongoing basis, maintain the Asset Protection Zones (APZ) to the standards stated in the Bushfire Management Plan
2	Each year, comply with the relevant local government Annual Firebreak and Fuel Load Notice issued under s33 of the Bush Fires Act 1954.

Local Government	
No.	**Management Action**
1	Enforcement of firebreak notices and asset protection zones

8.0 References

Shire of Collie. Annual Firebreak and Fuel Load Notice 2020/21 Shire of Collie, WA.

OBRM. (2019). Map of Bush Fire Prone Areas 2019. Office of Bushfire Risk Management. Perth, WA.

Standards Australia. (2009). AS 3959-2018 Construction of buildings in bushfire prone areas. SAI Global.

WAPC. (2015). State Planning Policy 3.7 Planning in Bushfire Prone Areas. Western Australian Planning Commission & Department of Planning.

WAPC. (2016). Planning Bulletin 111/2016 Planning in Bushfire Prone Areas. Western Australian Planning Commission.

WAPC. (2017a). Guidelines for Planning in Bushfire Prone Areas Version 1.3. Western Australian Planning Commission, Department of Planning & Department of Fire and Emergency Services.

WAPC. (2017b). Guidelines for Planning in Bushfire Prone Areas Appendices Version 1.3. Western Australian Planning Commission, Department of Planning & Department of Fire and Emergency Services.

Table A1: Abbreviations- General terms

APZ	Asset Protection Zone
AS 3959	*Australian Standard 3959-2018 Construction of buildings in bushfire prone areas*
BAL	Bushfire Attack Level
BMP	Bushfire Management Plan
BPAD	Bushfire Planning and Design
FDI	Fire Danger Index
FZ	Flame Zone
MRS	Metropolitan Regional Scheme
POS	Public Open Space

Appendix 1 – Asset Protection Zone Specifications

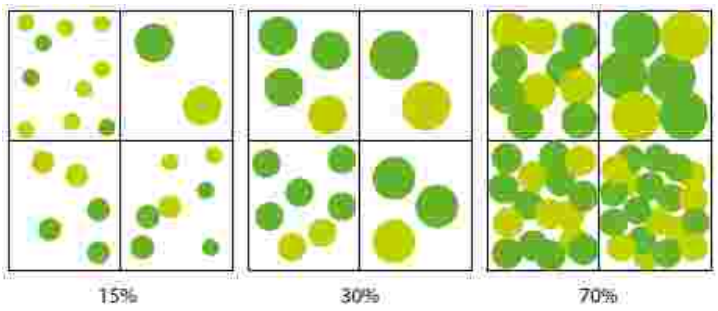
Source: Guidelines for Planning in Bushfire Prone Areas (DoP/DFES v1.3 2017)

Fences: within the APZ are constructed from non-combustible materials (e.g. iron, brick, limestone, metal post and wire). It is recommended that solid or slatted non-combustible perimeter fences are used.

Objects: within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e. windows and doors.

Fine Fuel Load: combustible dead vegetation matter less than 6 mm in thickness reduced to and maintained at an average of two tonnes per hectare. The visual guide below shows a fuel load that equates to approximately 2t/ha (source: Shire of Augusta Margaret River).

Trees (> 5 metres in height): trunks at maturity should be a minimum distance of 6 metres from all elevations of the building, branches at maturity should not touch or overhang the building, lower branches should be removed to a height of 2 metres above the ground and or surface vegetation, canopy cover should be less than 15% with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy. Diagram below represents tree canopy cover at maturity.



Shrubs (0.5 metres to 5 metres in height): should not be located under trees or within 3 metres of buildings, should not be planted in clumps greater than 5m2 in area, clumps of shrubs should be separated from each other and any exposed window or door by at least 10 metres. Shrubs greater than 5 metres in height are to be treated as trees.

Ground covers (<0.5 metres in height): can be planted under trees but must be properly maintained to remove dead plant material and any parts within 2 metres of a structure, but 3 metres from windows or doors if greater than 100 mm in height. Ground covers greater than 0.5 metres in height are to be treated as shrubs.

Grass: should be managed to maintain a height of 100 mm or less.

Appendix 2 – Local Government Firebreak and Fuel Load Notice

Shire of
Collie

FIRST AND FINAL NOTICE IS HEREBY SERVED
TO ALL RESIDENTSAND RATEPAYERS.

Firebreak & Fuel Hazard Reduction Notice 2020-2021

Your legal responsibilities and fire safety information.

Failure to install and maintain firebreaks in accordance with this Notice may result in a $5000 fine.

FIRE DANGER V:

TO REPORT ANY FIRE
DIAL 000

This notice and information has effect from 1 August.
All previous firebreak notices are hereby cancelled.

FIREBREAK NOTICE

A MINIMUM OF A 3 METER FIREBREAK IS REQUIRED

*As dates are subject to seasonal change refer to: www.collie.wa.gov.au or phone 9734 9000 for up to date information

BUSH FIRES ACT 1954
SHIRE OF COLLIE

Please read carefully

These are your legal requirements

You are hereby required, and are therefore ordered by the local government for all property owners/occupiers to comply with this Notice and/or an approved Bush Fire Management Plan (BMP) by **01 December each year and maintained compliance until 31 May** following for each year and every year. These requirements are defined further in this Notice by the relevant property area.

Pursuant to the powers contained in section 33 of the Bush Fires Act 1954 (as amended) you are required on or before 01 December to remove from your land whether owned or occupied by you, all flammable material to install unobstructed mineral earth fire breaks if required that can be trafficable. Thereafter maintain the land up to and including 31May, in such positions/dimensions as specified within this Notice, or approved in writing by Council or its authorised officers.

Landowners should note that restrictions exist on clearing native vegetation under other legislation. Clearing in accordance with this Firebreak Notice should be limited to the extent necessary to comply with this Notice.

FAILURE TO COMPLY MAY RESULT IN A $5000 FINE.

Firebreak: Means a strip of land that has been cleared of all trees, bushes, grasses and any other object or thing or flammable material leaving clear bare mineral earth 3 metres wide and 5 metres vertical clearance. This includes the trimming back of all overhanging trees, bushes, shrubs and any other object or thing over the firebreak area.

Read in conjunction with 'Important Information' section on next page			
WHAT and WHEN can I burn	**Garden Refuse**	**Wood or Solid Fuel BBQ, Camp and Cooking Fires**	**Grass Paddock, Bonfire, Bush**
Restricted **Burning Period** 2 November to 14 December	**Yes** Permit required	**Yes** **Check Fire Danger Ratings**	**Yes** Permit required
Prohibited* **Burning Period** 15 December to 14 March	**ALL FIRES PROHIBITED**	**ALL FIRES PROHIBITED**	**ALL FIRES PROHIBITED**
Restricted **Burning Period** 15 March to 31 May	**Yes** Permit required	**Yes** **Check Fire Danger Ratings**	**Yes** Permit required

BURNING INFORMATION

IMPORTANT INFORMATION

On any day during the restricted burning period where the fire danger rating is **CATASTROPHIC, SEVERE, EXTREME** and **VERY HIGH,** garden refuse, wood or solid fuel barbecues, camp & cooking fires or pizza ovens are NOT permitted to be used under any circumstances. Permits are automatically cancelled on these days.

Due to unseasonable weather conditions **RESTRICTED** and **PROHIBITED** burning dates may be extended or shortened. Fire Control Officers have the authority under the Bush Fires Act 1954 to halt any activity or operation that they deem as hazardous or likely to start a fire.

Penalties will be enforced by the Shire of Collie for failing to comply with the annual Firebreak notice.

You must check the local newspaper for details or call Shire Rangers on 9734 9000 or 0408 931 274 for further information. The fire danger rating can be found by calling the Bureau of Meteorology SW information line 1300 659 210.

WHAT CAN I BE FINED IF I DON'T COMPLY?

Failure to comply with this Notice	On the Spot Fine of $250 or prosecution of up to $5000
Offences relating to lighting fires in open air	$3000
Setting fire to the bush during prohibited burning times	$250,000 or up to 14 years imprisonment
Failure of occupier to extinguish bush fire	$10,000
Refusal to state name and abode or stating false name or abode	$1000
Failure to produce to permit to burn	$1000

WHAT IS A TOTAL FIRE BAN?

On a Total Fire Ban day, you are not allowed to light an open-air fire or conduct any activity that could start a fire. This includes lighting a campfire, using a welder, grinder or incinerator, conducting a burn-off, burning leaves and garden waste, firing up a wood or charcoal BBQ, using a wood-fired pizza oven, driving a vehicle in fire-prone areas and more.

Penalties for breach of a Total Fire Ban are **$1,000 on-the-spot fine** or up to **$25,000** and even receive **jail time of up to 12 months** if it is a serious breach.

For Lot Sizes Under 2024m²

YOUR LEGAL REQUIREMENTS ARE:

Compliance Date: 1 December through to 31 May inclusive each and every year.

Compliance	Compliance requirements
Fuel Reduction	Where your land is under 2024 square metres (half acre), all hazardous material is to be removed from the land excluding living plants and trees.
Clearance around Dwellings and Outbuildings	Grasses are to be slashed, mowed or by other means, maintained below 10 cms throughout the period of 1 December until 31May inclusive.
Vacant land – Cleared blocks	Where you have a vacant block that has been cleared. Grasses are to be slashed, mowed or by other means, maintained below 10cm throughout the period of 1 December until 31May inclusive.
Vacant land – Timbered or Bush Block	Where you have a vacant block that is timbered or bush. Hazardous material is to be removed from the land excluding living plants and trees. This includes dead branches, trees, leaf litter, twigs and bark to an acceptable standard.
Garden refuse and or wood stacks/ piles	2 metre clearance is required around all piles of garden refuse and or wood.

For Lot Sizes Between 2024m² and 5 Hectares

YOUR LEGAL REQUIREMENTS ARE:

Compliance Date: 1 December through to 31 May inclusive each and every year.

Compliance	Compliance requirements
All subdivisions with Bush Fire Management Plans/ and or Variations to Firebreak	Properties to comply with Approved Bush Fire Management Plans, approved Variation to Firebreaks, and this Notice.
Mineral Earth Firebreaks	Minimum 3 metre firebreak immediately inside all boundaries (can be extended to 6 metres of all boundaries) or as stated in your approved Fire Management Plan. Exempt if pasture maintained below 10cm.
Clearance around Dwellings and Outbuildings	1 metre horizontal and 5 metres vertical clearance around all dwellings and outbuildings. These include sheds, garages, water tanks, storage containers etc. Garden beds are allowed within this area if they are reticulated and maintained.
Asset Protection Zone – 0-20 metres around all dwellings	Area to be free from garden beds, shrubs, plants and grasses, unless it can be demonstrated to be reticulated and/ or regularly maintained. Hazardous material is to be removed excluding living plants and trees. This includes dead branches, trees, leaf litter, twigs and bark. To an acceptable standard of no more than 10cm in depth.
Hazard Separation Zone	Low fuel area (up to 10cm in depth) up to a distance of 100 metres between the buildings and the hazard if land is available.
Ungrazed Pastureland	To be slashed, mowed or by other means, maintained below 10cm throughout the period of 1 December until 31 May inclusive.
Garden refuse and or wood stacks/piles	A 3 metre clearance is required around all piles of garden refuge and or wood.
Fuel storage & haystack protection zone	Construct a 4 metre firebreak not closer than 6 metres around haystacks, and immediately around fuel storage tanks or gas cylinders.

All Land Over 5 Hectares

YOUR LEGAL REQUIREMENTS ARE:

*Compliance Date: **1** December through to **31** May inclusive each and every year.*

Compliance	Compliance requirements
All subdivisions with Bush Fire Management Plans/ and or Variations to Firebreaks	ALL properties to comply with Approved Bush Fire Management Plans, Approved Variation to Firebreaks and this Notice.
Clearance around Dwellings and Outbuildings	1 metre horizontal and 5 metre vertical clearance around all dwellings and outbuildings. These include sheds, garages, water tanks, storage containers etc. Garden beds are allowed within this area if they are reticulated and maintained.
Asset Protection Zone – 0-20 metres around all dwellings	Area to be free from garden beds, shrubs, plants and grasses, unless it can be demonstrated to be reticulated and/ or regularly maintained. Hazardous material is to be removed excluding living plants and trees. This includes dead branches, trees, leaf litter, twigs and bark. To an acceptable standard of no more than 10cm in depth.
Hazard Separation Zone	Low fuel area (up to 10cm in depth) up to a distance of 100 metres between the buildings and the hazard if land is available.
Garden refuse and or wood stacks/ piles	3 metre clearance is required around all piles of garden refuse and or wood.
Mineral Earth Firebreaks	Minimum 3 metre firebreak within 100 metres of all boundaries. Plantations 15 metres
Fuel storage & haystack protection zone	Construct a 4 metre firebreak not closer than 6 metres around haystacks, and immediately around fuel storage tanks or gas cylinders.

General Enquiries
Shire of Collie (08) 9734 9000
colshire@collie.wa.gov.au

Chief Bush Fire Control Officer

Julian Martin	0409 884 291

Deputy Chief Bush Fire Control Officer

Kohdy Flynn	0408 931 274

Firebreak Inspection Officers

Community Rangers	0408 931 274

Fire Control Officers

Collie	Rangers	0408 931 274
	Shane Hickson	0429 114 807
Allanson	Kohdy Flynn	0408 931 274
Buckingham	Graeme Pilatti	0407 779 172
CollieBurn/Cardiff	Neil Waywood	0429 114 837
Harris River	Michael Hart	0429 345 507
Williams Road	Julian Martin	0409 884 291
Worsley	Graham Genev	0437 883 589
Collie-Preston	Phil Bartolo	0419 918 588
Mungalup Road	Rangers	0408 931 274

Local Hazard Reduction Contractors

Rod Cross	0409 889 298
Chappell Landscaping	0417 183 608
MKJ Lawnmowing	0409 295 245
Terry Kowal (Rural)	0428 533 469
East End Contractors	0427 341 019
Neil Fraser	0428 342 775

For Information on applying for a Permit to Burn, Asset Protection Zone, Firebreak Variation guidelines and other general information, please refer to the website: collie.wa.gov.au

Shire of Collie

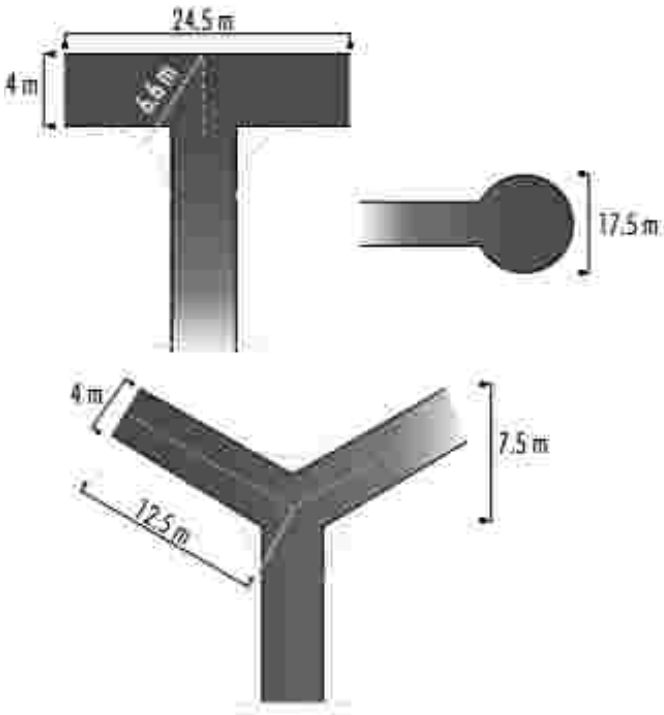
Appendix 3 - Driveway Access

For a driveway shorter than 50 metres, fire appliances typically operate from the street frontage however where the distance exceeds 50 metres, then fire appliances will need to gain access along the driveway in order to defend the camp during a bushfire. Where sites are more than 50 metres from a public road, access to individual houses and turnaround areas should be available for both conventional two wheel drive vehicles of residents and type 3.4 fire appliances.

Turn-around areas should be located within 50 metres of the camp. Passing bays must be installed every 200 metres and turn-around areas will also need to be installed..

Passing bays should be provided at 200 metre intervals along private driveways to allow two-way traffic. The passing bays should be a minimum length of 20 metres, with the combined width of the passing bay and the access being a minimum of six metres.

Turn-around areas should allow type 3.4 fire appliances to turn around safely (i.e. kerb to kerb 17.5 metres) and should be available at the house sites and at 500 metre intervals along the driveway



Vehicular access technical requirements

TECHNICAL REQUIREMENTS	Public road	Cul-de-sac	Private driveway	Emergency access way	Fire service access routes
Minimum trafficable surface (m)	6*	6	4	6*	6*
Horizontal clearance (m)	6	6	6	6	6
Vertical clearance (m)	4.5	N/A	4.5	4.5	4.5
Maximum grade	1 in 10	1 in 10	1 in 10	1 in 10	1in 10
Minimum weight capacity (t)	15	15	15	15	15
Maximum crossfall	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius (m)	8.5	8.5	8.5	8.5	8.5

Bushfire Management Plan/Statement addressing the Bushfire Protection

Criteria Coversheet

Site Visit: Yes☒ No☐

		YES	NO
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?		☐	☒
Have any of the bushfire protection criteria elements been addressed using a performance principle (tick no if only acceptable solutions have been used to address all the bushfire protection criteria elements)?		☐	☒
Is the proposal any of the following (see SPP 3.7 for definitions)?			
Unavoidable development (in BAL-40 or BAL-FZ)		☐	☒
Strategic planning proposal (including rezoning applications)		☐	☒
High risk land-use		☐	☒
Vulnerable land-use		☐	☒

Note: Only if one (or more) of the above answers in the tables is yes should the decision maker (e.g. local government or the WAPC) refer the proposal to DFES for comment.

If then why has it been given one of the above listed classifications (E.g. Considered vulnerable land- use as the development is for accommodation of the elderly, etc.)?

The information provided within this bushfire management plan to the best of my knowledge is true and correct

Author: Roderick Cameron BPAD37279 - Date: Friday, 14 May 2021

Planned Focus

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