

DYNAMIC PLANNING
AND DEVELOPMENTS

PROPOSED LOCAL STRUCTURE PLAN

LOT 6 (NO. 139) HAWKE AVENUE, WUNDOWIE

This structure plan is prepared under the provisions of the Shire of Northam
Local Planning Scheme No. 6

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY
RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION
ON: 22 JANUARY 2016

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:

M. Wieclaw

Witness

25 January 2016

Date

22 January 2026 _____ Date of Expiry

TABLE OF AMENDMENTS

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

TABLE OF DENSITY PLANS

Density Plan No.	Area of Density Plan Application	Date Endorsed by WAPC

EXECUTIVE SUMMARY

This submission, prepared on behalf of Kilarra Pty Ltd, the proponent of Lot 6 (No. 139) Hawke Avenue, Wundowie (herein referred to as the ‘subject site’) seeks support from the planning authorities to approve the proposed Local Structure Plan (LSP).

The LSP provides a framework for the future development of the subject land and a context for the consideration and approval of future subdivision applications.

The LPS has been prepared for 8.1 hectares of land located within the Northam South Locality for adoption under the provision of the Shire of Northam, Local Planning Scheme No. 6.

Item	Data		Structure Plan Reference (Section Number)
Total area covered by Structure Plan	8.1ha		Part 1 Section 1.0
Area of each land use proposed:	Hectares	Lot Yield	Part 2 Section 3.1
- Residential	0ha	0 lots	
- Public Open Space	0ha	0 lots	
- Parks and Recreation	0ha	0 lots	
- Rural Residential	7.56ha	7 lots	
Estimated Lot Yield	7 lots		Part 2 Section 3.1
Estimated Number of Dwellings	7 dwellings		Part 2 Section 3.1
Estimated Residential Site Density	Rural Residential		Part 2 Section 3.1
Estimated Population*	17		Part 2 Section 3.1
Number of High Schools	0		N/A
Number of Primary Schools	0		N/A
Estimated Commercial Floor Space	0		N/A
Estimated Area and Percentage of Public Open Space given over to:	Hectares	Percentage/Number of Parks	Part 2 Section 3.2
- Regional Open Space	0ha	0%	
- District Open Space	0	0%	
- Neighbourhood Parks	0	0 parks	
- Local Parks	0ha	0 parks	
Estimated Percentage of Natural Area:	Hectares	Percentage	N/A
	0ha	0%	

* Based on Australian Bureau of Statistics, Census of Population and Housing 2011 which states average household size in the Shire of Northam to be 2.5 per dwelling.

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APPENDIX 3: BUSHFIRE MANAGEMENT PLAN

PART ONE – IMPLEMENTATION

1.0 Local Structure Plan Area

This Local Structure Plan (LSP) shall apply to Lot 6 (No. 139) Hawke Avenue, Wundowie being the land contained within the inner edge of the line denoting the LSP boundary of the LSP map (Plan 3).

2.0 Local Structure Plan Content

This LSP comprises:

- a) Part One – Implementation
This section contains the LSP map and the subdivision and development provisions and requirements.
- b) Part Two – Explanatory Section and Technical Appendices
This section is to be used as a reference guide to interpret and justify the implementation of Part One.
- c) Appendices – Technical reports, supporting plans and maps.

3.0 Interpretation and Scheme Relationship

Unless otherwise specified in this part, the words and expressions used in this LSP shall have the respective meanings given to them in the Shire of Northam Local Planning Scheme No. 6 (LPS6) including any amendments gazetted thereto.

The LSP map (Plan 3) outlines land use, zones and reserves applicable within the LSP map area.

Pursuant to Part 4 of the deemed provisions of the Planning and Development (Local Planning Scheme) Regulations 2015:

- a) Part Two of this LSP and all appendices are to be used as a reference only to clarify and guide interpretation and implementation of Part One.

4.0 Operation

In accordance with Part 4 of the deemed provisions of the Planning and Development (Local Planning Scheme) Regulations 2015, this LSP shall come into operation when it is approved by the Western Australian Planning Commission (WAPC).

5.0 Subdivision and Development Requirements

5.1 Land Use Permissibility

The LSP map (Plan 3) provides a basis to guide subdivision and development within the LSP area.

Land use permissibility within the LSP area shall be in accordance with the corresponding zone or reserve under the Scheme.

5.2 Residential

5.2.1 Dwelling Target

Objective: To provide for seven (7) dwellings within the LSP area.

5.2.2 Density

The LSP area is zoned Rural Residential which provides for a minimum lot size of 1ha.

PART TWO – EXPLANATORY SECTION AND TECHNICAL APPENDICES

1.0 Planning Background

1.1 Introduction and Purpose

The key objectives of the LSP are as follows:

- To provide a basis to guide the use, subdivision and development of land to create a high quality urban environment.
- To achieve an optimum housing density with an emphasis of introducing a diversity in housing choice into the locality.
- Capitalise on the natural amenity of the area afforded through Kwolyinine Nature Reserve, which is reserved as ‘Conservation of Flora & Fauna’ reservation under LPS6, and located in close proximity to the subject site.

1.2 Land Description

1.2.1 Location

The subject site is located within the suburb of Wundowie, within the municipality of the Shire of Northam.

The subject site is located approximately 67 kilometres north-east of the Perth City Centre, approximately 33 kilometres south-west of the Northam Townsite and approximately 1.5 kilometres south of the Wundowie Townsite which provides a range of services including retail, community and entertainment uses.

Plan 1 illustrates the subject site’s location.

1.2.2 Area and Land Use

The subject site is bound by ‘Rural Residential’ zoned properties to the north, east and south, and Hawke Avenue to the west.

The subject land is approximately 8.1 hectares in area and comprises one (1) lot. The subject site has been predominantly cleared and comprises an existing dwelling and structures located in the south-western corner of the lot. These areas can be clearly seen in Plan 2 – Aerial.

Currently, the subject site is drained through a drainage swale which runs along the northern lot boundary which discharges into the Hawke Avenue drain.

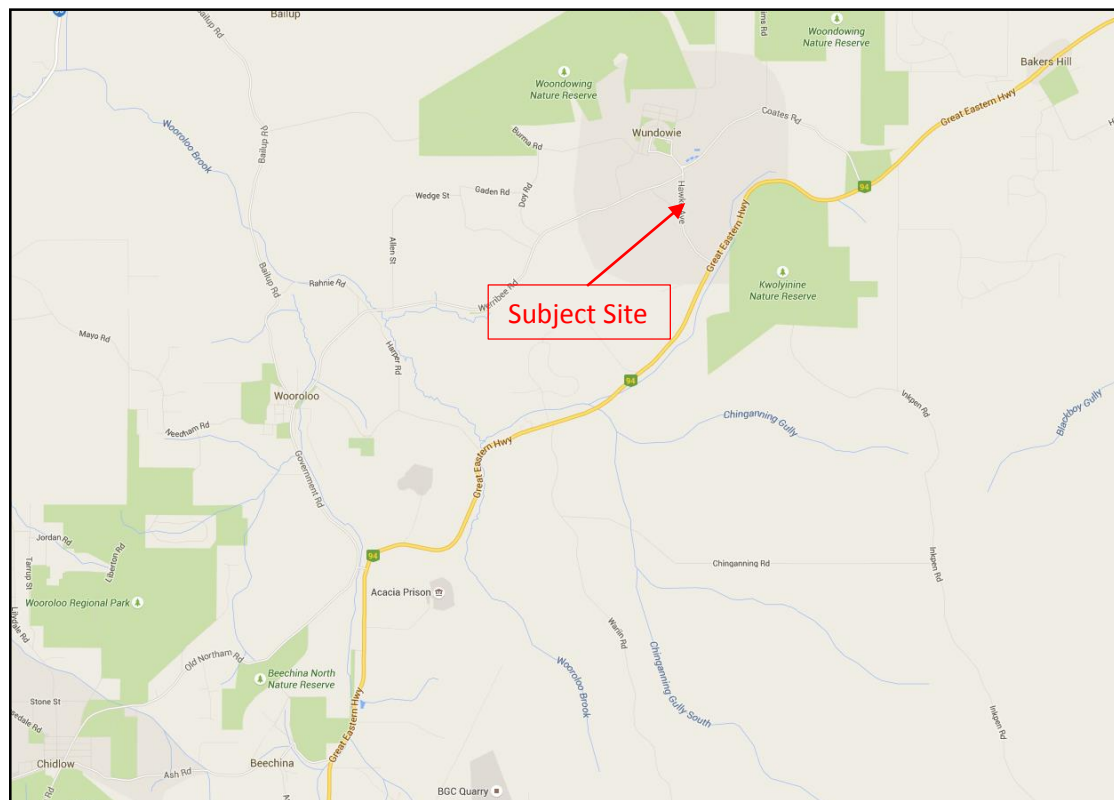
1.2.3 Legal Description and Land Ownership

The subject site has a total area of approximately 8.1 hectares. The lot forming the LSP area and the respective ownership details are outlined in the table below.

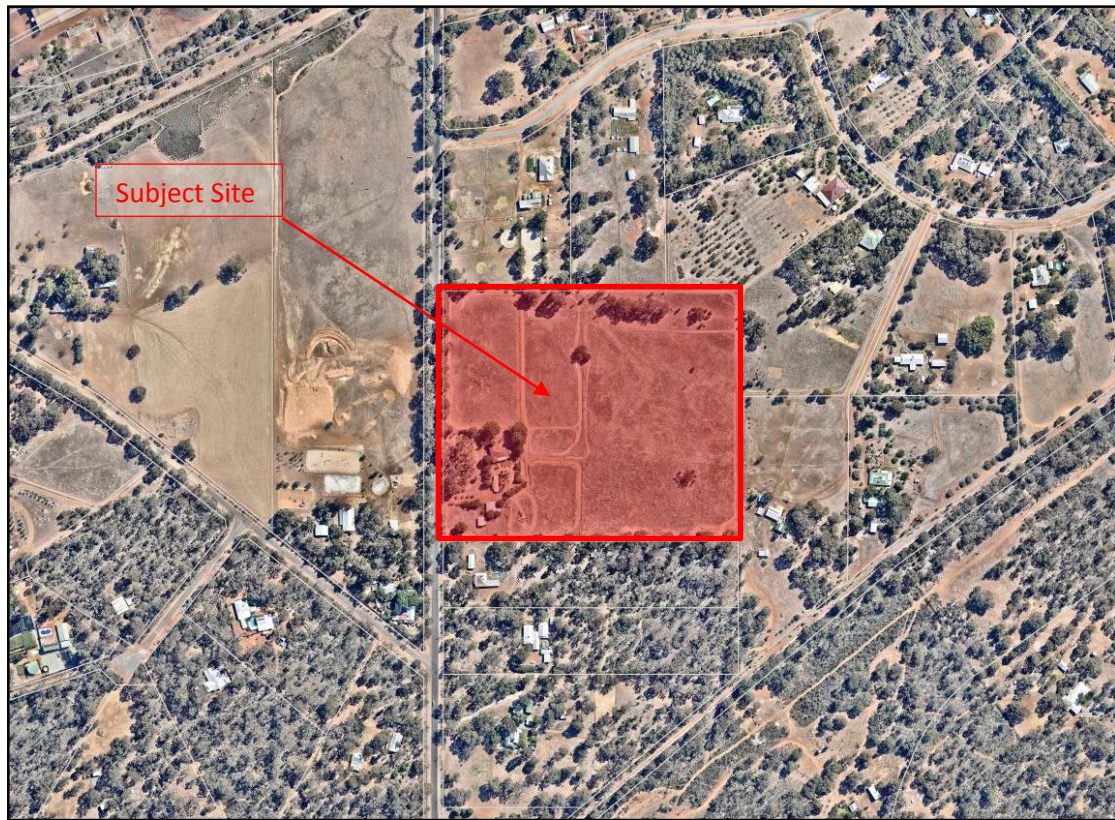
Lot	Certificate of Title	Land Ownership	Lot Area
6	6/P4744	Kilarra Pty Ltd	8.1ha

Table 1 – Certificate of Title and Ownership details

A copy of the Certificate of Title is contained in Appendix 1.



Plan 1 – Location Plan

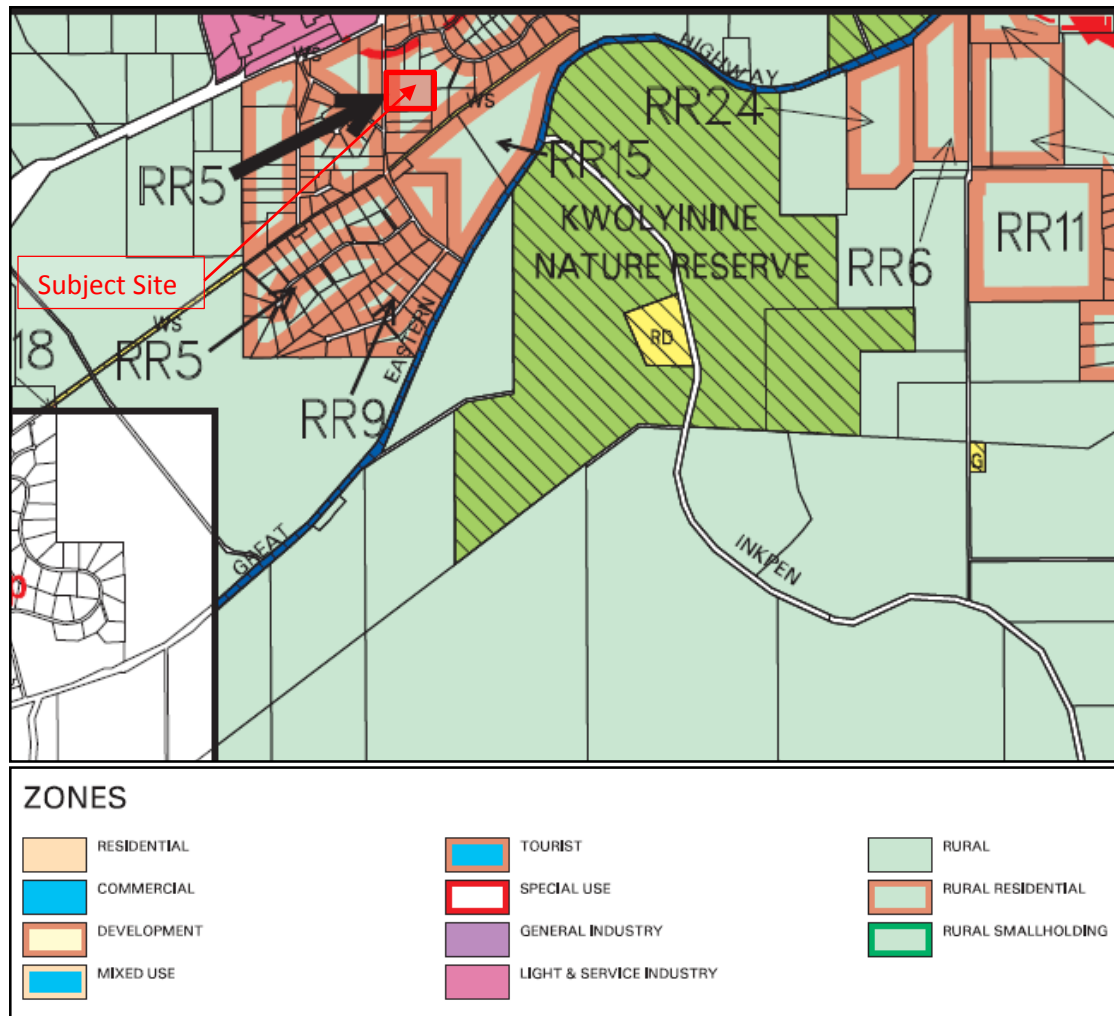


Plan 2 – Aerial Photograph

1.3 Planning Framework

1.3.1 Shire of Northam Local Planning Scheme No. 6

Under the provisions of the Shire of Northam Local Planning Scheme No. 6 (LPS6) the subject site is zoned 'Rural Residential' and 'RR5'. Plan 3 illustrates the subject site's zoning.



Plan 3 – Shire of Northam LPS6 Zoning

The objective of the 'Rural Residential' zone is:

- To provide for the use of land for rural living purposes in a rural setting on lots generally ranging in size from 1 to 4 hectares whilst preserving the amenity of such areas, ensuring landscape protection and conservation and controlling land use impacts.
- To reduce or eliminate the detrimental effect of keeping livestock in the zone by limiting stock numbers to those kept for hobby purposes and not for commercial gain.

Although explained in much greater detail in section 3 of this report, the LSP aims to introduce an increased mix of lot sizes to the Wundowie area in order to meet housing demands and affordability needs whilst introducing newer housing typologies to the market.

1.3.2 Regional and Sub-Regional Structure Plan

There are no regional or sub-regional structure plans applicable to the subject site.

1.3.3 Planning Strategies

1.3.3.1 State Planning Strategy 2050

The State Planning Strategy 2050, was prepared by the WAPC and provides a strategic planning response to the challenges that Western Australia is likely to face in the future.

It envisages that by 2050 Western Australia will double its current population and will have a diverse range of well-connected and vibrant communities of the highest quality in the world.

The LSP will allow for the future development of land for rural residential purposes which will contribute towards the goal to double the State's current population.

1.3.3.2 Liveable Neighbourhoods

Liveable Neighbourhoods is the State Government's key policy for the design and assessment of structure plans. The policy sets out a number of objectives and principle aims to ensure the design and layout of new developments:

- Facilitate ease of access, in particular walking and cycling through a network of connected streets that are safe, efficient and pleasant;
- Foster a sense of community, place and local identity;
- Support an efficient public transport system;
- Provide a variety of lot sizes, housing types and densities that support the diverse housing needs;
- Conserve and incorporate key environmental areas into designs;
- Integrate the design of open space and stormwater management systems; and
- Maximise the use of land for housing.

The implementation of these elements is fundamental to ensuring structure planning and resultant subdivisions occur in a well-considered and sustainable manner. Application of the Liveable Neighbourhoods principles is therefore relevant to all levels of planning for the site from the proposed LSP through to detailed lot and building design.

1.3.3.3 Avon Arc Sub-Regional Strategy

The purpose of the Avon Arc Sub-Regional Strategy (the Strategy) is to provide a regional framework for long-term land use within the Avon Arc. The strategy sets out a number of guiding principles which aim to ensure the objective of the strategic plan are met:

- Facilitating development that improves the regional economy, amenity and lifestyles;
- Directing settlement growth to be economically, socially and environmentally sustainable;
- Coordinating services and infrastructure in an orderly manner;
- Recognising agriculture as a significant land use and economic activity;
- Preserving the cultural heritage of the region;
- Encouraging tourism activities which provide a net benefit to the region;
- Facilitating the efficient and timely extraction of basic raw materials and mineral resources and subsequent rehabilitation;
- Conserving and enhancing the natural environment;
- Improving the landscape value;
- Promoting, protecting and expanding a regional greenway system;
- Promoting employment, training and research opportunities; and
- Integrating and co-ordinating of policies and actions across agencies and community groups.

The principles outlined within the Strategy are fundamental to guiding local planning policies, as it is through local level of planning that the objectives of this Strategy will mostly be realised.

1.3.3.4 State Planning Policy 2.5 – Land Use Planning in Rural Areas

State Planning Policy No. 2.5 – Land Use Planning in Rural Areas (SPP2.5) policy applies to rural and rural living land in Western Australia, and including the provision of creating lots for the purpose of rural living. The subject site is zoned ‘Rural Residential’ which is in keeping with the objective of SPP2.5.

1.3.3.5 Shire of Northam – Population and Housing Strategy

The Population and Housing Strategy (PHS) is a long term strategic project designed to accommodate population growth and ensure that there is a sufficient supply of suitably zoned and serviced residential land within the Shire.

As the site is zoned ‘Rural Residential’, the LSP will aid in accommodating population growth, which will contribute towards satisfying the identified need for the supply of suitably zoned and serviced residential land within the Shire of Northam.

2.0 Site Conditions and Constraints

2.1 Surface and Ground Water

A Local Water Management Strategy (LWMS) has been prepared by MJB Payne Consultants in support of the proposed LSP which analyses the subject site's pre-development ground and surface water. A copy of the LWMS is contained within Appendix 2.

2.1.1 Surface Water

Much of the rainfall that currently falls on the site percolates through to the groundwater. This means that there is initially little surface runoff from the site.

2.1.2 Ground Water

There is relatively good permeability of the soil, with minor erosions gullies evident at the north-wester corner of the site, indicating a small amount of runoff occurs from Lot 6 flowing out into the table-drain in Hawke Avenue.

2.2 Landform and Soil

The soil on Lot 6 is to be the typical orange, gravelly loam/sand found in the area, with rick present at some depth below the surface.

No Acid Sulphate soil testing has been undertaken at the subject site however, the Department of Environment Regulation (DER) mapping indicates a low to moderate risk for the subject site.

2.3 Biodiversity and Natural Area Assets

A Flora and Vegetation Survey has not been undertaken as the subject site has been cleared previously and remains cleared.

2.4 Bushfire Hazard

A Bushfire Management Plan (BMP) has been prepared by FirePlan WA in support of the proposed LSP which demonstrates compliance of the proposed LSP with all relevant criteria detailed in the WAPC (draft) Planning for Bushfire Risk Management Guidelines (2014). A copy of the BMP is contained within Appendix 3.

The pre-development site is identified through the BMP as having a low to moderate hazard classification over the site.

Given the presence of low to moderate hazard risk within the subject site, the design of the LSP has incorporated the BMP parameters to ensure the development is not exposed to an unreasonable level of bushfire related risk or threat in accordance with the requirements detailed in the WAPC Bushfire Risk Management Guidelines (2014).

2.5 Heritage

A review of the Aboriginal Heritage Online Inquiry System confirmed there are no Registered Aboriginal Sites of Other Heritage Places over the subject lot.

There are no European Heritage sites currently listed on the Heritage Council of WA's (HCWA) State Register of Heritage Places or the Shire of Northam Municipal Heritage Inventory.

3.0 Land Use and Subdivision Requirements

3.1 Design and Land Use

The proposed LSP provides for rural residential land uses consistent with the policy framework for the site. The rural residential lots have been configured to respond to the shape of the land and solar orientation.

The proposed movement network has been design in response to the Bushfire Risk in that 20 metre wide road reservation is proposed to ensure adequate separation distances are provided.

An overview of the LSP land uses and its key elements is provided in Table 2.

Item	Data	
Total area covered by Structure Plan	8.1ha	
Area of each land use proposed:	Hectares	Lot Yield
- Residential	0ha	0 lots
- Public Open Space	0ha	0 lots
- Parks and Recreation	0ha	0 lots
- Rural Residential	7.56ha	7 lots
Estimated Lot Yield	7 lots	
Estimated Number of Dwellings	7 dwellings	
Estimated Residential Site Density	Rural Residential	
Estimated Population*	17	
Number of High Schools	0	
Number of Primary Schools	0	
Estimated Commercial Floor Space	0	
Number and % of Public Open Space:	Hectares	Percentage/Number of Parks
- Regional Open Space	0ha	0%
- District Open Space	0	0%
- Neighbourhood Parks	0	0 parks
- Local Parks	0ha	0 parks
Estimated Percentage of Natural Area:	Hectares	Percentage
	0ha	0%

* Based on Australian Bureau of Statistics, Census of Population and Housing 2011 which states average household size in the Shire of Northam to be 2.5 per dwelling.

Table 2 – LSP Summary

3.2 Residential

The LSP anticipates a yield of seven (7) residential dwellings. The proposed density is intended to be sympathetic of the established rural residential character of Wundowie whilst introducing diversity of lot sizes and housing typologies to meet market and affordability demands in accordance with the strategic planning provisions. The proposed lot sizes are in keeping with the existing lot sizes located within the rural residential development located to north-east of the subject site, which is bound by Hyde Drive.

3.3 Movement Network

The LSP proposes a road running at right angle to Hawke Avenue.

All internal roads are proposed to meet the minimum standards of Liveable Neighbourhoods.

3.3.1 Vehicle Access

Access to the subject site is proposed via one (1) road intersecting with Hawke Avenue.

The indicative Concept Plan proposes two (2) lots to have dual road frontage to Hawke Avenue along the western portion of the subject site and a new subdivision road. All other lots within the development have direct frontage to the local street.

3.3.2 Parking Provision

Parking is proposed to be accommodated on-site internally throughout the development on each future lot.

3.3.3 Traffic Volumes

As a result of the forecasted subdivision and future development, traffic is expected to increase on the roads leading to and from the development; however it is not anticipated that the capacity for these roads will be exceeded.

3.3.4 Service Vehicles

The internal layout of the proposed development will support the access and egress of service vehicles such as waste removal trucks in a forward motion.

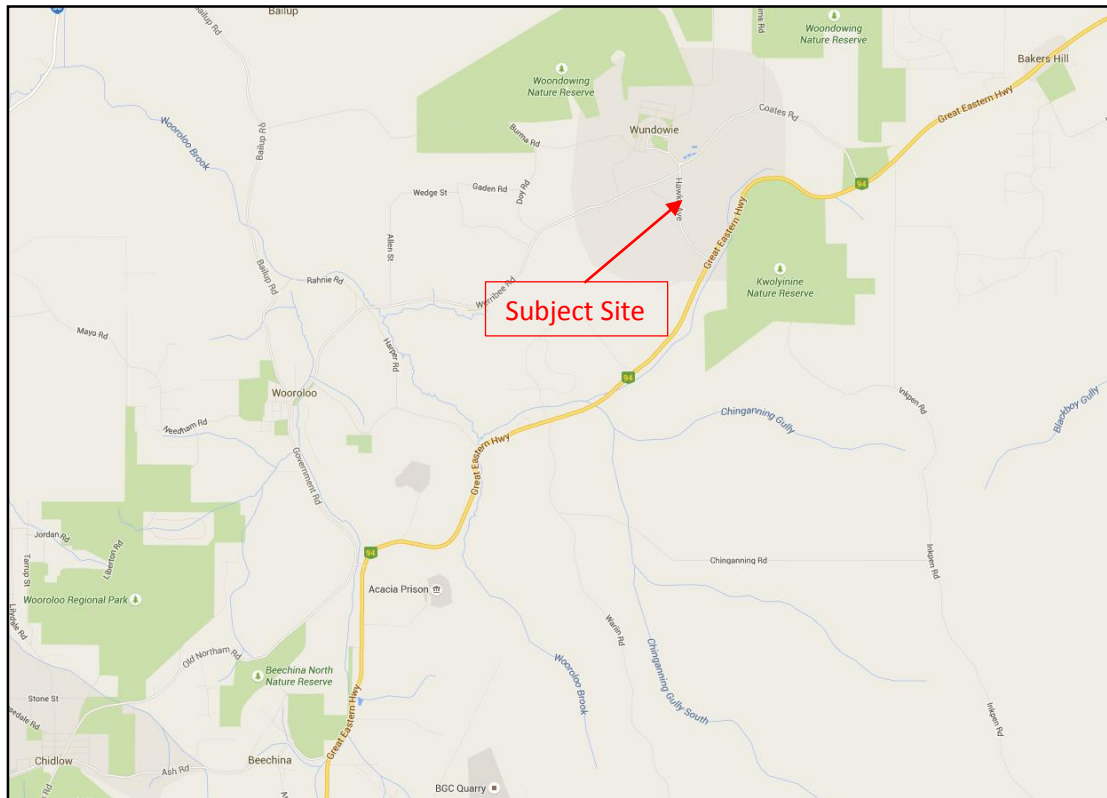
3.4 Water Management

As discussed above, a LWMS has been prepared by MJB Payne Consultants to support the proposed LSP. The LWMS sets out management requirements for water management, including specific targets (design objectives) for the management of surface and groundwater quantity and quality. The LWMS assists in integrating land and water planning as required by State Planning Policy 2.9 – Water Resources and Better Urban Water Management.

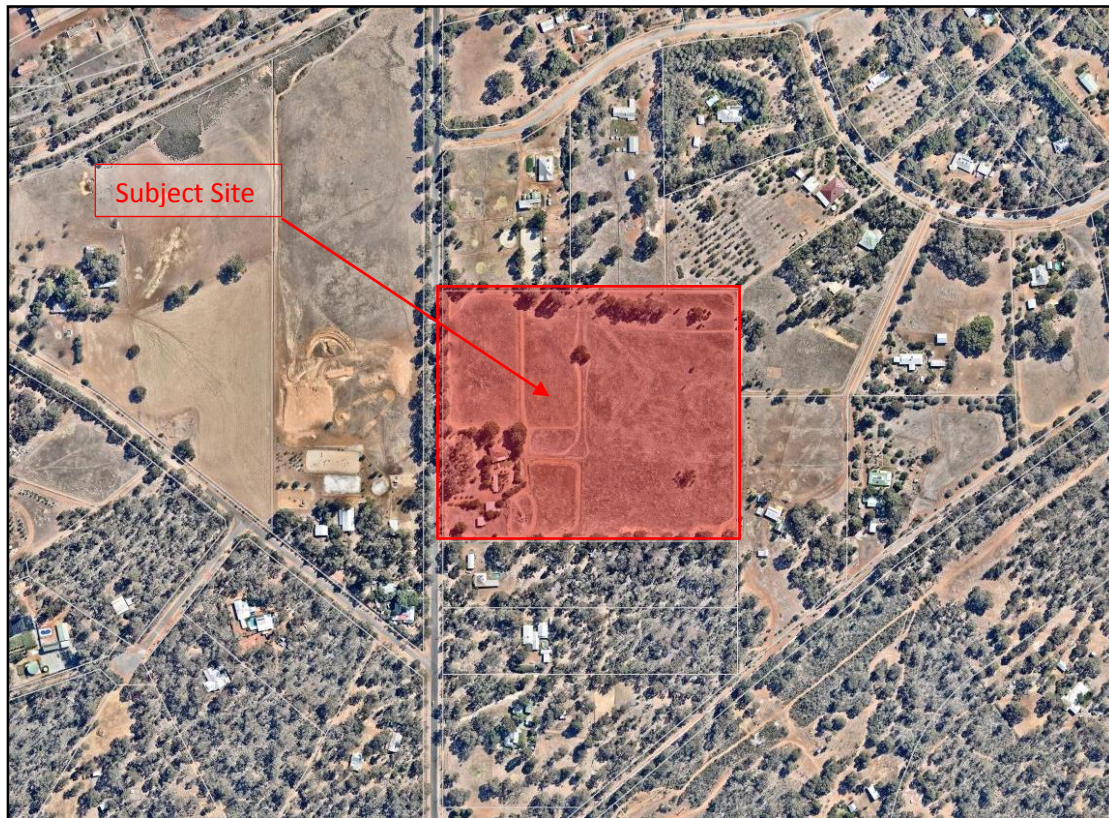
The LWMS determines the flood extent for 1 in 1, 1 in 5 and 1 in 100 year average recurrence interval events (ARI) and outlines management objectives which have been incorporated into the overall design of the drainage system for the site.

The water management for the proposed ODP and future development of the subject site is based upon the best practice water sensitive urban design which is achieved through maximising the sustainable use of water through the encouragement of water conservation and efficiency measures and controlling the flow of large storm events.

PLAN 1
Location Plan

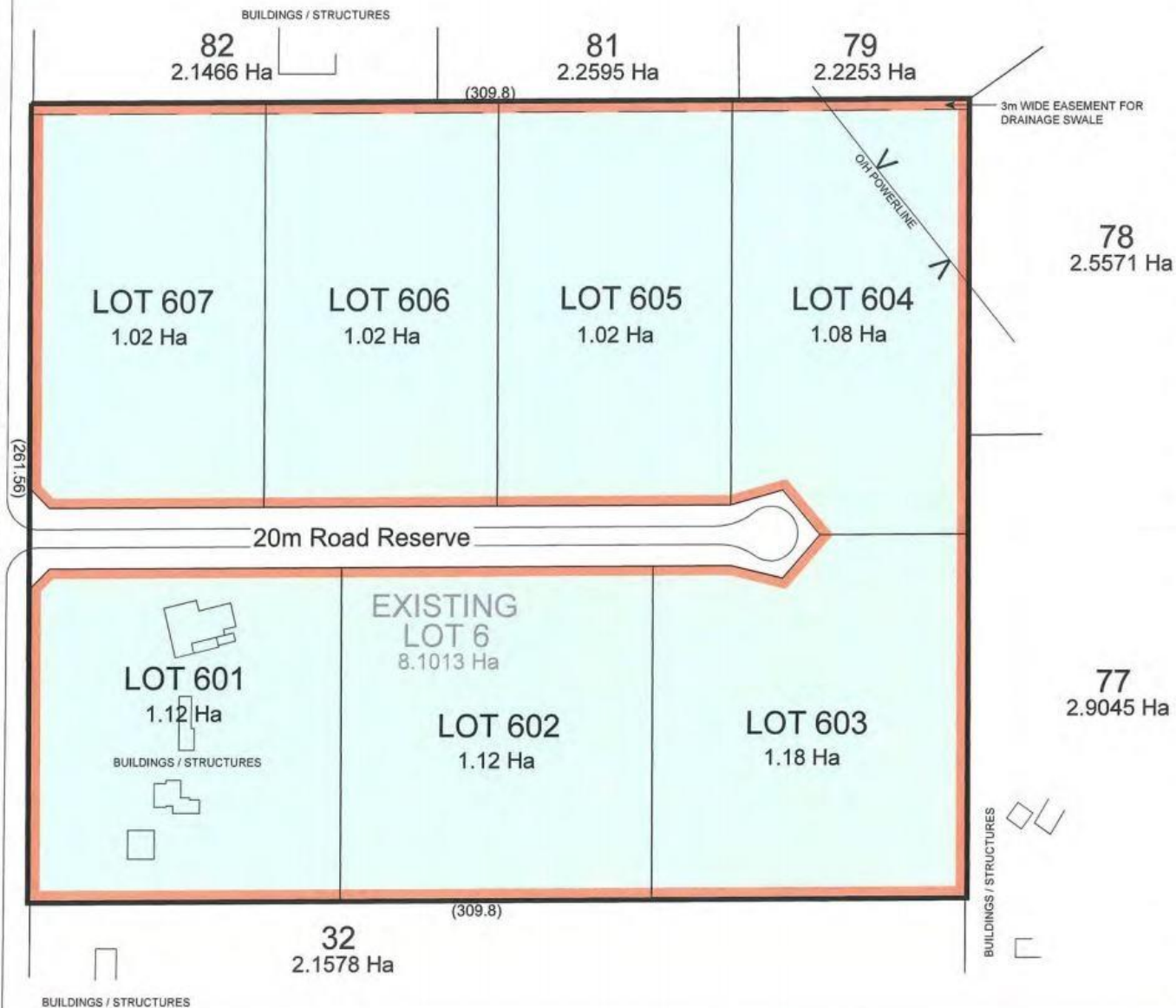


PLAN 2
Aerial Photograph



PLAN 3
Local Structure Plan

HAWKE AVENUE



Local Structure Plan Notes:

Local Structure Plan

This Local Structure Plan has been endorsed by the Council of the Shire of Northam and the Western Australian Planning Commission (WAPC). Subdivision and development should generally be in accordance with the Local Structure Plan.

Development Requirements and Lot Sizes

In considering development and subdivision on the land, the requirements of the Shire of Northam Local Planning Scheme No. 6 for the 'Rural Residential' zone applies.

Fire Control

Landowners to comply with the Shire of Northam's Firebreaks Orders, pursuant to the Bushfire Act 1954 (as amended). Individual fire breaks on private property are to be maintained by the owner/occupier to the satisfaction of the Chief Executive Officer.

Water Management

A 3m wide easement is required to the rear of Lots 604-607 to maintain the drainage swale to comply with the approved Local Water Management Strategy.

 LSP Boundary

 Rural Residential

PROPOSED LOCAL STRUCTURE PLAN

LOT 6 (No. 139) HAWKE AVENUE
WUNDOWIE

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**DYNAMIC PLANNING
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APPENDIX 1
Certificate of Title

WESTERN



AUSTRALIA

REGISTER NUMBER 6/P4744	
DUPLICATE EDITION 1	DATE DUPLICATE ISSUED 9/7/2015

RECORD OF CERTIFICATE OF TITLE **UNDER THE TRANSFER OF LAND ACT 1893**

VOLUME
1115FOLIO
404

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.

REGISTRAR OF TITLES



LAND DESCRIPTION:

LOT 6 ON PLAN 4744

REGISTERED PROPRIETOR: **(FIRST SCHEDULE)**

GIOVANNA ALMA LADIGES OF 55 WATTLE CRESCENT, WUNDOWIE
 AS EXECUTOR OF THE WILL OF PIA AGNESE DE CAMPO WHO DIED ON 24.08.2008
 (TA N053097) REGISTERED 6 JULY 2015

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

1. N053098 THIS EDITION WAS ISSUED PURSUANT TO SECTION 75 OF THE TLA. REGISTERED 6.7.2015.

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.
 * Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
 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: 1115-404 (6/P4744).
 PREVIOUS TITLE: 1086-235.
 PROPERTY STREET ADDRESS: 139 HAWKE AV, WUNDOWIE.
 LOCAL GOVERNMENT AREA: SHIRE OF NORTHAM.

APPENDIX 2
Local Water Management Strategy

CLIENT: Matthew Pavlinovich

**PROPOSED SUBDIVISION OF LOT 6 (No. 139), HAWKE AV,
WUNDOWIE**

LOCAL WATER MANAGEMENT STRATEGY

PREPARED BY

MJB PAYNE CONSULTANTS

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CHARTERED PROFESSIONAL ENGINEERS

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JOB No: 15E3

DATE: 3 Aug 2015

REVISIONS: 2

CHECKED:

DOCUMENT CONTROL RECORD

Site Details: Lot 6, (No. 139) Hawke Avenue, Wundowie

Client: Matthew Pavlinovich

Reference: 15E3

Date: 3rd August 2015

Prepared by

Britt Payne



Revision No:	Description of Revision:	Date:	Approved By:
1	comments re effluent disposal etc.	9/8/15	BP
2	change to Appendix 2	14/8/15	BP

Issued to:	Revision No.	Date
Client	0	4 th August 2015
Client & Dynamic Planning	1	9 th August 2015
Client & Dynamic Planning	2	14 th August 2015

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1. INTRODUCTION:

MJB Payne Consultants were engaged through Dynamic Planning to prepare a Local Water Management Strategy for the subdivision of Lot 6 (No. 139) Hawke Av, Wundowie, located in the Shire of Northam.

The purpose of this report is to identify any issues relating to groundwater and surface runoff in the proposed subdivision and to provide guidance on how they can be satisfactorily managed.

Relevant documents referred to in arriving at the recommendations and conclusions in this report include:

- *“Better Urban Water Management” (Dept. of Water, 2008)*
- *“Australian Runoff Quality” (Engineers Australia, 2006)*
- *“Australian Rainfall & Runoff” (Engineers Australia, 2013)*
- *“Stormwater Management (Source Control)” (Engineers Australia, 2006)*
- *“Local Government Guidelines for Subdivision Development” (IPWEA, 2009)*

2. SITE DETAILS:

The site is Lot 6, Hawke Av, Wundowie. It is situated on the eastern side of Hawke Av, approximately 1km south-east of Wundowie township. There is only minimal native vegetation on the land and it appears that many years ago it was cleared for some type of agriculture. However, the grass cover that currently exists is quite thick.

The highest point of the site is at the south-eastern corner where the elevation is approximately 302m AHD. From this corner there is a gentle slope diagonally to a low-point at the north-west corner, adjacent to Hawke Av, where the elevation is approximately 279m AHD. The average diagonal slope is 5.7%. An aerial photograph is included as Appendix 2 and photos 8, 9 & 10 are general views of Lot 6 taken from the higher ground in the SE corner.



Photo 8



Photo 9



Photo 10

3. PROPOSED DEVELOPMENT:

Lot 6 has an area of 8.1Ha and it is proposed that it be developed as a “Rural Residential” subdivision comprising 7 lots with an average area of 1.08Ha set around a new central access road (cul de sac). A plan of the proposed subdivision is included as Appendix 1.

4. SOIL TYPE:

Inspection showed the soil on Lot 6 to be the typical orange, gravelly loam/sand found in the area. The soil can be seen in Photo 7.



Photo 7

It should also be noted that rock will be present at some depth below the surface. The exact depth can only be determined by further investigation although no surface outcrops were seen during the inspection.

5. EXISTING GROUNDWATER & SURFACE WATER:

MJB Payne Consultants inspected the site on 23/7/15. Although the weather was fine at the time of inspection, rainfall in the preceding four days had been significant (a total of approximately 45mm), and yet there was no sign of any surface runoff either onto adjoining property or into Hawke Av. Neither was the ground noticeably wet underfoot. No springs, swamps or other signs of groundwater were seen.

Drilling to sample the quality of the groundwater was not undertaken.

A test was carried out to assess the permeability of the soil by digging a small hole and half-filling it with water. The test can be seen in Photo 7 above. It was found that the water level dropped 20mm in 5 minutes. This is a relatively good result and indicates that traditional leach drains for the disposal of effluent should work well on this site. However it is recommended that further testing of soil permeability be carried out on specific lots at the time of Building Licence application, to verify that the proposed effluent disposal system will operate efficiently on the particular lot.

Nevertheless, despite the relatively good permeability of the soil, minor erosion gullies were evident at the north-west corner of the site, indicating that a small amount of stormwater runoff does occur from Lot 6, flowing out into the table-drain in Hawke Av, although no erosion of the table-drain was seen. The gullies formed are shown in Photo 4.



Photo 4

Furthermore, along the northern boundary, a swale drain has previously been formed. This swale may have been formed unintentionally during the firebreak clearing, but it does perform the important function of preventing runoff onto the neighbouring property. As such, the swale should be retained after subdivision. The swale/firebreak can be seen in Photo 6 (looking west) and is mentioned again in Section 9.



Photo 6

As a final comment regarding existing surface water, it should be noted that the south-east corner of Lot 6 is located at the crest of a hill and therefore any surface water flowing onto Lot 6 from adjoining properties would be negligible.

6. ADJACENT ENVIRONMENT:

Lot 6 is a considerable distance from any Nature Reserves or waterways that may be considered to be environmentally significant. Water draining from Lot 6 would flow in the table-drain of Hawke Av, downwards to the north for approximately 0.5km, where there is a poorly-defined “soak” or “winter stream”.

7. WATER USE SUSTAINABILITY IN THE PROPOSED SUBDIVISION:

The “Better Urban Water Management” document requires that consideration be given to water efficiency measures. As its title suggests, that document is aimed generally at urban development. However, it is pointed out that the proposed subdivision, with its large lots, provides plenty of space for rainwater tanks to collect roof runoff. In addition, the potential exists for alternative means of effluent disposal, with perhaps a “Bio-Cycle” system on each lot which would maximise wastewater re-use.

8. STORMWATER RUNOFF MANAGEMENT:

The “time of concentration” of Lot 6 in its current state is estimated at 42 minutes. Using this value (and rainfall data from the IFD curves in Appendix 3) with the Rational Method of flow estimation (Australian Rainfall & Runoff) gives a maximum runoff rate into Hawke Avenue of 16.5 litres/second (l/s) for the 20% AEP (Annual Exceedance Probability or 1 in 5 year storm). In other words, this is the maximum discharge that could currently be expected from the land, on average every 5 years.

When Lot 6 is subdivided, the new road will form an impermeable layer which will obviously produce more runoff than the original grassland. However, it will also have a much shorter time of concentration than the grassland, meaning maximum runoff rate from the roadway will be achieved before that of the grassland. (It is assumed that runoff from house roofs is contained on site).

The time of concentration of the roadway, assuming standard table-drain cross-sections, is estimated at 9 minutes. The estimated peak flow from the new roadway for the 20% AEP is then 36 l/s. In addition, over a period of 9 minutes, there would also be some runoff from a portion of new lots 601, 602 & 603 into the roadway. This is estimated at an additional 7 l/s, making a total peak flow for the “1 in 5 year storm” of 43 l/s. This is obviously more than the current peak discharge of 16 l/s. However, 43 l/s is still a minimal flow when compared to the capacity of a standard table-drain which, at the typical gradient of 1:30 in Hawke Avenue, would flow only 100mm deep. Note also that the existing eastern table-drain in Hawke Avenue carries minimal water in this vicinity because of a culvert located a short way up the hill, which directs water to the opposite side of the road. The culvert is noted on the aerial photograph in Appendix 2.

Given this minimal flow into the existing table-drain, attempting to detain runoff on-site and restricting discharge, is not warranted. Note that the final design should include a check of flow velocities in the table-drains and the inclusion of energy dissipators to prevent erosion if needed.

9. DESIGN FOR THE 1% AEP STORM:

The design for the “1 in 100 year storm” must be such that houses in the subdivision, together with adjoining properties, are protected from flooding and the new road remains passable to traffic. To achieve these objectives, the runoff from new lots 601, 602 & 603 will be caught in the southern table-drain of the new road. The peak flow rate is estimated at 70 l/s, which is well within the capacity of a standard drain (and so the new road would not be inundated). However, it will be necessary to ensure during final design that the culvert under the new road where it joins Hawke Avenue is designed for the 1% AEP storm, to avoid localised flooding at the intersection.

On the down-slope side of lots 604-607 (i.e. along the north boundary), it will be important that the swale is retained to guide water along the boundary and out into Hawke Avenue. The only way to ensure long-term retention of the swale is to establish an easement over it, extending along the rear of lots 604-607 as shown in Appendices 1 & 2.

It is possible that some minor adjustments to the swale cross-section may be necessary to accommodate the 1% AEP storm and this should be checked during detailed design.

10. SUMMARY OF RECOMMENDATIONS:

No significant issues have been identified regarding water management and use in the proposed subdivision of Lot 6, Hawke Avenue, Wundowie. The main findings and recommendations are set out below:

- There are no sensitive ecological areas in the vicinity that may be adversely affected by the discharge of stormwater from the subdivision.
- The soil on Lot 6 is relatively permeable and should allow on-site disposal of effluent using leach-drains and the successful operation of stormwater soakwells, although further testing of soil permeability should be carried out on individual lots at the time of Building Licence application.
- There is minimal stormwater runoff from Lot 6 into Hawke Avenue at present. Once subdivided as planned, the peak stormwater discharge rate will increase (for the same storm event) but will still be a minimal flow compared to the capacity of the existing table-drain in Hawke Avenue. On this basis, full stormwater discharge into Hawke Avenue is acceptable. On-site detention and flow reduction are not warranted.
- The 1% AEP ("1 in 100 year") storm can easily be accommodated in the table-drains of the proposed new access road although the culvert that will be necessary at the junction with Hawke Avenue should be sized to handle the 1% AEP flow. This can easily be addressed as part of the detailed engineering design for the subdivision.

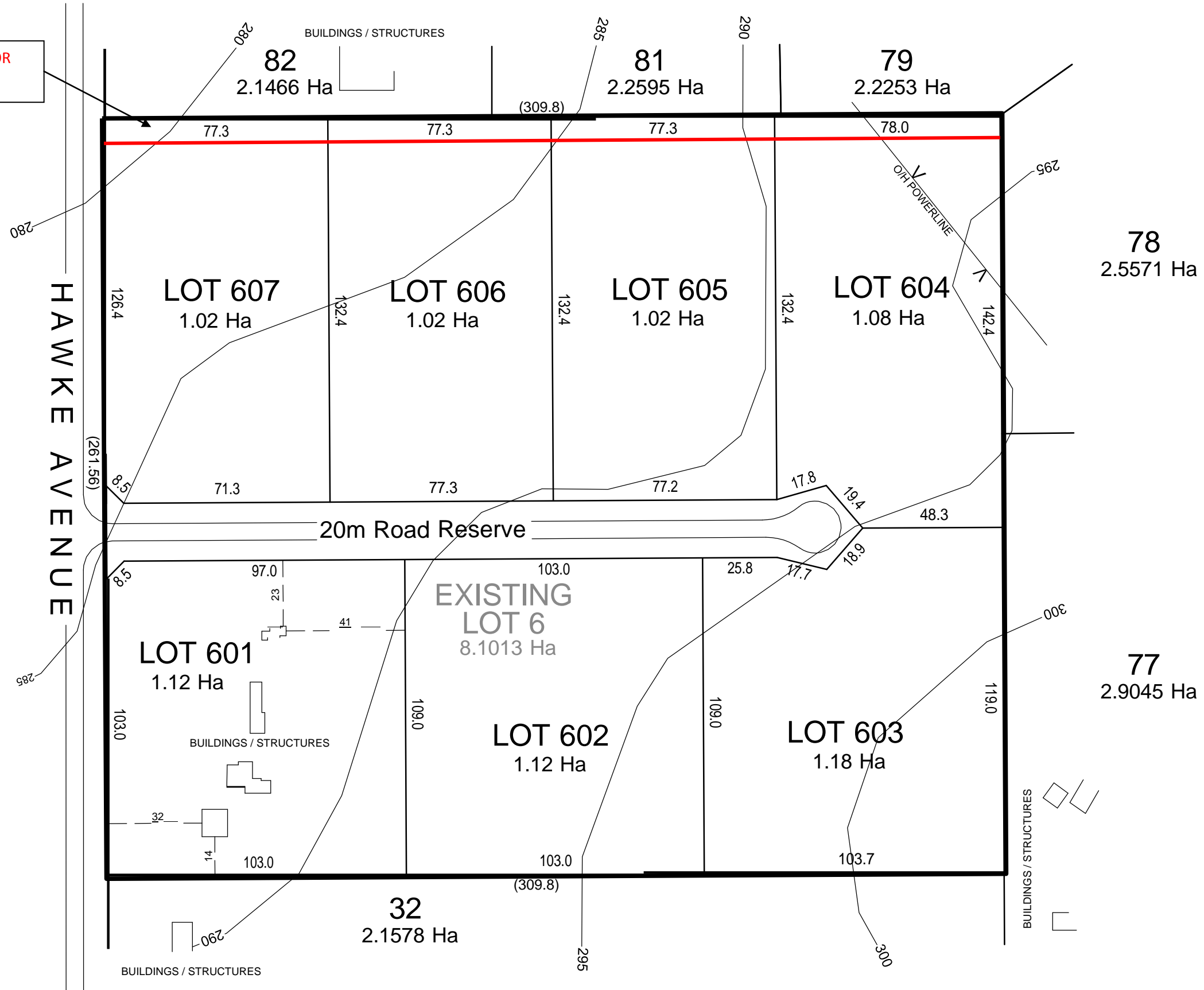
At the rear of lots 604-607 the existing swale in the firebreak should be retained as an easement and its depth checked during detailed design so that it can contain the 1% AEP flow and direct it to Hawke Avenue. Boundary fences between these new lots should not obstruct flow in the swale.

DISCLAIMER:

MJB Payne Consultants has taken every reasonable care in the preparation of this report. However, it is based upon information available to us at the time and therefore no liability is accepted in relation to any factors which may have been inadvertently overlooked. More in-depth investigations should be carried out at the stage of detailed design.

APPENDIX 1: PLAN OF PROPOSED SUBDIVISION

PROPOSED 3M WIDE EASEMENT FOR DRAINAGE SWALE



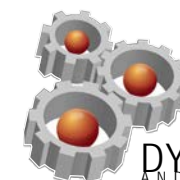
PROPOSED SUBDIVISION

LOT 6 (No. 139) HAWKE AVENUE
WILROW

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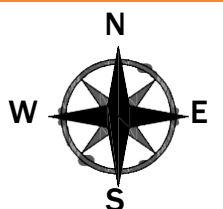


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APPENDIX 2: AERIAL PHOTOGRAPH



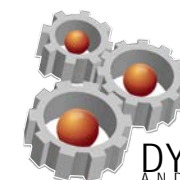
PROPOSED SUBDIVISION

LOT 6 (No. 139) HAWKE AVENUE
WINDOWIE

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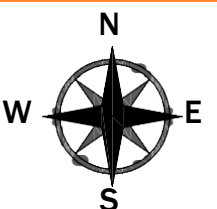


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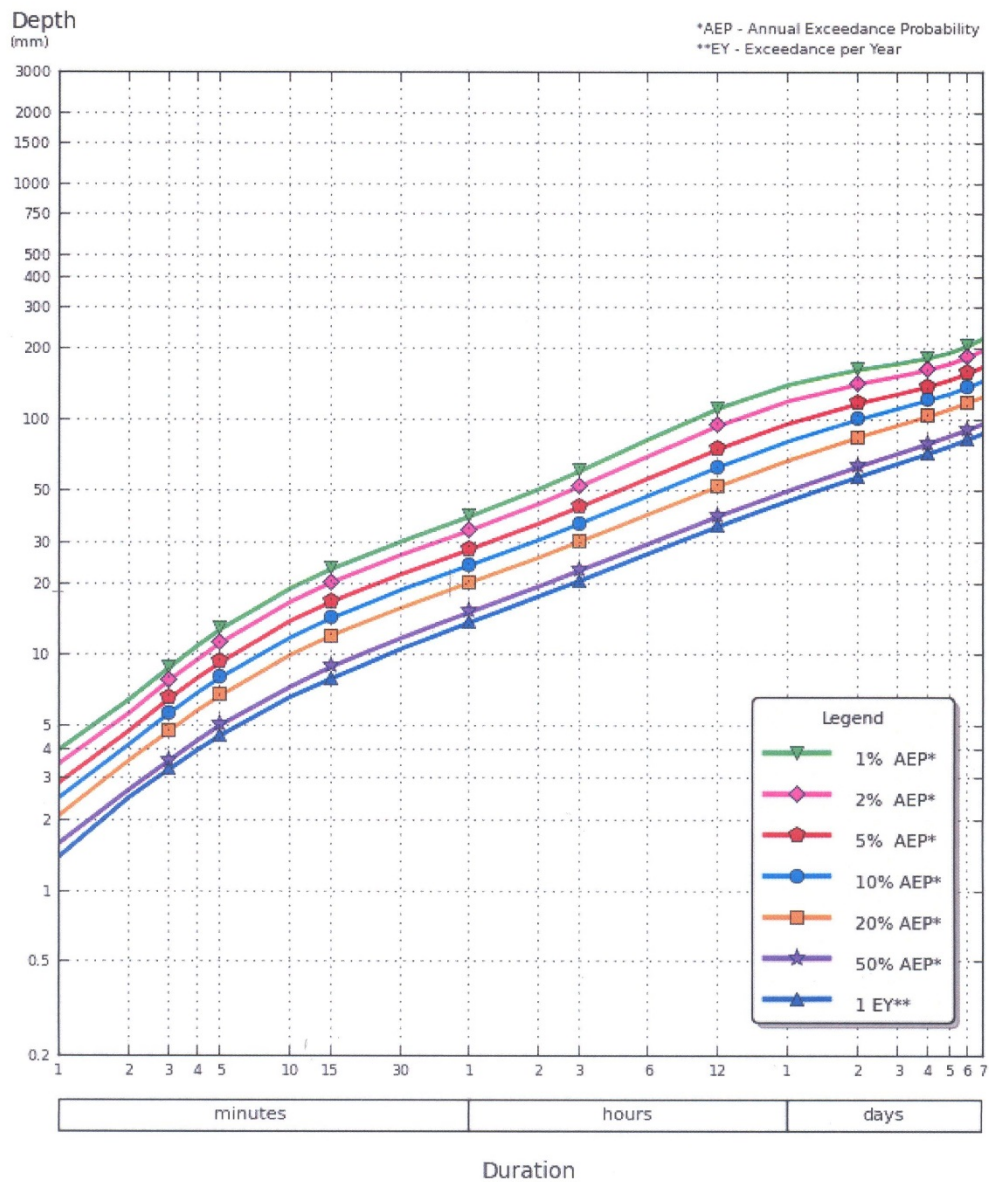


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APPENDIX 3: RAINFALL DATA-IFD CURVES



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APPENDIX 3

Bushfire Management Plan

2015

Bush Fire Management Plan

Lot 6 (#139) Hawke Avenue

Wundowie

Shire of Northam

FirePlan WA

July 2015

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Bushfire Management PlanLot 6 (#139) Hawke Avenue, Wundowie

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Document Status

Version	Comment	Reviewer	Review Date
Version 1		BWH	30.07.2015

Disclaimer: The measures contained in this fire management plan are considered to be minimum standards and they do not guarantee that a building will not be damaged in a bush fire. All surveys, forecasts, projections and recommendations made in this report associated with the project are made in good faith on the basis of information available to FirePlan WA at the time; and achievement of the level of implementation of fire precautions will depend among other things on the actions of the landowners or occupiers over which FirePlan WA has no control. Notwithstanding anything contained therein, FirePlan WA will not, except as the law may require, be liable for any loss or other consequences (whether or not due to the negligence of the consultants, their servants or agents) arising out of the services rendered by the consultants.

1.0 PURPOSE OF THE MANAGEMENT PLAN

The purpose of this Bushfire Management Plan (BMP) is to detail the fire management methods and requirements that will be implemented for the Subdivision of Lot 6 Hawke Avenue. (Refer Figure 1: Location Plan).

This Bushfire Management Plan satisfies the requirements of the WAPC and the Shire of Northam (via WAPC and Department of Planning document, *Planning for Bushfire Protection Edition 2 2010 and Planning for Bushfire Risk Management Guidelines May 2014*)

This Bushfire Management Plan will outline the responsibility and timing for implementing and maintaining the fire protection measures and strategies contained within this Bushfire Management Plan, allocating these responsibilities between individual land owners, the developers and the Shire of Northam.

As fire management strategies may require altering to meet changing weather, environment and land use needs, it must be advised that the provisions of the *Bush Fires Act 1954* may still be enforced, in addition to this Bushfire Management Plan.

The Department of Planning requires the preparation of a “Bushfire Management Plan” to support the proposed development. This document has been prepared to satisfy that requirement and becomes operational as a condition of subdivision.

This Bushfire Management Plan complies with the acceptable solutions detailed in Appendix 2 of *Planning for Bushfire Protection Guidelines* and are summarised in ‘Compliance Checklist for Performance Criteria and Acceptable Solutions’ at the end of this Bushfire Management Plan (Section 9).

In the Foreword of AS 3959- 2009 it states that “It should be borne in mind that the measures contained in this standard cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the degree of vegetation management, the unpredictable nature and behavior of fire and extreme weather conditions.”

Note: This Bushfire Management Plan has been prepared in the format detailed in (Draft) *Planning for Bushfire Risk Management Guidelines 2014*. The standards/specifications of access, Building Protection Zones and Water Supplies are the same as those detailed in *Planning for Bushfire Protection Edition 2*. Where there is a difference between the versions of the Guidelines the standards/specifications detailed in the 2014 version have been used.

Figure 1 Lot 6 Hawke Avenue Locality

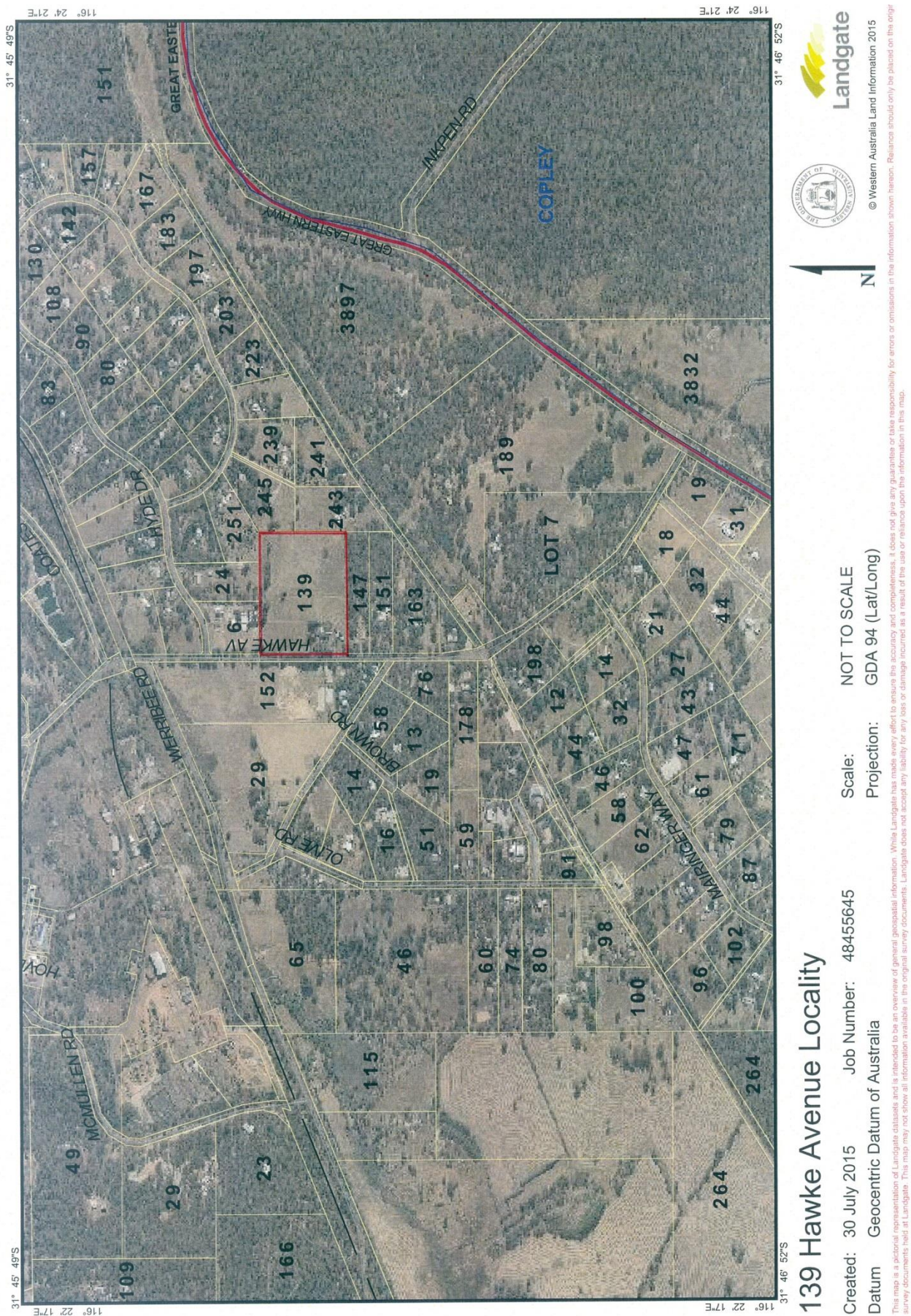
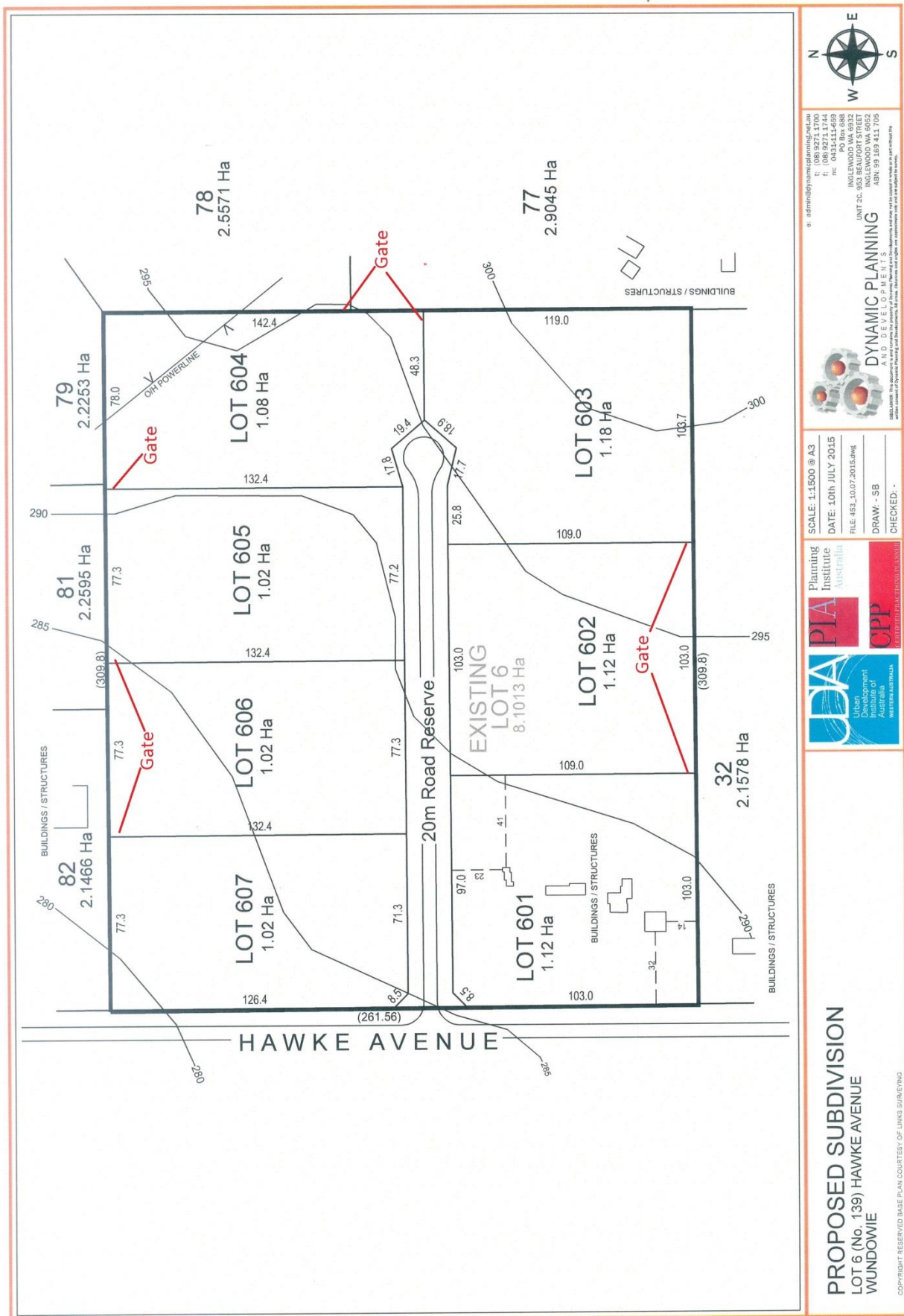


Figure 2 Development Layout



2.0 OBJECTIVES

The objectives of this Bushfire Management Plan are to:-

- Achieve consistency with objectives and policy measures of SPP 3.7 and the *Planning for Bushfire Risk Management Guidelines*, and any local planning scheme provisions relating to bushfire.
- Understand and document the extent of bushfire risk for the BMP area;
- Prepare bushfire risk management measures for bushfire management and all land subject of the Plan, with due regard for people, property, infrastructure and the environment;
- Nominate individuals and organisation's responsible for fire management and associated works within the plan area (e.g. Local government for land vested in it and private property owners for freehold land); and
- Define an assessment procedure which will evaluate the effectiveness and impact of proposed, as well as existing, bushfire risk management measures and strategies.
- Manage the fire risks in an acceptable manner in order to achieve subdivision of the land in accordance with the proposed plan.

3.0 DESCRIPTION OF THE SUBJECT AREA

3.1 General

The subject land comprises Lot 6 (#139) Hawke Avenue Wundowie in the Shire of Northam it is proposed to subdivide the Lot into 7 Lots of approximately 1.0 ha as shown in Figure 2.

Lot 6 is cleared with the exception of some scattered trees and orchard trees around the existing house in proposed Lot 601. See Figure 3.

A dwelling and sheds are located on proposed Lot 601.

Current access to the dwelling is via a private driveway off Hawke Avenue.

3.2 Topography

The site has a slight slope (5°) from the SE to the NW of the Lot. The vegetation within the adjoining Lot (to the South) is upslope/flat from the proposed Dwellings in Lots 602 & 603.

Upslope will be used as a factor to determine the setbacks from vegetation for habitable building construction standards for proposed development as detailed in Section 5.6.

3.3 Bushfire Fuels

The Site is cleared grassland. The vegetation in adjoining Lot 147 (to the South) consists of open Wandoo/Jarrahd Woodland, Grassland fuels exist in all other adjoining land.



Wandoo/Jarrah Woodland adjoining Lot 147



Adjoining vegetation to the east



Existing Vegetation in proposed lot 601

3.4 Land Use

It is proposed that the Lots will be used as Rural Residential purposes.

3.5 Assets

The rural area, dwellings, sheds, retained vegetation, roads, power lines.

3.6 Access

Current access to the existing Lot is via a Private driveway off Hawke Avenue.

Hawke Avenue connects to the Great Eastern Highway to the south and Werribee Road/Coates Road to the north

3.7 Water Supplies

3.7.1 Water for Fire Fighting

A Water Corporation Pipeline runs along the western side of Hawke Avenue. A fire hydrant is located at the corner of Hyde Road and Hawke Avenue and another at the corner of Hawke Avenue and Mairinger Way

3.7.2 Domestic Water Supply

Reticulated domestic Water supply will be provided to each Lot in the proposed Development

4.0 BUSHFIRE ASSESSMENT

Bushfire Risk is the chance of a bushfire starting that will have harmful consequences on life, property and the environment. It is measured in terms of consequences and likelihood and arises from the interaction of vegetation, communities and the environment expressed as a level of risk.

Table 1 Bushfire Risk Analysis

Risk Statement	Consequence	Likelihood	Risk Level	Prevention Controls (Planning Specific)
There is the potential that a bushfire will impact the proposed development which in turn may cause injury, first aid may be required	Minor	Possible	Moderate	<ul style="list-style-type: none"> Required increased construction standard to BAL for new dwellings constructed with 100 metres of vegetation Construction standard in accordance with AS 3959-2009 will provide bushfire resilient dwellings for people to seek shelter in. The development provides access and egress routes from the development area. Water supply for fire fighting is provided from fire hydrants located along the internal road within the development.
There is the potential that a bushfire will impact the proposed development which in turn may cause some damage to the proposed buildings.	Minor	Possible	Moderate	<ul style="list-style-type: none"> Increased construction standard to all new dwellings. Install and maintained Building Protection Zone. Dwellings to be located in grassland Whole of Lot will be slashed to 75 mm annually.
There is the potential that a bushfire will impact the proposed development which in turn may cause no measurable impact to the environment	Insignificant	Possible	Low	<ul style="list-style-type: none"> Compliance with Total Fire Bans Fire Breaks to be maintained in accordance with Firebreak order. Vegetation will regenerate. Fire Hydrants to provide water supply for fire fighting

The bushfire hazard assessment for the site is:-

Grassland Class G - Low

Woodland Class B - Moderate

See Figure 3

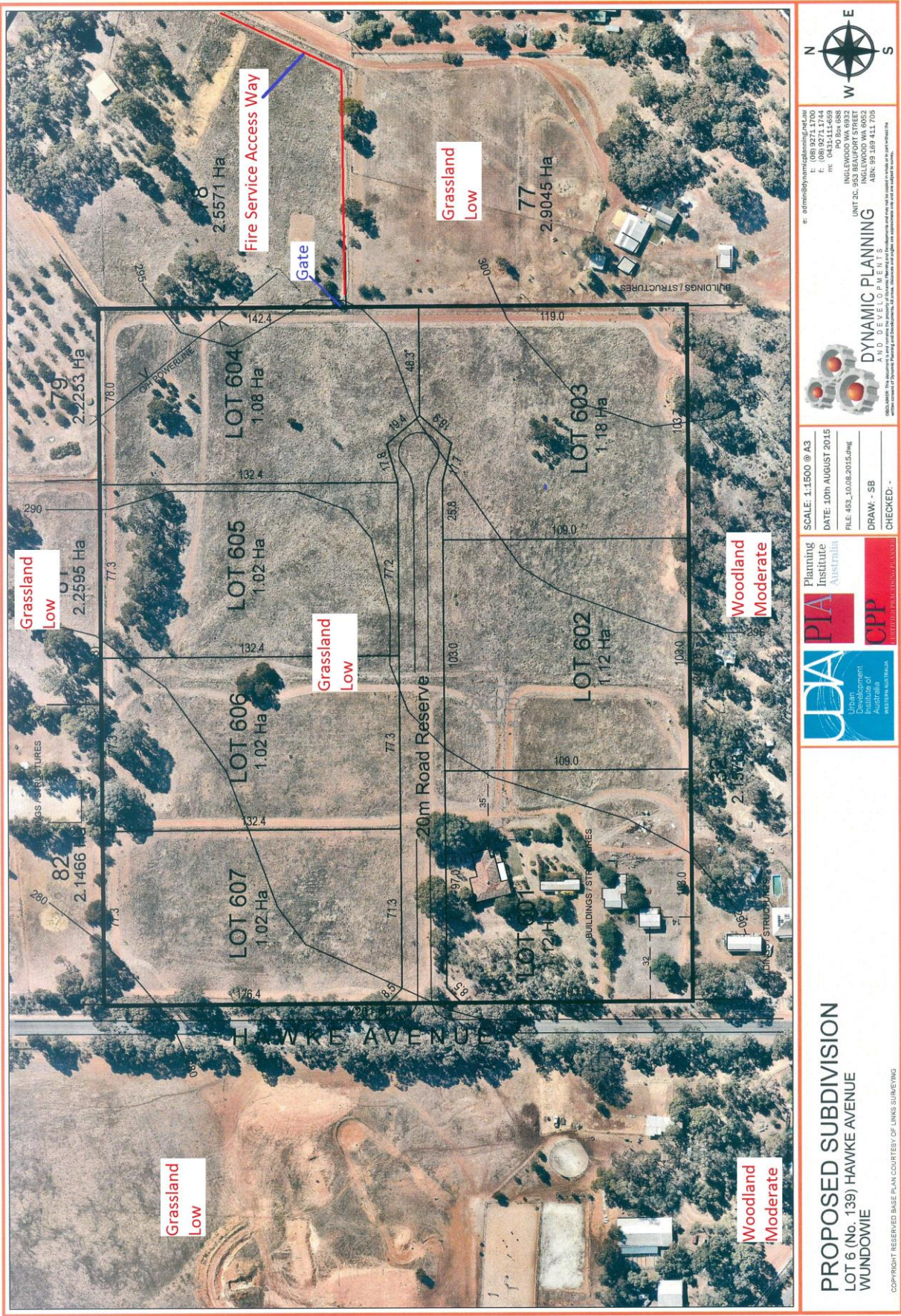
Bushfire Attack Level

Bushfire Attack Level (BAL) assessment classifies land into 6 categories based on a combination of vegetation type (fuel type, load and structure), effective slope of the land and the proposed distance from predominant vegetation. BAL assessment for the proposed development is detailed in Section 5.0.

Table 2 BAL Descriptions

BAL	DESCRIPTION
BAL-LOW	There is insufficient risk to warrant any specific construction requirements but there is still some risk.
BAL – 12.5	There is a risk of ember attack.
BAL – 19	There is a risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to radiant heat.
BAL – 29	There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level of radiant heat.
BAL – 40	There is much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front. Not supported by planning.
BAL – Flame Zone	There is an extremely high risk of ember attack and burning debris ignited by windborne embers, and a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front. Not supported by planning

Figure 3 Bush Fire Hazard Assessment (Not to scale)



5.0 BUSHFIRE RISK MANAGEMENT MEASURES

The bushfire management strategies detailed in this BMP are designed to comply with the Performance Criteria and Acceptable Solutions detailed in *Planning for Bushfire Protection* Edition 2 2010.

5.1 Element 1 – Development Location

Proposed habitable buildings will be located in grassland with an increased construction standard to comply with AS 3959-2009 (or as amended) the required setback (determined in Table 2.4.3 of AS 3959) is to be managed to the Building Protection Zone standard with dwellings complying with AS 3959 BAL construction standards.

5.2 Element 2 – Siting and Design of Development

5.2.1 Setback from Classified Vegetation

Using Table 2.4.3 of AS 3959 with the following inputs using Method 1 Section 2.2 of AS 3959-2009 were used to determine the BAL rating and required setback of a habitable building from vegetation.

Table 3. Setback of Habitable buildings from Vegetation and BAL Ratings

Class of Vegetation	Slope	Setback Distance Metres	BAL Rating
Woodland Class B	Upslope	29-100	12.5
	Upslope	20-29	19
Grassland Class G	0-5	20-50	12.5
	0-5	14-20	19

5.2.2 Building Protection Zone

The aim of the Building Protection Zones (BPZ) is to reduce bush fire intensity close to buildings, and to minimise the likelihood of flame contact with buildings.

The Building Protection Zone is a low fuel area immediately surrounding a building complying with *Planning for Bush Fire Protection* Acceptable Solution A4.3.

Building Protection Zone must fulfil the following conditions:-

- The minimum width of the BPZ is to be measured from the walls of the habitable building. See Section 5.7 for Width of Building Protection Zone.
- Loose flammable material within the BPZ should be removed to reduce the fuel load to less than 2 tonnes per hectare and this is to be maintained to this level.
- All grasses within the BPZ and the remainder of the site are to be maintained to a maximum height of a 75mm. In accordance with the Shire of Northam Firebreak Order.
- The crowns of trees are to be separated where possible to create a clear separation distance between adjoining or nearby trees crowns. The separation Distance between tree

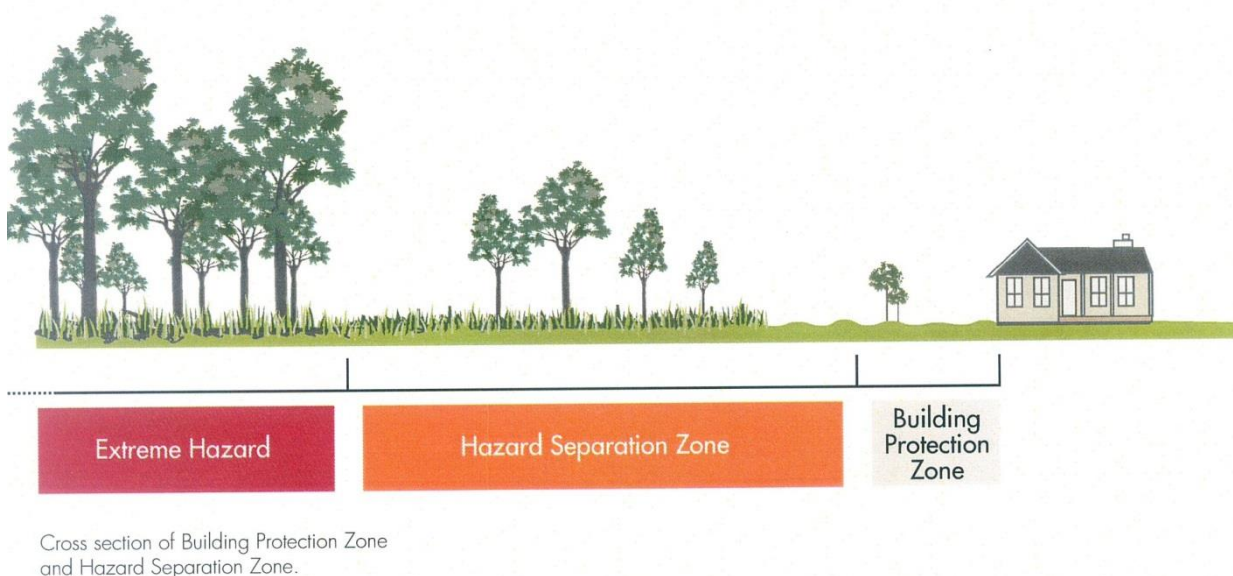
crowns is not required to exceed 10 metres. Trees in Proposed Lot 601 need to be thinned out to comply with this requirement.

- Prune lower branches of trees within the BPZ (up to 2 metres off the ground) to stop a surface fire spreading to the canopy of the trees. This will be required on the existing trees around the drainage basin.
- There are to be no tree crowns or branches overhanging the building or asset and a minimum horizontal clearance of 2 metres is required between tree branches and buildings or assets.
- Do not clump shrubs close to building. Ensure that there is a gap of at least 3 times the height (at maturity) of the shrub away from the building.
- Install paths and non-flammable features immediately adjacent to the habitable building to create a non-flammable area of a minimum area of 3 metres wide.
- Trees or shrubs in the BPZ are to be cleared of any dead material.
- Fences, sheds and structures within the BPZ should be constructed of non-flammable material and be clear of trees and shrubs as per building requirements.
- Gas Cylinders should be isolated from the Flame Zone and should be stored in an area that is clear of all flammable material. Gas vent valves should face away from the building and anything flammable. Gas cylinders should be securely tethered with non-flammable fastenings to prevent toppling over.
- Fire wood storage should be at least 20 metres from the building or contained in sealed nonflammable container located a minimum of 10 metres from the dwelling.
- Driveways and access ways must allow for the safe passage of a fire appliance to all buildings and assets on the land.
- Roof gutters should be free of leaves and other combustible material.
- Roof mounted evaporative air coolers should be fitted with ember proof screens to the filter media to reduce the possibility of bushfire embers igniting the air cooler.

It is further recommended that property owners, where possible and practical, further extend the width of the defendable space around assets by reducing fuel loads and fire hazards.

NOTE:

- The purpose of the BPZ is to reduce flammable fuel in the immediate vicinity of structures and other assets to reduce the bushfire attack level in accordance with current Australian Standard AS3959 Section 2.
- Maintained reticulated gardens are not classed as flammable for the defendable space.
- Areas such as pathways, drives, lawn, vegetable gardens, pools etc. all serve to reduce fire intensity and will form an integral part of any BPZ. The effectiveness of these in reducing the risk of fire damage to a building is enhanced if these areas are close to the building.

Figure 4 Relationship of BPZ & HSZ to Bushfire Hazard and Habitable building

5.3 Element 3 – Vehicle Access

5.3.1 Road System

Hawke Avenue connects to the Great Eastern Highway to the south and the Werribee Rd/Coates Rd to the north. Complies with Acceptable Solution A2.1.

Cul de sac

Access to proposed Lots will be via a cul de sac off Hawke Avenue then a private drive way within each Lot. The cul de sac will be 225 metres long and it will exceed the recommended cul de sac length of 200 metres by 25 metres. As the Site is cleared grassland and the cul de sac will be located a minimum 109 metres from the Woodland vegetation in 147 Hawke Avenue it is considered that the additional 25 metre will not increase the risk to the development and to residents needing to leave there Lot in an emergency.

The cul de sac is only servicing 7 Lots and in Planning for Bushfire Protection it does give some discretionary consideration that if there are no more than 8 Lots being serviced by the cul de sac.

The developer is to construct the cul de sac to the standards detailed in Table 4 and maintained by the Shire of Northam.

Complies with acceptable solution A2.3

Private Driveway

Each Lot will have a private driveway off the cul de sac and will be compliant with acceptable solution A2.5.

5.3.2 Internal Firebreaks

Notwithstanding the provisions of this Fire Management Plan, landowners of all lots within the site must comply with the requirements of the Shire of Northam Firebreak Order, as published

annually. The developer is to install firebreaks in accordance with the Firebreak Notice and maintained by the Landowner annually. Currently Firebreaks are 2 metres wide and a minimum of 4.0 metre vertical clearance. See Figure 2 for location of firebreaks.

5.3.3 Fire Service Access Route.

The developer is to seek agreement from the landowner of Lot 245 or 243 Hyde Road to insert a gate in the eastern boundary of the development and utilising the firebreaks in those Lots to provide a Fire Service Access Route (FSAR) linking the cul de sac head with Hyde Road to the NE. An agreement between the landowner and the developer would need to be provided to the Shire of Northam as part of the clearance of conditions of subdivision. See Figure 2 for Location. This FSAR is to be maintained by Landowners.

The FSAR would comply with acceptable solution A2.7.

The gate is to comply with acceptable solution A2.8.

A sign is to be placed on the AT HE Cul de sac head and the driveway off Hyde Road and the gate between relevant Lots by the Developer with the wording "Fire Service Access - No Public Access". Complies with acceptable solution A2.10

See Figure 3 for position of Fire Service Access.

Table 4. Vehicle Access Technical Requirements- Standards detailed in Draft Planning for Bushfire Risk Management May 2014

Technical Requirements	A2.2 Public Roads	A2.3 Cul De sac	A2.4 Battle axes	A2.5 Private Driveways	A2.6 Emergency Access Ways	A2.7 Fire Service Access Routes
Minimum trafficable surface (m)	6*	6	N/A	4	N/A	6*
Horizontal clearance (m)	6	6	N/A	6	N/A	6
Vertical clearance (m)	4	4	N/A	4	N/A	4
Maximum grades	1 in 8	1 in 8	N/A	1 in 8	N/A	1 in 7
Maximum grade over <50 metres	1 in 5	1 in 5	N/A	1 in 5	N/A	1 in 4
Maximum average grade	1 in 7	1 in 7	N/A	1 in 7	N/A	1 in 5
Minimum weight capacity (t)	15	15	N/A	15	N/A	15
Maximum crossfall	1 in 33	1 in 33	N/A	1 in 33	N/A	1 in 33
Curves minimum inner radius (m)	12	12	N/A	12	N/A	12
* refer to E3.2 Public Roads Trafficable Surface						

Rural Gate Standard A2.8

All gates used to restrict traffic on emergency access ways and fire service access routes meet the following requirements:

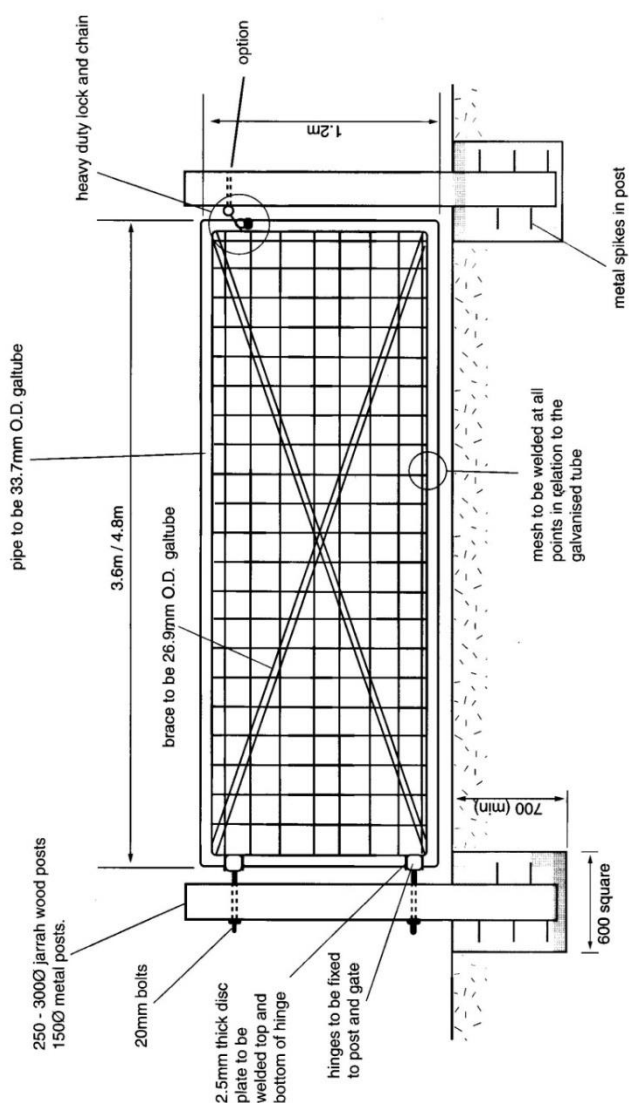
- minimum width 4.2 metres
- design and construction: to be approved by relevant local government
- fire service access route gates: may be locked but only with a common key that is available to local fire service personnel
- Signposted.

Signs A2.10

Signs are erected where emergency access ways and fire services access routes adjoin public roads, and meet the following requirements:

- minimum height above ground: 0.9 metres
- design and construction: to be approved by relevant local government
- lettering height: 100 millimetres
- to display the following wording (as appropriate): 'Fire Service Access – No Public Access' or 'Emergency Access Only'.

Rural Gate Design



Note: Mesh to be metric mesh 46G5 and galvanised finish complete with fittings.

5.4 Element 4 Water Supplies

5.4.1 Water for Fire Fighting

In discussion with the Department of Fire and Emergency Services there is a fire hydrant located at the corner of Hyde Road and Hawke Avenue. The developer is required to install a Fire Hydrant in the cul de sac approximately 50-100 metres off Hake Road. A hardstand is to be installed by expanding the shoulders of the road so that fire appliances can park off the bitumen road surface while filling up from the fire hydrant. The installation and marking of the fire hydrant is to be carried out by the developer in accordance with the Water Corporation's No 63 Water Reticulation Standard. Complies with Acceptable solution A3.1

5.4.2 Domestic Water Supply.

The developer is to supply water for domestic use to all Lots.

5.5 Vulnerable Uses

There is no proposed vulnerable land use proposed within this Development.

5.6 Hazard Reduction

The whole of each Lot is to be maintained to the Building Protection Zone standard in perpetuity by the Landowner. The developer is to slash/mow the grass and maintain the grass to a maximum of 75 mm until a Lot is sold.

See Table 6 for Landowner Annual Fire Prevention Works.

5.7 Building Construction

Individual dwellings on all lots shall be designed and built to conform with:

- The Building Code of Australia; and
- AS 3959 *Construction of Buildings in a Bushfire Prone Area*;

The State Government through Office of Bushfire Risk Management have identified Bushfire Prone areas across the State and have consulted with Local Governments on the proposed Bushfire Prone Areas for each Municipality. The Government through the Department of Fire and Emergency Services are in the process of declaring Bushfire Prone Areas. The target is to have the declaration in place in August/September 2015.

By the time the Planning process is completed for this Site and construction of a dwelling is about to commence the Declaration of Bush Fire Prone areas will be completed thus giving the Shire of Northam the Legal Authority through the Building Code of Australia to enforce compliance of Habitable Building construction in accordance with AS 3959.

When the Bush Fire Prone Areas are declared for this site the minimum distance of 100 metres (from vegetation rated 'Moderate' or 'Extreme') may be reduced in compliance with AS 3959. Under AS 3959 as the distance from the vegetation is reduced, the construction standard must be increased. Table 2.4.3 AS 3959- 2009 sets out this relationship and Section 2 of AS 3959 - 2009 details the methodology of determining the Bushfire Attack Level (BAL).

BAL (Bushfire Attack Level) Determination Using Methodology from Section 2.2.1 of current adopted AS 3959- 2009 and Table 2.4.3 which applies to this development:

Table 5 Bushfire Attach Levels and Width of Building Protection Zones

Vegetation Class	Setback from Vegetation (meters)	Slope	BAL	Construction Standard AS 3959-2009	BPZ (metres)
Woodland Class B	29-100	Upslope	12.5	S. 3 & 5	Whole of each Lot
Grassland G	20-50	0°-5°	12.5	s. 3 & 5	Whole of each Lot

Proposed Lot 601

As part of maintenance of the dwelling in proposed Lot 601 every effort should be made to increase the survivability of the dwelling by putting metal mesh screens on the window and other standards detailed in BAL 12.5 where practical to do so.

The whole of the Lot is to be managed to the Building Protection Zone standard detailed in Section 5.2.2

Lots 602- 603

The Building envelopes in Lots 602-603 are to be setback a minimum of 29 metres from the western, eastern and southern boundary and 10 metres from the northern boundary (or as required by the Shire of Northam) of the Lot so as to achieve the minimum setback as detailed in Table 3.

New habitable buildings will be constructed to BAL 12.5.

Any sheds constructed on each Lot is to be located a minimum of 6 metres from the walls of a habitable building otherwise the shed is to be constructed to the same standard as the Habitable building.

The whole of the Lot is to be managed to the Building Protection Zone standard detailed in Section 5.2.2.

Lots 604-607

The Building envelopes in Lots 604-607 are to be setback a minimum of 20 metres from the western, eastern and northern boundary and 10 metres from the southern boundary (or as required by the Shire of Northam) of the Lot so as to achieve the minimum setback as detailed in Table 3.

New habitable buildings will be constructed to BAL 12.5.

Any sheds constructed on each Lot is to be located a minimum of 6 metres from the walls of a habitable building otherwise the shed is to be constructed to the same standard as the Habitable building.

The whole of the Lot is to be managed to the Building Protection Zone standard detailed in Section 5.2.2.

As a result of ember attack evaporative air conditioners can be the cause of a fire starting in a building. It is a requirement that the roof unit of an evaporative air conditioner is enclosed in a suitable external ember protection screen. More information is available at www.dfes.wa.gov.au and in AS 3959.

5.8 Restrictions on the Use of Machinery, Tools, Vehicles and Tractors

5.8.1 Total Fire Ban Days

A Total Fire Ban is declared because of the extreme weather conditions or when fires are seriously stretching fire fighting resources. A Total Fire Ban is declared by DFES following consultation with Local Governments.

When a Total Fire Ban is declared it prohibits the lighting of any fires in the open air and any activities that might start a fire. The ban includes all open fires for the purpose of cooking or camping. It also includes the use of incinerators, welding, grinding soldering and gas cutting equipment.

The Shire of Northam may also impose a vehicle movement ban which may apply to the “Site” and may affect the movement of people within the “Site”.

The Department of Fire and Emergency Services and the Shire of Northam are to continue to educate the public on what a Total Fire Ban means and what actions members of the public need to take.

Public Education Program

The Shire of Northam is to continue to provide the community with advice on bush fire prevention and preparedness through brochures, newspaper articles, the Firebreak Order issued to rate payers and on their web site.

The developer is to provide a copy of the current Shire of Northam *Firebreak Order*, The *Homeowners Survival Manual* and *Prepare Act Survive* brochure and this *Bushfire Management Plan* at the time of sale of a Lot. It is essential that the Real Estate agent handling the sale of Lots on behalf of the Developer advises potential landowners that a Bushfire Management Plan exists and the modification of vegetation and ongoing fuel reduction will be required within this development.

Other Public Safety and Community information on Bush Fires is available on the Department of Fire and Emergency Services Authority web site www.dfes.wa.gov.au and the Shire of Northam website www.northam.wa.gov.au.

5.8.2 Fire Safer Areas

In the event of a bush fire, the Incident Controller of Fire Fighting operations will advise if an evacuation is necessary and, in conjunction with the Shire of Northam Emergency Services, direct residents to Safer Refuge Areas.

6.0 IMPLEMENTATION OF BUSHFIRE MANAGEMENT PLAN

This Bushfire Management Plan becomes operational as a condition of development approval.

In implementing this Bushfire Management Plan, the following responsibilities have been determined.

6.1 Responsibilities

6.1.1 Property Owners Responsibilities

To maintain the reduced level of risk and threat of fire, the owners/occupiers of all lots created by this proposal will be responsible for undertaking, complying and implementing measures protecting their own assets from the threat and risk of bush fire:

- Maintaining the property in good order to minimize potential bushfire fuels to mitigate the risk of fire on the property;
- Ensuring that the Subject land complies with the Shire of Northam Firebreak Notice. To be carried out annually;
- Ensuring that new dwellings are constructed to AS 3959 Table 3 Section 5.7. There will be a Section 70A notification on the Certificate of Title for each Lot requiring an increased construction standard in accordance with AS3959;
- Complying with the instructions of DFES Fire Services, the Shire of Northam and/or volunteer fire services in maintaining the property or during the event of a bushfire;
- Ensuring that in the event an evaporative air conditioner is installed at the property, suitable external ember screens are installed to roof mounted units and that they comply with AS 3959, check annually.
- Maintain annually the Building Protection Zone to Standards detailed in Section 5.2.2;
- Maintain Fire Service Access Route detailed in Section 5.4.

6.1.2 Developer's Responsibilities

As a condition of development the Developer shall be required to carry out works described in Section 6 of this Fire Management Plan to the satisfaction of the WAPC

- A 70A Notification is to be placed on the land title advising the landowner of the existence of this Bushfire Management Plan
- Install Access, Fire Service Access Route and firebreaks as detailed in Section 5.3;
- Install and maintain the Building Protection Zone as detailed in Section 5.7 until Lot is sold;
- Install domestic water supply as detailed in Section 5.4;
- Install Fire Hydrant in cul de sac as detailed in Section 5.4

6.1.3 Shire of Northam

The responsibility for compliance with the law rests with individual property owners and occupiers and the following conditions are not intended to unnecessarily transfer these responsibilities to the Shire of Northam.

The Shire of Northam shall be responsible for:

- Ensuring compliance with the current adopted AS3959, of any new habitable structure, renovation or extension to existing dwellings within each lot that is required to have an increased construction standards, is undertaken at the time of Building Permit Application;
- Enforcing the Shire of Northam Firebreak Notice;
- Ensuring the development complies with the Bushfire Management Plan on behalf of the WAPC.

6.2 Assessment of Fire Management Strategies

All the actions and recommendations in this BMP, meet the Bushfires Act and Regulations 1954 compliant with the acceptable solutions detailed in Planning for Bush fire Risk Management May 2014 and are sound, measurable and practical having been used and proven over time. These recommendations take into account the various costs, alternatives available, benefits for protection of residents and the wider community, the environment and biodiversity protection.

This Bushfire Management Plan will be implemented as a condition of development for the site.

It will be the responsibility of the developer to implement the provisions of this Bushfire Management Plan in order to seek clearance of those conditions of development.

Likewise it is the responsibility of the Shire of Northam to ensure that all standards required in this Bushfire Management Plan are met by the developer prior to clearing any conditions of subdivision relating to this Bushfire Management Plan.

After any major fires that may occur during or once this development has been completed, the Shire of Northam may conduct a Post Incident Analysis of the fire, which may include identifying and implementing any changes that may be needed to improve the performance of fire prevention strategies.

6.3 Works Program

Table 6 Works Program Prior to clearance of conditions of development

Developer Responsibilities				
Activity	Responsibility	Maintenance	Responsibility	Timing
Installation of access and FSAR to Standards Section 5.4.	Developer	Checking of quality of Roads	Developer	Developer clearance of Condition of subdivision
Implement fire protection measures as detailed in Sections 5.7	Developer	Annually maintenance required	Developer	Developer clearance of Condition of subdivision
Compliance with Firebreak Notice. Details Section 5.4	Developer	Compliance with Firebreak Notice annually	Developer	Developer clearance of Condition of subdivision
Section 70A notification on Title of each Lot advising BMP applies to each Lot.	Developer	Maintain Site in accordance with Developer responsibilities	Developer until Lot Sold	Developer clearance of Condition of subdivision
Water Supply	Developer	Connect Lots to Reticulated Water supply	Water Corporation	Developer clearance of Condition of subdivision
Install Shielding fence detailed in Section 5.7	Developer	Annually maintenance required	Developer	Developer clearance of Condition of subdivision
Provide a copy of following a sale of Lot:- <i>Bushfire Management Plan</i> <i>Home Owners Survival Manual</i> <i>Prepare Act Survive</i> <i>Fire Control Notice</i>	Developer	Landowners to familiarise themselves and annually update actions in the event of fire and annual maintenance.	Landowner	Developer clearance of Condition of subdivision
Landowner Responsibilities				
Compliance with Firebreak Order. Details Section 5.4	Developer	Compliance with Firebreak Order annually	Landowner	Completed by 1st November each year.
Landowner may request BAL reassessment to confirm or amend BAL rating. Copy of report to Shire of Northam	Landowner	Ensure Building design complies with relevant AS 3959 BAL rating	Shire of Northam to approve Building Permit	Re-assessment completed report sent to SoM as part of Building Permit Application
Maintain Building Protection Zone annually as detailed in Section 5.2	Developer to install	Annual Maintenance	Landowner	Completed by 1st November each year.
Maintain Fence and gates as detailed in Section 5.4	Developer to install	Annual Maintenance	Landowner	Completed by 1st November each year.

Table 7 Annual landowner Fire Prevention Activities

Timing	Activity
Autumn to Winter (May-August)	<p>Tree Pruning – remove lower branches; check that power lines are clear.</p> <p>Reduce fuel levels around the house – clear long grass, leaves, twigs & flammable shrubs.</p> <p>Ensure petrol and other flammables are safely stored away from the main dwelling.</p> <p>Make sure your firefighting equipment is in good working order and serviced where required.</p> <p>Make sure all resident are aware of your emergency plan including evacuation routes.</p> <p>Chemical spraying of firebreaks and low fuel zones – first and second applications.</p>
Spring (September – November)	<p>Move woodpiles and stacked timber away from the main dwelling.</p> <p>Keep grass short.</p> <p>Clean gutters and roof debris.</p> <p>Install firebreaks in accordance with this plan and the Firebreak Notice (November 30 to 31 May each and every year).</p> <p>Chemical spraying of firebreaks and low fuel zones – final applications and maintenance.</p>
Summer (November – May)	<p>Water lawns, trees & shrubs near the buildings to keep them green.</p> <p>Re-check firefighting equipment, screens, water supplies and that gutters remain clear.</p> <p>Maintain firebreaks in accordance with this plan and the firebreak notice by mechanical means or by use of chemical spraying.</p>
Long term precautions	<p>Ensure firebreaks are prepared in accordance with this Fire Management Plan, the latest Firebreak Notice and any Variation to Fire Order issued by council.</p> <p>Ensure that any planting of wind breaks or trees is in accordance with this Fire Management Plan and will not be detrimental to fire suppression requirements in years to come.</p> <p>Make sure that the buildings are safe – fit wire fly screens and shutters, fill gaps into roof/wall spaces, fit fire screens to evaporative air conditioners and have them operable to provide a water only supply.</p> <p>Give consideration to installing external building sprinkler systems and backup power and emergencies.</p> <p>Ensure the access to emergency water supply has the correct fittings, is unobstructed and the route trafficable.</p> <p>Get basic training in firefighting from your Local Bush Fire Brigade or even join your local Brigade.</p>

7.0 DISCLAIMER

In the event of large bushfires it is essential that landowners understand that fire appliances may not be available to protect each dwelling/building, landowners are responsible for the protection of their own assets which may require additional protection above the minimum detailed in this Bushfire Management Plan.

8.0 APPENDICES

8.1 Glossary

Acceptable Solution

A statement describing an acceptable means of complying with the requirements of corresponding performance criteria.

Appliance or Fire Appliance

A fire fighting appliance (vehicle) with structural, grass and bush fire fighting capabilities, with either a 2000 litres water capacity (2.4 appliance) or a 3000 litre water capacity (3.4 appliance) and four (4) wheel drive.

BAL – (abb) Bushfire Attack Level.

Bushfire Attack Level – an assessed rating of a site's risk to a bushfire, based on vegetation type, slope of the land and its proximity to buildings.

Building Construction Standard Buffer - An area 100 metres wide Including a Building Protection Zone in which an increase in building construction standard in accordance with AS3959 will apply.

Building Protection Zone (BPZ)

Low fuel area immediately surrounding buildings. Minimum width 20 metres, increasing with slope. Maintained by the landowner.

Bush

Under the Bush Fires Act 1954 the term bush is defined to include trees, bushes, plants, stubble, scrub and undergrowth of a kind whatsoever whether dead or alive and whether standing or not standing.

Bush Fire or Wildfire

A general term used to describe fire in vegetation that is not under control.

Bush Fire Hazard.

The flammability, arrangement and quantity of vegetation, dead or alive, that can be burnt in a bush fire. Development is to be avoided in extreme bush fire hazard designated areas.

Bush fire prone area - for the purposes of this fire management plan, a bush fire prone area is an area that has been declared as such by the relevant local government responsible for an area. Once an area is declared bush fire prone, then AS 3959 applies to new residential development in it.

Bush Fire Risk

The chance of a bush fire starting that will have harmful consequences on life and property. It is measured in terms of consequences and likelihood and arises from the interaction of hazards, communities and the environment.

Development Application

An application for approval to carry out a development under either a local planning scheme or regional planning scheme.

Dwelling setback – the horizontal distance between a wall of the dwelling at any point, and an adjacent lot boundary, measured at right angles (90 degrees) to the boundary.

DFES

The Department of Fire and Emergency Services of Western Australia previously FESA.

Emergency Access Way

Road not normally open but available to the public (using two wheel drive vehicles) for evacuation during a bush fire emergency.

Fire Break or Firebreak

Any natural or constructed discontinuity in a fuel bed used to segregate, stop and control the spread of a bush fire or to provide a fire line from which to suppress a bush fire. This is an area cleared to reduce the risk of bush fire damage.

FDI- Fire Danger Index

The chance of a fire starting, its rate of spread, its intensity and the difficulty of its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long and short-term drought effects.

Fire Protection

A generic term used to describe the range of services and systems used to mitigate the impact of fire on the community. It encompasses both fire prevention and emergency response.

Fire Management Plan

Ongoing, dynamic document that sets out the medium to long term mitigation strategies for fire hazards and risks in particular developments within local government areas.

Fire Services Access Route

Accessible by heavy four wheel drive fire fighting vehicles.

Fuel Reduction also Hazard Reduction

Removal and modification of bush fire fuel, or increase in building construction standards or a combination of the two.

Hazard Separation Zone (HSZ)

The fuel reduction area between an area bush fire hazard and the buildings (and associated building protection zones) of a development.

Low Fuel Area

An area 100 metres wide of reduced bush fire fuels that is required to surround a Stage of land release and negates the need to increase the standard of dwelling construction on the edge of the Stage of land release. It complies with the Building Protection Zone standards is temporary until the next stage of land is cleared for release.

Performance Criteria.

Statement which specifies the outcomes required for the protection of life and property from bush fires.

Structural Fire

A fire in a building.

9.0 COMPLIANCE CHECKLIST PERFORMANCE CRITERIA AND ACCEPTABLE SOLUTIONS

Property Details: Lot 6 (#139) South Yunderup Road, South Yunderup

Local Government: Shire of Northam

	Element	Compliance			Acceptable Solution
Element 1: Location					
		Yes	No	N/A	
A1.1	The subdivision/development is located in an area where the bush fire hazard level is manageable.	✓			
Element 2: Siting of development					
A2.1	The siting of the development minimises the bush fire risk to life and property. Hazard separation – moderate to extreme bush fire hazard level.	✓			
A2.2	Building protection zones.	✓			
A2.3	Hazard separation zones.			✓	
Element 3: Vehicular Access					
A3.1	The internal layout design and construction of public vehicular access in the subdivision/development allows emergency and other vehicles to move through it easily and safely at all times.	✓			
A3.2	Public Roads			✓	
A3.3	Cul-de-sacs	✓			
A3.4	Battle axes			✓	
A3.5	Private driveways			✓	
A3.6	Emergency access ways			✓	
A3.7	Fire services access routes	✓			
A3.8	Gates	✓			
A3.9	Signs			✓	
Element 4: Water					
A4.1	Reticulated areas	✓			
A4.2	Non-reticulated areas			✓	
A4.3	Static water supply – Dams			✓	

Applicant Declaration:

I declare that the information provided is true and correct to the best of my knowledge.

Name of Person Preparing the Fire Management Plan:

Full Name: *B.W. Harris* for FirePlan WA

Date: 4/08/2015

Developer:

Full Name: _____ **Signature:** _____ **Date:** _____