

Fire Management Plan



Stage I Subdivision & LSP Amendment

The Reef Estate

Lots 2001 and 9000 Reef Break Drive

Two Rocks

City of Wanneroo

March 23, 2016

Prepared for: Pindan Pty Ltd

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Front cover photo: Aerial photograph of development site

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EXECUTIVE SUMMARY

This Bushfire Management Plan (BMP) has been prepared to support a Local Structure Plan (LSP) amendment and the subdivision of Stage 1 of the development.

The study area includes Lots 2001 and 9000 Reef Break Drive and is herein referred to as “the site”. The site is dominated by low shrubland and grassland vegetation and large areas have been cleared and prepared for future development. Eucalypt woodland trees with a grassland understorey are restricted to a small area on the southern perimeter.

The site plan outlining the study area location is shown in **Appendix A**. The site is located in Two Rocks 6 km north-west of Yanchep in the City of Wanneroo and 62 km north-west of the Perth CBD.

The proposed stage 1 subdivision (**Appendix B**) indicates how the site will be subdivided into residential lots adjacent to existing residential development while **Appendix C** illustrates the more extensive Local Structure Plan (LSP) Amendment area including the road layout.

Following development, the site will be extensively cleared, and all vegetation retained or planted in public open spaces areas will become landscaped and managed parklands. The north west perimeter is largely adjacent to residential land and vegetation north east of the site will be retained in the medium term.

All areas within 100 metres (m) of the site boundary and within the LSP amendment have been assessed for vegetation classification (**Appendices D and E**) and bushfire hazard rating levels (**Appendices H and I**). The Asset Protection Zone (APZ) requirements has also been assessed and shown in **Appendices L and M**.

All new buildings constructed within 100 m of identified classified vegetation will be constructed to *AS3959 Construction of Buildings in Bushfire Prone Areas* standards. The areas impacted are outlined in the BAL contour plans (**Appendices J and K**)

It is expected that the implementation of this BMP will reduce the threat to site occupants, visitors and fire fighters in the area associated with this BMP.

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Nature of Report.....	1
1.2	Purpose of Bushfire Management Plan.....	1
1.3	Background.....	1
1.4	Accreditation	2
1.4.1	The Development Proposal.....	2
1.4.2	PLANNING CONTEXT (STATUTORY AND POLICY FRAMEWORK)	2
2	OBJECTIVES.....	4
3	DESCRIPTION OF SUBJECT AREA.....	4
3.1	General	4
3.2	Climate and Fire Weather.....	5
4	BUSHFIRE ASSESSMENT.....	7
4.1	Bushfire Hazard Assessment	7
4.1.1	Vegetation Type and Structure.....	8
4.1.2	Slope	10
4.1.3	Bushfire Hazard Level Assessment – Existing Site Conditions	10
4.1.4	BAL Contour Map – Post Development Conditions	11
4.2	FIRE MITIGATION STRATEGIES.....	11
4.2.1	Element 1: Location of the Development	12
4.2.2	Element 2: Siting of the Development.....	12
4.2.3	Element 3: Vehicular Access	16
4.2.4	Element 4: Water	18
5	Bushfire Risk Management Measures.....	18
5.1	Public Education and Community Awareness	19
5.2	Fire Safer Areas.....	19
5.3	Assessment of Fire Management Strategies	20
5.4	Implementing the Bushfire Management Plan	20
5.4.1	Developer’s Responsibilities	20
5.4.2	Property Owner Responsibilities	21
5.4.3	City of Wanneroo’s Responsibilities	21
5.4.4	Water Corporation’s Responsibilities	21
6	CONCLUSIONS	21
7	REFERENCES	22
8	GLOSSARY	24

TABLE OF TABLES

Table 1: Asset Protection Zone	13
Table 2: Indicative BAL assessment for proposed lots.....	13

TABLE OF FIGURES

Figure 1: Mean maximum recorded temperatures and mean rainfall for Medina Bureau of Meteorology Station between 1944 and 2015	6
Figure 2: Rose of wind direction and wind speed in km/h for December, January and February between 1944 and 2014 at the Medina Bureau of Meteorology Station	6
Figure 3: The five fuel layers in a forest environment that could be associated with fire behaviour	7
Figure 4: Degraded low shrubland and grassland in subdivision area	9
Figure 5: Grassland with scattered scrub in the subdivision area.....	9
Figure 6: Woodland plantation with grassy understorey.....	9
Figure 7: Landscaped public open space.....	9
Figure 8: Grassland in the dune swales.....	9
Figure 9: Shrubland on the higher ridges.....	9
Figure 10: Weedy scrub species are invading parts of the site and adjacent land.....	10

TABLE OF APPENDICES

Appendix A: Site Location
Appendix B: Stage 1 Proposed Subdivision
Appendix C: LSP Amendment Plan
Appendix D: Stage 1 Subdivision AS3959 Vegetation Classification
Appendix E: LSP Amendment AS3959 Vegetation Classification
Appendix F: Stage1 Subdivision Post Development Effective Slope
Appendix G: LSP Amendment Post Development Effective Slope
Appendix H: Stage 1 Subdivision Bushfire Hazard Rating
Appendix I: LSP Amendment Bushfire Hazard Rating
Appendix J: Stage 1 Subdivision BAL Contour Plan
Appendix K: LSP Amendment BAL Contour Plan
Appendix L: Stage 1 Subdivision APZ Plan
Appendix M: LSP Amendment APZ Plan
Appendix N: Stage 1 Subdivision Vehicular Access
Appendix O: LSP Amendment Vehicle Access
Appendix P: Bushfire Management Plan Checklist

1 INTRODUCTION

1.1 Nature of Report

This Report presents a Bushfire Management Plan (BMP) to provide guidance on how potential bushfire threat for Stage 1 of the proposed development and for the Local Structure Plan amendment (LSP) area can be mitigated to acceptable levels using land use planning and building controls. It also presents a Bushfire Hazard Level (BHL) assessment that evaluates the potential intensity of a bushfire in the area of the Stage 1 development and the LSP to inform judgements about the suitability of that land for current and future subdivision and development and considers how bushfire protection criteria can be met at subsequent stages of the planning process.

1.2 Purpose of Bushfire Management Plan

The purpose of this Bushfire Management Plan (BMP) is to provide guidance as to how potential bushfire threat at the site can be mitigated to acceptable levels using land use planning and building controls. The site is proposed for future development consistent with a residential subdivision.

This BMP has been prepared to support the subdivision application and the LSP amendment.

1.3 Background

Although the Local Structure Plan (LSP) was approved in 2005, changes to policy and practice which identifies areas of the LSP as bushfire prone and a recent subdivision application resulted in the Department of Planning (DoP) advising that ‘bushfire assessment and mitigation’ needed to be addressed. This Bushfire Management Plan (BMP) has been prepared to support that subdivision application.

The site is located in Two Rocks approximately 6 km north-north-west of Yanchep, an outer northern suburb in the City of Wanneroo and is 62 km north-north-west of the Perth CBD. This site is currently undeveloped and is located south of the centre of the suburb of Two Rocks (Appendix A). The proposed subdivision is shown in Appendix B. The site is owned by Pindan and is legally described as Lots 2010 and 9000 Reef Break Drive.

The LSP Amendment area (**Appendix C**) is bounded by residential land to the north, Two Rocks Road to the west, the future Reef Break Road to the south east and undeveloped land to the north east.

1.4 Accreditation

The BMP and BHL in this Report have been prepared by Bushfire Safety Consulting which is owned and operated by Rohan Carboon, a highly experienced bushfire consultant in the urban planning industry. Rohan has provided all technical input and review for the bushfire hazard assessment included within this BMP. He has an Applied Science degree in Environmental Management, postgraduate qualifications in Bushfire Protection and has been providing bushfire risk and hazard assessment and mitigation advice to the urban planning and development industry for more than 7 years. He first worked professionally in community bushfire safety education in 1999 and has been involved in land management including bushfire suppression since 1993. He is in the process of obtaining BPAD Level 1 BAL Assessor accreditation under the Fire Protection Association of Australia's new accreditation scheme and will also progress to Level 2 and Level 3 accreditation over time as this system is developed. Bushfire Safety Consulting is a Corporate Bronze Member of the Fire Protection Association of Australia.

1.4.1 The Development Proposal

The proposed subdivision of Stage 1 outlined in **Appendix B** indicates how the site is proposed to be developed into a large residential estate containing residential lots and landscaped public open spaces. The development fits into a broader planning context and must be considered along with the broader LSP site (**Appendix C**) which outlines the similar development of a residential estate

The site is serviced by scheme water and has good public road access proposed.

1.4.2 PLANNING CONTEXT (STATUTORY AND POLICY FRAMEWORK)

The following key legislation, policies and guidelines are relevant to the preparation of BMPs.

1.4.2.1 State Bushfire Prone Map

The Office of Bushfire Risk Management (OBRM) has established a single data standard for mapping bushfire-prone areas that has been adopted for all State and Local Government Areas. A bushfire-prone area is an area defined as an area that is subject to, or likely to be subject to, bushfire attack.

Being declared bushfire prone initiates the application of AS3959-2009 Construction of Buildings in Bushfire Prone Areas (Standards Australia 2009 as amended), and State Planning Policy 3.7: Planning for Bushfire Risk Management. The entire site is declared 'bushfire prone' under this process.

1.4.2.2 State Planning Policy (SPP) 3.7: Planning in Bushfire Prone Areas

This provides the overarching policy for bushfire planning throughout the State. The policy refers to the relevant guidelines and standards that must be addressed in land use planning decisions and the design of proposed developments in areas identified as bushfire prone.

Policy measure 6.2 in SPP 3.7 applies to subdivision applications within designated bushfire prone areas relating to land that has a Bushfire Hazard Level above low and/or where a BAL rating above BAL-LOW applies.

A subdivision development application in an area to which policy measure 6.2a) applies that has or will on completion have a rating of BAL-12.5 to BAL-29 inclusive, may be considered for approval where the subdivision can be undertaken in accordance with policy measures 6.3, 6.4 or 6.5.

Policy measure 6.4 outlines the information to accompany a subdivision application including the preparation of a Bushfire Management Plan.

1.4.2.3 Bush Fires Act 1954

The *Bush Fires Act 1954* sets out provisions to reduce the dangers resulting from bushfires; prevent, control and extinguish bushfires; and for other purposes. The Act addresses various matters including prohibited burning times, enabling Local Government to require landowners and/or occupiers to plough or clear fire breaks, to control and extinguish bushfires and establish and maintain Bush Fire Brigades.

Accordingly, the Shire of Wanneroo publishes an annual Fire Regulations Notice that can be downloaded from:

http://www.wanneroo.wa.gov.au/info/20035/community_health_and_safety/195/firebreaks

1.4.2.4 Guidelines for Planning in Bushfire Prone Areas (2015)

The Department of Planning have recently released the *Guidelines for Planning in Bushfire Prone Areas (2015)*. The requirements of this document are accommodated within this BMP.

The *Guidelines for Planning in Bushfire Prone Areas (2015)* is intended to inform and guide decision makers, referral authorities and proponents to achieve acceptable bushfire protection outcomes, including expectations at the different stages of planning.

The *Guidelines for Planning in Bushfire Prone Areas (2015)* provides an update on *Planning for Bush Fire Protection Guidelines - Edition 2 (WAPC et al, 2010)* to ensure necessary bushfire management measures are incorporated into proposed development.

1.4.2.5 AS3959-2009: Construction of buildings in bushfire-prone areas (Standards Australia 2009, as amended) and the Building Code of Australia (BCA)

These documents set out the construction requirements for buildings in bushfire-prone areas. AS 3959-2009 has six categories of Bushfire Attack Level, namely BAL-LOW, BAL-12.5, BAL19, BAL-29, BAL-40 and BAL-FZ. These categories are based on heat flux exposure thresholds. The method for determining the BAL involves a site assessment of vegetation, setback distances and local topography. The assumed Fire Danger Index (FDI) for Western Australia is 80. The BAL identifies the appropriate construction standard that applies as a minimum standard in AS 3959-2009.

2 OBJECTIVES

The objective of this BMP is to address bushfire management issues within the proposed development. If there is a bushfire within or near the site, implementing this BMP will reduce the threat to guests, residents, property, the environment and emergency response personnel.

The BMP objectives are to:

- Achieve consistency with the objectives and policy measures of SPP3.7 and the Planning for Bushfire Risk Management Guidelines and local planning scheme provisions;
- Establish and document the extent of bushfire risk for the site;
- Prepare bushfire risk management measures for bushfire management of the site, with due regard to people, property, infrastructure and the environment;
- Nominate individuals and organisations responsible for fire management and associated works within the plan area; and
- Define an assessment procedure which will evaluate the effectiveness and impact of proposed bushfire risk management measures and strategies.

Achievable and measurable goals of this plan include ensuring:

- Development is located in an area where the bushfire hazard assessment classification is or will be moderate or low, and the risk can be managed;
- The siting and design of the development and land use (including paths and landscaping) is appropriate to the level of risk that applies to the site and minimises the bushfire risk to people, property and infrastructure;
- The internal layout, design and construction of public and private vehicular access in the development allows emergency and other vehicles to move through it easily and safely at all times;
- The development is provided with a permanent and secure water supply that is sufficient for fire-fighting purposes.

This BMP sets out the roles and responsibilities of the developer, future owners of the site and the City of Wanneroo. It is important that the measures and procedures outlined in this BMP are adopted across the various stages of the land use planning and approvals processes.

3 DESCRIPTION OF SUBJECT AREA

3.1 General

The site is undeveloped and largely degraded, extensively covered in sand and contains low shrubland characterised by scattered low shrubs amongst significant grassland. A small area of planted eucalypt woodland occurs on the southern perimeter. Residential development lies to the north and north-west of the site.

The sites undulates along its whole perimeter, with the effective slope varying considerably including short , steep downslopes of up to 16 degrees.

Irrigated lawns and managed landscapes occur in the existing residential estate and the public open spaces to the north of the site. There will be no long term hazard to the north-east, north-west of south-west due to proposed further residential development consistent with the LSP amendment. In the interim period, this zone around Stage 1 will be cleared and managed to Exclusion clause 2.2.3.2(e) standards as outlined in the Australian Standard AS3959.

The broader LSP Amendment area will be impacted by surrounding vegetation south-west of Tow Rocks road, South-east of Reef Break Road and generally east of the site

The Stage 1 subdivision site is accessed via Montebello Drive which links the lots to the north of the site. The LSP amendment area similarly has multiple public road intersections with existing residential areas to the north and will be connected to Reef Break Road along the southern perimeter.

All future residents will have two immediate access ways. The proposed lots are serviced by mains water.

Community bushfire safety is a shared responsibility between state and local governments, fire agencies, communities and individuals. The planning and building controls outlined in this BMP, when implemented, will reduce the risk to people and property within the site. How future managers of the site interpret the risk, prepare and maintain the property and buildings and what decisions and actions they take (i.e. evacuate early or relocate to a safer place) will greatly influence the consequences of any bushfire.

3.2 Climate and Fire Weather

The behaviour of bushfires is significantly affected by weather conditions and they burn more aggressively when high temperatures combine with low humidity and strong winds. The fire risk is greatest from summer through autumn when the moisture content in vegetation is low. Summer and autumn days with high temperatures, low humidity and strong winds are particularly conducive to the spread of fire.

Research indicates that virtually all house losses occur during severe, extreme or catastrophic conditions (i.e. when the Fire Danger Index is over 50) (Blanchi et al., 2010).

The Bureau of Meteorology website¹ states that extreme fire weather conditions in the Perth region typically occur with strong easterlies or north-easterly winds associated with a strong high to the south of the state and a trough offshore. Easterly winds represent about 60 per cent of extreme fire weather days (events) compared to less than 5 per cent associated with southerly winds. About 15 per cent of Perth events occurred in a westerly flow following the passage of a trough.

Very dangerous fire weather conditions often follow a sequence of hot days and easterly winds that culminate when the trough deepens near the coast and moves inland. Winds can change from easterly to northerly and then to westerly during this sequence of climatic events.

¹ www.bom.gov.au/weather/wa/sevwx/perth/bushfires.shtml

Data from the Bureau of Meteorology research station at Swanbourne (45 km south of the study site) indicate the area experiences warm dry summers and cool wet winters (Figure 1), and is classified as a Mediterranean climate. Mean maximum temperatures vary from 31 degrees Celsius in February to 18 degrees Celsius in July.

The site is 500 metres from the coast and is significantly influenced by land and sea breezes. These are created by the daily heating and cooling of the land surface next to the ocean. The sea breeze occurs when the air over the land heats up and becomes more buoyant and rises, denser moist air over the ocean then flows inland. Sea breezes can strengthen prevailing wind, reduce it or even reverse it, depending on the strength and direction of the two airstreams (Cheney and Sullivan 2008).

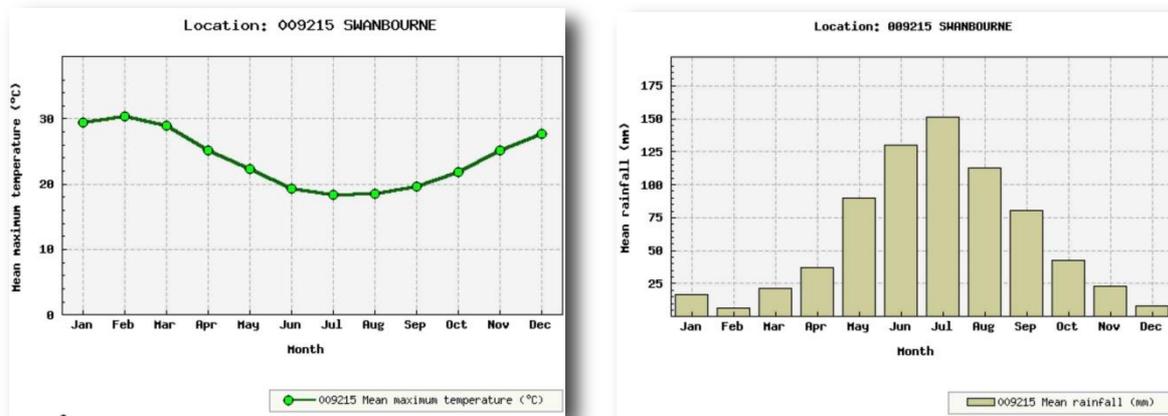
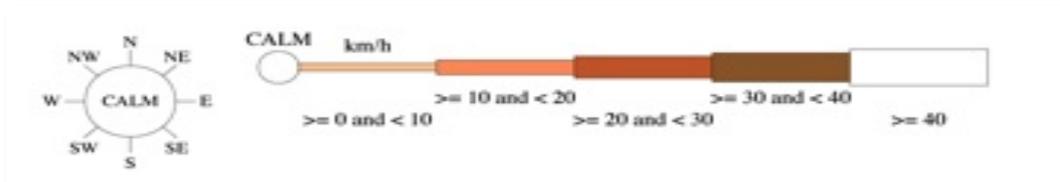


Figure 1: Mean maximum recorded temperatures and mean rainfall for Swanbourne Meteorology Station between 1993 and 2010

Data from the Bureau of Meteorology weather station at Swanbourne indicate that the predominant winds in the summer months at 3pm near the study site are south-westerly (Figure 2). Wind strength, direction and frequency of the south-west wind are clearly dominant and occur 70-80 per cent of the time. Winds from the west and south-east occur approximately less than 10% of the time.



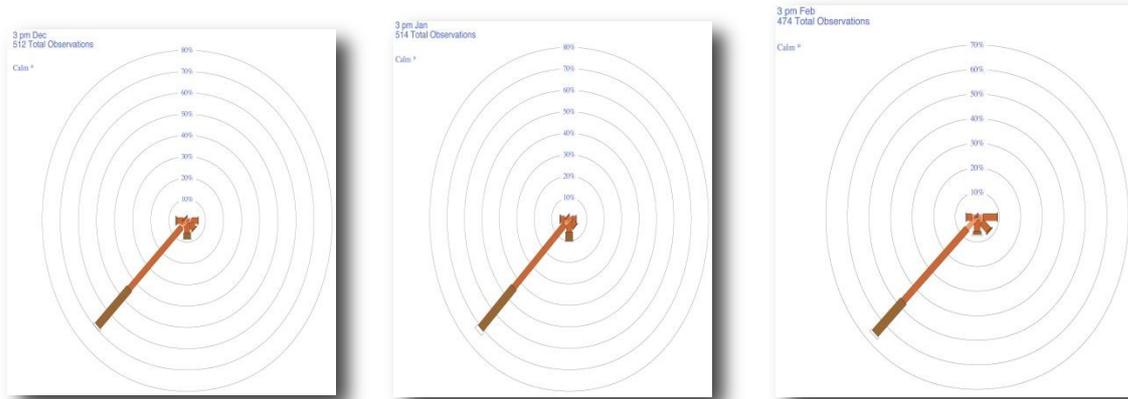


Figure 2: Rose of wind direction and wind speed in km/hr for December, January and February between 1993 and 2010 at Swanbourne Bureau of Meteorology Station

Interpreting – wind speed vs. direction plot

Wind roses summarize the occurrence of winds at a location, showing their strength, direction and frequency. The percentage of calm conditions is represented by the size of the centre circle - the bigger the circle, the higher is the frequency of calm conditions. Each branch of the rose represents wind coming from that direction, with north to the top of the diagram. Eight directions are used. The branches are divided into segments of different thickness and colour, which represent wind speed

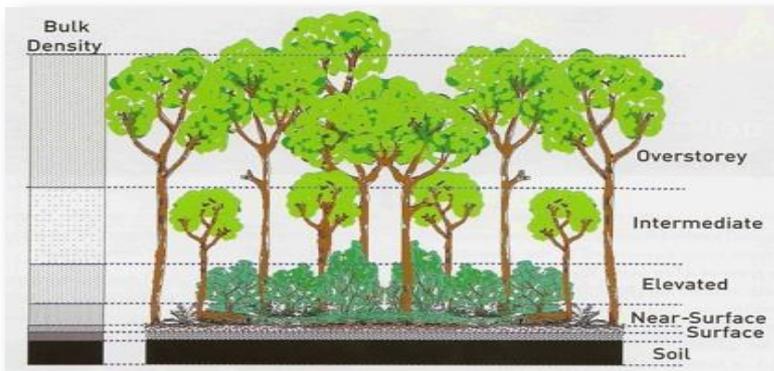
4 BUSHFIRE ASSESSMENT

Bushfires are common in the City of Wanneroo and local brigades respond to numerous bushfires in the district annually.

Given that bushfires are common in the City of Wanneroo this BMP plays a critical role in ensuring that the development of the land appropriately mitigates the risk from bushfire.

4.1 Bushfire Hazard Assessment

The methodology used to assess bushfire hazard is outlined in the *Guidelines for Planning in Bushfire Prone Areas (2015.)* Assessing bushfire hazards at the site specific level takes into account the predominant class of vegetation on the site and surrounding area for a minimum of 100 m, as shown in **Appendix D**. Fuel layers in a typical forest environment can be broken-down into five segments as illustrated in **Figure 3** below. These defined fuel layers are used in the following descriptions regarding vegetation types, fuel structure and bushfire hazard levels.



Source: Gould et al. (2007)

Figure 3: The five fuel layers in a forest environment that could be associated with fire behaviour

4.1.1 Vegetation Type and Structure

The Stage 1 subdivision site is largely a degraded environment. Extensive areas are not vegetated and contain only mineral earth (i.e. sand). The dominant vegetation type on the site is low shrubland which is characterised by scattered low shrubs amongst significant grassland vegetation (**Figure 4**).

Grassland dominated vegetation is also common particularly in disturbed areas and in areas of scattered acacia scrub (**Figure 5**). Eucalypt woodland trees, which contain a grassland understorey, have been planted in a small area within and adjacent to the southern perimeter of the site. There is no middle storey vegetation or fuels within the woodland (**Figure 6**).

The area to the north and north-west of the site contains residential development where there is no bushfire hazard. The area south of the site and adjacent to Two Rocks Road is currently being cleared to accommodate residential development. The vegetation north-east and south-east of the site contains similar low shrub land, grassland and scattered scrub vegetation which remains a bushfire threat to the development until such time as it is permanently cleared.

Two public open spaces (POS) areas border the site. Both contain landscaping and irrigated turf and garden beds (**Figure 7**). Ongoing management of the POS areas will be necessary to ensure long term fuel loads are maintained in a low condition and the parklands comply with exclusion clause 2.2.3.2(f) in Australian Standard AS3959-2009.

The larger Local Structure Plan (LSP) area extends to the south-west and more significantly to the north-east and contains similar vegetation assemblages (**Appendix E**). Grassland vegetation is concentrated in the dune swales (**Figure 8**). Thick shrubland vegetation occurs on the higher ridges and contains typical coastal heath under two metres in height (**Figure 9**). Scrub vegetation is scattered and is dominated by weed species which appears to be infesting the degraded environment. The infestation occurs in the dune swales and is very common north of the site in the adjacent property (**Figure 10**). The land to the south-west of the site has been largely cleared for a future residential development. Surrounding areas

north-east and south-east of the LSP site contain similar coastal vegetation with the scrub and shrubland vegetation extending to the western side of Two Rocks Road.



Figure 4: Degraded low shrubland and grassland in subdivision area.



Figure 5: Grassland with scattered scrub in the subdivision area



Figure 6: Woodland plantation with grassy understorey.



Figure 7: Landscaped public open space (POS).



Figure 8: Grassland in the dune swales.



Figure 9: Shrubland on the higher ridges.



Figure 10: Weedy scrub species are invading parts of the site and adjacent land..

4.1.2 Slope

The topography is undulating around the whole perimeter of the Stage 1 site and the LSP consistent with old sand dune systems on the Swan Coastal Plain. Effective slope (that is the slope that will affect the behaviour of an approaching bushfire) varies considerably on the perimeter of the subdivision site (**Appendix F**) and the LSP (**Appendix G**) with short, steep downslopes in the order of 16 degrees in some areas.

4.1.3 Bushfire Hazard Level Assessment – Existing Site Conditions

The vegetation class map for the Stage 1 subdivision (**Appendix D**) outlines the existing vegetation classifications on the site and in the surrounding 100 m assessment area as identified in AS 3959:2009. Descriptions of the vegetation types, structure and fuel layers are outlined in Section 4.1.

The bushfire hazard assessment levels were determined using Appendix 2 of the *Guidelines for Planning in Bushfire Prone Areas (2015)*.

The northern portion of the Stage 1 subdivision has a low bushfire hazard rating due to existing residential development to its north and north-west. The southern corner of Stage 1 is clear of vegetation and therefore also has a low bushfire rating. Moderate hazard occurs in areas of unmanaged grassland to the south-east and east of the site. Extreme bushfire hazard exists in areas of remnant woodland and scrub to the south of the Stage 1 site. The existing hazards surrounding the site can be seen in **Appendix H**.

Hazards in the LSP amendment area are illustrated in **Appendix I**. The northern portion has a low bushfire rating due to existing and proposed residential development while much of the east and south-east perimeter are rated at a moderate hazard. Extreme bushfire hazard exists affecting the LSP amendment area mainly in the far north corner, in the planted eucalypt woodland in the south and in the south-west, over Two Rocks Road although some small, isolated patches occur especially along the south-east.

4.1.4 BAL Contour Map – Post Development Conditions

A post development BAL contour plan has been prepared for the Stage 1 subdivision (**Appendix J**) and the LSP amendment area (**Appendix K**) which shows the predicted impacts of radiant heat levels on the development area.

The residential lots on the south-eastern perimeter of the Stage 1 subdivision are exposed to BAL-12.5, Bal-19 and BAL-29 and residential dwellings can be comfortably excluded where BAL-40 or BAL-FZ impacts the site.

All residential lots in the Stage 1 subdivision can accommodate dwellings constructed to BAL-29 standards or lower. At Stage 1 subdivision, five lots require an internal Asset Protection Zone (APZ) to a width of 3 metres.

The extension of Reef Break Drive on the south-east perimeter of the Local Structure Plan amendment area will provide an adequate low threat zone to ensure that dwellings constructed on adjacent lots are limited to exposure of BAL-29 or less. Most perimeter lots will only be exposed to BAL-12.5. The lots sited on the north-east perimeter of the LSP amendment area are exposed to BAL-FZ or BAL-40 due to the absence of a perimeter road or adequate setback from vegetation.

These perimeter lots will therefore provide a temporary APZ for adjacent lots in the LSP amendment area until such time that bushfire fuel and the consequent threat can be removed. The removal of vegetation for a future road will allow the safe development of dwellings at BAL-29 or lower on the perimeter of the a site.

Two Rocks Road provides an adequate low threat area adjacent to the south-western perimeter of the LSP amendment area so adjacent perimeter lots can accommodate dwellings of a BAL-29 or lesser BAL standard.

An Asset Protection Zone (APZ) is incorporated into the design (see Acceptable Solution A2.1) to ensure all future dwellings are sited within acceptable exposure limits (i.e. BAL-12.5, BAL-19 and BAL-29) or less.

4.2 FIRE MITIGATION STRATEGIES

This report adopts an acceptable solution and performance-based system of control for each bushfire protection criteria. This approach is consistent with Appendix 4 of the *Guidelines for Planning in Bushfire Prone Areas (2015)*. The management issues are:

- Location of the development
- Siting and Design of Development
- Vehicular access.
- Water

Acceptable solutions are proposed for all of the bushfire protection criteria and each illustrates a means of satisfactorily meeting the corresponding performance criteria.

Land use planning bushfire risk mitigation strategies are comprehensively detailed in the following sections by providing responses to the performance criteria that fulfil the intent of

the bushfire hazard management issues outlined in the *Guidelines for Planning in Bushfire Prone Areas (2015)*. The compliance checklist is attached as **Appendix P**.

4.2.1 Element 1: Location of the Development

4.2.1.1 Intent

To ensure that development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure.

4.2.1.2 Acceptable Solution- Stage 1 Subdivision and LSP Amendment Area

The Stage 1 subdivision is located in an area that will, on completion, accommodate dwellings subject to BAL ratings of BAL-29 or lower on the most exposed perimeter lots. The LSP amendment area is adjacent to roads on all interfaces except the north east perimeter.

This will ensure that dwellings can be constructed to a standard of BAL-29 or lower.

4.2.2 Element 2: Siting of the Development

Intent

To ensure that the siting and design of the development minimises the level of bushfire impact.

Background

The extent of post-development classified vegetation and hazard is restricted to the immediate south-east of Stage 1 subdivision and the west, east and south-west interface areas with the LPS.

4.2.2.1 Acceptable Solution A2.1: Asset Protection Zone (APZ)

One of the most important fire protection measures influencing the safety of people and property is to create an Asset Protection Zone (APZ) around buildings. The APZ is a low fuel area immediately surrounding a building. Non-flammable features such as irrigated landscapes, mown and slashed grasslands, gardens, driveways and roads can form parts of a APZ.

Recent research into land management and house losses during the ‘Black Saturday’ Victorian bushfires concluded that the action of private landholders who managed fuel loads close to their houses was the single most important factor in determining house survival when compared with other land management practices, such as broad scale fuel reduction burning remote from residential areas (Gibbons et al., 2012).

The creation of the APZ areas will ensure the predicted radiant heat flux exposure levels remains at or below BAL-29 for all perimeter dwellings in the Stage 1 subdivision (Appendix L) and the provision for the temporary APZ in the LSP we will ensure dwellings are constructed to BAL 29 or lower (Appendix M). Construction may only occur in the temporary APZ following permanent removal of adjacent vegetation and on-going maintenance of vegetation in a low hazard condition.

Managing vegetation in the APZ has two main purposes:

- To reduce direct flame contact and radiant heat from igniting the building during the passage of a fire front.
- To reduce ember attack and provide a safer space for people to defend (if required) before, during and after a fire front passes.

Some lots created by the Stage 1 subdivision on the south-eastern perimeter of the site contain areas exposed to BAL ratings. Incorporation on an APZ between the bushfire hazard in the Reef Break Drive reserve and the site will extend for 3 metres into five residential lots (**Appendix L**). This perimeter APZ combined with adjacent cleared areas will accommodate construction of residential dwellings which will be exposed to BAL-29 or less. Requirements for a conforming APZ according to the *Guidelines for Planning in Bushfire Prone Areas* (WAPC 2015) are listed in **Table 1**.

Table 1: Asset Protection Zone requirements

Width:	20 metres measured from any external wall of the building or building envelope. Where the slope increases above 10 degrees, the APZ should be increased to ensure the potential radiant heat impact of a fire does not exceed 29kW/m ² . Where a full 20 metre APZ is not possible, the APZ should be sufficient enough to ensure the potential radiant heat impact of a fire does not exceed 29kW/m ² ;
Location:	Within the boundaries of the lot on which the building is situated
Fine Fuel load:	Reduced to and maintained at two tonnes per hectare
Trees (crowns):	Are a minimum distance of ten metres apart. A small group of trees within close proximity to one another may be treated as one crown provided the combined crowns do not exceed the area of a large or mature crown size for that species
Tall shrubs or trees:	No tall shrubs or trees located within two metres of a building
Overhanging trees crowns:	No tree crowns overhang the building
Fences:	Fences within the APZ are constructed using non-combustible materials (e.g. iron, brick, limestone, metal post and wire)
Sheds:	Sheds within the APZ should not contain flammable materials

4.2.2.2 Building Siting and Predicted Bushfire Attack Levels

AS 3959:2009 *Construction of buildings in bushfire prone areas* has six categories of Bushfire Attack Level, namely BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ. These categories are based on heat flux exposure thresholds.

4.2.2.3 Methodology and Assumptions

The following indicative BAL assessment has been undertaken to demonstrate that a proposed dwelling on Lot 1 will fall within acceptable levels of risk. This indicative BAL assessment was undertaken by assessing the permanent classified vegetation and effective slope. The criteria to determine the BAL is outlined as follows:

Designated FDI:	80
Flame Temperature:	1090
Slope:	Various
Vegetation Class:	Woodland, Scrub, Shrubland and Grassland
Setback distances:	Shown in Table 2 below

4.2.2.4 BAL Outcome

The following BAL assessment outlines the minimum setback distances from vegetation with different effective slopes to achieve BAL-19. These minimum setback distances are achieved for both the Stage 1 subdivision and LSP Amendment. Most perimeter lots are exposed to BAL-12.5. The BAL contour plans (Appendices J and K) summarise the outcomes.

The BAL contour assessment was undertaken on the post development site conditions because this reflects what the buildings will be exposed to once the site is fully developed and the Asset Protection Zone and adjacent roads are established and maintained in perpetuity.

Table 1 shows the BAL assessment outcomes for the site.

Table 2: Maximum Bushfire Attack Level ratings for perimeter lots

Development Stage	Vegetation Class	Setback Distance	Effective Slope (°)	BAL Rating
Stage 1 Subdivision and LSP Amendment	Scrub	13-<19 metres	Flat-upslope	BAL-29
		15-<22 metres	Downslope 0-5	BAL-29
		17-<24 metres	Downslope 5-10	BAL-29
	Woodland	14-<20 metres	Flat / upslope	BAL-29
		17-<25 metres	Downslope 0-5	BAL-29
		14-<20 metres	Downslope 5-10	BAL-29
	Shrubland	9-<13 metres	Flat-upslope	BAL-29
		10-<15 metres	Downslope 0-5	BAL-29
		11-<17 metres	Downslope 5-10	BAL-29
		13-<19 metres	Downslope 10-15	BAL-29
		15-<22 metres	Downslope 15-20	BAL-29
	Grassland	8-<12 metres	Flat-upslope	BAL-29
		9-<14 metres	Downslope 0-5	BAL-29
		10-<16 metres	Downslope 5-10	BAL-29
		12-<18 metres	Downslope 10-15	BAL-29
		14-<21 metres	Downslope 15-20	BAL-29

Note: See Appendices J and K for the BAL Contour Plan.

A proposed dwelling can be sited on all perimeter lots and achieve a bushfire exposure level of BAL-29 or less.

An assessment of BAL-29 means there is an increased risk of ember attack and impact by burning debris with the likelihood of exposure to an increased level of radiant heat (AS 3959:2009). The risk is considered to be high. It is expected that the construction elements will be exposed to a heat flux not greater than 29 kW/m². In this case, the recommended construction sections in the Australian Standard are 3 and 7.

An assessment of BAL-19 means the risk is considered to be moderate. It is expected that the construction elements will be exposed to a radiant heat flux not greater than 19 kW/m². There is a risk of ember attack and burning debris ignited by wind borne embers and a likelihood of exposure to radiant heat (AS 3959:2009). The recommended construction sections in the Australian Standard are 3 and 6.

An assessment of BAL-12.5 means the risk is considered to be low. It is expected that the construction elements will be exposed to a radiant heat flux not greater than 12.5 kW/m². There is a risk of ember attack and burning debris ignited by wind borne embers and a likelihood of exposure to radiant heat (AS 3959:2009). The recommended construction sections in Australian Standard are 3 and 5.

Any new dwellings constructed within 100 m of classified vegetation will require consideration of the need for increased construction requirements to address AS3959 ‘Construction of Buildings in Bushfire Prone Areas’.

All lots within the bushfire prone area will be subject to a notification pursuant to section 70A of the *Transfer of Land Act 1893* placed on the certificate(s) of title indicating that the lot is subject to the requirements of a bushfire management plan (i.e. increased construction standards to meet increased BAL ratings).

4.2.2.5 Acceptable Solution A2.2: Hazard Separation Zone (HSZ)

A HSZ is not required because the BAL rating for all future dwellings will not exceed BAL-29 for both Stage 1 subdivision and LSP. An APZ has been incorporated where the site is immediately adjacent to bushfire hazard and this ensures dwellings are exposed to BAL-29 or less.

4.2.3 Element 3: Vehicular Access

Intent

To ensure that the vehicular access serving a subdivision or development is available and safe during a bushfire event.

Background

The indicative road network for the Stage 1 subdivision is outlined in **Appendix N** and for the the Local Structure Plan (see **Appendix O**). The proposed road network integrates Two Rocks Road on the south-western perimeter and Reef Break Drive to be constructed on the south-eastern perimeter.

Loop roads are common, providing two access routes, and the interconnected roads create a permeable grid-like pattern. The proposed road network also reflects the anticipated traffic volumes.

At Stage 1, ten temporary dead end roads will service the subdivision. Each dead end will be serviced by a temporary cul-de-sac head to facilitate the safe movement of vehicles around the development (**Appendix N**). The completed LSP has no cul-de-sacs, all roads are connected in two directions and Reef Break Road will be completed providing direct access to Two Rocks Road along the southern boundary (**Appendix O**).

4.2.3.1 Acceptable Solution A3.1: Two Access Routes

All proposed lots achieve two access routes.

4.2.3.2 Acceptable Solution A3.2: Public Road

The proposed public roads will achieve the following standards.

Minimum trafficable surface (m)	6
Horizontal clearance (m)	6
Vertical clearance (m)	4.5
Maximum grade < 50 metres	1 in 10
Minimum weight capacity (t)	15
Maximum crossfall	1 in 33
Curves minimum inner radius (m)	8.5

4.2.3.3 Acceptable Solution A3.3: Cul-de-sac / Dead End Road

The Stage 1 subdivision will have ten temporary dead end roads which service the subdivision. The completed LSP has no dead end roads or cul-de-sacs. Each dead end will be serviced by a temporary cul de sac head, to facilitate the safe movement of fire appliance around the development, to the following standards

Minimum trafficable surface (m)	6
Horizontal clearance (m)	6
Vertical clearance (m)	4.5
Maximum grade < 50 metres	1 in 10
Minimum weight capacity (t)	15
Maximum crossfall	1 in 33
Curves minimum inner radius (m)	8.5
Maximum length	200 metres
Turn-around area	A 17.5 metre diameter head is provided

4.2.3.4 Acceptable Solution A3.4: Battle Axe

No battle axe ways are proposed in this development.

4.2.3.5 Acceptable Solution A3.5: Private Driveway longer than 50 metres

No private driveways are proposed in this development

4.2.3.6 Acceptable Solution A3.6: Emergency Access Way

No emergency access way is proposed in this development.

4.2.3.7 Acceptable Solution A3.7: Fire Service Access Route

No fire service access route is proposed in this development

4.2.3.8 Acceptable Solution A3.8: Firebreak width

Compliance with the City of Wanneroo Fire Control Notice is required at all times.

4.2.4 Element 4: Water

4.2.4.1 Intent

To ensure that water is available to the subdivision to enable people, property and infrastructure to be defended from bushfire.

4.2.4.2 Acceptable Solution A4.1: Reticulated Water

Fire services require ready access to an adequate water supply during fire emergencies.

The area is provided with a reticulated water supply. The provision of scheme water together with fire hydrants will meet the specifications of Water Corporation Design Standard DS 63 and DFES.

The Water Corporation is responsible for all hydrant repairs.

5 Bushfire Risk Management Measures

The risk management process described in AS/NZS ISO 31000:2009 *Risk management – Principles and guidelines* is a systematic method for identifying, analysing, evaluating and treating emergency risks.

Bushfire risk is determined by assessing:

- Bushfire hazard (i.e. vegetation).
- Threat level (i.e. proximity of the hazard to assets and people).
- Vulnerability of the asset.
- Consequence rating (i.e. a rating for the potential outcome once the 'incident' has occurred).
- Likelihood rating (i.e. the chance of an event).

It is beyond the scope of this report to detail a comprehensive bushfire risk assessment according to AS/NZS ISO 31000:2009; however, a comprehensive bushfire hazard assessment is outlined in **Section 4.1**. The threat level has been assessed for all proposed new buildings in previous sections by determining the Bushfire Attack Levels (BALs) for all new structures in the development.

The vulnerability of assets such as buildings is impacted by several factors. Some relate to the way a bushfire behaves at a site, others to the design and construction materials in the building and siting of surrounding elements. Infrastructure, utilities and human behaviour are also factors. Leonard (2009) identified the following factors:

- Terrain (slope).
- Vegetation (overall fuel load, steady state litter load, bark fuels, etc.).
- Weather (temperature, relative humidity and wind speed).
- Distance of building from unmanaged vegetation.

- Individual elements surrounding the building that are either a shield or an additional fuel source.
- Proximity to surrounding infrastructure.
- Building design and maintenance.
- Human behaviour (ability to be present and capacity to fight the fire).
- Access to the building and how that influences human behaviour.
- Water supply for active and/or passive defence.
- Power supply.

It is likely that buildings are lost because of their vulnerability to the mechanisms of bushfire attack. Buildings constructed to AS 3959:2009 *Construction of buildings in bushfire-prone areas* (Standards Australia 2009) are more likely to survive a bushfire than buildings that do not conform to construction standards; however, building survival is not guaranteed.

The vulnerability of people is determined by several factors, including age, fitness levels, gender, level of preparation, evacuation triggers and number of occupants who can actively defend a property.

Vulnerability, consequence and likelihood ratings are all determined using a risk assessment matrix which is beyond the scope of this report.

5.1 Public Education and Community Awareness

Community bushfire safety is a shared responsibility between individuals, the community, government and fire agencies. DFES has an extensive Community Bushfire Education Program including a range of publications, a website and Bushfire Ready Groups. *Prepare. Act. Survive.* (DFES, 2012) provides excellent advice on preparing for and surviving the bushfire season. Other downloadable brochures are available from <http://www.dfes.wa.gov.au/safetyinformation/fire/bushfire/pages/publications.aspx>.

The City of Wanneroo provides bushfire safety advice to residents available from their website www.wanneroo.wa.gov.au. It also provides details on how to become a volunteer at the local volunteer Bush Fire Brigades. Professional, qualified consultants also offer bushfire safety advice and relevant services to residents and businesses in bushfire prone areas.

5.2 Fire Safer Areas

There are no designated Community Fire Refuges in the City of Wanneroo, however, at the time of an emergency, the relevant authorities can select an evacuation centre and DFES, the City of Wanneroo and Police will provide this information to site managers and people accommodated on the site.

A predetermined centre cannot be nominated, because there are no purpose-built structures (such as bunkers) designed to withstand the impacts of a bushfire.

This means that the location of an evacuation centre is not determined until the position of the fire and the characteristics of a specific event are considered by authorities. There would be nothing more dangerous than sending residents to a centre which is in the direct path of a fire.

The safest place to be during a bushfire is away from it. Where to go is an important element when people are relocating during a time of emergency (NSW Rural Fire Service, 2004). The preferred option for residents is to designate a destination that is not in a bushfire-prone area and will be safe to travel to before a bushfire attack.

Those who find themselves threatened by a bushfire need options (VBRC, 2009). This may be because their plan to leave is no longer possible, because they cannot reach a place away from the fire front, or their plan to defend their property fails.

The concept of a 'Neighbourhood Safer Place' and 'Neighbourhood Safer Precincts' has arisen from recommendations by the Victorian Bushfire Royal Commission into the Black Saturday bushfires.

5.3 Assessment of Fire Management Strategies

The bushfire hazard that could threaten the Stage 1 development occurs SE of the site. The broader LSP area has exposed perimeters east and south-west of the site.

Dwellings within 100 m of classified veg will be constructed to the appropriate bushfire attack level standard outlined in AS 2959 2009

Fire response operations will utilise the reticulated water supply and public road access to defend property and life.

5.4 Implementing the Bushfire Management Plan

5.4.1 Developer's Responsibilities

To maintain a reduced level of risk from bushfire, the developer's responsibilities are to:

- Install the public roads and cul-de-sac to standards outlined in Section 4.2.3.4
- Install Reef Break Drive during construction of Stage 2 subdivision to ensure the road services the completed development
- On all vacant land, comply with the City of Wanneroo Fire Control Notice as published.
- Do not create titles on the perimeter lots exposed to BAL-FZ or BAL-40 on the north-east interface of the LPS area until such time as adjacent vegetation is permanently removed and dwellings can be constructed to BAL-29 or lower.
- Lodge a Section 70A Notification on the Certificate of Title in order to alert any purchasers and successors in title of the responsibilities of the BMP and bushfire building construction requirements.
- Establish and maintain the APZs within the site to standards as specified in this document
- Prior to the creation of titles and after all land clearing has been undertaken, complete a detailed BAL Assessment to advise future purchasers of BAL ratings and bushfire construction standards.

5.4.2 Property Owner Responsibilities

The owners of the new lots, as created by the development approval process, are to maintain a reduced level of risk from bushfire, and will be responsible for undertaking, complying and implementing measures to protect their own assets (and people under their care) from the threat and risk of bushfire. Site owners will be responsible for:

- Ensuring the site complies with the City of Wanneroo Fire Control Notice as published.
- Maintaining the APZ in good order to minimise the exposure of buildings and people to bushfire attack.
- Ensuring construction of buildings complies with AS 3959:2009.
- If buildings are subject to additional construction in the future, such as renovations, AS 3959:2009 compliance is required.

5.4.3 City of Wanneroo's Responsibilities

The responsibility for compliance with the law rests with the individual property owner and occupiers, and the following conditions are not intended to unnecessarily transfer some of the responsibilities to the Shire of Mundaring.

The City of Wanneroo shall be responsible for:

- Providing fire prevention and preparedness advice to landowners upon request, including the *Homeowners Bush Fire Survival Manual, Prepare, Act, Survive* (or similar suitable documentation) and the City of Wanneroo Fire Control Notice.
- Monitoring bush fuel loads in road reserve sites and liaising with relevant stakeholders to maintain fuel loads at safe levels.
- Maintaining public roads to appropriate standards and ensuring compliance with the City of Wanneroo's Fire Control Notice.
- Reviewing the BMP every 5 years.

5.4.4 Water Corporation's Responsibilities

The Water Corporation is responsible for the repair of water hydrants, as needed.

6 CONCLUSIONS

This Plan provides acceptable solutions and responses to the bushfire protection criteria that fulfil the intent of the bushfire hazard management issues outlined in the *Guidelines for Planning in Bushfire Prone Areas (2015)*. However, community bushfire safety is a shared responsibility between governments, fire agencies, communities and individuals.

Buildings located in the bushfire prone area (i.e. within 100 m of classified vegetation) will have the risk mitigated via compliance with AS 3959:2009 standards. BAL-29 is not exceeded and an APZ is incorporated into the entire site where the perimeter is immediately adjacent to hazard. Reticulated water supply and hydrants are provided. Public road access provides two access routes at all times. The proposed development will fall within the acceptable level of risk.

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8 GLOSSARY

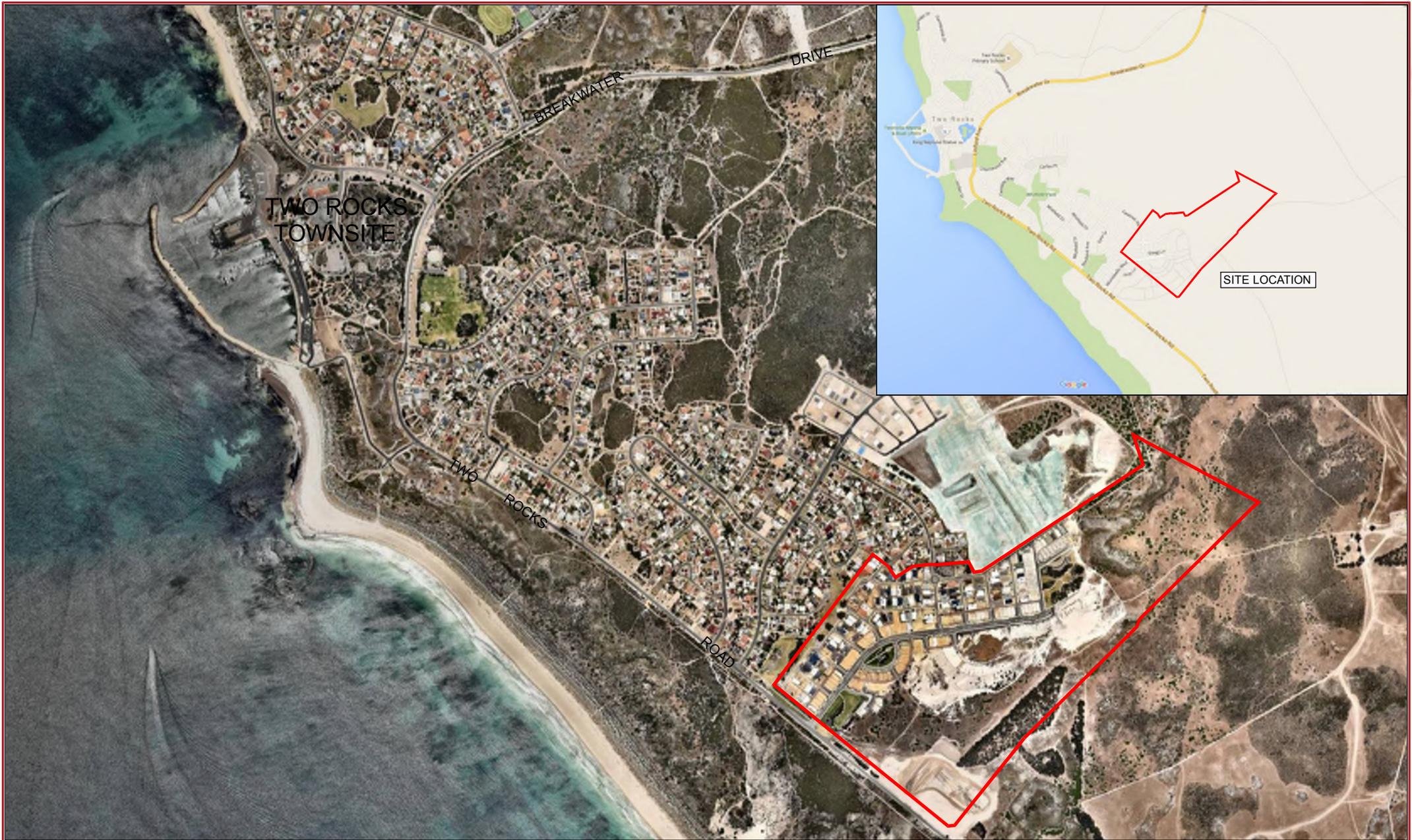
AS	Australian Standard
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BMP	Bushfire Management Plan
BCA	Building Code of Australia
BOM	Bureau of Meteorology
DFES	Department of Fire and Emergency Services (was FESA)
FESA	Fire and Emergency Services (now DFES)
HSZ	Hazard Separation Zone
TPS	Town Planning Scheme
VBRC	Victorian Bushfires Royal Commission
WAPC	Western Australian Planning Commission

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APPENDICES

- Appendix A: Site Location
- Appendix B: Stage 1 Proposed Subdivision
- Appendix C: LSP Amendment Plan
- Appendix D: Stage 1 Subdivision AS3959 Vegetation Classification
- Appendix E: LSP Amendment AS3959 Vegetation Classification
- Appendix F: Stage1 Subdivision Post Development Effective Slope
- Appendix G: LSP Amendment Post Development Effective Slope
- Appendix H: Stage 1 Subdivision Bushfire Hazard Rating
- Appendix I: LSP Amendment Bushfire Hazard Rating
- Appendix J: Stage 1 Subdivision BAL Contour Plan
- Appendix K: LSP Amendment BAL Contour Plan
- Appendix L: Stage 1 Subdivision APZ Plan
- Appendix M: LSP Amendment APZ Plan
- Appendix N: Stage 1 Subdivision Vehicular Access
- Appendix O: LSP Amendment Vehicle Access
- Appendix P: Bushfire Management Plan Checklist



**APPENDIX A:
SITE LOCATION PLAN**

LOTS 2001 & 9000 REEF BREAK DRIVE
TWO ROCKS
City of Wanneroo

LEGEND

SUBJECT LAND.....



SOURCE:
PHOTOGRAPHY FROM NEARMAP



NORTH



SCALE 1:15 000 @ A4
DATE: FEBRUARY 2016

Base mapping supplied by Nearmap & Google Maps

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APPENDIX B
STAGE 1
PROPOSED SUBDIVISION

LOT 9000 REEF BREAK DRIVE
TWO ROCKS
City of Wanneroo

LEGEND

100m ZONE FROM DEVELOPMENT.



SOURCE:
PHOTOGRAPHY FROM NEARMAP



NORTH



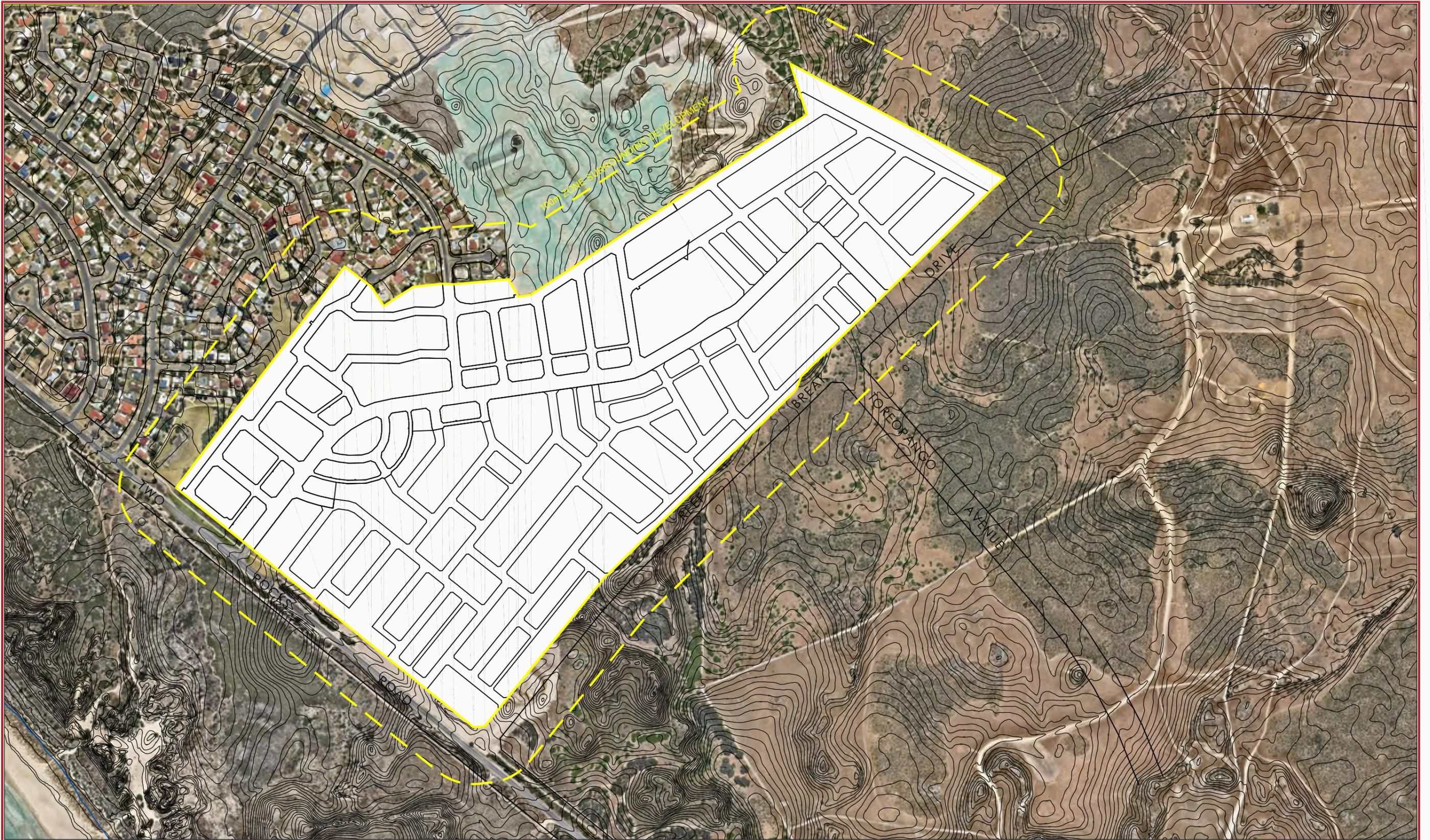
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DATE: MARCH 2016
Base mapping supplied by Chappell Lambert Everett

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**APPENDIX C
LSP AMENDMENT PLAN**

LOTS 2001 & 9000 REEF BREAK DRIVE
TWO ROCKS
City of Wanneroo

LEGEND

100m ZONE FROM DEVELOPMENT.



SOURCE:
PHOTOGRAPHY FROM NEARMAP



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DATE: FEBRUARY 2016
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APPENDIX D
STAGE 1 SUBDIVISION
AS3959 VEGETATION CLASSIFICATION

LOT 9000 REEF BREAK DRIVE
TWO ROCKS
City of Wanneroo

LEGEND

100m ZONE FROM DEVELOPMENT.



SOURCE:
PHOTOGRAPHY FROM NEARMAP

Wd - Woodland (Class B)

Sh - Shrubland (Class C)

Sc - Scrub (Class D)

Gr - Grassland (Class G)

Ex 2.2.3.2 (e) - Exclusion Clause 2.2.3.2 (e)

Ex 2.2.3.2 (f) - Exclusion Clause 2.2.3.2 (f)



NORTH



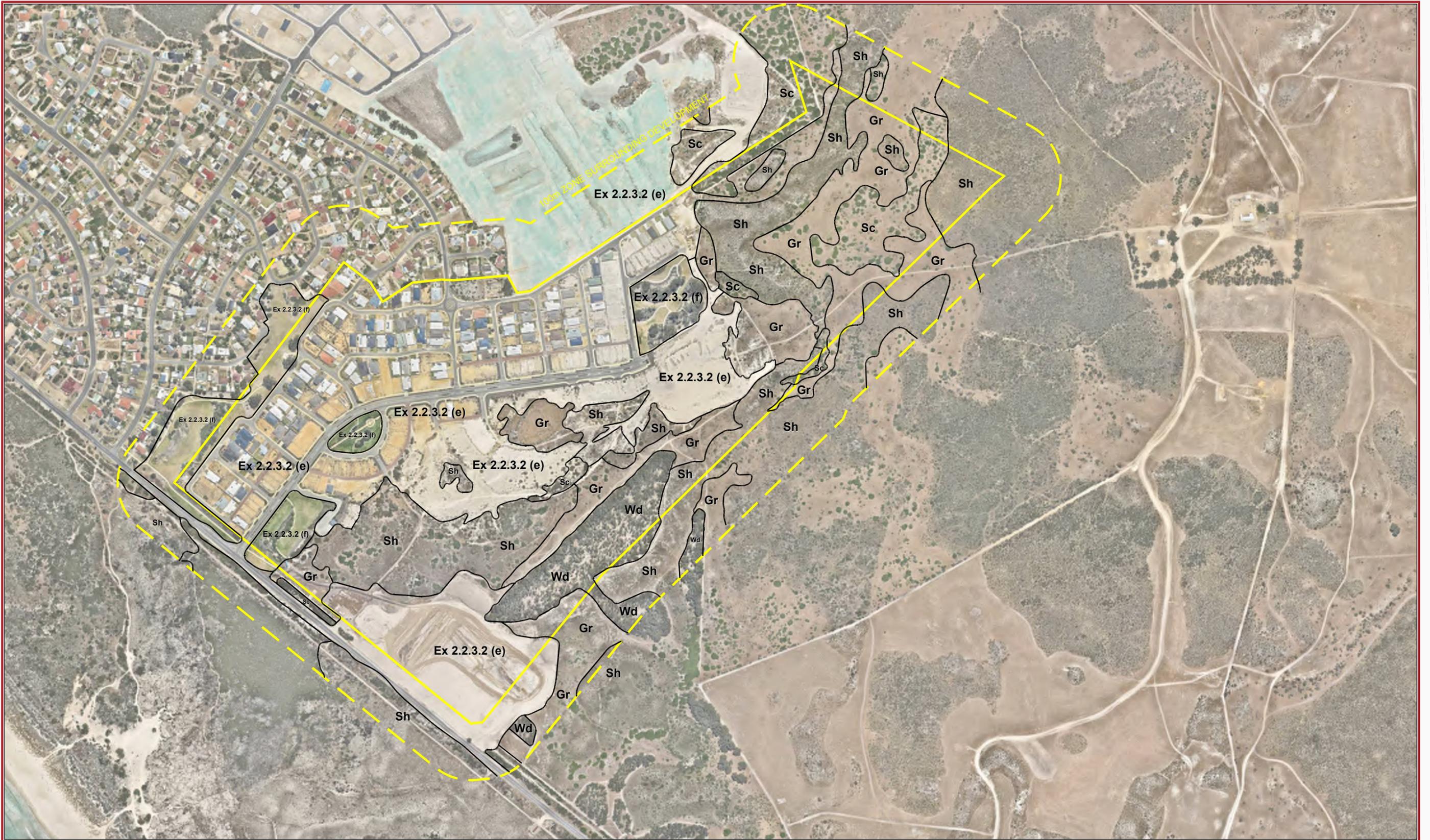
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APPENDIX E
LSP AMENDMENT
AS3959 VEGETATION CLASSIFICATION

LOTS 2001 & 9000 REEF BREAK DRIVE
TWO ROCKS
City of Wanneroo

LEGEND

100m ZONE FROM DEVELOPMENT.



SOURCE:
PHOTOGRAPHY FROM NEARMAP

Wd - Woodland (Class B)

Sh - Shrubland (Class C)

Sc - Scrub (Class D)

Gr - Grassland (Class G)

Ex 2.2.3.2 (e) - Exclusion Clause 2.2.3.2 (e)

Ex 2.2.3.2 (f) - Exclusion Clause 2.2.3.2 (f)



NORTH

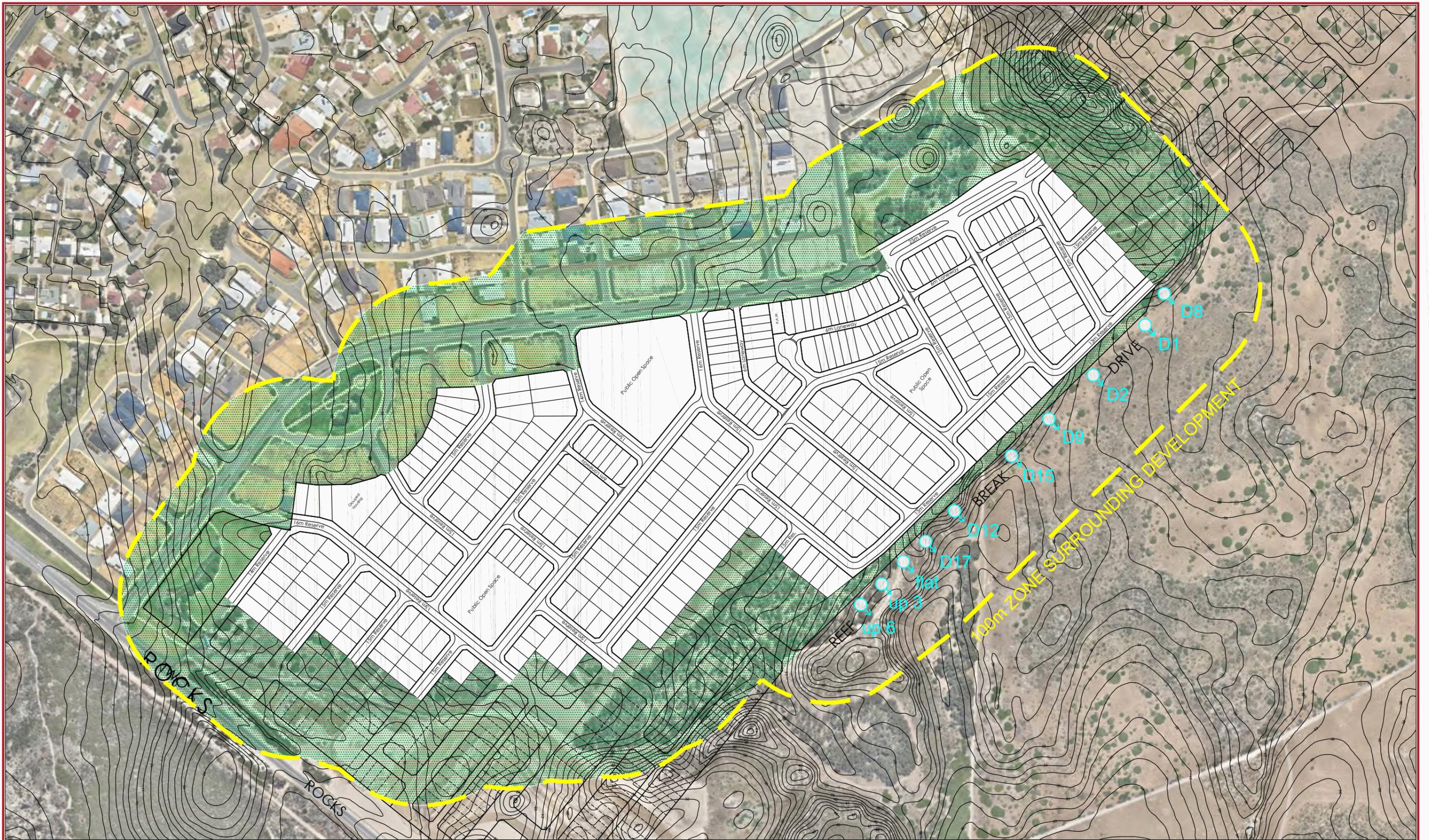


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APPENDIX F
STAGE 1 SUBDIVISION - POST DEVELOPMENT
EFFECTIVE SLOPE

LOT 9000 REEF BREAK DRIVE
TWO ROCKS
City of Wanneroo

LEGEND

100m ZONE FROM DEVELOPMENT.



SOURCE:
PHOTOGRAPHY FROM NEARMAP



Exclusion Clause 2.2.3.2(e) or 2.2.3.2(f)



NORTH

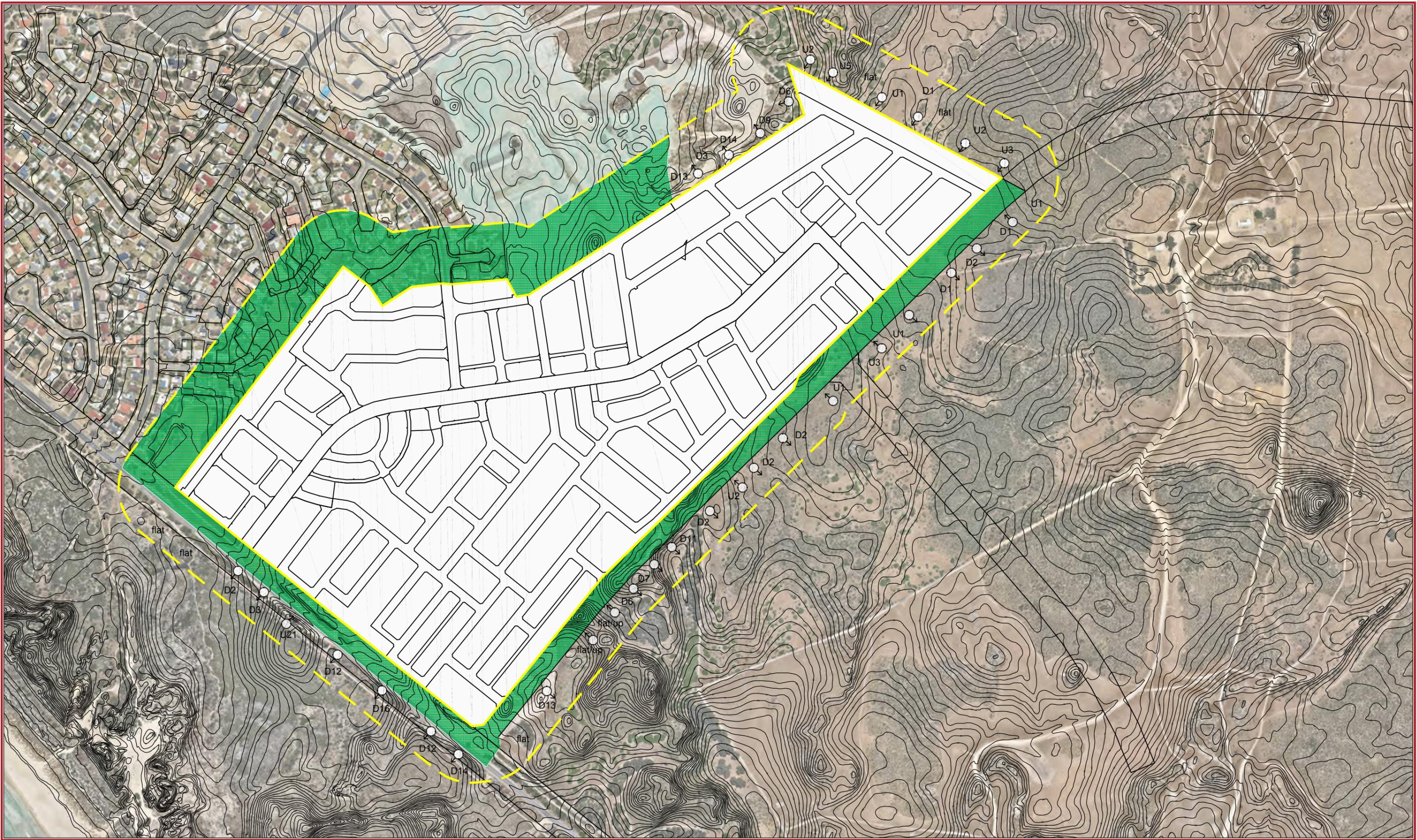


NOT TO SCALE @ A3
DATE: MARCH 2016
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APPENDIX G
LSP AMENDMENT - POST DEVELOPMENT
EFFECTIVE SLOPE

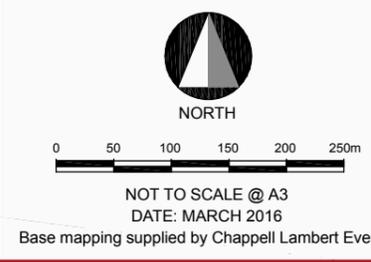
LEGEND

100m ZONE FROM DEVELOPMENT...

SOURCE:
PHOTOGRAPHY FROM NEARMAP

 Exclusion Clause 2.2.3.2(e) or 2.2.3.2(f)

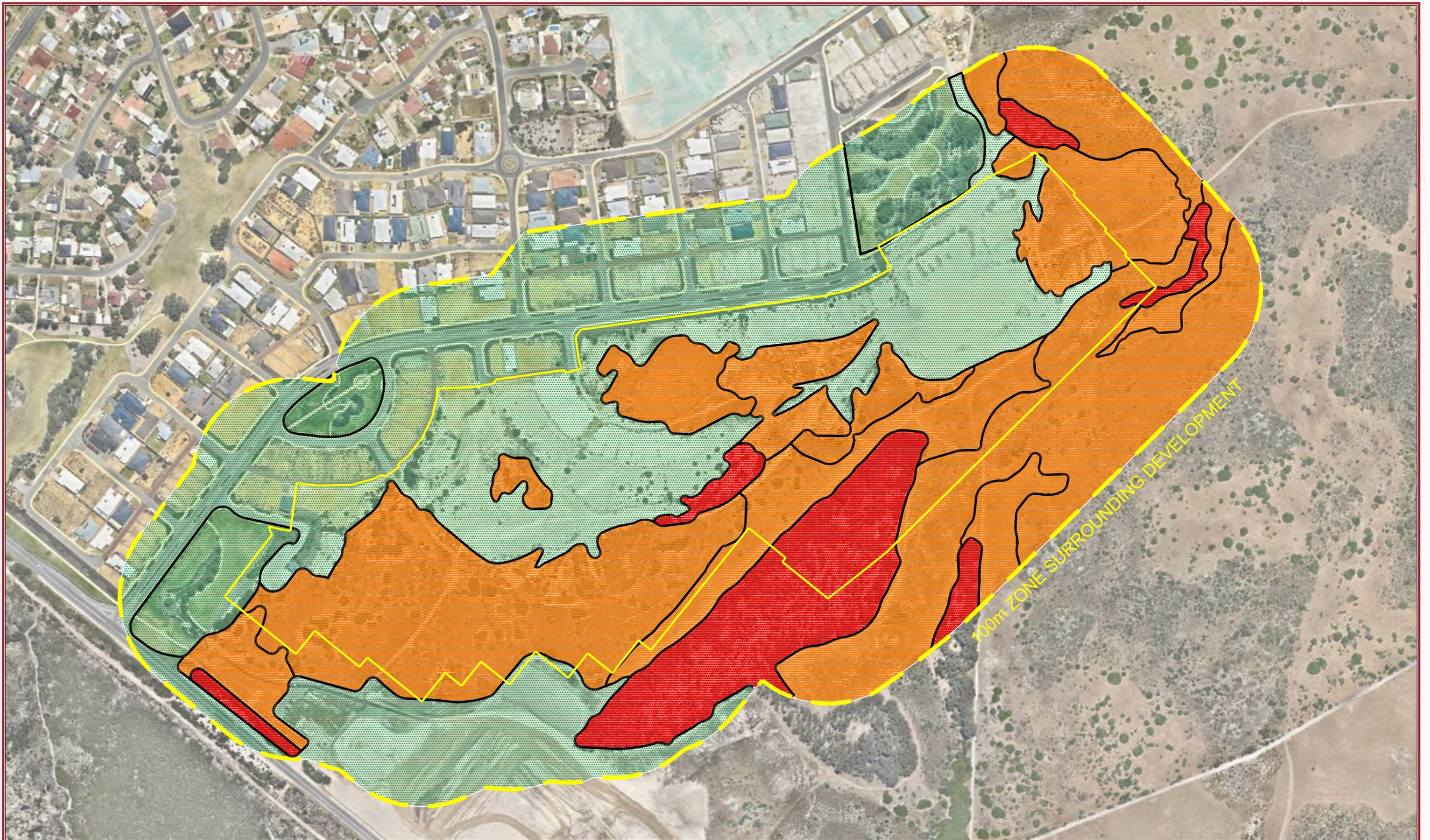
LOTS 2001 & 9000 REEF BREAK DRIVE
TWO ROCKS
City of Wanneroo



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100m ZONE SURROUNDING DEVELOPMENT

APPENDIX H
STAGE 1 SUBDIVISION
BUSHFIRE HAZARD RATING

LOT 9000 REEF BREAK DRIVE
TWO ROCKS
City of Wanneroo

LEGEND

100m ZONE FROM DEVELOPMENT.



SOURCE:
PHOTOGRAPHY FROM NEARMAP

-  Extreme
-  Moderate
-  Low



NORTH

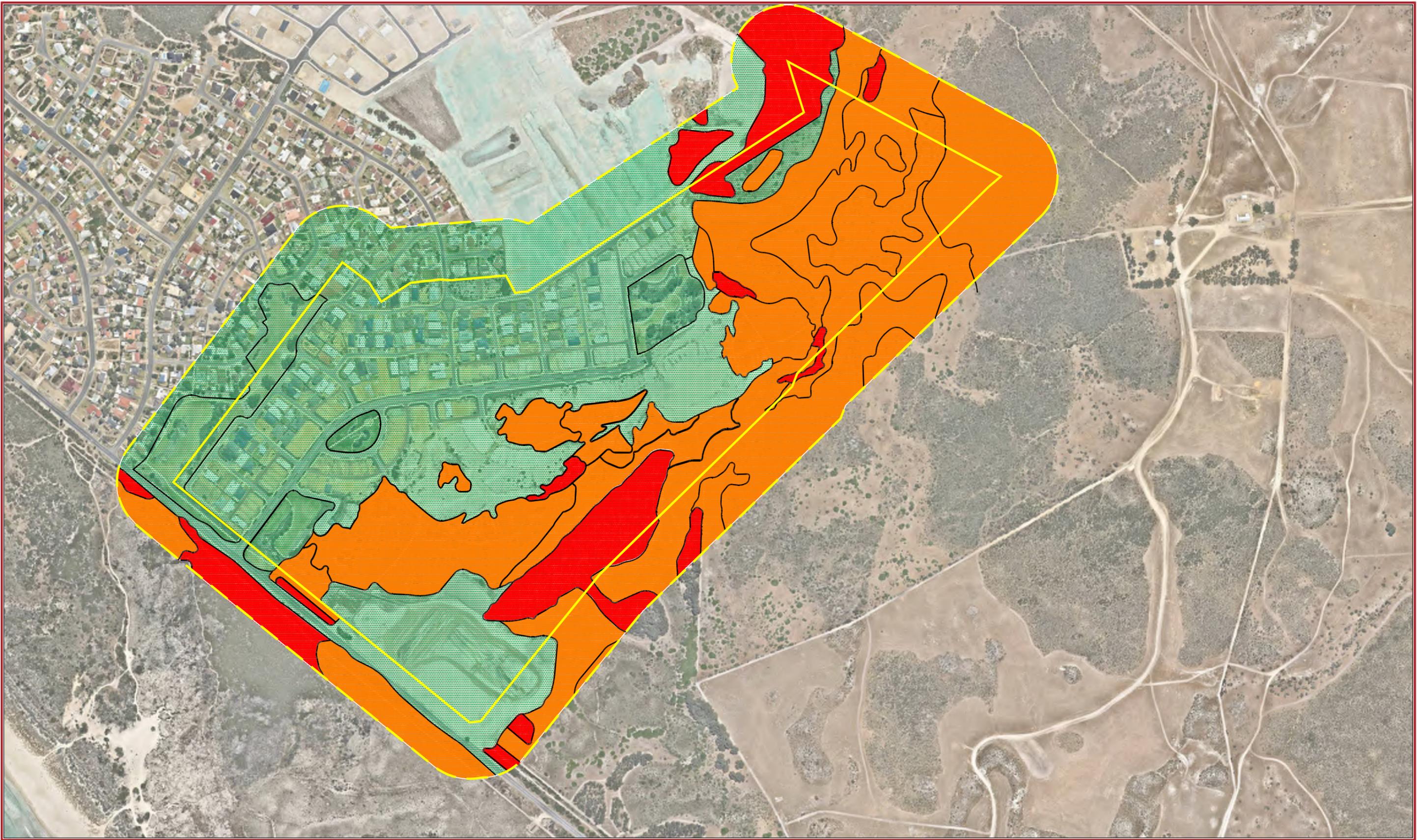


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APPENDIX I
LSP AMENDMENT
BUSHFIRE HAZARD RATING

LOTS 2001 & 9000 REEF BREAK DRIVE
TWO ROCKS
City of Wanneroo

LEGEND

100m ZONE FROM DEVELOPMENT...

SOURCE:
PHOTOGRAPHY FROM NEARMAP

-  Extreme
-  Moderate
-  Low



NORTH

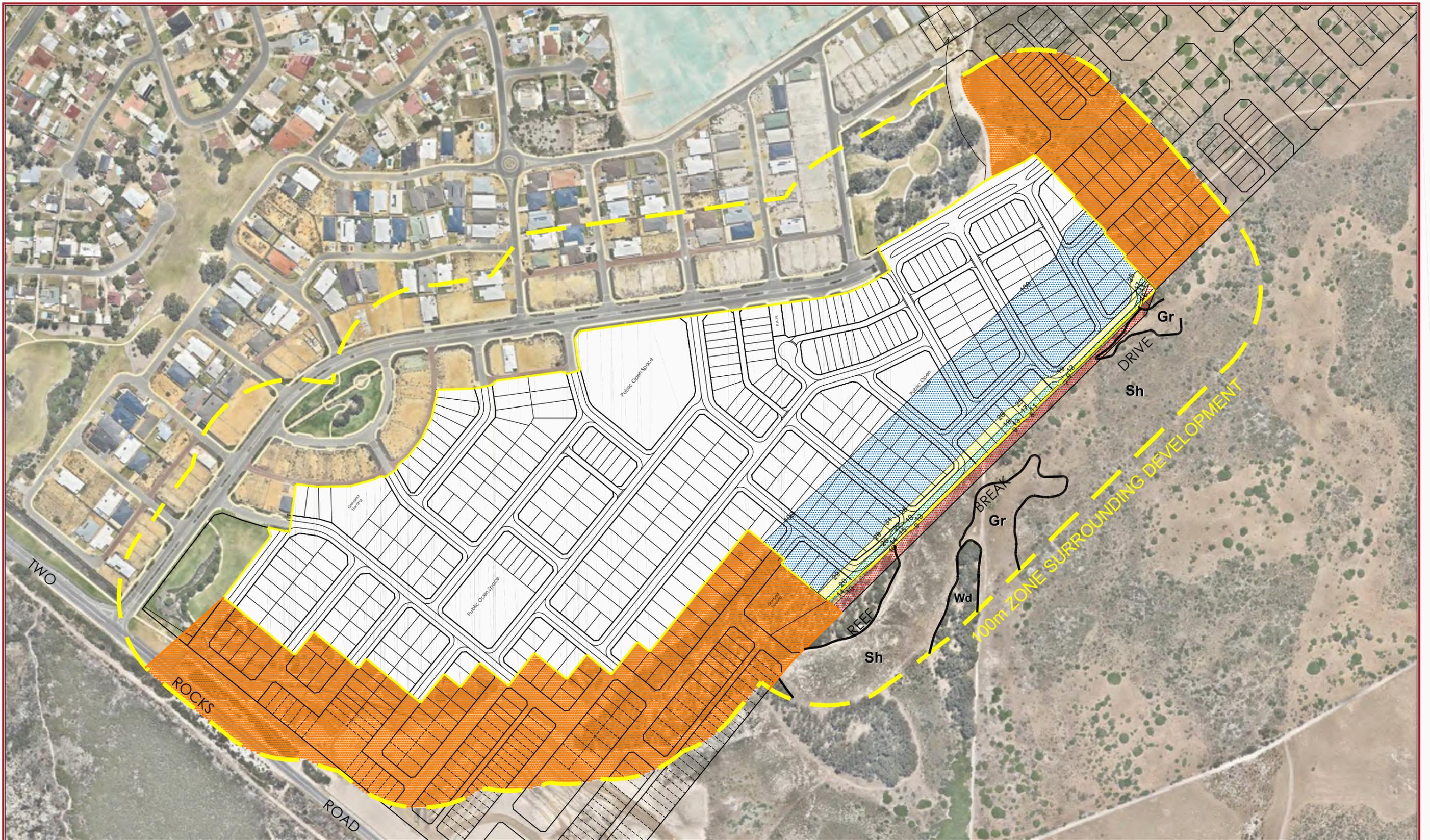


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APPENDIX J
 STAGE 1 SUBDIVISION - POST DEVELOPMENT
 BAL CONTOUR PLAN

LOT 9000 REEF BREAK DRIVE
 TWO ROCKS
 City of Wanneroo

LEGEND

100m ZONE FROM DEVELOPMENT.



SOURCE:
 PHOTOGRAPHY FROM NEARMAP

BAL RATING

- BAL FLAME ZONE
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- Exclusion Clause 2.2.3.2.(e)



NORTH

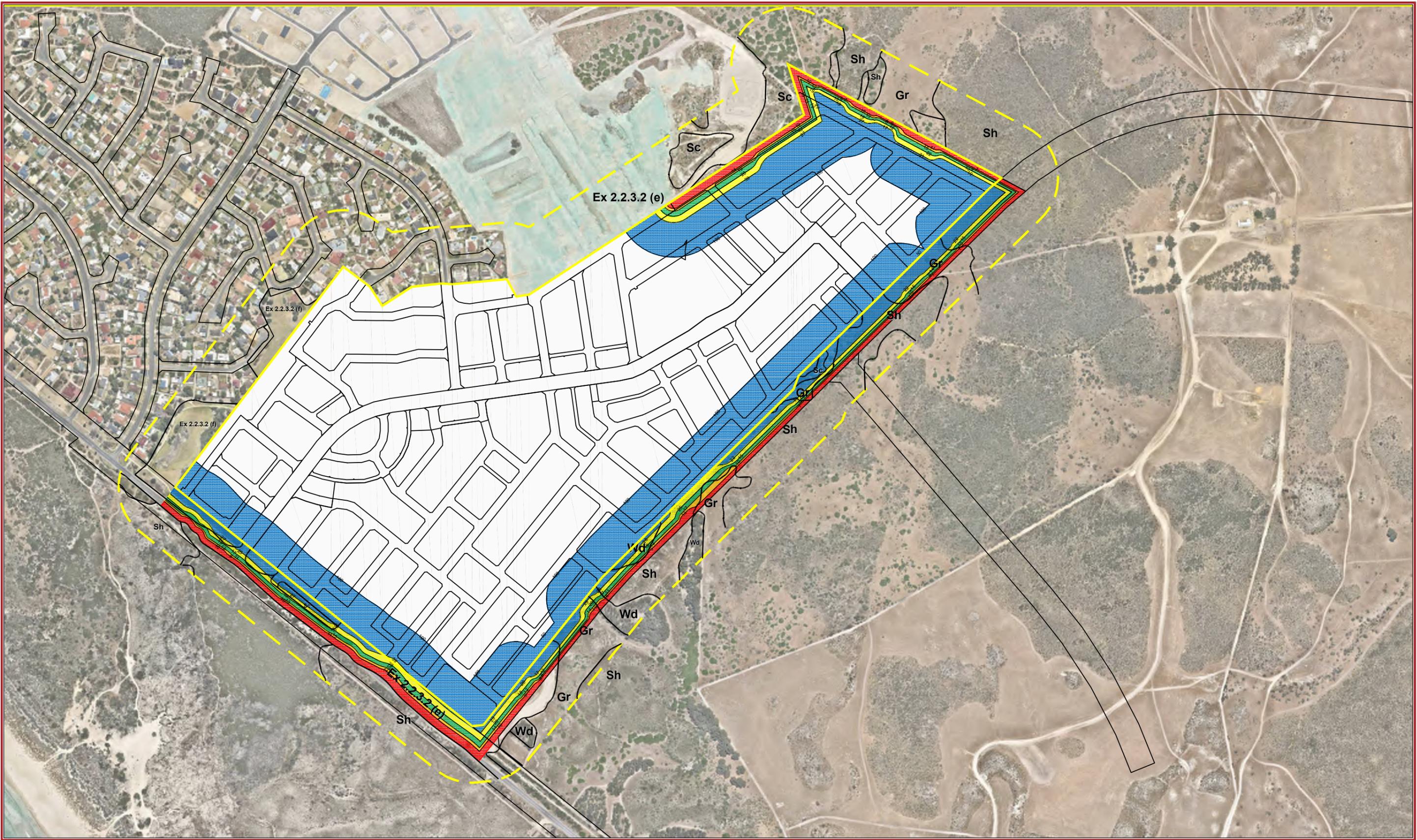


NOT TO SCALE @ A3
 DATE: FEBRUARY 2016
 Base mapping supplied by Chappell Lambert Everett

Bushfire Safety
 CONSULTING

BUSHFIRE SAFETY CONSULTING

PO BOX 84 STONEVILLE WA 6081
 Mbl: 0429 949 262
 www.bushfiresafety.net



APPENDIX K
LSP AMENDMENT - POST DEVELOPMENT
BAL CONTOUR PLAN

LEGEND

100m ZONE FROM DEVELOPMENT..

SOURCE:
PHOTOGRAPHY FROM NEARMAP

- BAL RATING**
-  BAL FLAME ZONE
 -  BAL 40
 -  BAL 29
 -  BAL 19
 -  BAL 12.5



NORTH

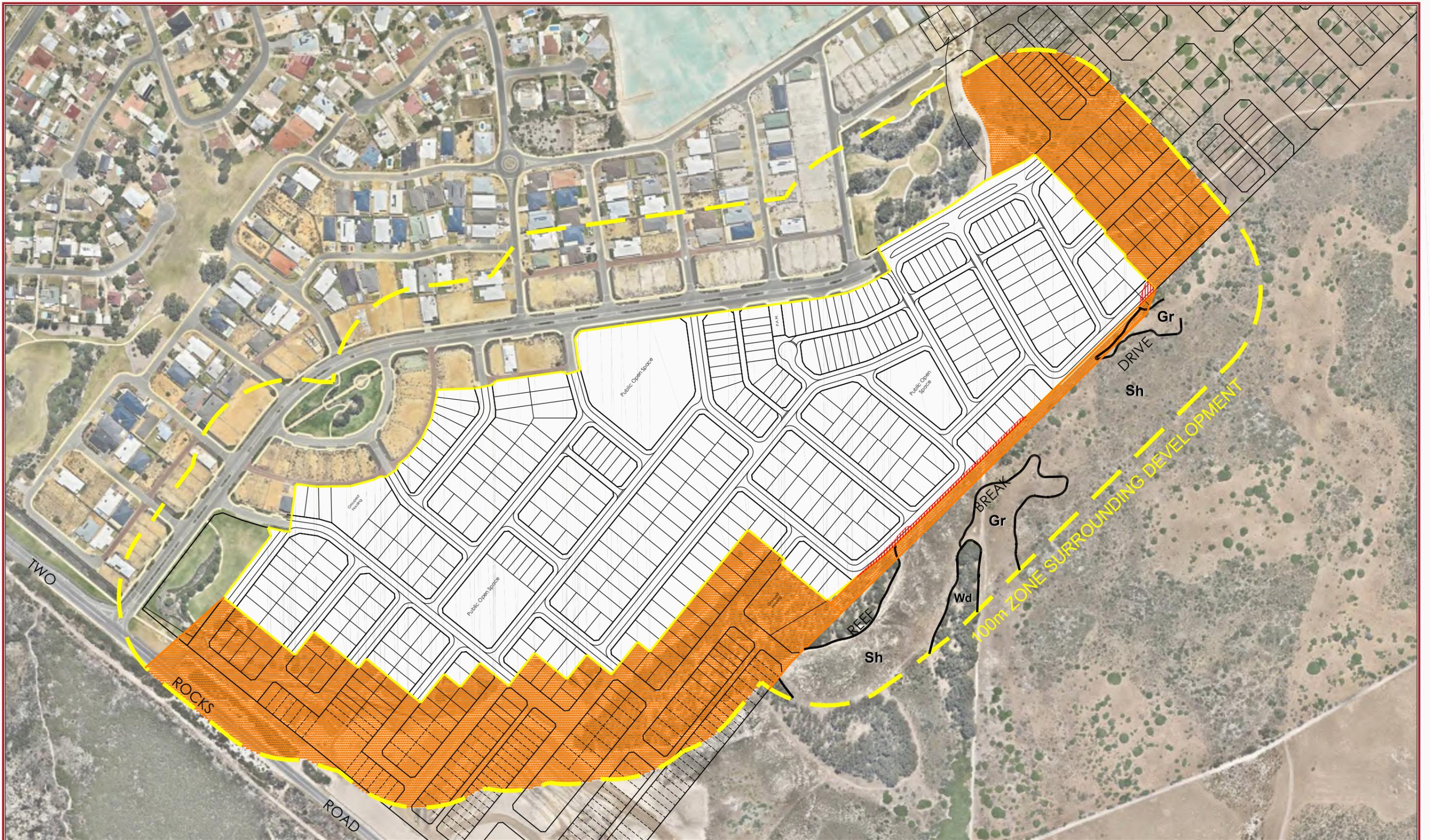


NOT TO SCALE @ A3
DATE: MARCH 2016
Base mapping supplied by Chappell Lambert Everett



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APPENDIX L
STAGE 1 SUBDIVISION
APZ PLAN

LOT 9000 REEF BREAK DRIVE
TWO ROCKS
City of Wanneroo

LEGEND

100m ZONE FROM DEVELOPMENT.



SOURCE:
PHOTOGRAPHY FROM NEARMAP

BAL RATING

-  Asset Protection Zone
-  Exclusion Clause 2.2.3.2.(e)



NORTH



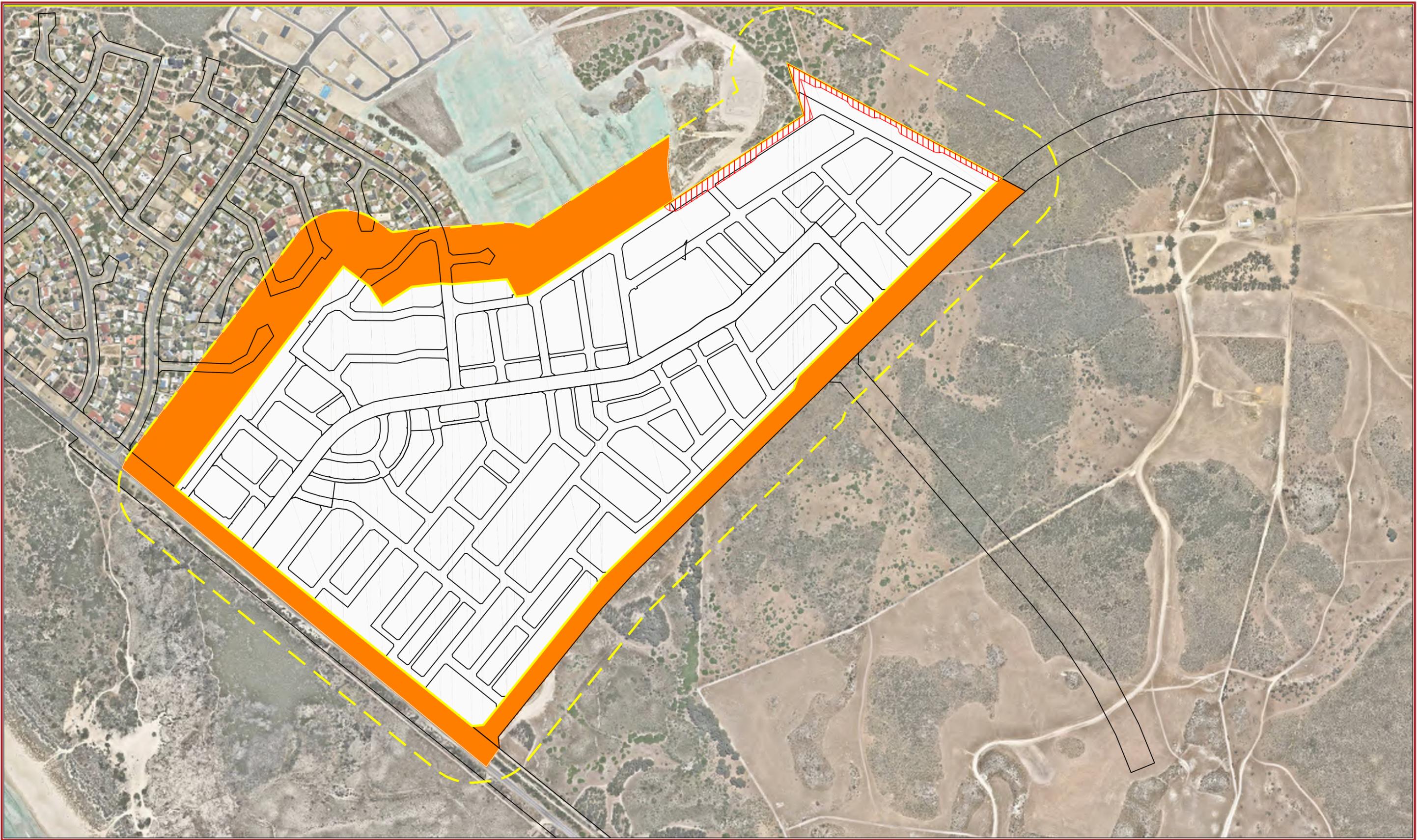
NOT TO SCALE @ A3
DATE: MARCH 2016
Base mapping supplied by Chappell Lambert Everett

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APPENDIX M
LSP AMENDMENT
APZ PLAN

LOTS 2001 & 9000 REEF BREAK DRIVE
TWO ROCKS
City of Wanneroo

LEGEND

100m ZONE FROM DEVELOPMENT...

SOURCE:
PHOTOGRAPHY FROM NEARMAP



Asset Protection Zone



Exclusion Clause 2.2.3.2.(e)



NORTH



NOT TO SCALE @ A3
DATE: MARCH 2016
Base mapping supplied by Chappell Lambert Everett

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Appendix N
 Stage 1 Subdivision
 Vehicular Access Plan

LOT 9000 REEF BREAK DRIVE
 TWO ROCKS
 City of Wanneroo

LEGEND

100m ZONE FROM DEVELOPMENT.



SOURCE:
 PHOTOGRAPHY FROM NEARMAP



temporary 17.5m cul-de-sac heads



NORTH



NOT TO SCALE @ A3
 DATE: FEBRUARY 2016
 Base mapping supplied by Chappell Lambert Everett

Bushfire Safety

CONSULTING

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8.1.1.1 Appendix P: Bushfire Management Plan Checklist

Criteria	Response
1 Background Information	Details on skills, expertise, qualifications and accreditation provided.
2. Spatial Consideration of Bushfire Threat	Aerial photography and maps are provided outlining spatial distribution of vegetation and bushfire hazard on the site and within 100 metres of the site boundary
3. Proposal Compliance	The proposal to create residential lots and meets the objectives of SPP 3.7
3.1 Location of Development	
Does the proposal comply with the performance criteria by applying acceptable solution A1.1?	Yes. The subdivision and LSP is located in an area that will on completion be subject to a BAL rating of BAL-29 or lower for all proposed Lots.
3.2: Siting of Development	
Does the proposal comply with the performance criteria by applying acceptable solution A2.1?	Yes. An APZ is accommodated on lots adjacent to perimeter hazard that provides sufficient setback from bushfire fuels to ensure all future dwellings be subject to a BAL rating of BAL-29 or lower
Does the proposal comply with the performance criteria by applying acceptable solution A2.2?	Yes. A HSZ is not required because the APZ provides adequate setback distances. The BAL rating for all future dwellings do not exceed BAL-29.
3.3: Vehicular Access	
Does the proposal comply with the performance criteria by applying acceptable solution A3.1?	Yes, Two access ways are provided on public roads for all lots
Does the proposal comply with the performance criteria by applying acceptable solution A3.2?	Yes
Does the proposal comply with the performance criteria by applying acceptable solution A3.3?	Yes
Does the proposal comply with the performance criteria by applying acceptable solution A3.4?	Not applicable
Does the proposal comply with the performance criteria by applying acceptable solution A3.5?	Not applicable.
Does the proposal comply with the performance criteria by applying acceptable solution A3.6?	Not applicable.
Does the proposal comply with the performance criteria by applying acceptable solution A3.7?	Not applicable.
Does the proposal comply with the performance criteria by applying acceptable solution A3.8?	Yes, compliance with fire control notice can be achieved
Does the proposal comply with the performance criteria by applying acceptable solution A3.9?	Not applicable.
4: Water	

Bushfire Management Plan – Lots 2001 & 9000 Reef Break Drive, Two Rocks

Criteria	Response
Does the proposal comply with the performance criteria by applying acceptable solution A4.1?	Yes
Does the proposal comply with the performance criteria by applying acceptable solution A4.2?	Not applicable
Does the proposal comply with the performance criteria by applying acceptable solution A4.3?	Not applicable

Applicant Declaration

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

Signature:



Name: Rohan Carboon

Date: 24/03/2016
