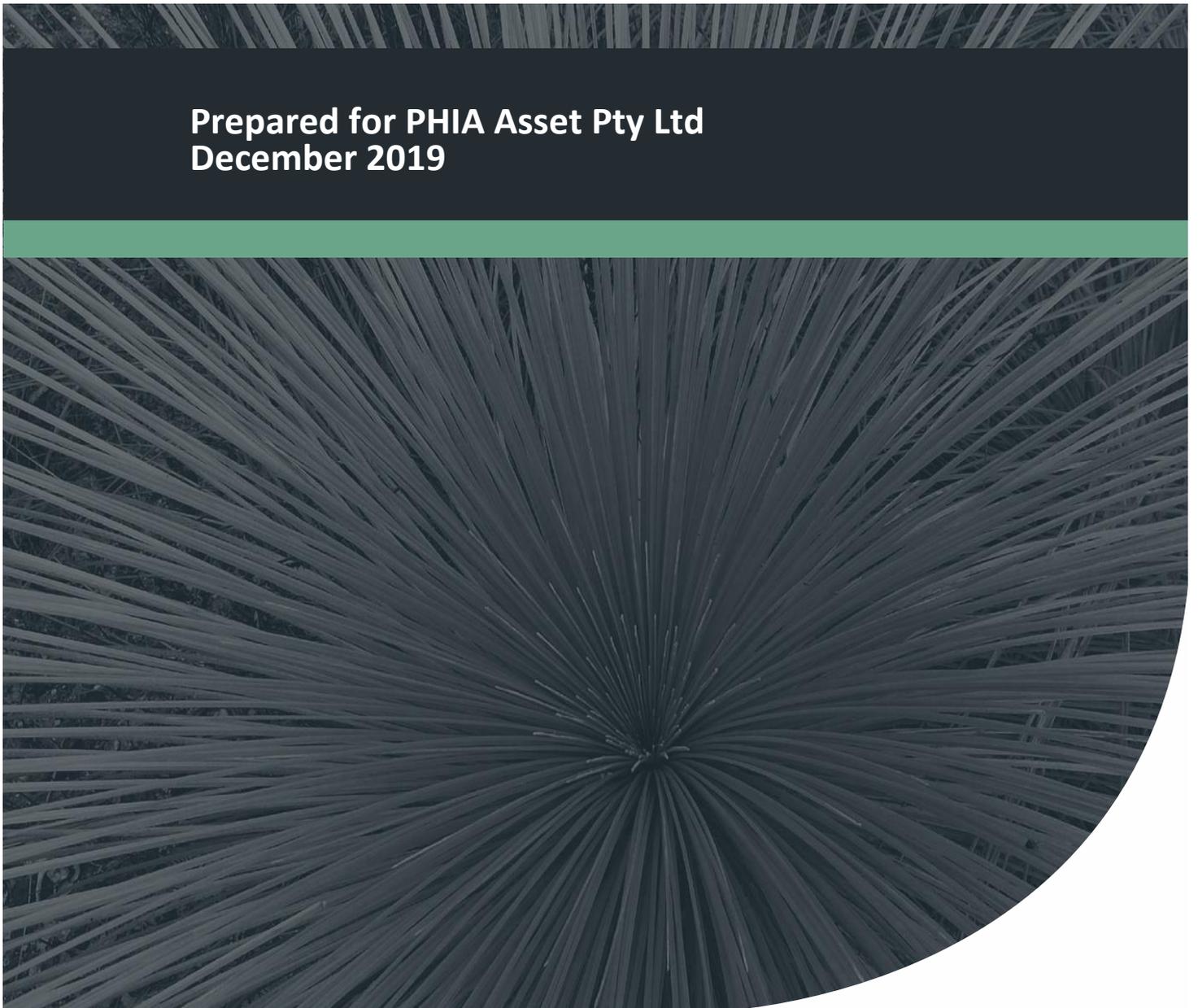


Bushfire Management Plan

PHIA - Highway Precinct

Project No: EP18-117(03)

**Prepared for PHIA Asset Pty Ltd
December 2019**



Bushfire Management Plan

PHIA - Highway Precinct



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Disclaimer:

This document has been prepared in good faith and is derived from information sources believed to be reliable and accurate at the time of publication. Nevertheless, it is distributed on the terms and understanding that the author is not liable for any error or omission in the information sources available or provided to us, or responsible for the outcomes of any actions taken based on the recommendations contained herein. It is also expected that our recommendations will be implemented in their entirety, and we cannot be held responsible for any consequences arising from partial or incorrect implementation of the recommendations provided.

This document has been prepared primarily to consider the layout of development and/or the appropriate building construction standards applicable to development, where relevant. The measures outlined are considered to be prudent minimum standards only based on the standards prescribed by the relevant authorities. The level of bushfire risk mitigation achieved will depend upon the actions of the landowner or occupiers of the land and is not the responsibility of the author. The relevant local government and fire authority (i.e. Department of Fire and Emergency Services or local bushfire brigade) should be approached for guidance on preparing for and responding to a bushfire.

Notwithstanding the precautions recommended in this document, it should always be remembered that bushfires burn under a wide range of conditions which can be unpredictable. An element of risk, no matter how small, will always remain. The objective of the Australian Standard AS 3959:2018 is to "prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire" (Standards Australia 2018). Building to the standards outlined in AS 3959 does not guarantee a building will survive a bushfire or that lives will not be threatened by the effects of bushfire attack.

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Executive Summary

The PHIA Asset Trust Pty Ltd (the proponent) is seeking to develop a portion of Lot 9008 on Plan 404824 in Port Hedland (herein referred to as 'the site') to facilitate industrial development. The site is approximately 38 hectares (ha) in area, and is bound by Great Northern Highway to the north, short-term accommodation dwellings to the east, and the airport taxiway and runway to the south and west. The proposed development will include 16 industrial lots and an internal road network that will connect to Great Northern Highway.

The site is identified within a 'bushfire prone area' under the state-wide *Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM 2018). The Western Australia *Planning and Development Act 2005* requires for any land identified as bushfire prone that an assessment of the bushfire risk is undertaken utilising the methodology described in *Australian Standard 3959-2018 Construction of buildings in bushfire prone areas (AS 3959)* (Standards Australia 2018).

The purpose of SPP 3.7, and its policy intent, is best summarised as preserving life and reducing the impact of bushfire on property and infrastructure through effective risk-based land use planning. Accordingly, this Bushfire Management Plan (BMP) examines the likely long-term bushfire risk risks and advances responses that will make the ultimate use of the land suitable for its intended purpose.

The majority of the site contains a mixture of native and weedy vegetation, identified in AS 3959 as 'shrubland' (Class C) and unmanaged 'grassland' (Class G). Shrubland vegetation has been identified to the south-east of the site, with grassland vegetation identified to the north and north-east of the site.

In order to understand the likely bushfire risk applicable to future development within the site, a post development vegetation classification scenario has been assumed in which all classified vegetation within the site will be removed, whilst vegetation identified outside of the site will remain in its current condition.

The outcomes of this BMP demonstrate that as development progresses, it will be possible for an acceptable solution to be adopted for Elements 1, 2 and 4 of the bushfire protection criteria outlined in the Guidelines. This includes:

- **Location:** future habitable buildings can be located in an area that will, on completion, be subject to a low or moderate bushfire hazard.
- **Siting and Design:** all future habitable buildings can be sited within the proposed development so that BAL-29 or less can be achieved based on the proposed development layout through the location of public roads or in lot setbacks.
- **Water:** the development will be provided with a reticulated water supply to support onsite firefighting requirements, to be installed by the proponent and located no more than 100 m apart (or as otherwise agreed to with the Water Corporation).

The outcome of the BMP has identified that the land is constrained in its ability to provide a secondary access that would provide for alternative destinations to that of its primary access from the Great Northern Highway.

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The subject land is effectively a triangle bound by the Great Northern Highway, the Railway line and airport runway.

The proposal will be serviced by two opposing cul-de-sacs, that whilst exceeding the acceptable length (200 m) will otherwise be compliant with the construction described in the *Guidelines* i.e. in terms of carriage width, horizontal and vertical clearance and gradient.

Notwithstanding the cul-de-sacs exceed the maximum length they will be located adjacent to low threat surfaces AS 3959 2.2.3.2 (e) and (f) post development. Up to development occurring within the site, it is proposed that the proponent will take responsibility to manage the land in a low threat state, with the vegetation on site to be removed, and if grass within the site is to be retained it should not exceed 100 mm at any time, as per AS 3959 requirements. If development is to be staged, vegetation within 100 m of development should be maintained in this state. It is proposed that this be reflected as condition of approval; to require the management by the proponent with oversight (to the benefit) of the Town of Port Hedland.

These measures will ensure the road network complies with the performance principle in Element 3

P3 The internal layout, design and construction of public and private vehicular access and egress in the subdivision/ development allow emergency and other vehicles to move through it easily and safely at all times.

The measures to be implemented through this development application have been outlined as part of this BMP and can be used to support future construction and development.

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Appendix A

Development Application Layout (CLE 2018)

Appendix B

Cul-de-sac dimensions

Appendix C

Existing and proposed water infrastructure

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List of Abbreviations

Table A1: Abbreviations – General terms

General terms	
AHD	Australian Height Datum
AS	Australian Standard
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BMP	Bushfire Management Plan
BPAD	Bushfire Planning and Design
EEP	Emergency Evacuation Plan
ESL	Emergency Services Levy
FDI	Fire Danger Index
FZ	Flame Zone

Table A2: Abbreviations – Organisations

Organisations	
DBCA	Department of Biodiversity Conservation and Attractions
DoW	Department of Water (now known as Department of Water and Environment Regulation)
DFES	Department of Fire and Emergency Services
OBRM	Office of Bushfire Risk Management
SES	State Emergency Services
WAPC	Western Australian Planning Commission

Table A3: Abbreviations – Legislation and policies

Legislation	
Guidelines	<i>Guidelines for Planning in Bushfire Prone Areas version 1.3 (WAPC and DFES 2017)</i>
SPP 3.7	<i>State Planning Policy 3.7 Planning in Bushfire Prone Areas (WAPC 2015)</i>

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Table A4: Abbreviations – Planning and building terms

Planning and building terms	
AS 3959	<i>Australian Standard 3959-2018 Construction of buildings in bushfire prone areas</i>
TPS	Town Planning Scheme
POS	Public Open Space

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1 Introduction

1.1 Background

The PHIA Asset Trust Pty Ltd (the proponent) is seeking to develop a portion of Lot 9008 on Plan 404824 in Port Hedland (herein referred to as 'the site') to facilitate industrial development, with a proposed development layout provided in **Appendix A**. The site is approximately 38 hectares (ha) in area, and is bound by Great Northern Highway to the north, short-term accommodation dwellings to the east and the Port Hedland International Airport and associated runway to the south and west of the site.

The site is identified within a 'bushfire prone area' under the state-wide *Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM 2019), as shown in **Plate 1**. The *Western Australia Planning and Development Act 2005* requires for any land identified as bushfire prone that an assessment of the bushfire risk is undertaken utilising the methodology described in *Australian Standard 3959-2018 Construction of buildings in bushfire prone areas* (AS 3959) (Standards Australia 2018). The suitability of the land, for the intended land use, is then to be assessed having regard to the determined risk for its consistency with the intent and objectives of *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7) (WAPC 2015). The assessment follows the procedures and investigations described in the *Guidelines for Planning in Bushfire Prone Areas Version 1.3* (the Guidelines) (WAPC and DFES 2017).

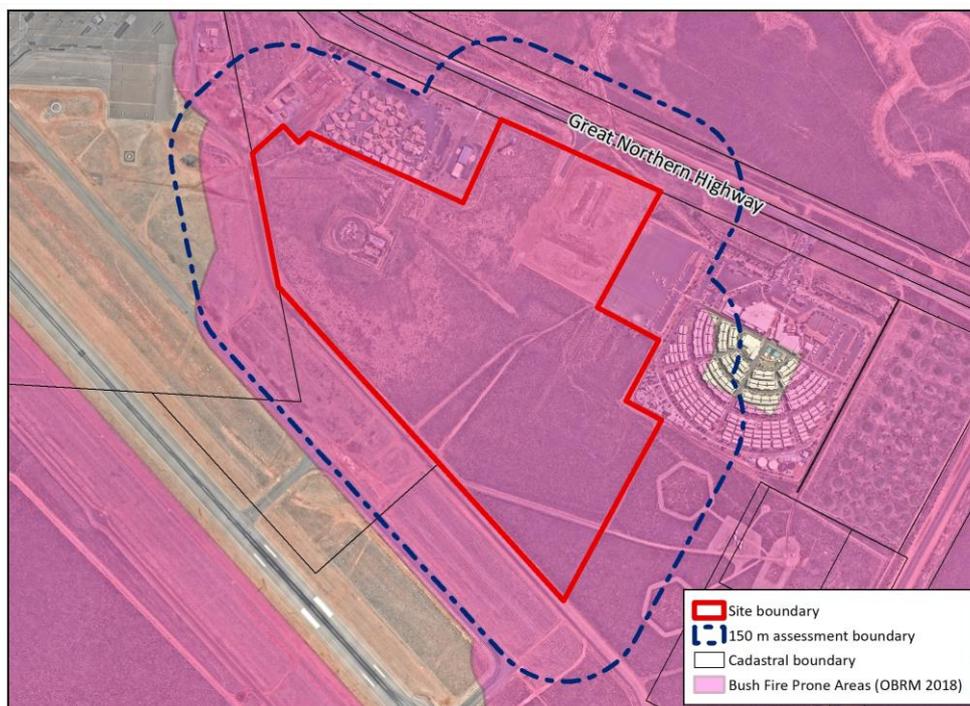


Plate 1: Areas within and surrounding the site identified as 'bushfire prone areas' (as indicated in purple) under the state-wide *Map of Bush Fire Prone Areas* (OBRM 2019).

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1.2 Aim of this report

The purpose of this BMP is to assess bushfire hazards both within and nearby the site, and ensure that the threat posed by any identified hazards can be appropriately mitigated and managed. This BMP has been prepared to support the proposed development application for the site and addresses the requirements of SPP 3.7 (WAPC 2015), the Guidelines (WAPC and DFES 2017) and AS 3959 (Standards Australia 2018). The document provides an assessment of the general bushfire management strategies to be considered as part of future development and includes:

- An assessment of the existing classified vegetation in the vicinity of the site (within 150 m) and consideration of bushfire hazards that will exist in the post development scenario (**Section 3**).
- Commentary on how the future development can achieve the bushfire protection criteria outlined within the Guidelines including an indication of BAL ratings likely to be applicable to future development (**Section 5**).
- An outline of the roles and responsibilities associated with implementing this BMP (see **Section 6**).

1.3 Statutory policy and framework

The following key legislation, policies and guidelines are relevant to the preparation of a bushfire management plan:

- *Fire and Emergency Services Act 1998*
- *Bush Fires Act 1954*
- *Planning and Development Act 2005*
- *Building Act 2011*
- *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (WAPC 2015)
- *Guidelines for Planning in Bushfire Prone Areas version 1.3* (WAPC and DFES 2017)
- *Australian Standard AS 3959 – 2018 Construction of buildings in bushfire prone areas* (Standards Australia 2018)

1.4 Description of the proposed development

The site is proposed to be developed for industrial purposes, which will be required to comply with the permissible land uses under the 'Airport' zoning, under the Town of Port Hedland Town Planning Scheme No. 5. Development within the site will include:

- industrial lots, and;
- an interconnected road network.

The future industrial land uses which will ultimately be developed within the site may meet the definition of 'high-risk land uses' as provided in SPP 3.7 and the Guidelines. Such land uses may include, for example, bulk storage of hazardous materials. Policy measure 6.6 of SPP 3.7 requires any development application which may result in the introduction of a high-risk land use in an area likely to be subject to a Bushfire Attack Level (BAL) rating of BAL-12.5 or higher to be supported by a Bushfire Management Plan and make provision for emergency evacuation and/or a risk management

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plan. Policy measure 6.6 has been specifically addressed in this regard and is discussed in **Section 5.1.4.**

1.5 Description of the site characteristics

The majority of the site currently supports native vegetation, although a review of available historic aerial imagery indicates that the site (and broader Lot 9008) has historically been cleared of remnant native vegetation, with clearing across the entire lot occurring between 2001 and 2002 (Landgate 2018). As the majority of the site has not been utilised for any purposes since clearing occurred, regrowth of native and weedy vegetation has occurred across the majority of the site, with the north-eastern portion of the site cleared again in 2017 and 2018.

Surrounding land uses include:

- Short-stay workers accommodation facilities are located to the north (Mia Mia) and north-east (Port Haven Village) of the site.
- The airport taxiway and runway are located approximately 140 m and 330 m respectively to the south of the site.
- An access road, Pettersson Road, is located to the south-western boundary of the site, which serves as an internal access road for the airport facility.
- A high frequency antenna array, located to the east of the site.

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2 Environmental Considerations

In accordance with the *Bushfire Management Plan – BAL Contour* template prepared by the Department of Planning, Lands and Heritage (2018), this BMP has considered whether there are any environmental values that may require specific consideration through either protection, retention or revegetation. To support this, a review of publicly available databases has been undertaken, with particular reference to the Shared Location Information Platform (SLIP) databases, and any available environmental reports. A summary of the search results has been provided in **Table 1**.

The majority of the site supports native vegetation that has regrown from a previous clearing event, and is mostly native low shrubland, primarily *Acacia* spp. over grassland of native species, primarily *Triodia* spp., in addition to weed species (Emerge Associates 2018).

Table 1: Summary of potential environmental considerations that may be associated with the site (based on a search of the SLIP databases and available environmental reports)

Key environmental feature (information in brackets refers to mapping data source)	Yes / no / potentially occurring within the site	If yes / potentially, describe value that may be impacted
RAMSAR wetlands (DBCA-010)	No	Not applicable.
Threatened and priority flora (Emerge Associates 2018)	No	Not applicable. A flora and vegetation survey undertaken by Emerge Associates (2018) did not record any threatened or priority flora within the site.
Threatened and priority fauna (DBCA-037)	No	Not applicable. As part of the flora and vegetation survey undertaken, vegetation was assessed for potential fauna habitat. The vegetation was assessed as not posing suitable fauna habitat, which corresponded to desktop surveys which did not identify any threatened or priority fauna within the site.
Threatened ecological communities (Emerge Associates 2018)	No	Not applicable. A flora and vegetation survey undertaken by Emerge Associates (2018) did not record any threatened ecological communities within the site.
Clearing regulations – Environmentally Sensitive Areas (DWER-046)	No	Not applicable.

2.1 Native vegetation – modification and clearing

No existing areas of native vegetation are proposed to be retained within the site. Clearing of remaining native vegetation within the site will require a clearing permit pursuant to Part V of the *Environmental Protection Act 1986* (EP Act), which is being progressed simultaneously to the preparation of this BMP.

All vegetation outside the site, is assumed to remain in its existing condition. No areas of native vegetation outside the site are proposed to be modified or cleared by the proponent as part of the proposed development.

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2.2 Revegetation and landscape plans

No areas are required to be revegetated as part of the proposed development within the site.

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3 Bushfire Assessment Results

Bushfire risk for the site has been considered following the methods described in the Guidelines (WAPC and DFES 2017) and in AS 3959.

Appendix Two of the Guidelines provides a description for undertaking a broad level of hazard assessment using the vegetation classifications from AS 3959. The purpose is to identify at the strategic level the Bushfire Hazard Level (BHL) and the likely impact and intensity of a bushfire attack.

The objective of AS 3959 is to reduce the risk of ignition and loss of a building to bushfire. It provides a consistent method for determining a radiant heat level (radiant heat flux) as a primary consideration of bushfire attack on a building or object. It measures the Bushfire Attack Level as the radiant heat level (kWm^2) over a distance of 100 m.

It also prescribes simple construction responses that can resist the determined radiant heat level at a given distance from the fire and is based on six Bushfire Attack Level (BAL) ratings: BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ. Bushfire risk for the site has been appropriately considered in the specific context of the Guidelines and AS 3959.

Not all vegetation is a classified bushfire risk. Vegetation and ground surfaces that are exempt from classification as a potential hazard is identified as low threat under Section 2.2.3.2 of AS 3959. Low threat vegetation includes the following:

- a) Vegetation of any type that is more than 100 m from the site.
- b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified.
- c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other or of other areas of vegetation being classified.
- d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified.
- e) Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.
- f) Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and wind breaks.

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3.1 Bushfire attack level (BAL) assessment

In accordance with Appendix Five of the Guidelines, a method 1 BAL assessment has been undertaken to support the proposed development within the site in order to determine the BAL ratings potentially applicable to future development based on the vegetation classification and effective slope, and to prepare the associated BAL contour plan.

3.1.1 Assessment inputs

Assessing bushfire hazards considers the classes of vegetation within the site and surrounding area for a minimum of 100 m, in accordance with AS 3959. The assignment of vegetation classifications is based on an assessment of vegetation structure, which includes consideration of the various fuel layers of different vegetation types. For example, fuel layers in a typical forest environment can be broken-down into five segments as illustrated in **Plate 2** below. These defined fuel layers are considered when determining the classification of vegetation and associated bushfire hazard levels.

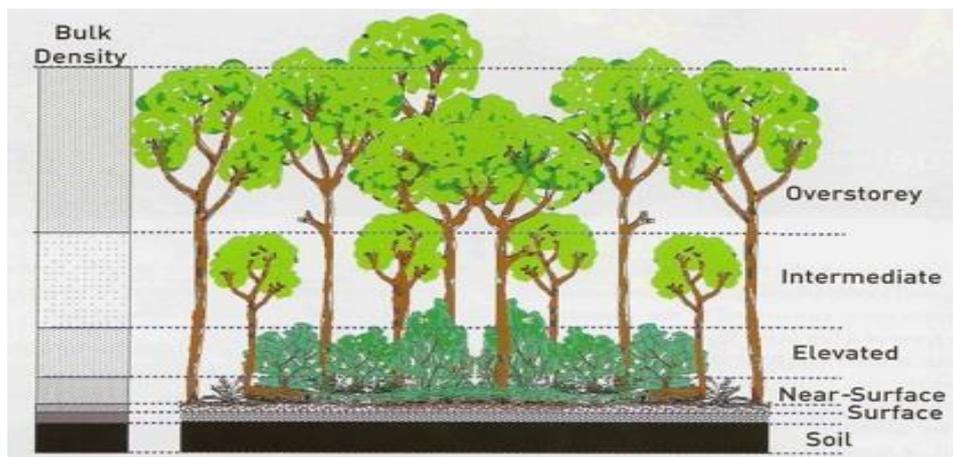


Plate 2: The five fuel layers in a forest environment that could be associated with fire behaviour (Gould et al. 2007)

An assessment of existing vegetation within the site and surrounding 150 m was undertaken on 16 November 2018 in accordance with AS 3959 and the Guidelines.

Table 2 below outlines the type of vegetation observed within and surrounding the site, the classification of each area of vegetation in accordance with Section 2.2.3 and Table 2.3 of AS 3959, and its assumed post-development classification and any associated management of this vegetation (where applicable).

As outlined in **Table 2**:

- The pre-development AS 3959 vegetation classifications (and associated photo locations) are shown in **Figure 2**.
- The post-development AS 3959 vegetation classifications are shown in **Figure 3**.
- The effective slope for each area of classified vegetation present in the post-development scenario is shown in **Figure 4**.

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Table 2: Vegetation classification, effective slope and future management

Pre-development (see Figure 2)			Post development (see Figure 3 and Figure 4)	
Plot no.	AS 3959 classification	Site photo/s (location points shown in Figure 2)	Plot no.	AS 3959 classification, effective slope and assumptions
1 - 3	<p>AS 3959 classification (Figure 2): Shrubland (Class C)</p> <p>Shrubland vegetation is located in the central portion of the site where wastewater settling ponds are located (Plot 1). This vegetation is characterised by vegetation < 2 m in height.</p> <p>Shrubland vegetation is located within the south-eastern portion of the site (Plot 2). This vegetation is characterised by vegetation < 1 m in height, and consists of a mixture of shrubland and grassland species.</p> <p>Shrubland vegetation has also been identified to the south-east of the site (Plot 3), and is similar to the composition of Plot 2, consisting of a mixture of shrubland and grassland vegetation < 1 m in height.</p>	 <p><i>Photo location 1: shrubland vegetation located in the northern portion of the site</i></p>	 <p><i>Photo location 2: shrubland vegetation located in the eastern portion of the site</i></p>	<p>AS 3959 classification (Figure 3): Shrubland (Class C)</p> <p>Effective slope (Figure 4): Flat/upslope</p> <p>Shrubland vegetation located to the south-east of the site is assumed to remain in its existing state, and will remain a bushfire risk to the site.</p>
		 <p><i>Photo location 3: shrubland vegetation located in the central portion of the site</i></p>	 <p><i>Photo location 4: shrubland vegetation located in the central portion of the site</i></p>	<p>AS 3959 classification (Figure 3): Non-vegetated area (Exclusion 2.2.3.2(e))</p> <p>Effective slope (Figure 4): Not applicable</p> <p>Shrubland vegetation within the site will be removed to facilitate industrial development which will result in currently vegetated areas being converted to non-vegetated areas comprised of roads and/or hardstand areas associated with the industrial lots.</p>

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Table 2: Vegetation classification, effective slope and future management (continued)

Pre-development (see Figure 2)			Post development (see Figure 3 and Figure 4)	
Plot no.	AS 3959 classification	Site photo/s (location points shown in Figure 2)	Plot no.	AS 3959 classification, effective slope and assumptions
4 - 7	<p>AS 3959 classification (Figure 2): Grassland (Class G)</p> <p>Grassland vegetation is located across the north-western portion of the site (Plot 4), as well as to the north-west (Plot 5) and north of the site (Plot 6 and 7).</p> <p>Grassland vegetation is characterised by areas of low unmanaged grassland of native and introduced species, with the density of the grass varying within and surrounding the site.</p>	 <p><i>Photo location 5: grassland vegetation located in the western portion of the site</i></p>	 <p><i>Photo location 6: grassland vegetation located in the southern portion of the site</i></p>	<p>5 - 7 AS 3959 classification (Figure 3): Grassland (Class G)</p> <p>Effective slope (Figure 4): Flat/upslope</p> <p>Grassland vegetation located to the north and north-west of the site (Plot 5 – 7) is assumed to remain in its existing state, and will remain a bushfire risk to the site.</p>
		 <p><i>Photo location 7: grassland vegetation located in the northern portion of the site</i></p>	 <p><i>Photo location 8: grassland vegetation located in the northern portion of the site</i></p>	

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Table 2: Vegetation classification, effective slope and future management (continued)

Pre-development (see Figure 2)			Post development (see Figure 3 and Figure 4)	
Plot no.	Plot no.	Plot no.	Plot no.	AS 3959 classification, effective slope and assumptions
8	<p>AS 3959 classification (Figure 2): Non-vegetated area (Exclusion clause 2.2.3.2(e))</p> <p>Non-vegetated areas such as roads, driveways, existing residential buildings and areas of mineral earth within and surrounding the site have been excluded in accordance with Clause 2.2.3.2(e) of AS 3959.</p>	 <p><i>Photo location 9: non-vegetated area in the northern portion of the site</i></p>	 <p><i>Photo location 10: non-vegetated area to the north of the site</i></p>	<p>AS 3959 classification (Figure 3): Non-vegetated area (Exclusion clause 2.2.3.2(e))</p> <p>Effective slope (Figure 4): Not applicable</p> <p>The existing maintenance regimes for all existing non-vegetated areas within and surrounding the site are assumed to continue in the long-term based on current land uses and management arrangements and/or future proposed land uses.</p>
9	<p>AS 3959 classification (Figure 2): Low threat vegetation (Exclusion clause 2.2.3.2(f))</p> <p>Low threat vegetation has been identified adjacent to the south-western boundary within the airport facility, where vegetation is managed to a low threat standard adjacent to the taxiway.</p>	No photos available.		<p>AS 3959 classification (Figure 3): Low threat vegetation (Exclusion clause 2.2.3.2(f))</p> <p>Effective slope (Figure 4): Not applicable</p> <p>The maintenance regimes for all existing low-threat vegetation surrounding the site is assumed to continue in the long-term based on current land uses.</p>

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3.1.1.1 Post development assumptions

The BAL assessment, to determine the predicted BAL ratings applicable to the site, has assumed the following:

- **Designated FDI:** 80
- **Flame temperature:** 1090
- **Vegetation classification:** Shrubland (Class C) and grassland (Class G) vegetation identified within the post-development scenario, see **Figure 3**.
- **Effective slope beneath classified vegetation:** flat/upslope (see **Figure 4**)
- **Setback distances:** as per Table 2.5 in AS 3959 with the relevant distances used to inform the BAL contour plan provided in **Figure 5** and summarised in **Table 3**.

In addition to the above, the following key assumptions have informed this assessment:

- All vegetation within the site will be cleared as part of the development of the site (in accordance with the proposed development layout, provided in **Appendix A**). If development within the site is to be staged, vegetation within 100 m of lots where construction is to occur will be required to be cleared or managed to a low threat standard in accordance with clause 2.2.3.2(f) of AS 3959, which includes (but is not limited to):
 - Where grass is present, this should be regularly cut so that the grass is maintained at or below 100 mm in height, particularly during the bushfire season.
 - Regular removal of weeds and built up dead material (such as fallen branches, leaf litter etc.).
 - Low pruning of trees (branches below 2 m in height removed where appropriate).
 - Application of ground/surface covers such as mulch or non-flammable materials as required.
 - Irrigation of grass and garden beds (where required within the site).
 - Clearing/permanent removal of existing vegetation and conversion to non-vegetated areas or landscaped gardens/verges.
- Classified vegetation surrounding the site has been assumed to remain in its current state, and will therefore remain a bushfire risk to development within the site.
- No areas of revegetation have been assumed within the site, in accordance with the proposed development layout.
- The existing management of vegetation to the south of the site, within the airport runway vicinity, which includes the maintenance and removal of vegetation, will continue in perpetuity.

3.1.2 Assessment outputs

The BAL assessment for the site has been undertaken based on the observed vegetation (see **Figure 2** and **Table 2**) and effective slope (**Figure 4**). **Table 3** provides a summary of the setback distances from the identified classified vegetation necessary to achieve the indicated BAL ratings, with the BAL Contour Plan (**Figure 5**) being a visual representation of these distances based upon a post development vegetation state (**Figure 3**). The setback distances are based on the distances outlined in Table 2.5 of AS 3959.

The assessment shows that all future lots will be able to accommodate a BAL rating of BAL-12.5 or less, based on lot size and separation from classified vegetation.

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Table 3: Setback distances based on vegetation classification and effective slope and Table 2.5 of AS 3959, as determined by the method 1 BAL assessment

Vegetation classification (see Figure 3)	Effective slope (see Figure 4)	Distance to vegetation (from Table 2.5 of AS 3959)	BAL Rating (see Figure 5)
Shrubland (Class C) (Plot 3)	Flat/upslope	< 7 m	BAL-FZ
		7 - < 9 m	BAL-40
		9 - < 13 m	BAL-29
		13 - < 19 m	BAL-19
		19 - < 100 m	BAL-12.5
		> 100 m	BAL-LOW
Grassland (Class G) (Plot 5 – 7)	Flat/upslope	< 6 m	BAL-FZ
		6 - < 8 m	BAL-40
		8 - < 12 m	BAL-29
		12 - < 17 m	BAL-19
		17 - < 50 m	BAL-12.5
		> 50 m	BAL-LOW

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4 Identification of Bushfire Hazard Issues

From a bushfire hazard management perspective, the key issues that are likely to require management and/or consideration as part of the development process associated with the site include:

- Permanent bushfire hazards will exist to the north, north-west and south-east of the site in the post-development scenario. Ensuring the provision of appropriate separation distance from these hazards to ensure a BAL rating of BAL-29 or less can be achieved at future built form is an important consideration.
- Availability of an appropriate water supply and associated infrastructure to be provided by the proponent. This includes the provision of hydrants located no more than 100 m apart (or as otherwise agreed with the Water Corporation).
- The potential for the development of high-risk land uses within the site.

These issues are considered further in **Section 5**.

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5 Assessment Against the Bushfire Compliance Criteria

5.1 Compliance Assessment

This BMP provides an outline of the mitigation strategies that will ensure that as planning and development is progressed within the site, an acceptable solution and/or performance-based system of control can be adopted for each of the bushfire protection criteria detailed within Appendix Four of the Guidelines (WAPC and DFES 2017). The bushfire protection criteria identified in the Guidelines and addressed as part of this BMP are:

- Element 1: Location of the development
- Element 2: Siting and design of the development
- Element 3: Vehicular access
- Element 4: Water supply.

5.1.1 Acceptable Solutions

As part of future development, the bushfire protection criteria can be satisfied, with an 'acceptable solution' able to address the intent of Elements 1, 2 and 4 and a performance solution required to address Element 3. A summary of how the bushfire protection criteria can be achieved and an associated compliance statement for each has been provided in **Table 4**.

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Table 4: Summary of bushfire protection criteria and compliance statement

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance statement
		Acceptable solution	Performance principle		
Element 1: Location	To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure.	A1.1 Development location		Future built form within the site will be able to achieve a BAL rating of BAL-29 or less, based on the outcomes of the BAL assessment (see Figure 5) which indicates that the proposed road network and lot sizes accommodate the required separation.	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 1: Location.
		Yes.	N/A		
Element 2: Siting and design	To ensure the siting and design of development minimises the level of bushfire impact.	A2.1 Asset Protection Zone		<p>One of the most important bushfire 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, and can include non-flammable features such as irrigated landscapes, gardens, driveways, public roads and managed public open space.</p> <p>The post-development vegetation classification (Figure 3) identifies bushfire hazards to the north, north-west and south-east of the site, associated with areas of grassland and shrubland.</p> <p>Based on the BAL assessment, the associated BAL contour plan (see Figure 5) shows:</p> <ul style="list-style-type: none"> • Based on a 4 m-wide setback within the northern boundary of the north-eastern lot (Inset 2 on Figure 5), and a 7 m-wide setback within the eastern edge of the lot, future buildings would be able to achieve a BAL rating of BAL-29 or less. • Based on a 9 m-wide setback within the eastern boundary of the eastern lot (Inset 3 on Figure 5), future buildings would be able to achieve a BAL rating of BAL-29 or less. <p>Overall, the acceptable solution can be satisfied, with the majority of the site able to achieve a BAL rating of BAL-LOW, through the location of roads providing suitable separation from bushfire hazards. Where BAL-29 is exceeded, notably in the south-eastern and north-eastern portions of the site, adjacent to retained vegetation, lots are suitably sized to ensure future development will be able to be located within areas within the lot that are not exposed to a BAL rating exceeding BAL-29.</p>	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 2: Siting and design.
		Yes.	N/A		

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Table 4: Summary of bushfire protection criteria and compliance statement (continued)

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance statement
		Acceptable solution	Performance principle		
Element 3: Vehicular access	To ensure vehicular access serving a subdivision/development is available and safe during a bushfire event.	A3.1 Two access routes		<p>The proposed development layout, provided in Appendix A, provides for an interconnected road network, which connects to the existing public road network, namely Great Northern Highway to the north of the site. Great Northern Highway provides egress in two directions to the west and east of the site.</p> <p>The proposed development is constrained to one access point to Great Northern Highway. A controlled access can be provided from the north-western cul-de-sac in the short-to-medium term, via an existing airport access track (Pettersson Road), which currently serves as an access road for the airport facility. The controlled access to Pettersson Road will be replaced in the long-term, as a through road when future development progresses in the proponents' broader landholdings. Further information as to how the proposed development layout complies with the intention of Element 3 is provided in Section 5.1.2.1.</p>	Addressed in 5.1.2 Performance Principle
		No.	Yes.		
		A3.2 Public road		Existing surrounding public roads and all new roads within the site can and will comply with the minimum standards outlined in Appendix Four of the Guidelines (WAPC and DFES 2017), which includes a minimum 6 m-wide trafficable surface (or as agreed with the Town of Port Hedland).	
		Yes.	N/A		
A3.3 Cul-de-sac (including dead-end-road)		<p>The layout proposed two opposing cul-de-sacs (north-western and south-east) each of a length exceeding the maximum of 200 m as required to meet the acceptable solution. The cul-de-sac in the north-western portion of the site (temporary) will become a through road in the longer term, and in the short term will be connected to Pettersson Road by a controlled access that can be used in a bushfire emergency. The cul-de-sac in the southern portion of the site will be retained.</p> <p>Both cul-de-sacs will comply with the construction requirements outlined in the Guidelines (excluding the length), as provided below:</p> <ul style="list-style-type: none"> • A minimum trafficable surface of 6 m. • A horizontal clearance of 6 m. • Support a minimum weight of 15 tonnes. • Will have a turn-around area with a minimum 17.5 m diameter head. <p>Appendix B details the cul-de-sac dimensions within the site, with a minimum trafficable surface width of 12 m (including 1 m-wide road shoulders), in addition to a 26 m diameter head, demonstrating that the cul-de-sac will be constructed to safely accommodate Type 3.4 fire appliance vehicles in the event of a bushfire emergency.</p>			
No.	Yes.				

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Table 4: Summary of bushfire protection criteria and compliance statement (continued)

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance statement
		Acceptable solution	Performance principle		
Continued from above.	Continued from above.	Continued from above.		<p>In addition to the cul-de-sac specifications accommodating Type 3.4 fire appliance vehicles, the cul-de-sac in the south-eastern portion is likely to have limited vehicle traffic as it only services six lots, and there are two egress options provided from the development as outlined above. Therefore, vehicular access and egress can be safely accommodated within the development despite the presence of the cul-de-sac in the southern portion of the site.</p> <p>Further information as to how the proposed development layout complies with the intention of Element 3 is provided in Section 5.1.2.2.</p>	Continued from above.
		A3.4 Battle-axe		Not applicable. No battle-axe properties are proposed as part of development.	
		Yes.	N/A		
Continued from above.	Continued from above.	A3.5 Private driveway longer than 50 m		<p>Due to the size of the industrial lots within the site, it is possible that some lots may have private driveways longer than 50 m. If private driveways longer than 50 m are constructed, lots are sufficiently sized to comply with the requirements outlined in the Guidelines, as provided below:</p> <ul style="list-style-type: none"> • A minimum trafficable surface of 6 m • A horizontal clearance of 6 m • Support a minimum weight of 15 tonnes. <p>In addition, whilst it is unlikely that driveways will be longer than 200 m based on the size of the lots, if driveways exceed 200 m, they are required to meet the minimum requirements as provided below:</p> <ul style="list-style-type: none"> • Passing bays every 200 m with a minimum length of 20 m and minimum width of 2 m. • Any turn-around areas will be required to have a minimum 17.5 m diameter head. However, these are only required every 500 m. 	Continued from above.
		Yes.	N/A		

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Table 4: Summary of bushfire protection criteria and compliance statement (continued)

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance statement
		Acceptable solution	Performance principle		
Continued from above.	Continued from above.	A3.6 Emergency access way		Whilst two egress options are to be provided in the long term via Great Northern Highway (west and east of the site), an interim emergency access is provided from the temporary cul-de-sac through controlled access to Pettersson Road. The controlled access point will allow for emergency access in the event of a bushfire emergency, allowing alternative access to Great Northern Highway from a second location. This emergency access way will be utilised until future development is progressed in the broader airport landholdings, when secondary access options will become available for future users of the site. The location of the controlled access and the egress direction is shown in Figure 6 .	Continued from above.
		Yes.	No.		
		A3.7 Fire service access routes (perimeter roads)		Future development within the site will be provided with appropriate vehicular access that will not require a fire service access route, as outlined above, including emergency access provided via Pettersson Road, and therefore fire service routes are unlikely to be required.	
		Yes.	N/A		
A3.8 Firebreak width		Once industrial development is progressed in accordance with the proposed development plan, future lessees will be required to comply with the Town of Port Hedland Firebreak Notice, as published.			
Yes.	N/A				
Element 4: Water	To ensure water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.	A4.1 Reticulated areas		<p>Development is located within an Emergency Services Levy (ESL) Category 4 area, which indicates that bushfire events are responded to by a volunteer fire and rescue service brigade(s) or a volunteer fire and emergency service or bush fire brigade with breathing apparatus, and the State Emergency Service. Fire response services require ready access to an adequate water supply during bushfire emergencies.</p> <p>The site will connect with a reticulated water supply and will include fire hydrants installed by the developer to meet the specifications of Water Corporation (Design Standard DS 63) and DFES. In non-residential areas hydrants should be installed prior to tenants occupying future lots within the site. The location of existing and proposed water infrastructure, including water mains and hydrants, is provided in Appendix C.</p> <p>If development is proposed to occur in a staged manner, water infrastructure will be connected to any lots being developed, to ensure water is available for emergency services in the event of a bushfire prior to the entire site being developed.</p>	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 4: Water.

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Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance statement
		Acceptable solution	Performance principle		
				The Water Corporation will be responsible for all hydrant maintenance and repairs.	

Table 4: Summary of bushfire protection criteria and compliance statement (continued)

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance statement
		Acceptable solution	Performance principle		
Continued from above.	Continued from above.	A4.2 Non-reticulated areas		Not applicable.	Continued from above
		Yes.	N/A		
		A4.3 Individual lots within non-reticulated areas (only for use if creating 1 additional lot and cannot be applied cumulatively)		Not applicable.	
		Yes.	N/A		

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5.1.2 Performance Principle

The subject land is located within a 'moderate' Bushfire Hazard level area and the ground is level and open affording good visibility.

The proposal is to develop an industrial estate with the internal road network located between large industrial lots.

The proposed road network will be constructed to the standards provided in the Guidelines.

The Guidelines provide that the acceptable solutions provide examples of how that intent may be met. The performance principle allows for 'alternative solutions' to be developed where the acceptable solutions cannot be achieved.

The intent of Element 3, in supporting the Objective of SPP3.7 is

Intent: To ensure that the vehicular access serving a subdivision/development is available and safe during a bushfire event

And the accompanying Performance Principle provides

P3 The internal layout, design and construction of public and private vehicular access and egress in the subdivision/ development allow emergency and other vehicles to move through it easily and safely at all times.

The Great Northern Highway is a wide road and predominantly runs through grassland and shrubland, it has sufficient width to avoid an extreme BAL level and a fire's passing would be readily observable. A denial of access to the site for attending firefighting services from Great Northern Highway would only be short. However, the emphasis placed by the performance principle is upon an internal layout and design. In this regard when the estate is developed the internal road network will be amongst low threat surfaces that will permit movement through it safely at all times.

It is recommended that until the estate is fully developed there is an enforcement mechanism, in addition to *s.33 of the Bushfires Act 1954*, to ensure that the land until developed will be maintained in a low threat state at all times in accordance with AS 3959 (as per the mechanisms described in Section **3.1.1.1**), and therein provide a safety of movement from the outset. It is therefore recommended as part of development approval that a condition of approval require a restrictive covenant to be applied to each lot title, made to the benefit of the Town of Port Hedland, that requires the land to be maintained by the owner in a low threat condition as described in AS 3959.

5.1.2.1 Two access routes

It is noted that as part of the proposed development, there will be one access point to Great Northern Highway, which provides egress in two directions, to the east and west of the site. Whilst this proposed development layout doesn't comply with the acceptable solution for A3.1, it achieves the intent of Element 3, through the provision of egress for emergency and other vehicles in two different directions in the event of a bushfire emergency.

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Additionally, a controlled access can be provided from the north-western cul-de-sac in the short-to-medium term, via an existing airport access track (Pettersson Road), which currently serves as an access road for the airport facility. The controlled access to Pettersson Road will be replaced in the long-term, as a through road when future development progresses in the proponents' broader landholdings. This secondary access will provide access in the event of an emergency in the short-to-medium term, until the broader landholdings are developed, which will allow for more than one access route.

As part of staged development, temporary access/egress routes may be required including emergency access ways or temporary turnaround areas. Where temporary cul-de-sacs or emergency access ways are required, these will comply with the minimum standards as outlined in the Guidelines.

5.1.2.2 Cul-de-sacs

It is noted that there are two cul-de-sacs proposed as part of the proposed development within the site, within the north-western and south-eastern portions. Both of the cul-de-sacs extend longer than the 200 m provided in the acceptable solutions of the Guidelines; however, these cul-de-sacs can both achieve the intent of Element 3.

The cul-de-sac located in the northern portion of the site is proposed to connect to Pettersson Road via a controlled access point, which will serve as an emergency access way in the event of a bushfire emergency. Notwithstanding the provision of the emergency access way, the cul-de-sac meets the intent of Element 3, as the cul-de-sac is wide and flat, allowing for safe egress as the cul-de-sac is unlikely to be blocked by unseen hazards e.g. fallen trees. Additionally, the cul-de-sac will only service eight lots, so there is unlikely to be a large number of users that will be utilising the cul-de-sac in the event of a bushfire.

The cul-de-sac located within the south-eastern portion of the site is longer than 200 m, exceeding the maximum length as identified as an acceptable solution in the Guidelines. However, the cul-de-sac complies with the other minimum standards as set out in the Guidelines, as identified in **Table 4**.

Whilst the cul-de-sac doesn't comply with the minimum standards as outlined in the Guidelines, the cul-de-sac meets the intent of Element 3 of the Guidelines. The proposed cul-de-sac will allow for safe and available access during a bushfire event, as it is appropriately sized to accommodate all future users of the site, including trucks, as shown in **Appendix B**, allowing for safe turnaround during a bushfire, and the proposed road is wide and flat, allowing for safe egress as the cul-de-sac is unlikely to be blocked by unseen hazards e.g. fallen trees. Additionally, the cul-de-sac will only service six lots, so there is unlikely to be a large number of users that will be utilising the cul-de-sac in the event of a bushfire.

As discussed below, until such a time that the site is fully developed, if development is proposed to be staged, and Lots 9 - 13 are developed prior to the development of the lots to the north, the proponent will manage vegetation 100 m-wide either side of the proposed road to a low-threat standard. This will ensure that during a bushfire event, road users will not be exposed to a BAL rating exceeding BAL-LOW.

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In considering the proposal's compliance with Element 3, the design of the estate, and the measures to ensure the internal roads are set within a low threat condition, the proposal accords with the performance principle. It will provide an internal layout providing for vehicular access and egress in the subdivision that will allow emergency and other vehicles to move through it easily and safely at all times.

5.2 Additional management strategies

5.2.1 Future approval considerations

The BAL assessment within this document is considered to be a conservative assessment of potential bushfire risk posed to future habitable buildings within the site based on the proposed management of vegetation within the airport facility and assumptions outlined in **Section 3**.

This BMP and the predicted BAL ratings (see **Figure 5**) are expected to inform the placement requirements for habitable buildings, with the results of the BAL assessment undertaken to support this BMP to be confirmed/certified to support the building licence process as part of the title clearance process.

As discussed in **Section 3**, the proposed development does not include any Class 1, 2, 3 or 10a buildings, which means that future buildings are not required to be constructed to an increased building standard in accordance with AS 3959. Notwithstanding, the BAL contour plan (see **Figure 5**) demonstrates that future development within the site will be able to be suitably located so as to avoid areas of BAL-40 and BAL-FZ, ensuring future development will not be exposed to a BAL rating greater than BAL-29. Based on the BAL contour plan, the majority of the lots within the site are not exposed to a BAL rating exceeding BAL-LOW.

5.2.2 Landscape management

5.2.2.1 Within the site

No areas of POS have been identified within the site. It has been assumed that all vegetation identified within the site will be removed as part of future development. Any future landscaping that may occur in the site should be designed to achieve low threat vegetation in accordance with Section 2.2.3.2 of AS 3959 and the Town of Port Hedland Firebreak Notice.

If development occurs in a staged manner, vegetation within 100 m of the lots to be developed (located within the site boundary) will be cleared to ensure that future development will not be impacted by vegetation within the site. This clearing can occur in accordance with the approved clearing permit that is applicable to the site (CPS 8325/1).

Additionally, until such a time that the site is fully developed, if development is proposed to be staged, and Lots 9 - 13 are developed prior to the development of the lots to the north, the proponent will manage vegetation 100 m-wide either side of the proposed road to a low-threat standard. This will ensure that during a bushfire event, road users will not be exposed to a BAL rating exceeding BAL-LOW.

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5.2.2.2 Surrounding the site

All vegetation surrounding the site is assumed to remain in its existing condition for the foreseeable future. This includes management of the vegetation within the airport facility adjacent to the south-western boundary of the site, adjacent to the taxiway. This management of vegetation to a low threat standard is assumed to continue in the long term.

5.2.3 Town of Port Hedland Firebreak Notice

The Town of Port Hedland releases a Firebreak Notice on an annual basis to provide a framework for bushfire management within the Town. The Town of Port Hedland are able to enforce this notice in accordance with Section 33 of the *Bush Fires Act 1954*. In addition, Section 33 1(b) also provides the City with additional power to direct landowners to undertake works to remedy conditions conducive to the outbreak or spread of bushfire.

All land areas will be required to comply with the Town of Port Hedland Firebreak Notice, as published. This will include a 3 m-wide firebreak being constructed within 2 m of the external perimeter of future landholdings, in addition to 3 m surrounding any future buildings within the site. Firebreaks are required to be totally cleared of all vegetation, and maintained year-round.

5.2.4 High-risk land uses

It is possible that future industrial land uses which will ultimately be developed within the site may meet the definition of 'high-risk land uses' as provided in SPP 3.7 and the Guidelines. Policy measure 6.6 of SPP 3.7 requires any development applications which may result in the introduction of high-risk land use within areas subject to a BAL rating at BAL-12.5 or higher to be supported by a Bushfire Management Plan (BMP) and should make provision for emergency evacuation and/or a risk management plan.

The development design has made provision for emergency evacuation through the inclusion of an internal road network and a permanent access option to the Great Northern Highway, as outlined in **Table 4**. This provides vehicular access to and egress from the site at all times for future land users and emergency response personnel. Controlled access will be provided from the cul-de-sac in the north-western portion of the site in the short-to-medium term, with long term access to be provided to Pettersson Road, providing a secondary access and egress option.

Policy measure 6.6 of SPP 3.7 also outlines a requirement for the preparation of an emergency evacuation plan and/or a risk management plan for any flammable on-site hazards to support a development application for any high-risk land use. This BMP has been prepared to support the proposed development application for the site only to create land parcels for future industrial/commercial development but does not specify future uses as these will be detailed when tenants are known and future development approvals are applied for. As such this component of policy measure 6.6 is not applicable at this stage of the planning process.

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Any future development application/s which propose to establish a high-risk land use (as defined by the Guidelines, and may include uses such as (but not limited to) bulk storage of hazardous materials and fuel depots) within the site in areas subject to a BAL rating of BAL 12.5 or higher will be required to address these requirements as part of a separate development application process. This may include:

- Preparation of an updated bushfire management plan specific to the proposed land use.
- Controls to minimise ignition of fuel, or exacerbation of a bushfire.
- Emergency evacuation within the development area.
- Fire-fighting or fire control measures, specific to the land use.

5.2.5 Public education and preparedness

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. The DFES publication '*Prepare. Act. Survive.*' (DFES 2014) 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 Town of Port Hedland provides bushfire safety advice to landowners available from their website <https://www.porthedland.wa.gov.au/planning-building-and-environment/environment/bushfire-management.aspx>. Professional, qualified consultants also offer bushfire safety advice and relevant services to residents and businesses in high risk areas in addition that that provided in this BMP.

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6 Responsibilities for Implementation and Management of Bushfire Measures

Table 5 outlines the future responsibilities of the proponent, the Town of Port Hedland and the Water Corporation associated with implementing this BMP as part of the proposed development of the site.

The proponent (and/or future owners/leases) will be responsible for maintaining a reduced level of risk from bushfire within the site, 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.

Table 5: Responsibilities for the implementation of this BMP

Management action	Timing
Proponent	
Ensure that the site is prepared and maintained to a low threat condition in accordance with AS 3959 cl.2.2.3.2(e) or (f). If development within the site is staged, then this area of low threat condition needs to be within 100 m of future lots within the site. In order to maintain vegetation to a low threat condition this includes (but is not limited to): <ul style="list-style-type: none"> • Where grass is present, this should be regularly cut so that the grass is maintained at or below 100 mm in height, particularly during the bushfire season. • Regular removal of weeds and built up dead material (such as fallen branches, leaf litter etc.). • Low pruning of trees (branches below 2 m in height removed where appropriate). • Application of ground/surface covers such as mulch or non-flammable materials as required. • Irrigation of grass and garden beds (if landscaping occurs within individual lots). • Clearing/permanent removal of existing vegetation and conversion to non-vegetated areas or landscaped gardens/verges. 	As part of development, and ongoing where applicable.
If at any stage in the future the proponent ceases to have control over the landholdings (e.g. through subdivision), a restrictive covenant (or other appropriate agreement) should be placed upon any future lot titles, obligating the owner of the land to maintain it at all times in a low threat state as described in AS 3959 cl. 2.2.3.2(e) and (f). The covenant is to be made to the benefit of the Town of Port Hedland.	As part of development, and ongoing where applicable.
Where controlled access is provided to Petterson Road via the north-western cul-de-sac, the proponent needs to ensure the road complies with the minimum requirements of the Guidelines, which includes a minimum 6 m-wide trafficable surface, and upgrade this road as applicable, prior to any future development occurring within the site.	Prior to any future development occurring within the site.
For future land uses located in areas impacted by BAL-12.5 or greater that are identified as a 'high-risk' land use (as per the Guidelines), a risk management plan will need to be prepared, in accordance with the Guidelines and SPP 3.7.	As part of development, where applicable.
Install the roads to standards outlined in Appendix Four of the Guidelines or as agreed with the Town of Port Hedland.	As part of development.
Reticulated water supply and hydrants to be installed as per standard Water Corporation requirements, unless otherwise agreed. If development is proposed to be staged, ensure any lots being developed are connected to water infrastructure, to ensure water is available for emergency services in the event of a bushfire prior to the entire site being developed.	As part of development.

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Table 5: Responsibilities for the implementation of this BMP (continued)

Management action	Timing
Proponent (continued)	
Ensure vegetation to the south of the site within the airport boundary is maintained as per the current management practices, to ensure this area does not pose a bushfire risk to the site.	Ongoing, as required.
Ensure that until such a time that the site is fully developed, if development is proposed to be staged, and Lots 9 - 13 are developed prior to the development of the lots to the north, the proponent will manage vegetation 100 m-wide either side of the proposed road to a low threat standard. This will ensure that during a bushfire event, road users will not be exposed to a BAL rating exceeding BAL-LOW.	Ongoing, as required.
Ensure the cul-de-sacs within the southern portion of the site remains unobstructed to allow for fire appliances to turn-around, if required. If future development is to be staged, any temporary cul-de-sacs should comply with the minimum requirements as outlined in the Guidelines.	Ongoing, as required.
Ensure the controlled access in the north-western portion of the site remains unobstructed to allow secondary access in the case of a bushfire emergency.	Ongoing, as required.
Future leasees	
Future leasees of the lots within the site will need to ensure the lots are complying with the Town of Port Hedland Firebreak Notice.	Ongoing, as required.
Town of Port Hedland	
Ensure that surrounding landholdings are complying with the Town of Port Hedland Firebreak Notice.	Ongoing, as required.
Water Corporation	
The Water Corporation is responsible for the ongoing maintenance and repair of water hydrants.	Ongoing, as required.

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7 Applicant Declaration

7.1 Accreditation

This BMP has been prepared by Emerge Associates who have been providing bushfire risk management advice for more than six years, undertaking detailed bushfire assessments (and associated approvals) to support the land use development industry.

Anthony Rowe is a Fire Protection Association of Australia (FPAA) Level 3 Bushfire Planning and Design (BPAD) accredited practitioner (BPAD no. 36690) with over nine years' experience and is supported by a number of team members who have undertaken BPAD Level 1 and Level 2 training and are in the processing of gaining formal accreditation.

7.2 Declaration

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

Signature:

Name: Kirsten Knox

Company: Emerge Associates

Date: 20 August 2019

Signature:

Name: Anthony Rowe

Company: Emerge Associates

Date: 20 August 2019

BPAD Accreditation: Level 3 BPAD no. 36690

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8 References

8.1 General references

Department of Fire and Emergency Services (DFES) 2014, *Prepare. Act. Survive.*, Perth. August 2014.

Standards Australia 2018, *AS 3959-2018 Construction of buildings in bushfire-prone areas*, Sydney.

Western Australian Planning Commission (WAPC) 2015, *State Planning Policy 3.7 Planning in Bushfire Prone Areas*, Perth.

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

8.2 Online references

Department of Water 2008 (DoW), *LIDAR derived 1 m elevation contours* dataset, Government of Western Australia.

Office of Bushfire Risk Management (OBRM) 2019, *Map of Bush Fire Prone Areas*, viewed August 2019, <https://maps.slip.wa.gov.au/landgate/bushfireprone/>

Figures



Figure 1: Site Location

Figure 2: Existing Site Conditions – AS 3959 Vegetation Classification

Figure 3: Post Development Conditions – AS 3959 Vegetation Classification

Figure 4: Post Development Conditions – Effective Slope

Figure 5: Bushfire Attack Level Contours

Figure 6: Spatial Response to Bushfire Management Strategies



Figure 1: Site Location

Project: Bushfire Management Plan
PHIA – Highway Precinct
Client: PHIA Asset Pty Ltd

Plan Number:
EP18-117(03)-F13
Drawn: SCM
Date: 19/12/2018
Checked: KK
Approved: AJR
Date: 11/01/2019



0 100 200 300
Metres
Scale: 1:7,500@A4
GDA 1994 MGA Zone 50

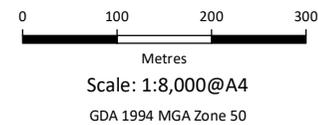




Figure 2: Existing Site Conditions - AS 3959 Vegetation Classification

Project: Bushfire Management Plan
 PHIA – Highway Precinct
Client: PHIA Asset Pty Ltd

Plan Number:
 EP18-117(03)-F14
Drawn: SCM
Date: 19/12/2018
Checked: KK
Approved: AJR
Date: 11/01/2019



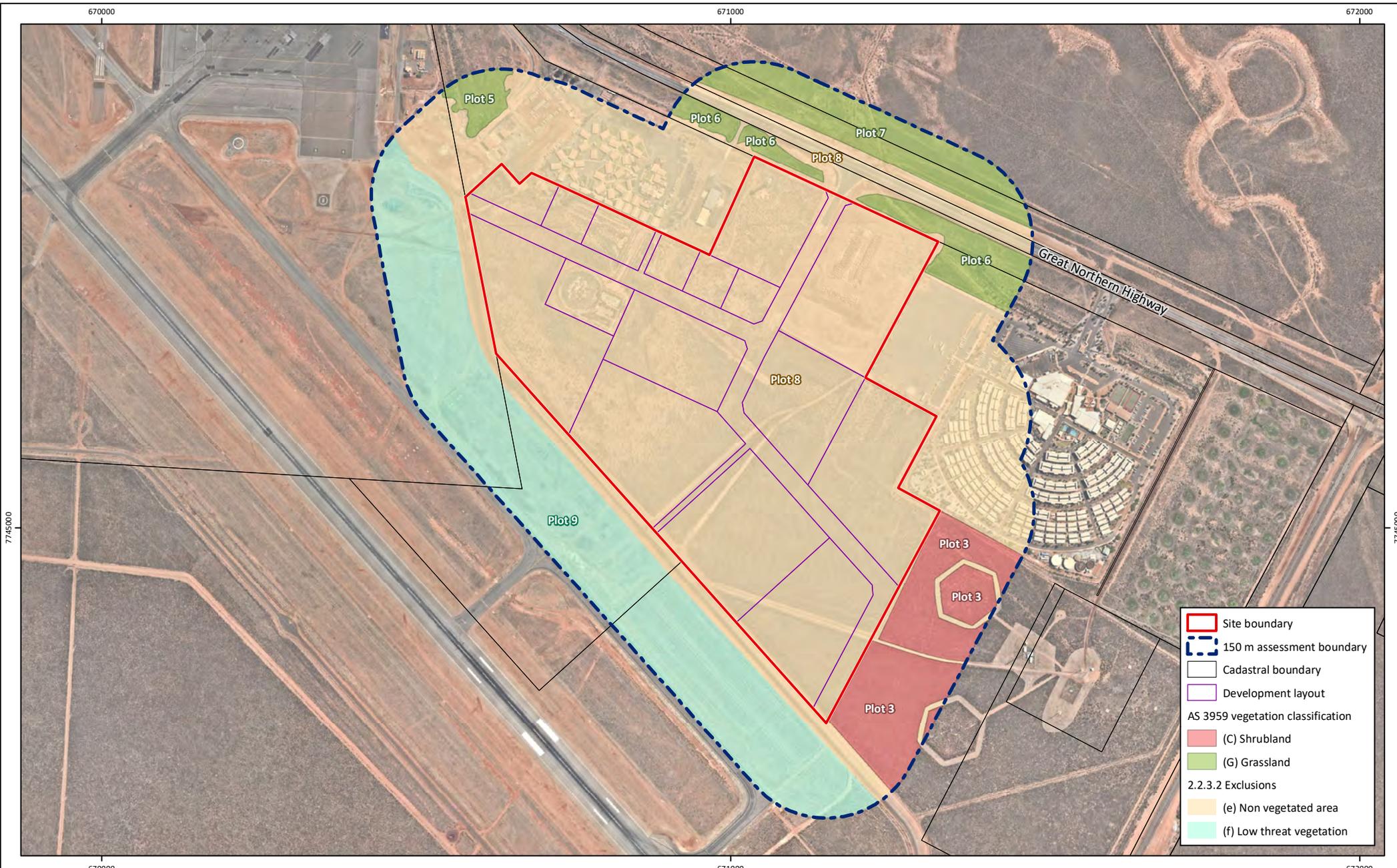
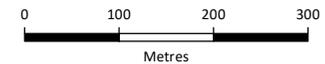


Figure 3: Post Development Conditions - AS 3959 Vegetation Classification

Project: Bushfire Management Plan
PHIA – Highway Precinct
Client: PHIA Asset Pty Ltd

Plan Number:
EP18-117(03)-F16
Drawn: SCM
Date: 19/12/2018
Checked: KK
Approved: AJR
Date: 11/01/2019



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GDA 1994 MGA Zone 50



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

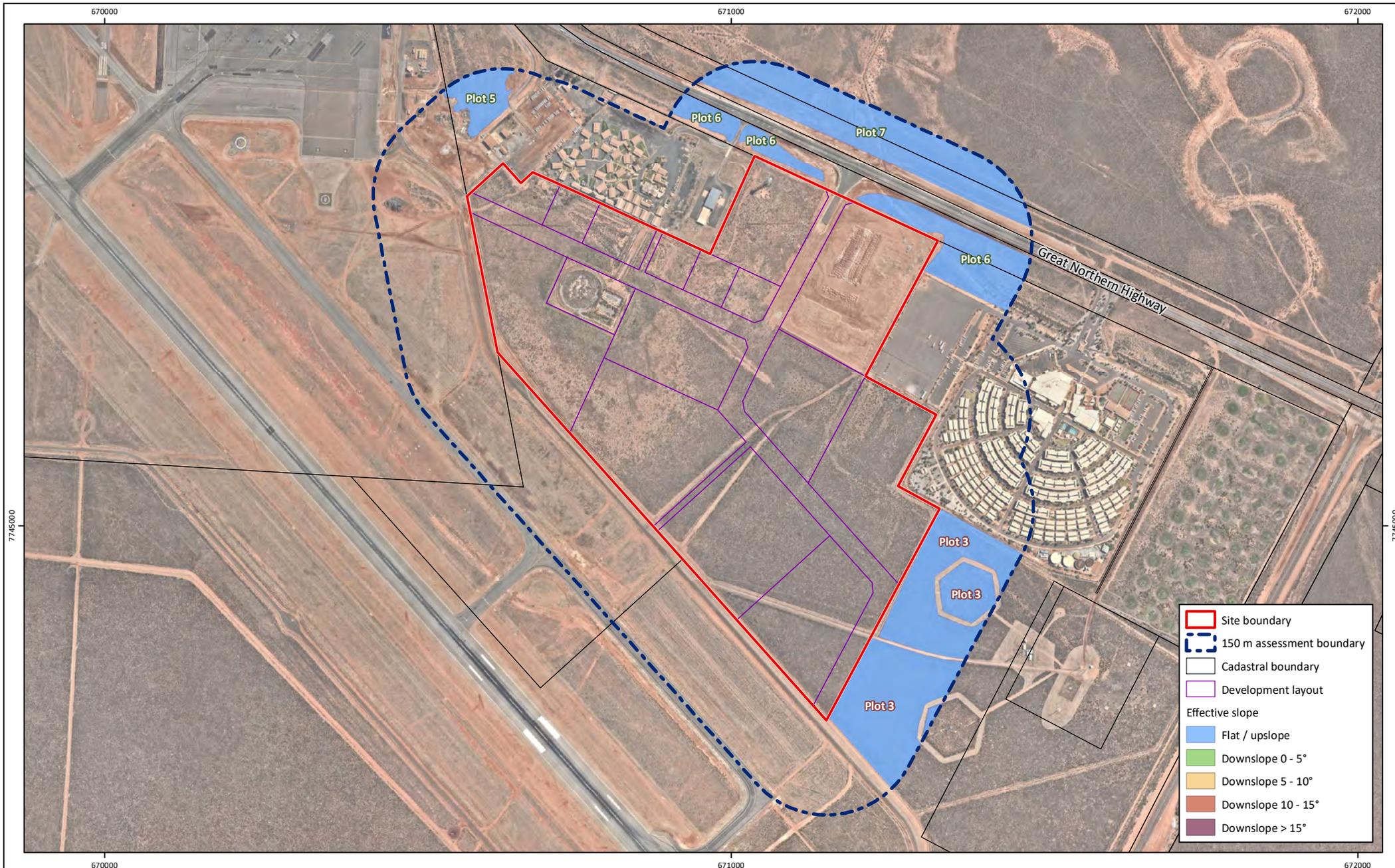
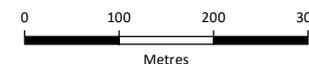


Figure 4: Post Development Conditions - Effective Slope

Project: Bushfire Management Plan
PHIA – Highway Precinct
Client: PHIA Asset Pty Ltd

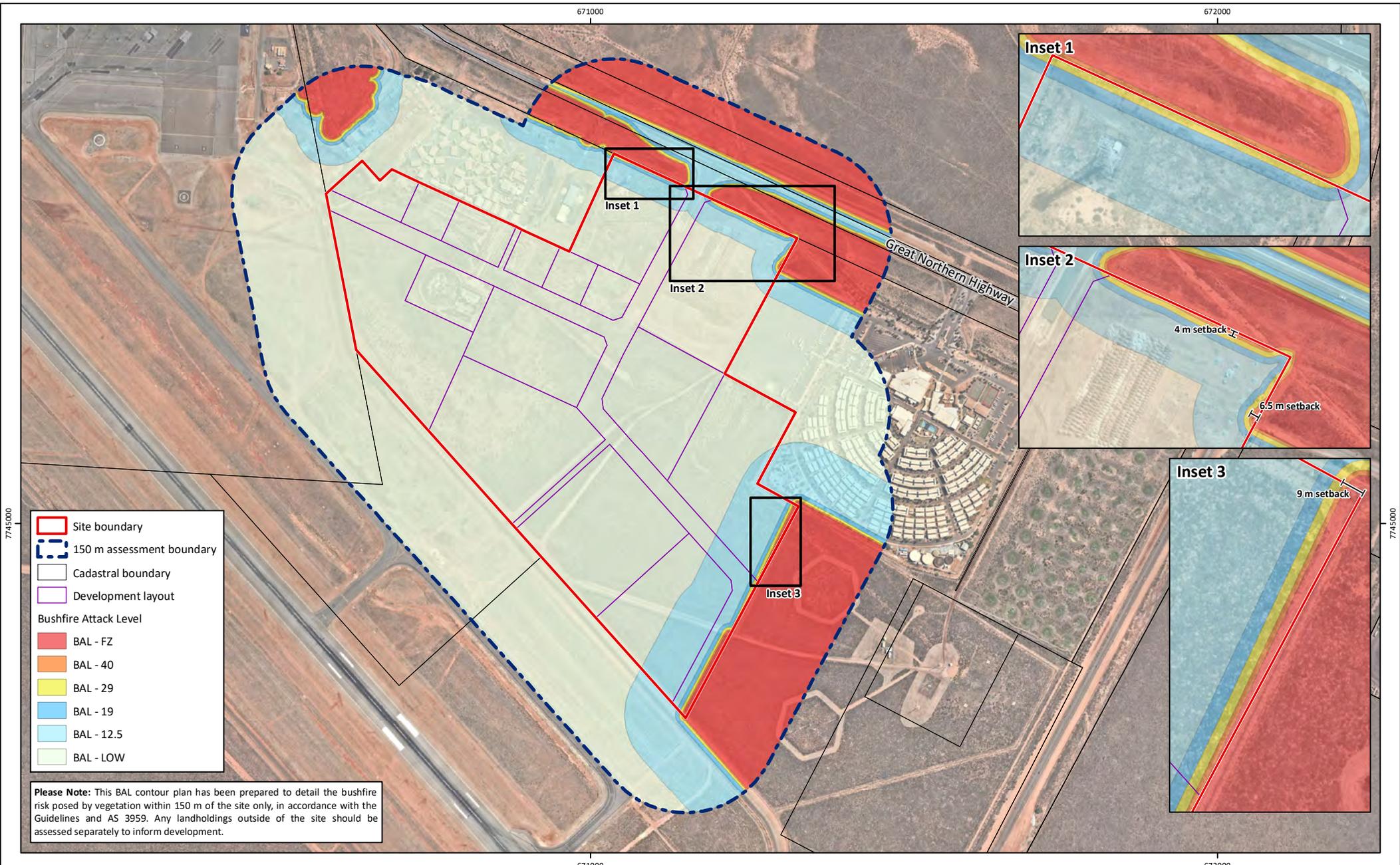
Plan Number:
EP18-117(03)-F17
Drawn: SCM
Date: 19/12/2018
Checked: KK
Approved: AJR
Date: 11/01/2019



Scale: 1:8,000@A4
GDA 1994 MGA Zone 50



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used



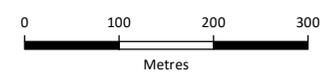
- Site boundary
- 150 m assessment boundary
- Cadastral boundary
- Development layout
- Bushfire Attack Level**
- BAL - FZ
- BAL - 40
- BAL - 29
- BAL - 19
- BAL - 12.5
- BAL - LOW

Please Note: This BAL contour plan has been prepared to detail the bushfire risk posed by vegetation within 150 m of the site only, in accordance with the Guidelines and AS 3959. Any landholdings outside of the site should be assessed separately to inform development.

Figure 5: Bushfire Attack Level Contours

Project: Bushfire Management Plan
PHIA – Highway Precinct
Client: PHIA Asset Pty Ltd

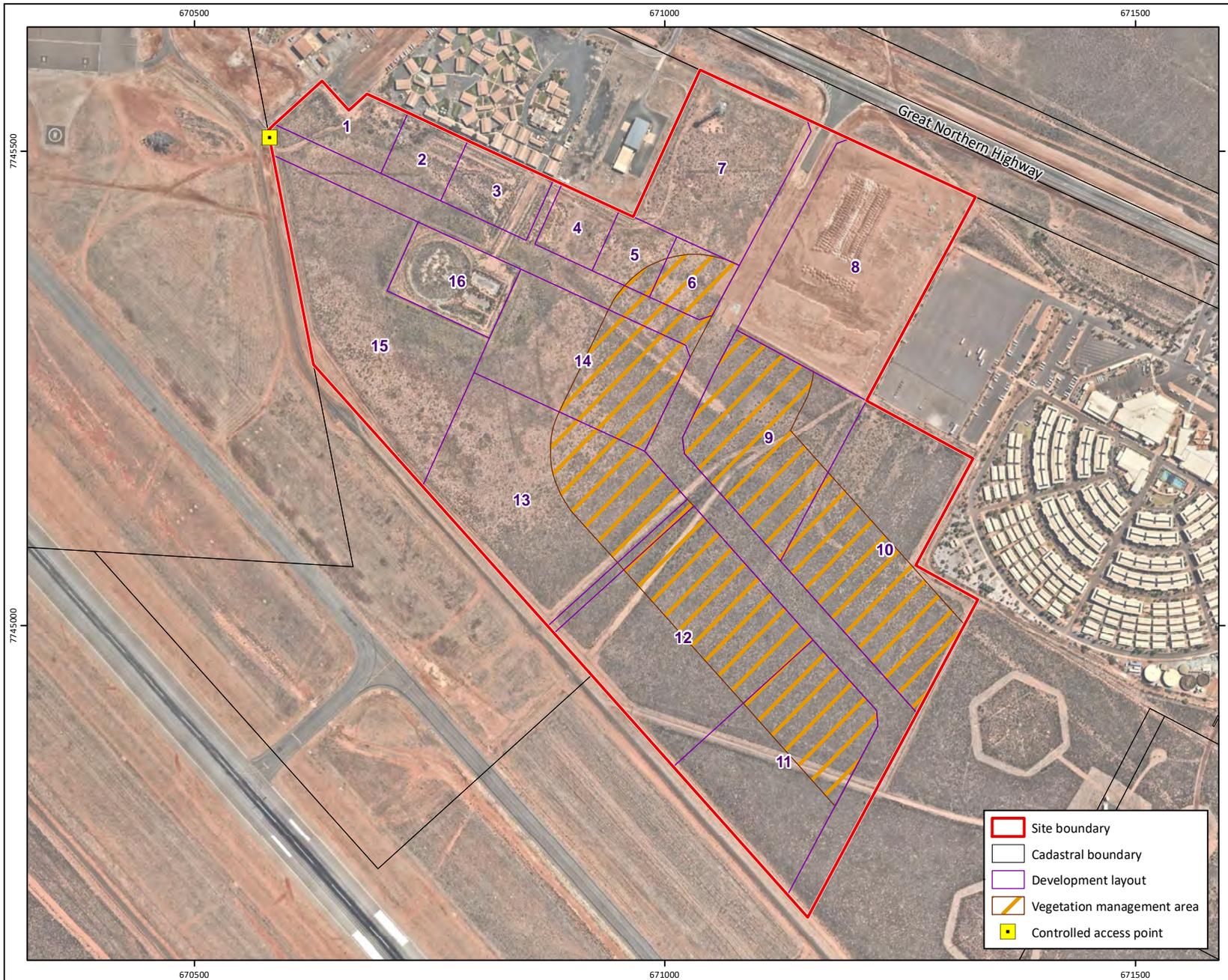
Plan Number:
EP18-117(03)-F18a
Drawn: SCM
Date: 20/08/2019
Checked: AJR
Approved: AJR
Date: 20/08/2019



Scale: 1:8,000@A4
GDA 1994 MGA Zone 50



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

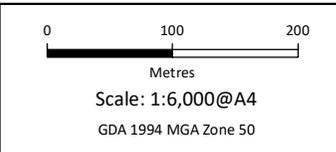


- ### Requirements
1. Ensure that the site is prepared and maintained to a low threat condition in accordance with AS 3959 cl.2.2.3.2(e) or (f). If development within the site is staged, then this area of low threat condition needs to be within 100 m of future lots within the site. The methods of vegetation management are identified within the Bushfire Management Plan.
 2. Where controlled access is provided to Petterson Road via the north-western cul-de-sac, the proponent needs to ensure the road complies with the minimum requirements of the Guidelines, which includes a minimum 6 m-wide trafficable surface, and upgrade this road as applicable, prior to any future development occurring within the site.
 3. Ensure the cul-de-sac within the southern portion of the site remains unobstructed to allow for fire appliances to turn-around, if required. If future development is to be staged, any temporary cul-de-sacs should comply with the minimum requirements as outlined in the Guidelines.
 4. Reticulated water supply and hydrants to be installed as per standard Water Corporation requirements, unless otherwise agreed. If development is proposed to be staged, ensure any lots being developed are connected to water infrastructure, to ensure water is available for emergency services in the event of a bushfire prior to the entire site being developed.
 5. Until such a time that the site is fully developed, if development is proposed to be staged, and Lots 9 - 13 are developed prior to the development of the lots to the north, the proponent will manage vegetation within 100 m of the proposed southern cul-de-sac. This will ensure that during a bushfire event, road users will not be exposed to a BAL rating exceeding BAL-LOW.

Figure 6: Spatial Representation of Bushfire Management Strategies

Project:	Bushfire Management Plan PHIA – Highway Precinct
Client:	PHIA Asset Pty Ltd

Plan Number:	EP18-117(03)–F65a
Drawn:	SCM
Date:	03/12/2019
Checked:	AJR
Approved:	AJR
Date:	03/12/2019



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

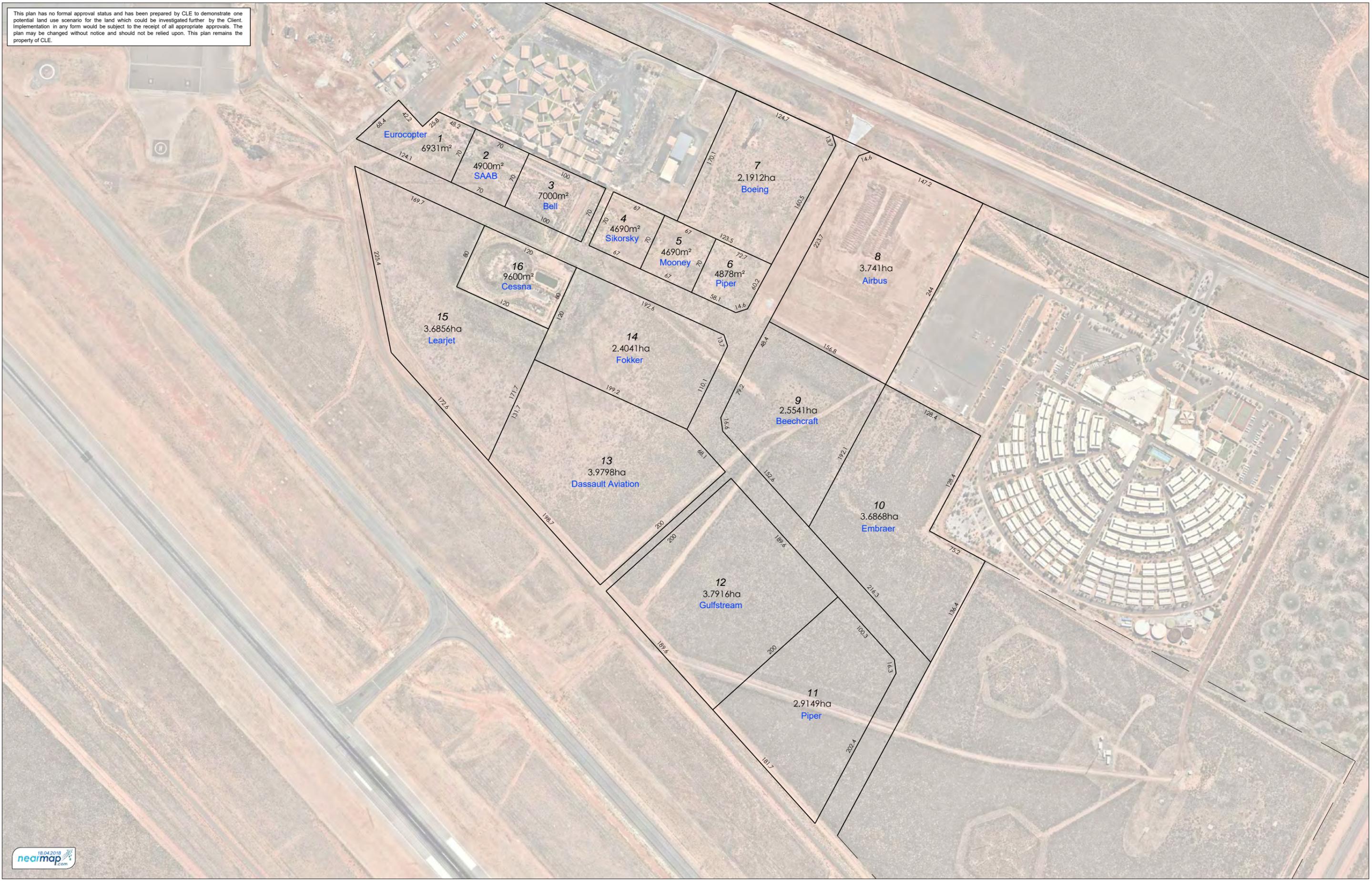


Appendix A

Development Application Layout (CLE 2018)



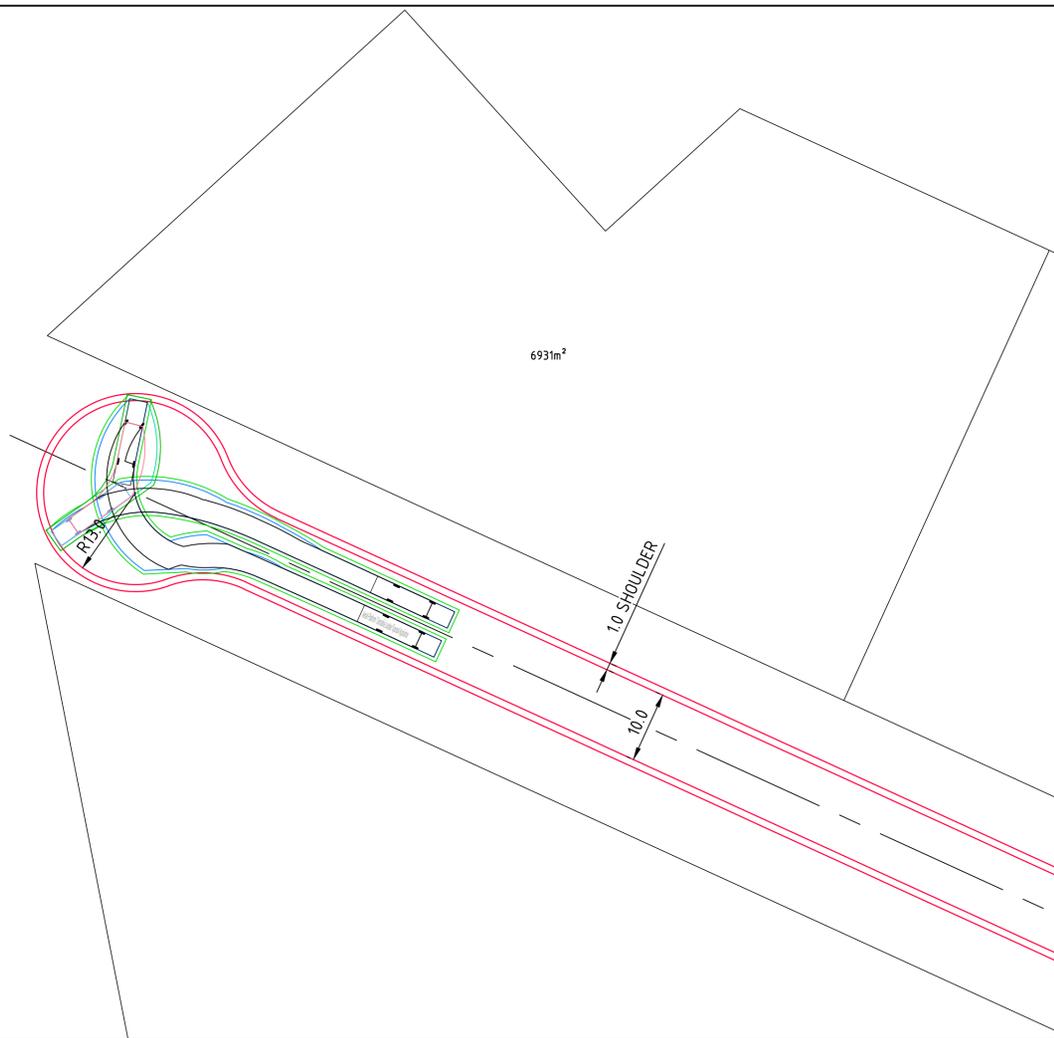
This plan has no formal approval status and has been prepared by CLE to demonstrate one potential land use scenario for the land which could be investigated further by the Client. Implementation in any form would be subject to the receipt of all appropriate approvals. The plan may be changed without notice and should not be relied upon. This plan remains the property of CLE.



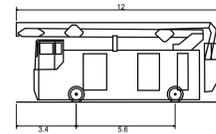
Appendix B

Cul-de-sac dimensions

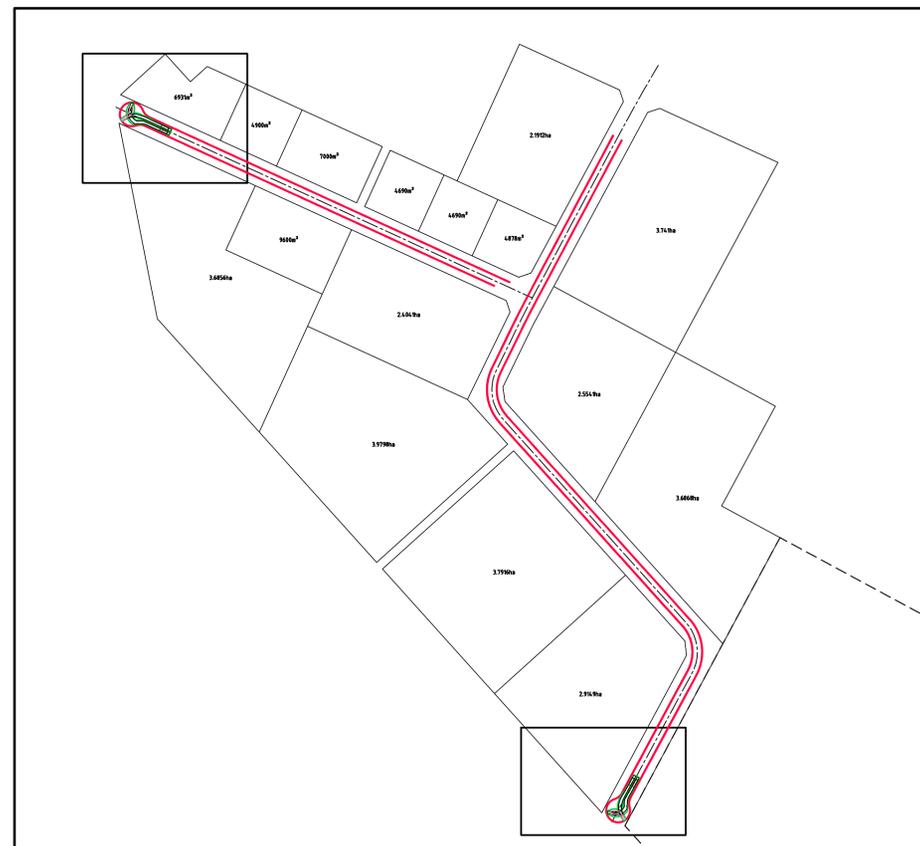
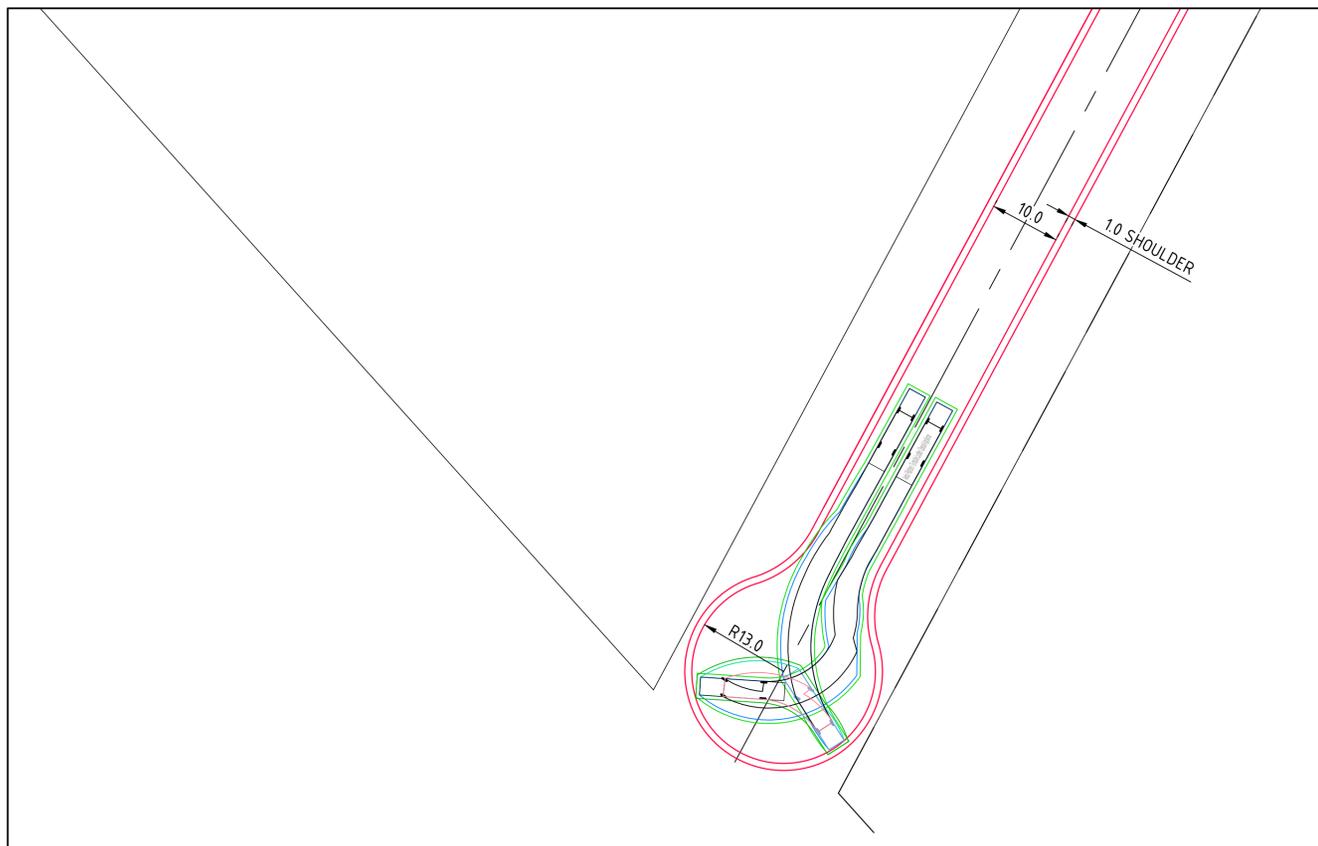




VEHICLE TURNING MOVEMENT FOR:



Aerial Platform/Turntable Ladder
 Overall Length 12.000m
 Overall Width 2.550m
 Overall Body Height 4.500m
 Min Body Ground Clearance 0.130m
 Track Width 2.550m
 Lock-to-lock time 4.00s
 Curb to Curb Turning Radius 13.750m



KEY PLAN
SCALE 1:5000

NOT FOR CONSTRUCTION

ARUP Level 11, Exchange Tower,
2 Esplanade, Perth,
WA 6000, Australia
Tel: +61 (08) 9337 8300
www.arup.com
 CONSULT AUSTRALIA
Member Firm
Aus Pty Ltd
ABN 18 000 966 165

PROJECT TITLE
PORT HEDLAND INTERNATIONAL AIRPORT

DRG. TITLE
HIGHWAY PRECINCT
VEHICLE TRACKING - DFES TRUCK TURNING MOVEMENT

DES. BY / DRN. BY
M.MONTEIRO / A.MEIER
DATE
20.11.2018
SCALE
1:500 @A1

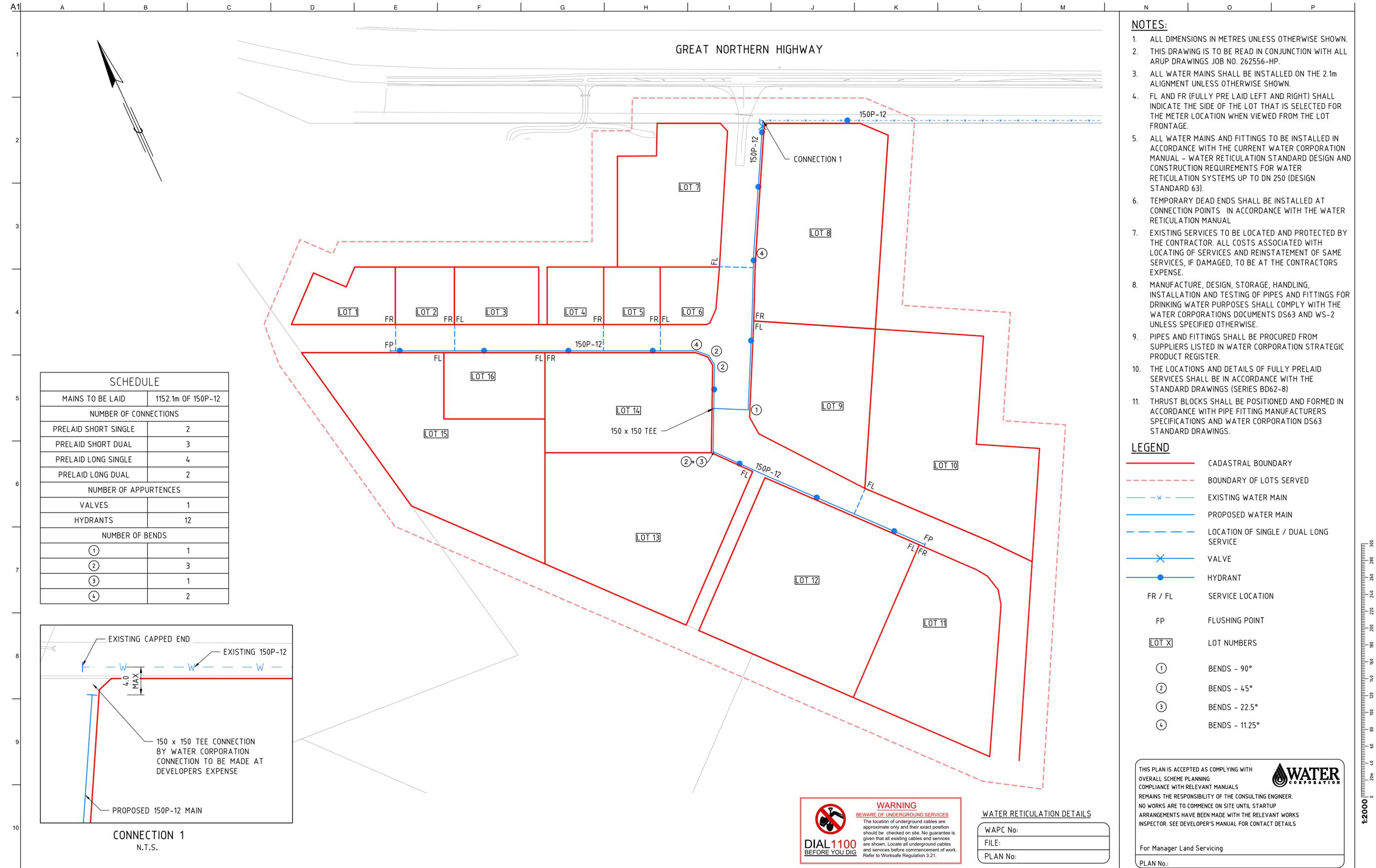
DRG. NUMBER
SK-C-1004
REV.
B

1:500
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Appendix C

Existing and proposed water infrastructure

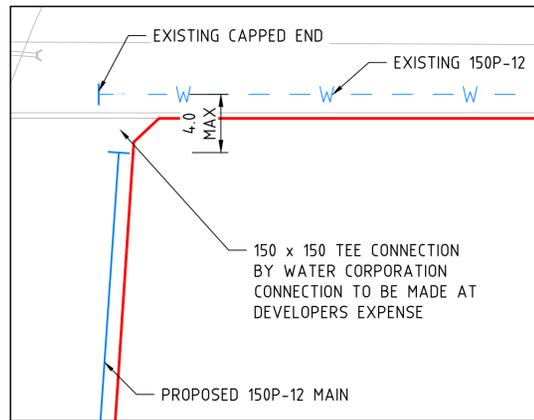




- NOTES:**
- ALL DIMENSIONS IN METRES UNLESS OTHERWISE SHOWN.
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ARUP DRAWINGS JOB NO. 262556-HP.
 - ALL WATER MAINS SHALL BE INSTALLED ON THE 2.1m ALIGNMENT UNLESS OTHERWISE SHOWN.
 - FL AND FR (FULLY PRE LAID LEFT AND RIGHT) SHALL INDICATE THE SIDE OF THE LOT THAT IS SELECTED FOR THE METER LOCATION WHEN VIEWED FROM THE LOT FRONTAGE.
 - ALL WATER MAINS AND FITTINGS TO BE INSTALLED IN ACCORDANCE WITH THE CURRENT WATER CORPORATION MANUAL - WATER RETICULATION STANDARD DESIGN AND CONSTRUCTION REQUIREMENTS FOR WATER RETICULATION SYSTEMS UP TO DN 250 (DESIGN STANDARD 63).
 - TEMPORARY DEAD ENDS SHALL BE INSTALLED AT CONNECTION POINTS IN ACCORDANCE WITH THE WATER RETICULATION MANUAL
 - EXISTING SERVICES TO BE LOCATED AND PROTECTED BY THE CONTRACTOR. ALL COSTS ASSOCIATED WITH LOCATING OF SERVICES AND REINSTATEMENT OF SAME SERVICES, IF DAMAGED, TO BE AT THE CONTRACTORS EXPENSE.
 - MANUFACTURE, DESIGN, STORAGE, HANDLING, INSTALLATION AND TESTING OF PIPES AND FITTINGS FOR DRINKING WATER PURPOSES SHALL COMPLY WITH THE WATER CORPORATION DOCUMENTS DS63 AND WS-2 UNLESS SPECIFIED OTHERWISE.
 - PIPES AND FITTINGS SHALL BE PROCURED FROM SUPPLIERS LISTED IN WATER CORPORATION STRATEGIC PRODUCT REGISTER.
 - THE LOCATIONS AND DETAILS OF FULLY PRELAID SERVICES SHALL BE IN ACCORDANCE WITH THE STANDARD DRAWINGS (SERIES BD62-8)
 - THRUST BLOCKS SHALL BE POSITIONED AND FORMED IN ACCORDANCE WITH PIPE FITTING MANUFACTURERS SPECIFICATIONS AND WATER CORPORATION DS63 STANDARD DRAWINGS.

- LEGEND**
- CADASTRAL BOUNDARY
 - - - BOUNDARY OF LOTS SERVED
 - - - EXISTING WATER MAIN
 - PROPOSED WATER MAIN
 - - - LOCATION OF SINGLE / DUAL LONG SERVICE
 - X VALVE
 - HYDRANT
 - FR / FL SERVICE LOCATION
 - FP FLUSHING POINT
 - LOT X LOT NUMBERS
 - ① BENDS - 90°
 - ② BENDS - 45°
 - ③ BENDS - 22.5°
 - ④ BENDS - 11.25°

SCHEDULE	
MAINS TO BE LAID	1152.1m OF 150P-12
NUMBER OF CONNECTIONS	
PRELAID SHORT SINGLE	2
PRELAID SHORT DUAL	3
PRELAID LONG SINGLE	4
PRELAID LONG DUAL	2
NUMBER OF APPURTENCES	
VALVES	1
HYDRANTS	12
NUMBER OF BENDS	
①	1
②	3
③	1
④	2



CONNECTION 1
N.T.S.

WARNING
BEWARE OF UNDERGROUND SERVICES
The location of underground cables are approximate only and their exact position should be checked on site. No guarantee is given that all existing cables and services are shown. Locate all underground cables and services before commencement of work. Refer to Worksafe Regulation 3.21.

DIAL 1100
BEFORE YOU DIG

WATER RETICULATION DETAILS

WAPC No: _____

FILE: _____

PLAN No: _____

THIS PLAN IS ACCEPTED AS COMPLYING WITH OVERALL SCHEME PLANNING COMPLIANCE WITH RELEVANT MANUALS REMAINS THE RESPONSIBILITY OF THE CONSULTING ENGINEER. NO WORKS ARE TO COMMENCE ON SITE UNTIL STARTUP ARRANGEMENTS HAVE BEEN MADE WITH THE RELEVANT WORKS INSPECTOR. SEE DEVELOPER'S MANUAL FOR CONTACT DETAILS

WATER CORPORATION

For Manager Land Servicing

PLAN No.: _____

Issue	Description	Date	By	Chkd	Appd
A	Development Application	2.08.19	BH	AR	MM

ARUP

Level 14, Exchange Tower, 2 The Esplanade,
Perth, Western Australia, 6000
Tel +61 8 9227 8500
www.arup.com

CONSULT AUSTRALIA

Member Firm
Arup Pty Ltd
ABN 18 000 968 165

Client

Port Hedland
INTERNATIONAL AIRPORT
GATEWAY TO THE
PILBARA

Job Title
Port Hedland International Airport
Highway Precinct

Drawing Title
Highway Precinct
Water Reticulation
Layout Plan

Scale at A1 1:2000

Discipline	CIVIL
Job No	262556-03
Drawing No	262556-HP-C-0501
Drawing Status	DA
Issue	A



