



Highway Precinct Design Guidelines

August 2020



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1.0 Introduction

These Design Guidelines apply to land within the Highway Precinct, refer to Figure 1 of these Design Guidelines. The land within the Highway Precinct is owned by the Town of Port Hedland (the Town), leased to the Port Hedland International Airport Asset Pty Ltd (PHIA) and subleased.

The Design Guidelines aim to provide guidance for the design and approval of development within the Highway Precinct and address:

- Primary building requirements including setbacks, minimum levels, and height;
- Site design requirements including parking and access, loading and storage; fencing and landscaping;
- Built form design requirements including orientation and layout, materials, finishes, signage, plant and equipment; and
- Management requirements including stormwater, waste, verge amenity and bushfire risk.

1.1 Highway Precinct vision

The precinct is intended to form a small business park in a manner that is compatible with the *Port Hedland International Airport Master Plan 2018 – 2038*, the objectives of Local Planning Scheme No. 7 (LPS 7).

The *Port Hedland International Airport Master Plan 2018-2038* makes the following visionary comments:

“The Highway Precinct will accommodate businesses that wish to be located at the airport and take advantage of the exposure and/or access to the Great Northern Highway.

Airport-related activities include:

- *Rental car storage areas;*
- *Freight sheds; and*
- *Aircraft maintenance facilities.*

Uses that may wish to be located at or near the airport for other reasons include:

- *Offices for businesses that use the airport;*
- *General warehousing;*
- *Industry-general;*
- *Industry-light;*
- *Retail fuel sales; and*
- *Road freight facilities and road transport lay down yards.*

Other non-aviation related uses may include:

- *Car dealerships;*
- *Short-term accommodation (for example a TWA);*
- *Solar power storage or collection; and*
- *Offices for airport-related businesses*

1.2 Land use permissibility

Special Use 1 (SU1) within Table 7 of LPS 7 identifies the land use permissibility within the Highway Precinct. If this policy is inconsistent with LPS 7, LPS 7 prevails to the extent of any inconsistency.

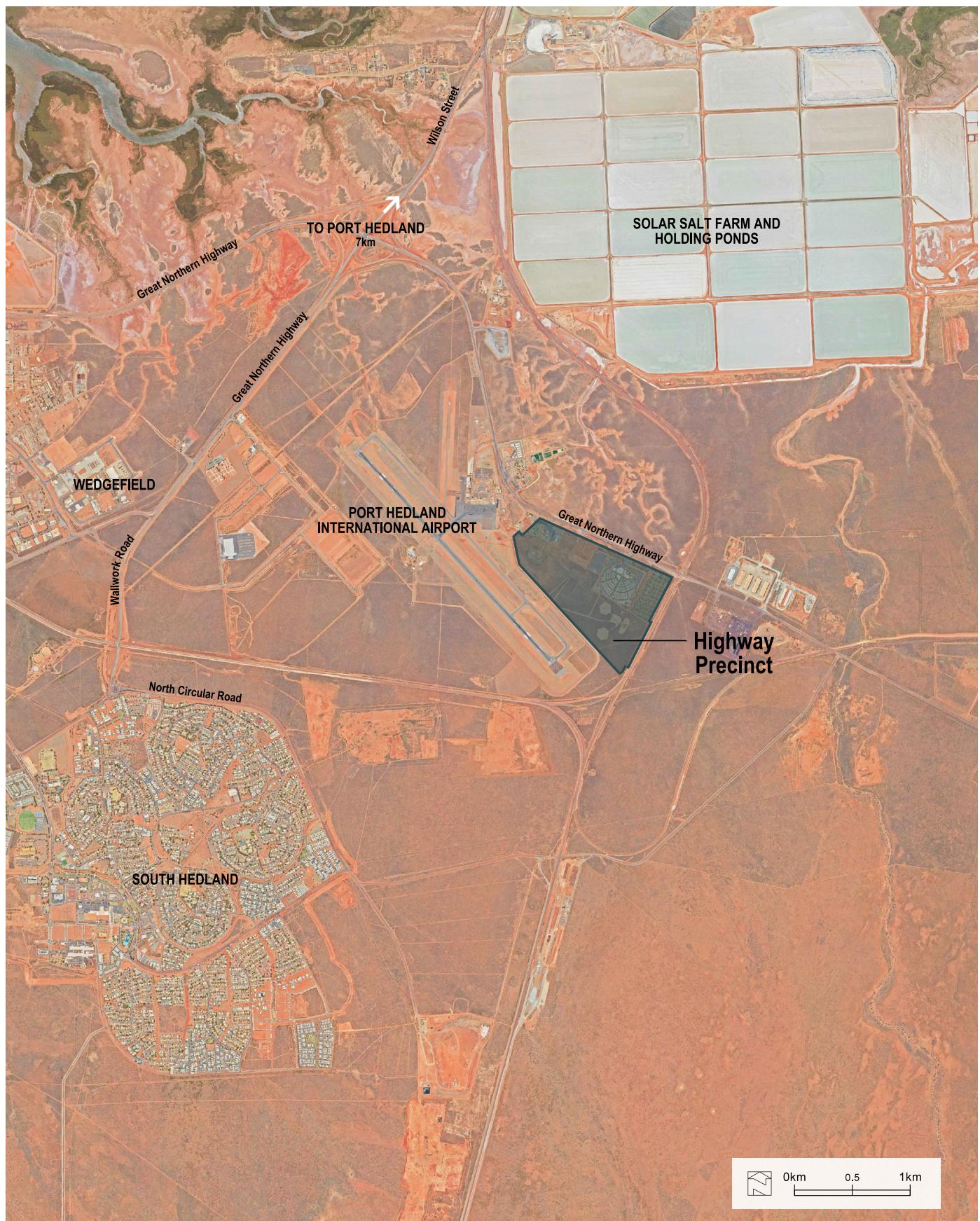


Figure 1 - Context plan

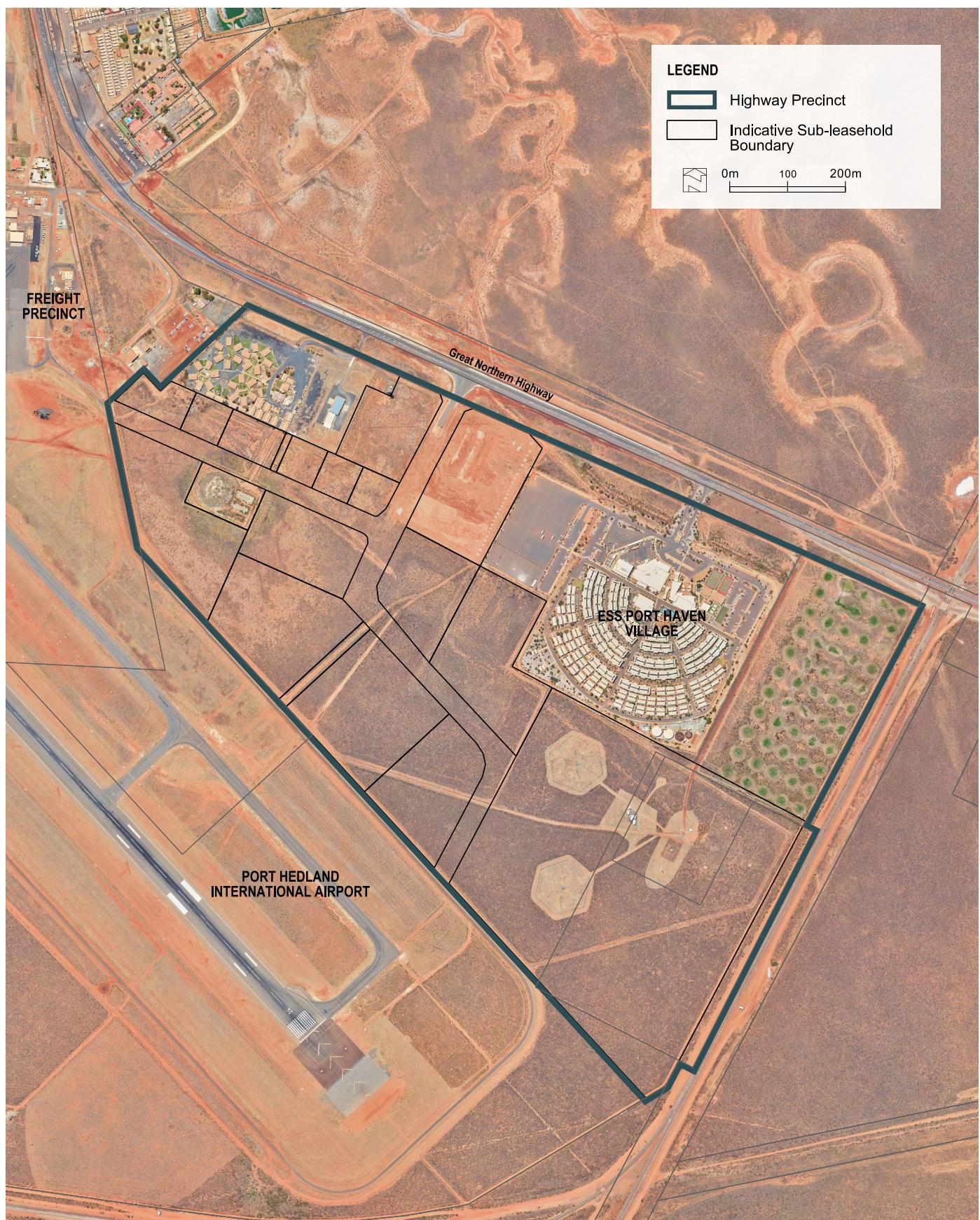


Figure 2 - Local plan

1.3 Design principles

These design principles are to be considered for development in the Highway Precinct:

1. Development shall be constructed and operate in a manner that does not compromise the efficiency or operational capability of the Port Hedland International Airport, having regard to the Airport Safeguarding Plan and in particular:
 - a. Navigation aid infrastructure safety zones and signal direction;
 - b. Minimising sun reflection and glare from surfaces;
 - c. Complying with height limitations as per the Obstacle Limitation Surface (OLS), Procedures for Air Navigational Surfaces – Aircraft Operations (PANS-OPS) and Visual Segment Surface (VSS) of the airport; and
 - d. Design and installation of lighting that does not illuminate above the horizontal nor have the potential to cause confusion to pilots.
2. If noise sensitive premises are proposed, that these are located beyond the N70 noise contour as per the *Port Hedland International Airport Master Plan 2018-2038* and the proposal will provide details of how it will mitigate noise impacts on the receiver(s) to acceptable levels.
3. Development is to provide an appropriate level of streetscape amenity and landscape appearance, in particular:
 - a. Introducing a landscape buffer along the frontage to Great Northern Highway; and
 - b. Buildings have a finished appearance, fencing is consistent, and other site improvements minimise visual clutter.
4. Development and site layout should provide sufficient flexibility and sustainability in relation to (but not limited to):
 - a. Buildings and site layouts that can facilitate alternate land uses and functions in the future;
 - b. Buildings that are designed to be climate responsive and energy efficient;
 - c. Consideration of the total water cycle as part of a site and building design; and
 - d. Waste minimisation, reuse and recycling as part of activities on-site.

2.0 Status, Requirements & Process

2.1 Relationship to other planning instruments

These design guidelines have been prepared and adopted as a local planning policy pursuant to the Town of Port Hedland Local Planning Scheme No. 7 (LPS 7). Due regard shall be given to the design guidelines in the determination of development applications.

The LPS 7 prevails to the extent of any inconsistency with these design guidelines.

Where applicable, Part 139 of the *Civil Aviation Safety Regulations 1998* and Part 139 Manual of Standards – Aerodromes prevail to the extent of any inconsistency with these design guidelines.

Other local planning policies apply to the Highway Precinct and should be read in conjunction with the design guidelines, including:

- LPP/02 Advertising Signs;
- LPP/03 Shipping/sea containers & transportable buildings; and
- LPP/08 Port Hedland International Airport.

2.2 Variations to the design guidelines

Variations to the design guidelines may be considered by the Town, however, the Town will require the applicant to provide suitable justification demonstrating how a proposed variation will not compromise this Policy's design principles or the provisions of LPS 7.

2.3 Lodgement requirements / application guidance

These design guidelines include the following elements to assist proponents in preparing their designs and applications:

- The following sections address site and building requirements, built form design, and natural resource management;
- The sections contain development controls to address for all development applications;
- The Development Checklist provides a quick reference guide for proponents and the Town. Pursuant to clause 63(1)(d) of the *Regulations*, the Town can reasonably require a development application to provide further information.

3.0 Design Guidelines

3.1 Site and building requirements

3.1.1 Building setback

Development controls

The nominated setbacks ensures there is space at the front of the site to accommodate on-site visitor, vehicle circulation, and a landscape zone.

1. Figure 3 demonstrates the following setbacks:
 - a. Great Northern Highway setback: 15 metres minimum;
 - b. Primary street setback: 33 metres minimum;
 - c. Secondary street setback: 10 metres minimum; and
 - d. Other / side / rear setbacks: encouraged to provide setbacks for vehicle circulation and reciprocity where practicable with abutting properties; to assist with natural light penetration; natural cross-flow ventilation; for landscaping to reduce heat loads / on-site drainage.
2. Parking for staff and trade display may be located in the street setback, where it does not result in an encroachment into the landscaping zone, and provision of visitor car parking is met.



Vegetation endemic to area can be suitable for vegetation buffer to Highway.

3.1.2 Appearance to Great Northern Highway

Great Northern Highway is a key freight route and entry road into Port Hedland.

Development controls

The Town seeks to ensure that development sites provide a suitable appearance to the Highway.

1. Boundary fencing to Great Northern Highway shall be black chain link or steel mesh fencing, garrison or palisade fencing with a maximum height of 2.4m.
2. Buildings, outbuildings, structures, storage, laydown and parking areas shall be kept in a manner that does not reduce the amenity, and free of vandalism/ graffiti.
3. The site shall be kept free of rubbish.

Landscape controls

The Town seeks to ensure that a vegetation buffer is established adjacent to the Highway.

1. Within a site's 15m Great Northern Highway setback area, the site shall be planted with a native buffer to screen views of the development.
2. Buffer shall be wide enough for multiple rows of plants in a staggered layout, nominally 20 metres. The setback area may be used for open swales integrated with the buffer.
3. Implementation of buffer plantings to coincide with development to ensure establishment and consistency of plantings. Reticulation and/or watering shall be required to ensure survival.
4. Vegetation screening may warrant an addendum or revised BMP, refer section 3.3.5.

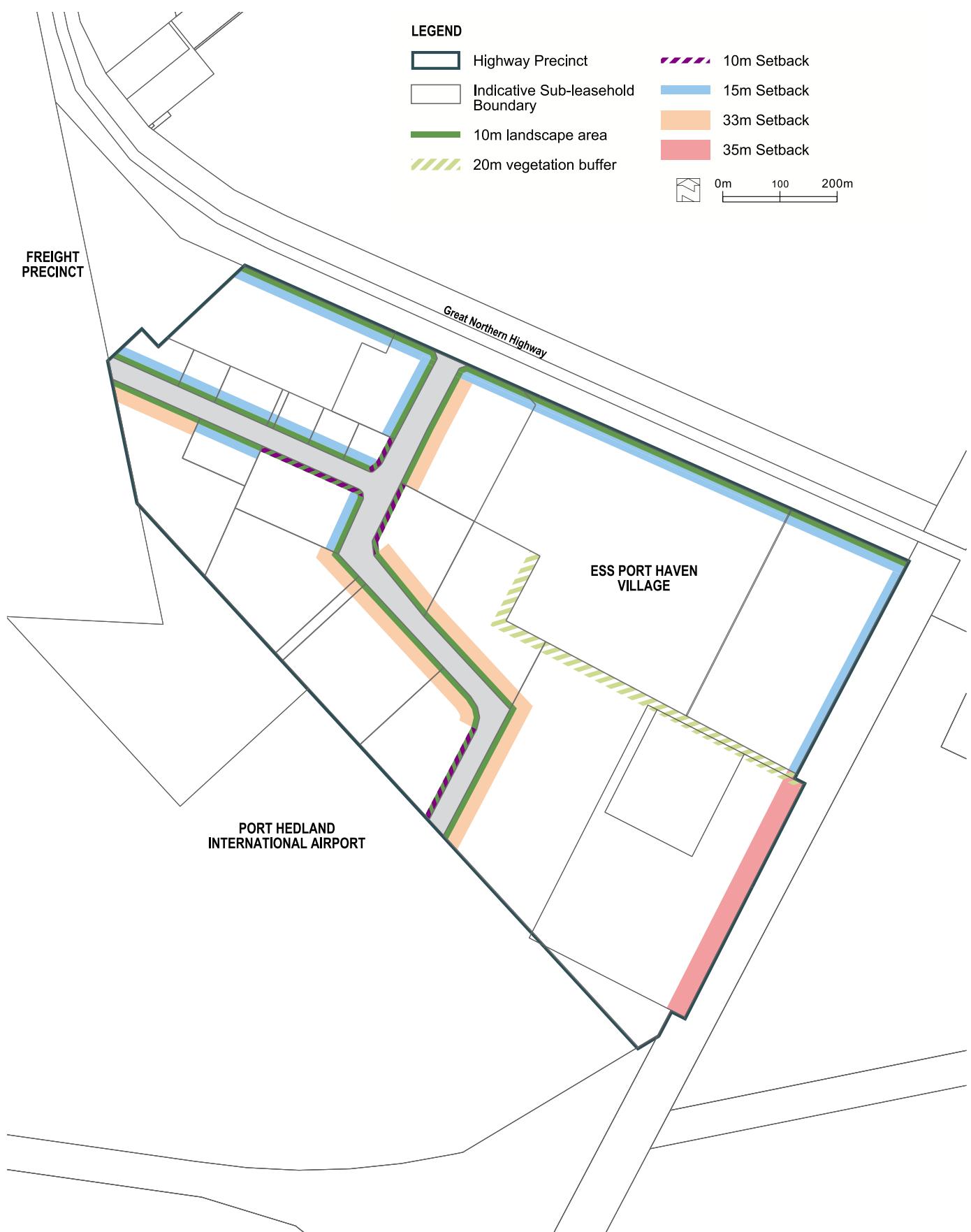


Figure 3 - Setback and landscape plan

3.1.3 Building height

Development controls

Height of development and temporary structures (including but not limited to cranes and light towers) shall maintain minimum height clearances for the operational requirements of the airport.

1. Building height is limited in accordance with the Airport Obstacle Limitation Surface (OLS). The Town will generally not support permanent intrusions into the OLS. Any proposed variation, whether temporary or permanent, shall be referred to the PHIA for comment, prior to erection.

Non-Directional Beacon controls

Development shall not impact upon the Non-Directional Beacon with a High Frequency Radio Antenna Array (NDB) located in the south-east of the airport.

In order to protect radio reception and transmission in / within proximity of the Highway Precinct, the infrastructure has buffers that extend to 500 metres from the NDB at an angle of 3 degrees vertical from the NDB antenna array. The NDB has an elevation of 100 feet (30.48 metres).

Building height will be subject to the following:

1. Height shall be in accordance with the buffer surrounding the Non-Directional Beacon, as applicable (explained above).

3.1.4 Parking and site access

Development controls

Development of a site shall be capable of accommodating required parking, vehicle circulation, loading areas and safe movement. Refer to example of indicative parking layout and setbacks on following page.

1. All parking, loading areas and vehicle accessways must be contained on-site, excluding the designated crossovers.
2. Provision of car parking bays shall:

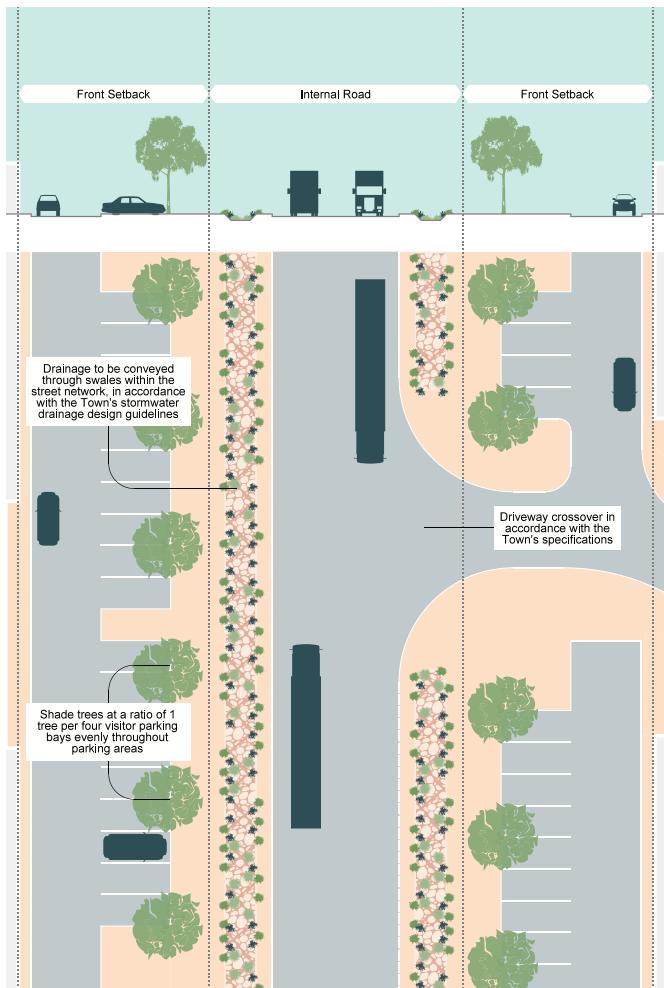
- a. be in accordance with the Town's LPS 7; and
- b. the number of accessible car parking spaces shall be in accordance with the Building Code of Australia; and
- c. design of parking spaces shall be in accordance with Australian Standards AS 2890.1.

5. Heavy vehicle and commercial vehicle parking shall be separated from visitor and staff parking areas, screened from the street and located behind the front building line to the rear or sides of the buildings (where buildings are proposed). Swept path diagrams are required to be submitted with the development application to demonstrate that vehicles can enter and exit the site in forward gear.

6. Visitor parking areas are to be provided with suitable species (refer section 3.3.4) of shade tree at a ratio of 1 tree per four visitor parking bays evenly throughout the parking areas (unless alternate shading is provided for bays adjacent to the building).

7. Parking areas and access driveways shall be sealed to the Town's specifications and satisfaction. Where parking or circulation areas are proposed to be unsealed the application shall be accompanied with a dust management plan and detailed stormwater plan that addresses sediment control and erosion. Lots closest to the ESS Port Haven Village shall have sealed parking areas and driveways to help reduce dust emissions.

8. Construction and provision of crossovers shall be appropriate for the proposed vehicle types and weight. The crossover and culvert design standards are to be in accordance with the Town's Engineering Department Guidelines.



Example of indicative parking layout and setbacks

3.1.5 Site coverage

Development controls

1. There is no minimum or maximum site coverage.
2. Site plan to detail building coverage and demonstrate that the proposal accommodates required car parking, vehicle circulation, drainage, landscaping, storage areas associated with the use and activity, stormwater, and effluent disposal.

3.1.6 Verge treatment

Development controls

Development will positively contribute to the amenity of the street.

Outside of the sublease sites, the street verge areas provide a stormwater drainage and landscaping function.

1. Drainage is to be conveyed through swales within the street network. Development is to connect to the stormwater drainage system within the street network, in accordance with the Town's stormwater drainage design guidelines.
2. Verges are not permitted to be used for anything other than landscaping or stormwater.



Landscape area with visitor parking in front setback

3.2 Built form design

3.2.1 Building orientation

Development controls

Buildings shall be oriented to the street, and contribute to the streetscape and character of the Highway Precinct.

1. The primary building entrance and façade shall orient to the primary street.
2. Extensive blank walls facing a street boundary should be avoided. Design elements to alleviate the potential visual impact of blank walls include building orientation, design detail, materials and the use of openings (doors and windows)

3.2.2 Building entries and address

Development controls

1. Buildings shall provide a legible and visible entry to the street.
2. The main entrance should be designed for universal access and connected with a path and access ramps to the visitor parking area(s).
3. The primary entrance point to a building should provide weather protection for pedestrian through the use of a veranda, canopy, awning or similar
4. Blank, monotonous façades are not permitted to the primary street. Façade treatments to break up the bulk and scale of buildings must be incorporated into the design.

3.2.3 Loading, external service, washdown bays

Development controls

The location of storage areas, loading, external service, and washdown bays shall not be visible from the Great Northern Highway or the airport.

1. All servicing, loading/unloading or open storage areas shall be located behind the building line (where buildings are proposed) and screened from the street, Great Northern Highway and the airport as applicable.

2. Loading areas shall be designed to accommodate manoeuvrability on-site so that vehicles can enter and exit in forward gear.
3. Washdown area(s) to be accompanied with details of the area, pad, plate oil / hydrocarbon separator and disposal area to the specification and satisfaction of the Town.



Primary building entrance and facade being legible and visible



Entrance point provides protection, facade treatment provides surveillance



Primary building entrance connected to car park area, main facade treatment breaks up the bulk and scale of building

3.2.4 Boundary fences

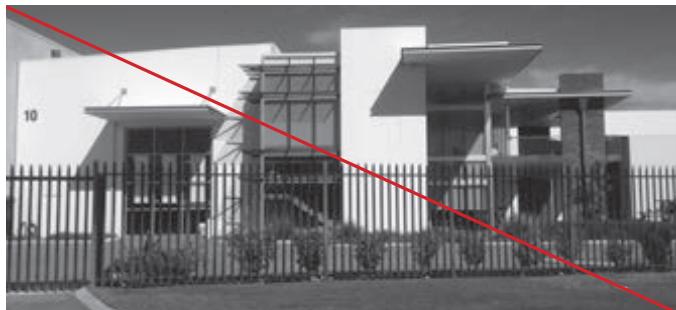
Development controls

Fencing shall compliment the visual appearance of the development, whilst providing security to businesses.

1. Front fencing is permitted between buildings / boundaries where it is aligned to the building line.
2. Fencing is permitted to rear and side boundaries.
3. The front visitor parking and landscape area is to be unfenced.
4. Fencing standards apply as follows:
 - a. Street frontage: black chain link or steel mesh fencing, garrison or palisade fencing to a maximum height of 2.4m; and
 - b. Side and rear boundaries: Colorbond fencing; black or galvanized chain link or steel mesh fencing to a maximum height of 2.4m.
5. Barb wire or razor wire is not permitted.
6. Electrified fencing may be permissible with sufficient justification and a high standard of design.



Example of suitable fencing



Front visitor parking and landscape area is to be unfenced

3.2.5 Materials, finishes and colours

Development controls

Temporary structures, transportable buildings and sea/shipping containers are to be finished and maintained to a comparable standard as permanent buildings.

1. As a minimum, prefabricated tilt-up concrete panels shall be painted.
2. Cladding and complementary materials and finishes to walls that would be visible from a street shall be incorporated. Use of external materials should help to break up the building mass and provide variation.
3. The primary building elevation should include windows in order to achieve passive surveillance of the front setback.
4. Any transportable buildings / sea containers shall have finishes consistent with LPP/03 Shipping/sea containers & transportable buildings.

3.2.6 Plant and equipment

Development controls

Where buildings are proposed, buildings shall be sited in order to limit the potential visual impact of plant and equipment on the street

1. Plant and equipment must be screened from the street view using roof structures, architectural elements, and screens.

3.2.7 Signage

Development controls

Signage is an important element for commercial wayfinding and identifying a business address for deliveries and customers alike. The Design Guidelines seek to discourage the proliferation and visual intrusion of signage on the streetscape.

1. A ‘gateway sign’ may be established for identifying the Highway Precinct as a location and for wayfinding purposes. The following applies to an entry statement:
 - a. The gateway sign is located within the Highway Precinct land, and is not in a road reserve nor integrated into a road design;
 - b. The gateway sign promotes the whole precinct and not a selection of businesses;
 - c. The gateway sign may be a pylon sign, consistent with the assessment criteria in LPP/02 *Advertising Signs*;
 - d. Signage font is legible from the Highway to minimise the level of driver distraction;
 - e. The gateway sign is not illuminated in a manner that is unsafe for users of the Highway or aircraft;
 - f. Is limited to one, and shall have signage space for all tenancies; and
 - g. The gateway sign does not constitute a traffic hazard nor interfere with road safety or traffic efficiency.
2. No signage is permitted within the setbacks to Great Northern Highway.
3. Large scale signage may be considered on roofs, given proximity to the airport, where it is simple in design, is not offensive, and does not result in detrimental impacts to the safety or operational capability of the airport.
4. All other signage shall be considered in accordance with the Scheme and LPP/02 *Advertising Signs*.

3.2.8 External and internal lighting

Development controls

External lighting can create confusion, distraction or glare to pilots in the air. Lighting needs to be carefully selected so that it does not impact the operation of the airport.

1. Light sources and fixtures that contribute to safety and crime prevention.
2. Developers and designers should take advice upon the zones of restricted lighting of the Port Hedland International Airport and refer to the *National Airports Safeguarding Framework Principles and Guidelines* and the guideline issued by CASA *Lighting in the Vicinity of Aerodromes – Advice to Designers*.
3. Artificial lighting shall not be installed 3 degrees above the horizontal and directed within the site, or appropriately screened or shielded to limit light spill.
4. Proposals for coloured external lights should be referred to the Port Hedland International Airport for advice.

3.2.9 Outbuildings and other structures

Development controls

Outbuildings and other structures should be considered in the context of presenting as an integrated whole with the main building(s) on-site.

1. Outbuildings and other structures that are not integrated with the main building should be set behind the main building line.
2. Shipping/sea containers and transportable buildings shall be located at the rear of the site; painted and in good condition prior to being placed on-site, and otherwise address the provisions of LPP/03 *Shipping/sea containers & transportable buildings*.



Example of transportable buildings, painted and in good condition

3.3 Natural resource management

3.3.1 Stormwater and drainage management

Development controls

1. A stormwater plan shall be prepared as part of a development application, designed in accordance with the Town's Engineering Guidelines to the satisfaction of the Town and in particular:
 - a. Should have regard to and incorporate water sensitive urban design principles;
 - b. Shall be designed to ensure there is no standing water on-site or within the aerodrome that would attract birds or wildlife; and
 - c. Where a site is proposed to be unsealed, a detailed plan shall include erosion prevention measures and sediment traps.
2. On-site drainage flows should be as noted on the plan.
3. Indicative leasehold lots shall be filled, in accordance with Appendix A.
4. Stormwater shall be directed to the drainage swales within the road network.
5. Each leasehold site shall contain a minimum of the 1 in 5 year rainfall event (6 minute duration).
6. Discharge points shall be designed and constructed with sediment traps and secured with cemented rock pitching or similar to prevent erosion.
7. Any private swales located within the lot boundary swales shall include protected embankments and a base to prevent erosion. Should an unsealed yard or other area be proposed, sediment traps shall be designed and constructed to prevent sediment entering swales at all discharge points.

3.3.2 Effluent disposal

Development controls

A reticulated sewerage service is not available to the Highway Precinct.

1. An on-site treatment and disposal system for sewerage (which includes nutrient removal) will be required. Indicative details can be shown on the Site Plan, with an advice note for submitting *Application to Construct or Install an Apparatus for the Treatment of Sewage*.
2. The developable area of the lot will be determined based on the system's effluent disposal capacity.
3. There will be ongoing leasee obligations to ensure that the treatment and disposal system is regularly maintained in accordance with relevant health regulations.

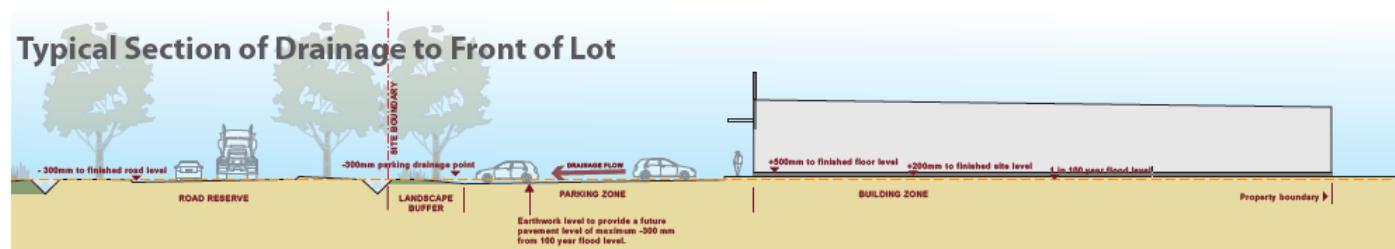


Figure 4 - Typical sections through different lot drainage types

3.3.3 Waste management

Development controls

Minimising the visual impact of storage and waste receptacle areas is important given the views from the airport and Great Northern Highway. It is necessary to ensure that rubbish and waste areas do not attract birds or animals.

1. Waste and recycling storage areas are to be screened from all road frontages. The dimensions and location of rubbish bin storage areas will be at the discretion of the Town.
2. Rubbish bins and waste storage areas are to be sealed and covered / enclosed and provided with a bin wash down facility. If not fenced or otherwise enclosed, tie down points or alternative means of securing bins during cyclones must be provided.
3. No permanently open bins shall be permitted on-site. Bins shall be closed and capable of being sealed at all times.

3.3.4 Landscaping

Development controls

The Highway Precinct will incorporate landscaping treatments including hard scape (i.e. rock swales) and soft landscaping (i.e. trees and shrubs). Endemic species that are tolerant to the climate and/or will not encourage birdlife to the area are preferred.

1. Plant species must be selected and planted in accordance with the species list in Table 1. The Town may require a landscape plan to be submitted and approved as a condition of development approval.
2. Undertake weed management at minimum quarterly treatments.
3. All landscape areas and tree planting shall be undertaken prior to the commencement of the use.
4. Suitable species of shade tree are to be provided to parking areas at a ratio of 1 per 4 car bays, evenly throughout the parking areas (unless alternate shading is provided for bays adjacent to the building).

3.3.5 Bushfire management

Development controls

A bushfire management plan, refer Appendix B, has been prepared for the Highway Precinct and there are ongoing responsibilities for each site occupier.

1. Vegetation in verges and landscape areas to be maintained as 'low threat vegetation'.

Table 1 - Species list

Tree Species			
Scientific Name	Common Name	Mature Size	Planting rate (per m ²) to obtain 60% canopy coverage.
<i>Acacia anuera</i>	Mulga	10m	single/group 3 - 5 per 10m ²
<i>Acacia coriacea</i>	Desert oak / dogwood	7m	
<i>Brachychiton acuminatus</i>	Rock kurrajong	8m	
<i>Corymbia deserticola</i>	Desert bloodwood	7m	
<i>Eucalyptus dichromophloia</i>	Variable barked bloodwood	10m	
<i>Lysiphyllum cunninghamii</i>	Native bauhinia	7m	
<i>Melaleuca leucadendron</i>	Cadgeput	10m	
<i>Pittosporum phylliraeoides</i>	Weeping pittosporum	8m	

Shrub Species			
Scientific Name	Common Name	Mature Size (height x spread)	Planting rate (per m ²)
<i>Acacia sclerosperma</i>	Limestone wattle	1.5m x 1.5m	1/sqm
<i>Acacia xiphophylla</i>	Snakewood	1.5m x 1.5m	1/sqm
<i>Eremophila glabra</i>	Emu bush	1m x1m	3/sqm
<i>Eremophilla macdonnellii</i>		1m x1m	3/sqm
<i>Eremophila maculata</i>	Spotted emu bush	1.5m x 1.5m	2/sqm
<i>Eremophila pterocarpa</i>	Silver poverty bush	1m x 1m	3/sqm
<i>Senna artemisioides</i>	Silver cassia	1.5m x 1.5m	1/sqm
<i>Senna artemisioides</i> ssp. <i>helmsii</i>	Crinkled cassia	1.5m x 1.5m	1/sqm
<i>Senna artemisioides</i> ssp. <i>Oligophylla</i>	Bloodbush	1.5m x 1m	2/sqm
<i>Senna artemisioides</i> ssp. <i>Sturtii</i>	Grey cassia	1.5m x 1.5m	2/sqm

Groundcover Species			
Scientific Name	Common Name	Mature Size (height x spread)	Planting rate (per m ²)
<i>Acacia gregorii</i>	Gregory's wattle	0.5m x 2m	2/sqm
<i>Enchytraea tomentosa</i>	Barrier salt bush	0.1-0.6 x 2m	3/sqm
<i>Gomphrena canescens</i>	Bachelor's buttons	0.1-0.9m x 0.8m	3/sqm
<i>Ipomoea muelleri</i>	Native morning glory	0.2m x 2m	2/sqm
<i>Maireana georgei</i>	Satiny bluebush	0.5m x 1.3m	3/sqm
<i>Pimelea ammonocharis</i>		0.2-1.5m x 1.5m	3/sqm
<i>Ptilotus calostachyus</i>	Weeping mulla mulla	0.2-2m x 0.5m	3/sqm
<i>Ptilotus rotundifolius</i>	Royal mulla mulla	0.5m x 1m	2/sqm
<i>Scaevola parvifolia</i>	Camel weed	0.3m x 0.5m	3/sqm
<i>Swainsona Formosa</i>	Sturt's desert pea	0.3m x 1m	3/sqm
<i>Tribulus hirsutus</i>		0.15 x spreading	3/sqm

Tussock Species			
Scientific Name	Common Name	Mature Size (height x spread)	Planting rate (per m ²)
<i>Chrysopogon fallax</i>	Golden beard grass	0.3-1.5m(h)	4/sqm
<i>Cymbopogon ambiguus</i>	Native lemon grass	0.5m x0.5m	4/sqm
<i>Triodia epactia</i>		1m x 0.5m	4/sqm
<i>Triodia pungens</i>	Soft spinifex	0.3-2m (h)	3/sqm

4.0 Development Checklist

Item	Yes / No	Comment
Details of the proposed minimum finished floor levels (above the 1-in-100 year ARI flood level) and proposed heights of buildings, lighting, antennae, and cranes (below the Obstacle Limitations Surface).		
Details of proposed vehicles (light and heavy vehicles) to access the site, accompanied with swept paths annotated on the site plan demonstrating how vehicles can enter and exit the site in forward gear.		
Crossover details from the site to the road network to demonstrate it is appropriate for the proposed vehicle types.		
Stormwater details to accommodate a minimum 1-in-5 year ARI event on-site, with overflow stormwater being directed to the drainage system.		
Landscape concept plan, using the species list in these Design Guidelines.		
Colours and materials scheme, annotated on the elevations.		
Fencing details (type, colour, location and height).		
Locations for signage.		
Where parking and access areas are proposed to be unsealed, accompanied with a dust management plan.		



APPENDIX A

Initial Stormwater Strategy

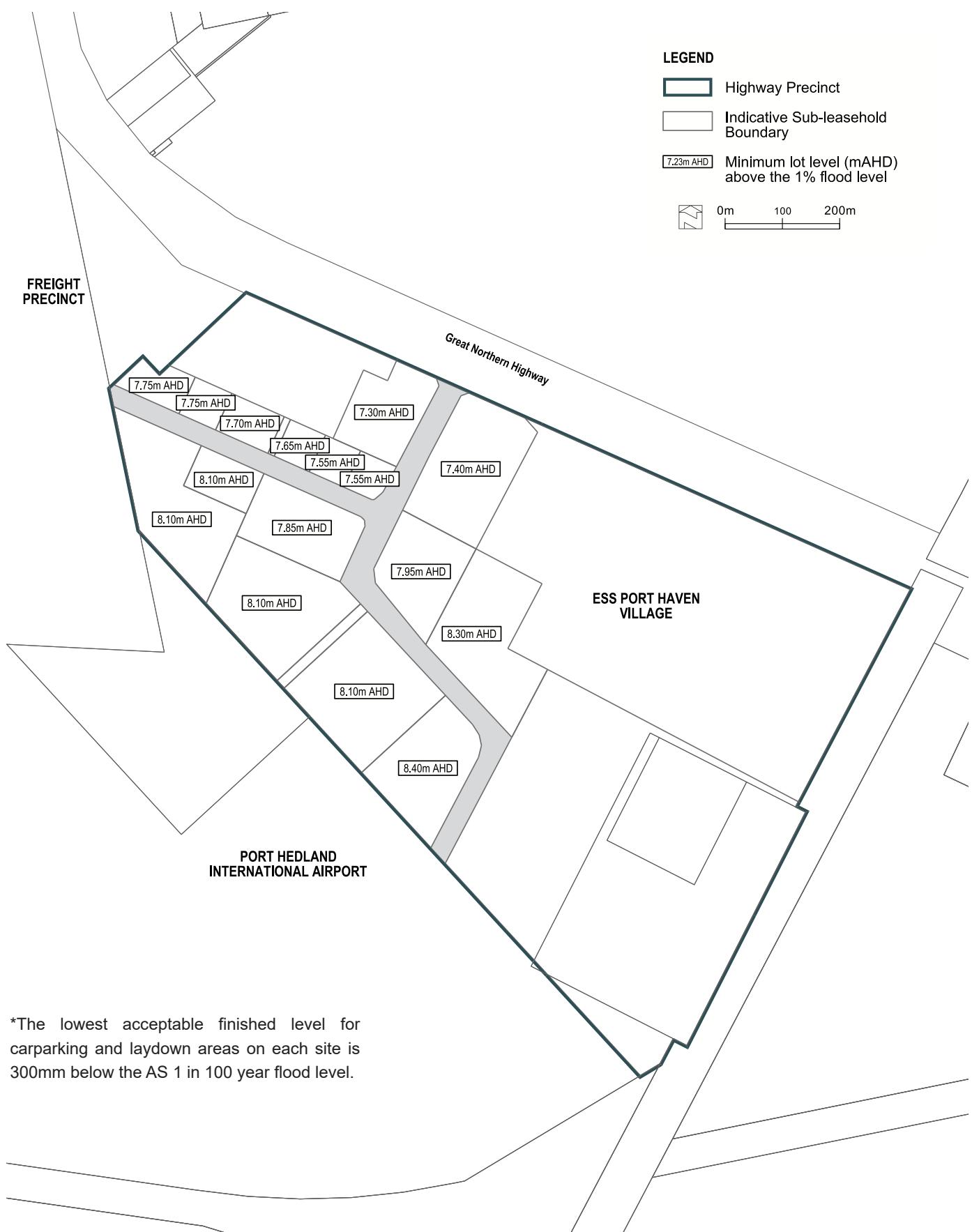
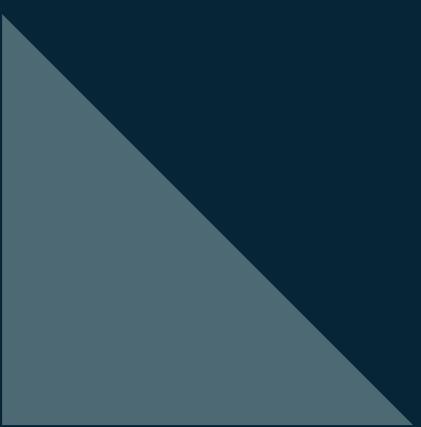


Figure 5 - Plan of Minimum Lot Levels



APPENDIX B

Bushfire Management Plan

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



Document Control

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1	January 2019	Sean Moylan	SCM	Kirsten Knox	KK
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Document submitted to client for review.					
A	February 2019	Sean Moylan	SCM	Anthony Rowe	AJR
	Document updated as per client comments.				
B	August 2019	Sean Moylan	SCM	Anthony Rowe	AJR
	Document updated to respond to Town of Port Hedland comments.				
C	December 2019	Sean Moylan	SCM	Anthony Rowe	AJR
	Document updated to respond to final Town of Port Hedland comments.				

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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Appendices

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).

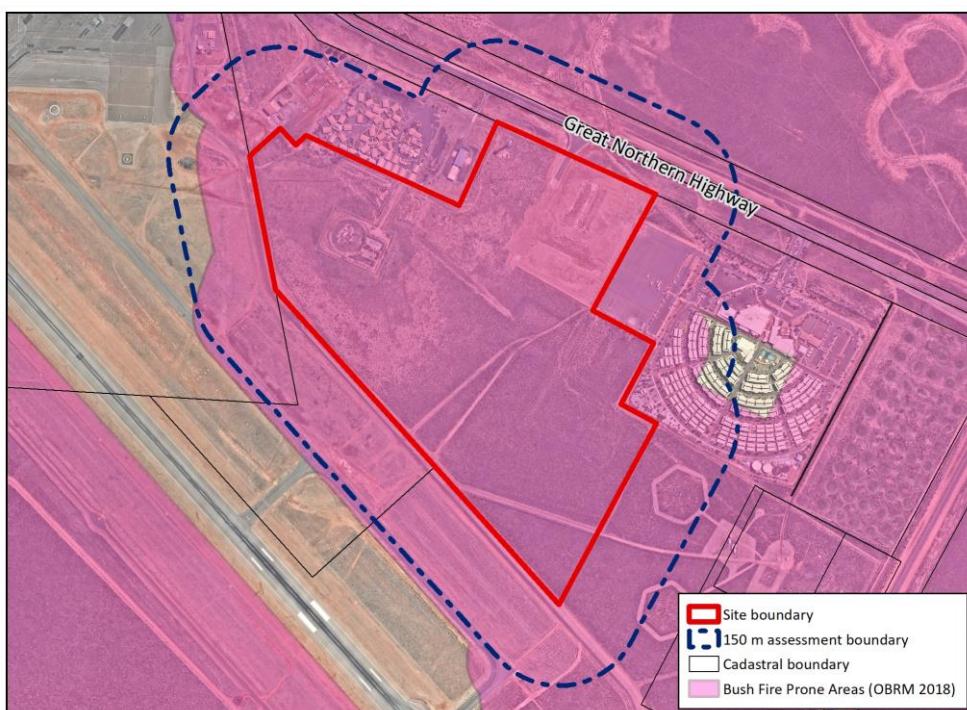


Plate 1: Areas within and surrounding the site identified as ‘bushfire prone areas’ (as indicated in purple) under the state-wide Map of Bush Fire Prone Areas (OBRM 2019).

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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 (kW m^{-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.

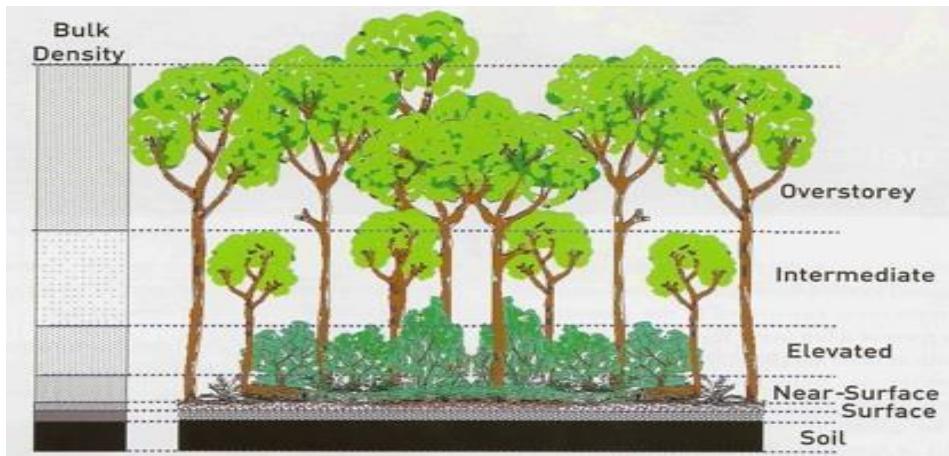


Plate 2: The five fuel layers in a forest environment that could be associated with fire behaviour (Gould et al. 2007)

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	AS 3959 classification (Figure 2): Shrubland (Class C) 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. 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. 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><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><i>Photo location 3: shrubland vegetation located in the central portion of the site</i></p>	3	AS 3959 classification (Figure 3): Shrubland (Class C) Effective slope (Figure 4): Flat/upslope 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.
			8	AS 3959 classification (Figure 3): Non-vegetated area (Exclusion 2.2.3.2(e)) Effective slope (Figure 4): Not applicable 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.

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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	AS 3959 classification (Figure 2): Grassland (Class G) 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). 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.	 <i>Photo location 5: grassland vegetation located in the western portion of the site</i>  <i>Photo location 7: grassland vegetation located in the northern portion of the site</i>	 <i>Photo location 6: grassland vegetation located in the southern portion of the site</i>  <i>Photo location 8: grassland vegetation located in the northern portion of the site</i>	AS 3959 classification (Figure 3): Grassland (Class G) Effective slope (Figure 4): Flat/upslope 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.
			5 - 7	
			8	AS 3959 classification (Figure 3): Non-vegetated area (Exclusion 2.2.3.2(e)) Effective slope (Figure 4): Not applicable Grassland 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.

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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>	 <i>Photo location 9: non-vegetated area in the northern portion of the site</i>	 <i>Photo location 10: non-vegetated area to the north of the site</i>	<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>	<i>No photos available.</i>		<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	Yes.	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.
Element 2: Siting and design	To ensure the siting and design of development minimises the level of bushfire impact.	A2.1 Asset Protection Zone	Yes.	<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.

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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		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. 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 .	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)		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. Both cul-de-sacs will comply with the construction requirements outlined in the Guidelines (excluding the length), as provided below: <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. 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.	
		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			
		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. 		

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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		
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.	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.	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 4: Water.
		Yes.	N/A		
		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>	

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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 if 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 to 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 Pettersson 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:

Signature:

Name: Kirsten Knox

Company: Emerge Associates

Date: 20 August 2019

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

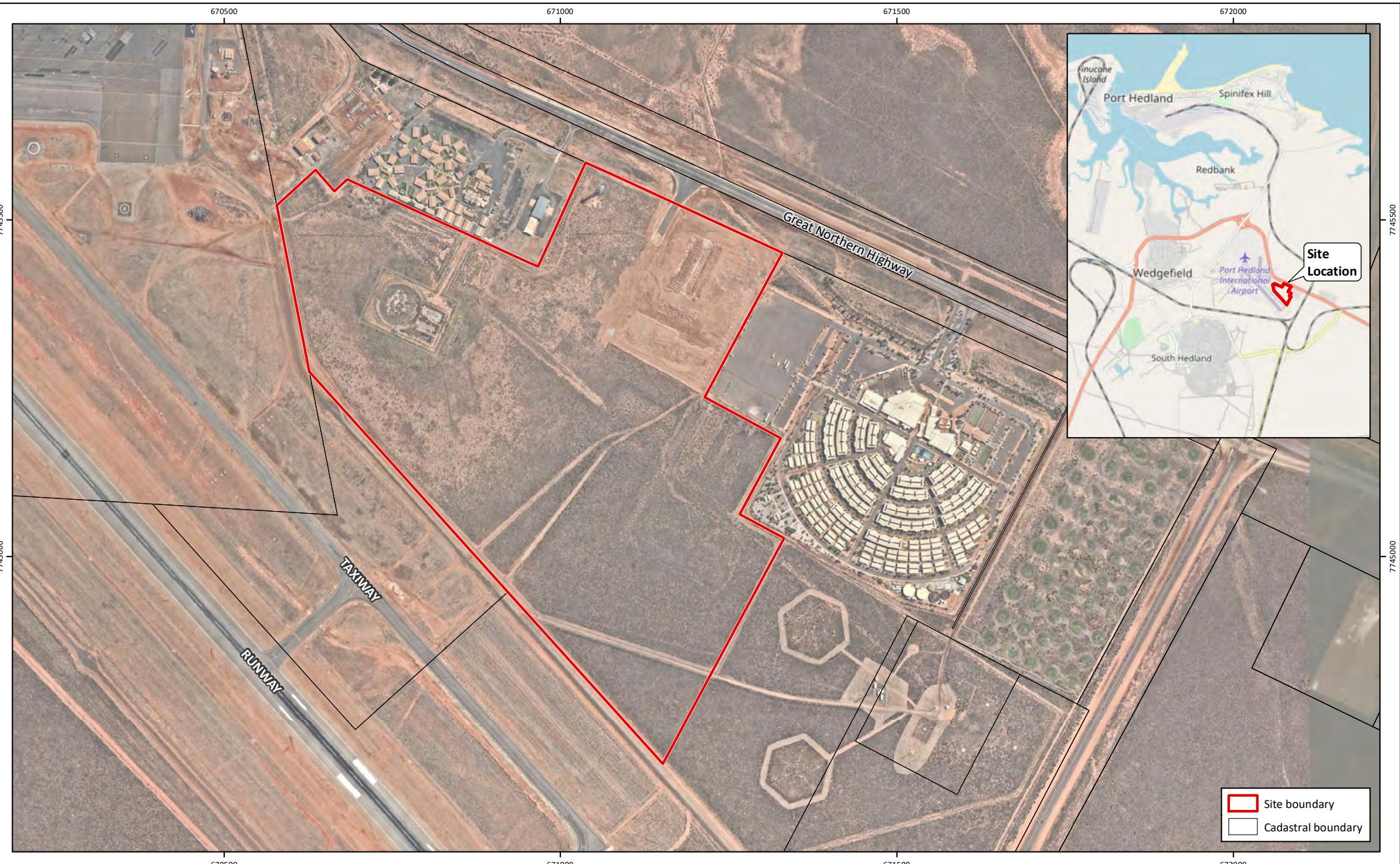


Figure 1: Site Location

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

emerge
ASSOCIATES



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



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

emerge
ASSOCIATES

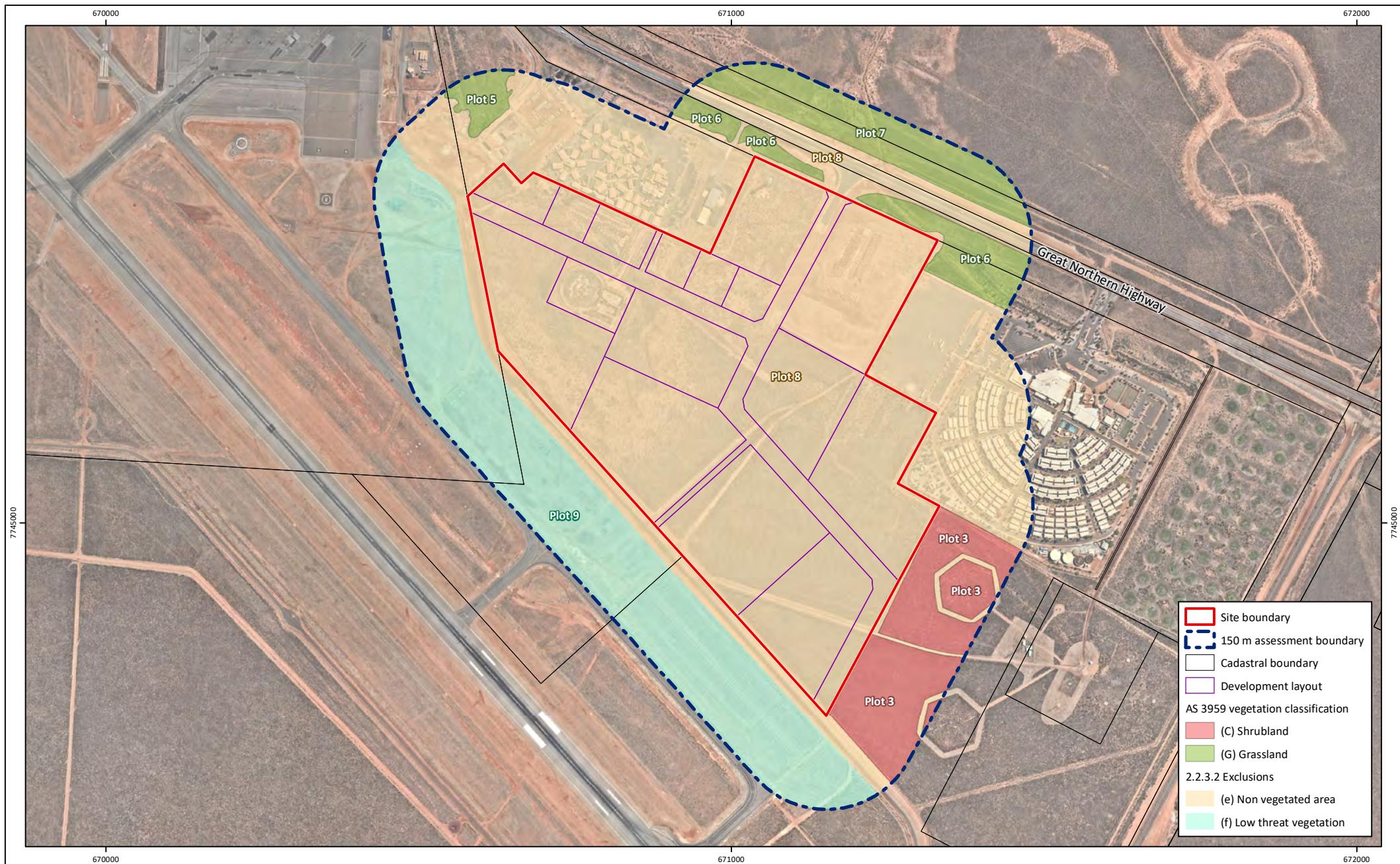


Figure 3: Post Development Conditions - AS 3959 Vegetation Classification

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

emerge
ASSOCIATES

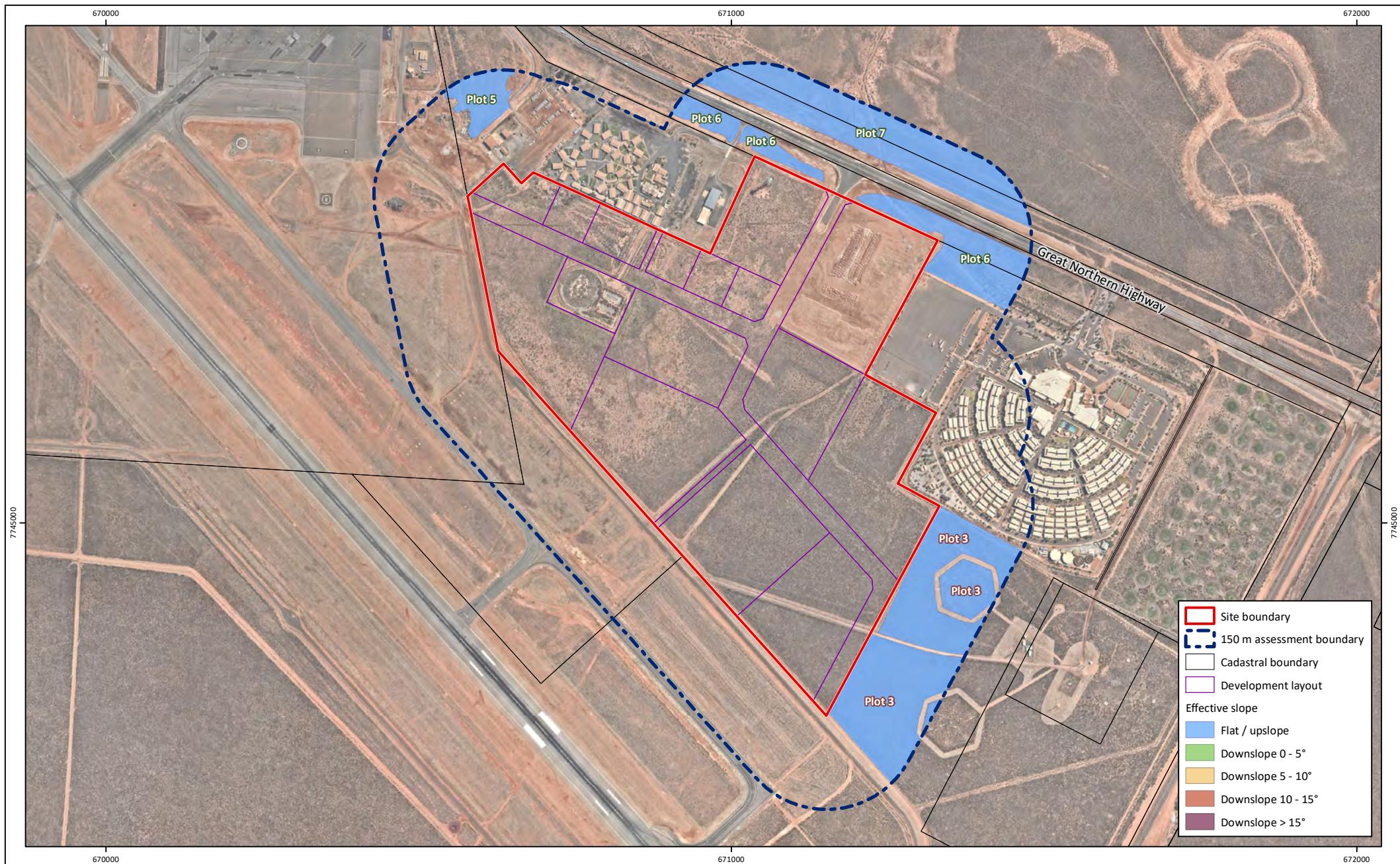


Figure 4: Post Development Conditions - Effective Slope

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



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GDA 1994 MGA Zone 50

emerge
ASSOCIATES

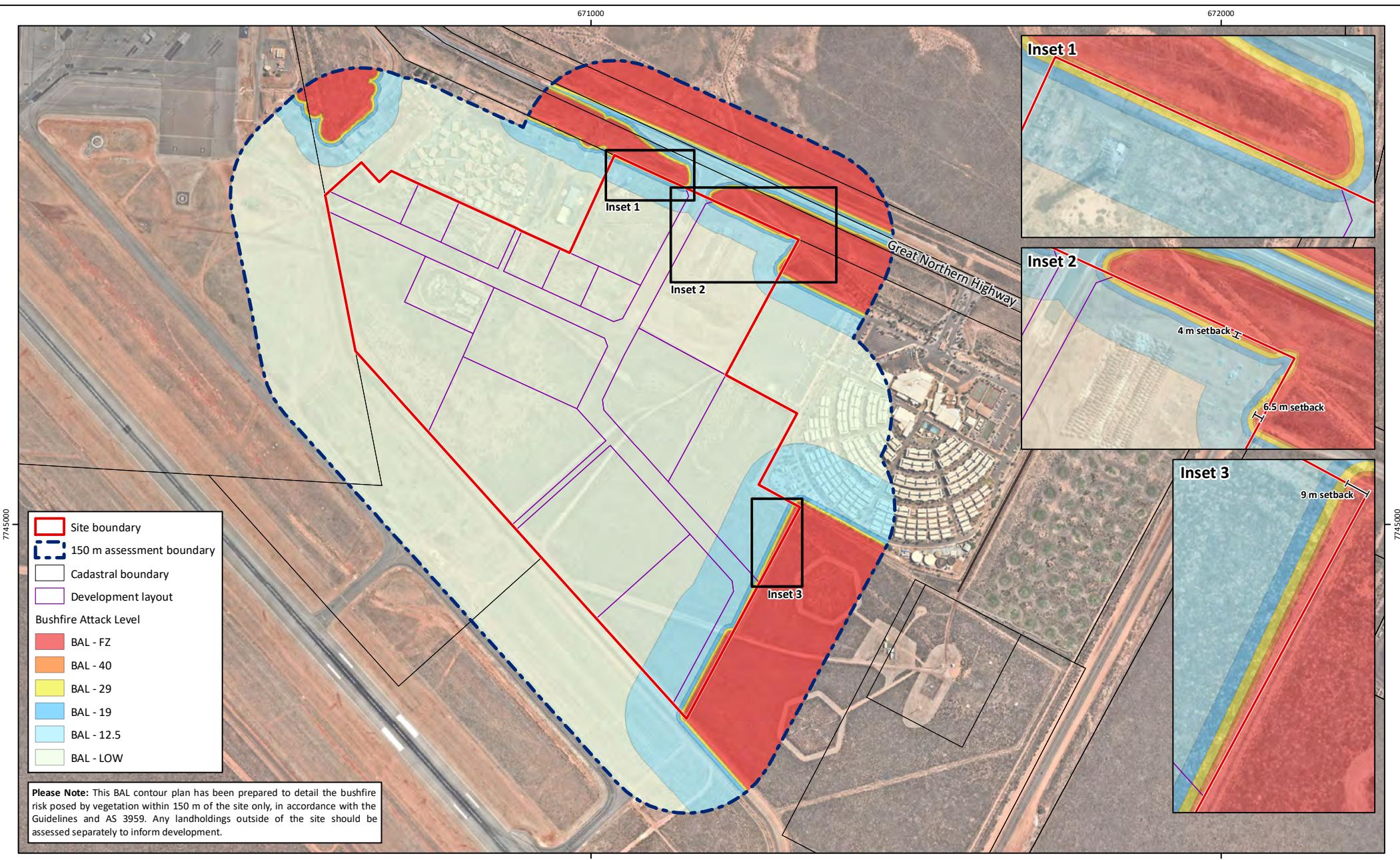


Figure 5: Bushfire Attack Level Contours

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



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

emerge
ASSOCIATES

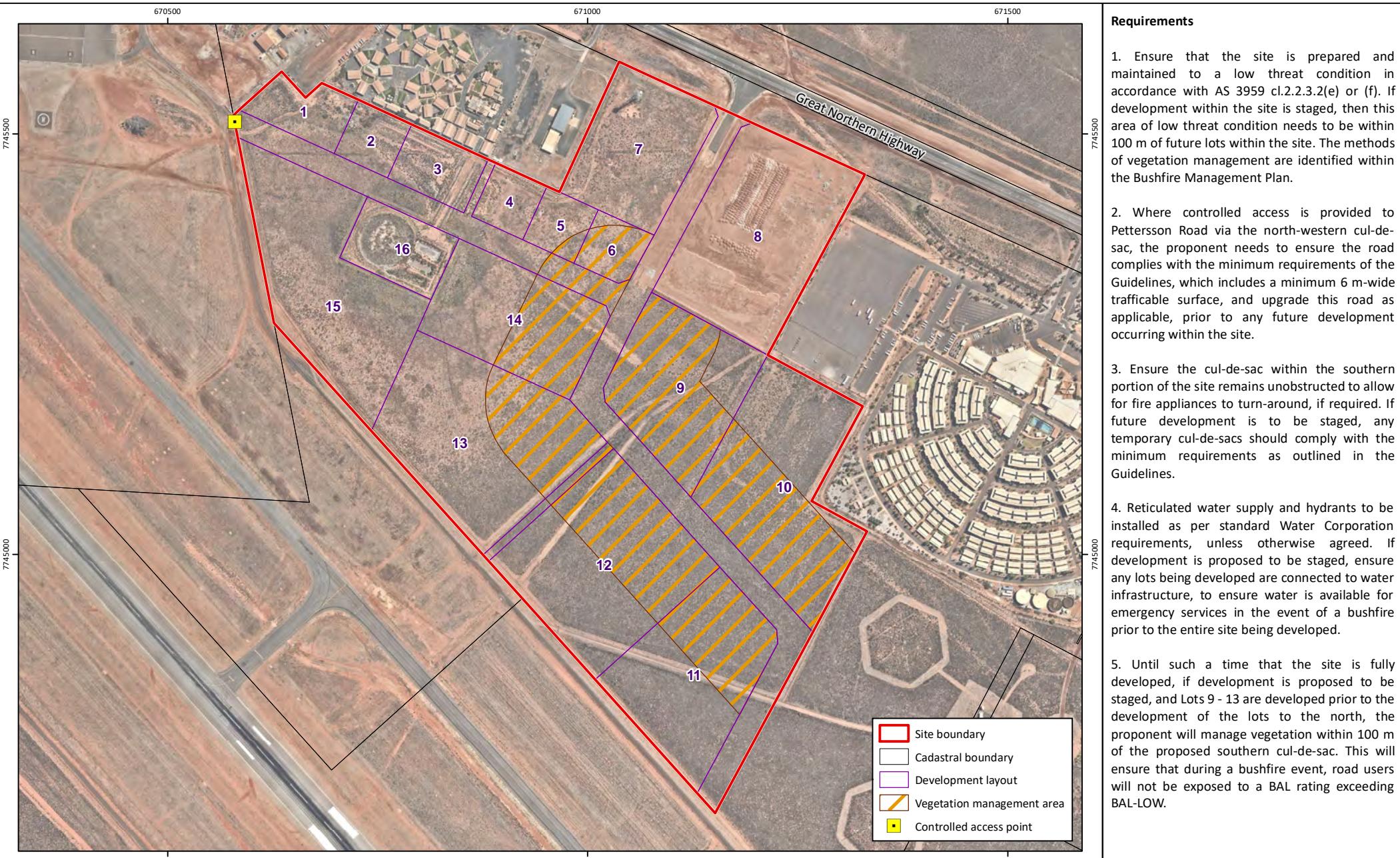


Figure 6: Spatial Representation of Bushfire Management Strategies

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

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



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 Metres
 Scale: 1:6,000@A4
 GDA 1994 MGA Zone 50

emerge
 ASSOCIATES

Appendix A

Development Application Layout (CLE 2018)



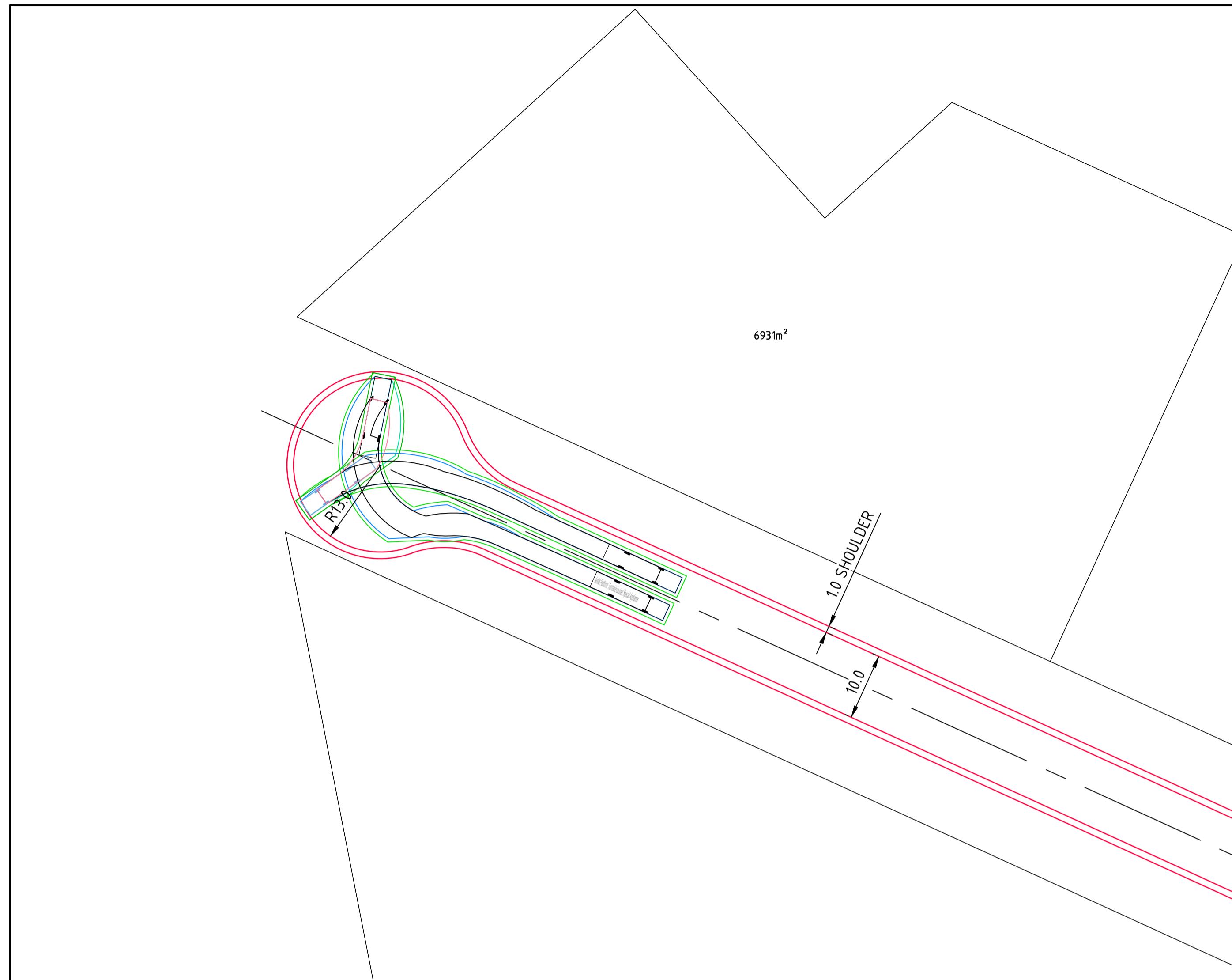
This plan has no formal approval status and has been prepared by CLE to demonstrate one potential land use scenario for the land which could be investigated further by the Client. Implementation in any form would be subject to the receipt of all appropriate approvals. The plan may be changed without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



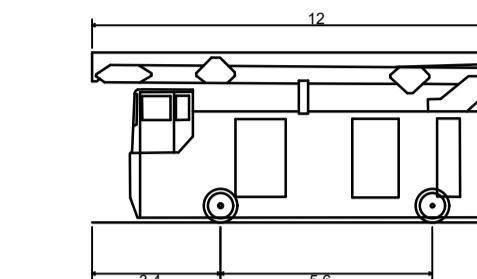
Appendix B

Cul-de-sac dimensions

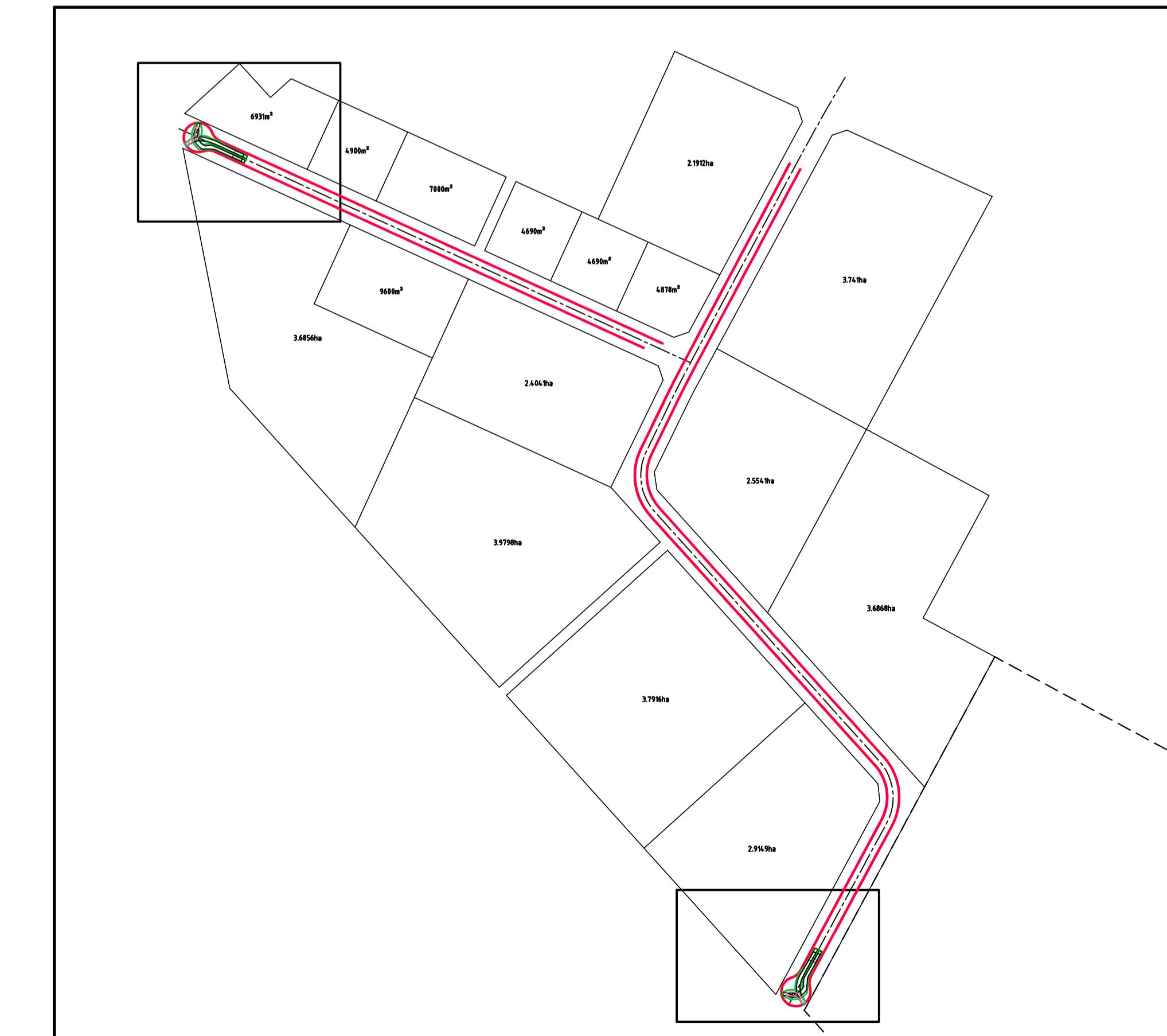
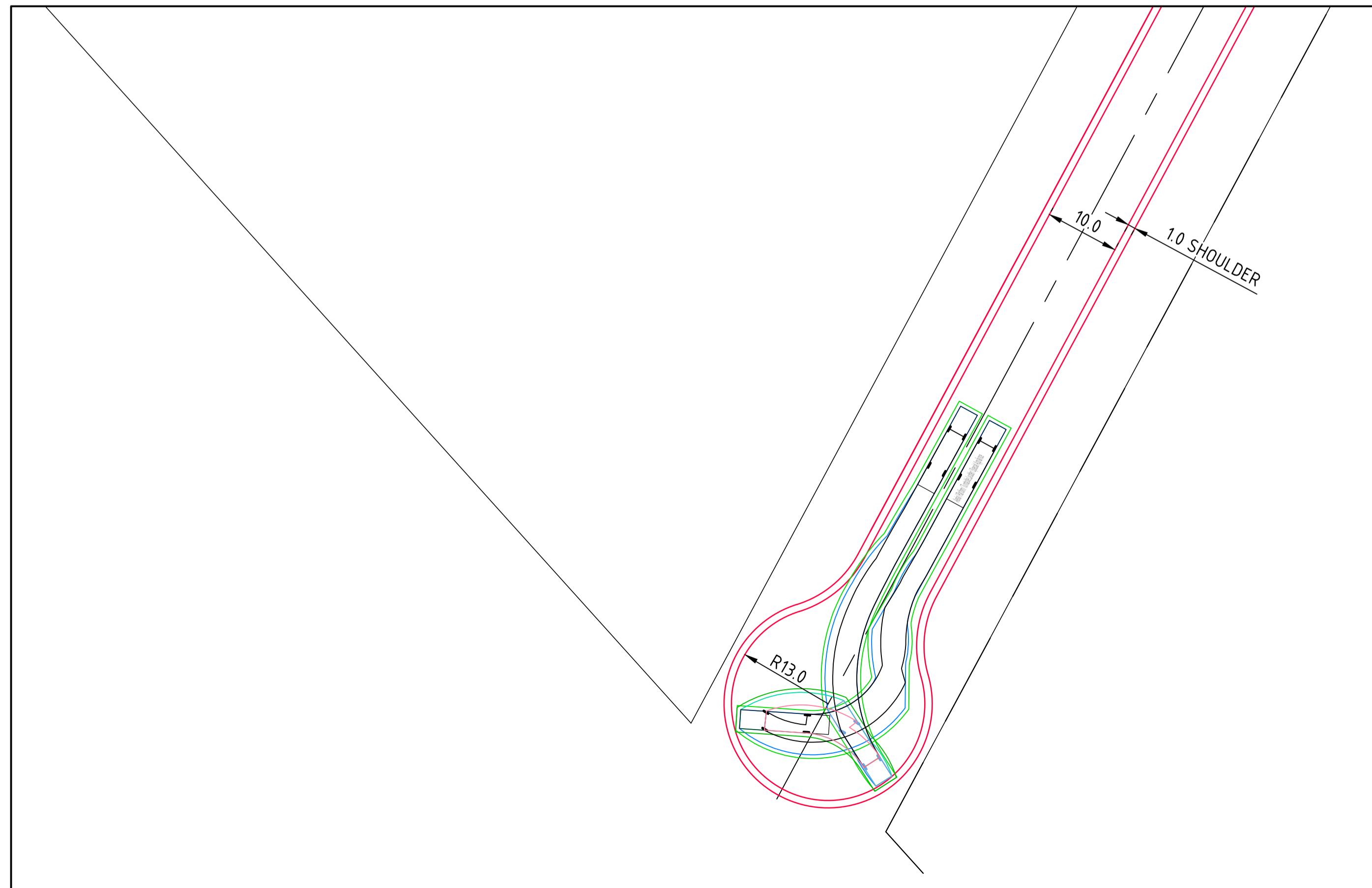




VEHICLE TURNING MOVEMENT FOR:



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 2.300m
 Lock-to-lock time 4.01s
 Curb-to-Curb Turning Radius 13.750m



NOT FOR CONSTRUCTION

ARUP		Level 14, Exchange Tower, 2 Esplanade, Perth, WA 6000, Australia Tel: +61 (08) 9327 8300 www.arup.com
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
DRG. NUMBER	SK-C-1004	SCALE 1:500 @A1
REV.		B

Appendix C

Existing and proposed water infrastructure



