



GAP RIDGE INDUSTRIAL ESTATE STRUCTURE PLAN

Prepared for: City of Karratha on behalf of Landcorp
This Structure Plan was prepared under the provisions of the
City of Karratha's Local Planning Scheme No 8.



ENDORSEMENT PAGE

This structure plan is prepared under the provisions of the City of Karratha
Local Planning Scheme No.8

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

15 OCTOBER 2010

In accordance with Schedule 2, Part 4, Clause 28 (2) and refer to Part 1, 2. (b) of the
Planning and Development (Local Planning Schemes) Regulations 2015.

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19 OCTOBER 2030

GAP RIDGE INDUSTRIAL ESTATE

STRUCTURE PLAN

CITY OF KARRATHA

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Prepared for: City of Karratha on behalf of LandCorp
Prepared by: Urbis

**Level 14
1 William Street
PERTH WA 6000
Phone: 9346 0500**

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Gap Ridge Industrial Estate

Structure Plan

Prepared for the City of Karratha on behalf of
LandCorp

January 2019

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TABLE OF MODIFICATIONS

Modification Number	Summary of the Amendment	Amendment Type	Date approved by WAPC
0	Original Adoption.	N/A	N/A
1	<ul style="list-style-type: none"> Alterations to Table 4. Deletion of sub-station site. Allowance for a TWA on a limited a single site to be known as a Contractors Camp. Introduction of second service centre site (lot 1). 	N/A	8 March 2012
2	<ul style="list-style-type: none"> Removal of second service centre site (lot 1). Change in permissibility of Restaurant use on service centre site. Removal of Contractors Camp Site Introduction of Noxious Use Sub-Precinct Introduction of Drainage Reserve along eastern boundary Consequential amendment to account for changes to City of Karratha Town Planning Scheme No.8 Introduction of Statement of Intent for Service Centre Site. Introduction of Statement of Intent for Noxious Use Precinct. Can in permissibility of Noxious Uses in Table 4 within the General Industry Precinct Updating of Staging details. 	N/A	26 November 2013
3	<ul style="list-style-type: none"> Expansion of Noxious Use Precinct to east of Exploration Drive Update references from Shire of Roebourne to City of Karratha, town planning scheme to local planning scheme and Development Plan to structure plan Minor formatting updates Include section on Bushfire Management 	Minor	25 January 2019
4			
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1 PART ONE - OPERATIVE

1.1 Introduction

This document shall be read in conjunction with the Gap Ridge Industrial Estate Structure Plan Map. Pursuant to the provisions of the City of Karratha's Local Planning Scheme No.8, this document forms part of the Structure Plan.

This Structure Plan has been prepared for the land located in Gap Ridge, to the west of Seven Mile Creek, north of the land fill site and south of Dampier Highway. The site is currently zoned 'Industrial Development' and pursuant to clause 6.7.11 of the City of Karratha's Local Planning Scheme No. 8 (the Scheme), a Structure Plan is required to be prepared over the site prior to considering a Subdivision or Development Application to guide development form.

1.2 Structure Plan Area

The area to which this Structure Plan applies is Lot 507 Dampier Highway and part Lot 300 Dampier Highway, as identified as the Structure Plan Area in Figure 1.

1.3 Contents of the Structure Plan

The Gap Ridge Structure Plan is comprised of the following:

- The Structure Plan Map (Attached at Appendix A); and
- The Structure Plan Text

1.4 Objectives of the Structure Plan

The objectives of the Structure Plan are:

- To guide the future subdivision, development and use of the land within the Structure Plan area;
- To provide for a range of industrial allotments from light industrial land uses to larger more expansive industrial activities, and in particular to provide for the logistics and laydown uses associated with offshore construction activities;
- To facilitate economic clustering by directing land use within the estate and creating individual precincts of complimentary uses;
- To establish a road layout and orientation to support heavy vehicle traffic and facilitate the future connection to Madigan Road to the east of the site by setting aside land for the "Karratha Western Bypass";
- To establish a drainage network that will provide for the effective hydraulic operation of the site and ensures suitable water quality prior to discharge into Seven Mile Creek; and
- To facilitate a well-designed and climatically appropriate landscape, responsive to local and site specific conditions.

1.5 Operation

This Structure Plan is to be immediately in operation following its formal adoption by the relevant approval authority. The plan will remain in operation until the estate is fully developed, or until such time as an amendment to the scheme is undertaken, rezoning the subject site to the applicable industrial zones.

1.6 Definitions

“LandCorp” means the Western Australian Land Authority

“Scheme” means the City of Karratha’s Local Planning Scheme No 8

“Commission” or “WAPC” means the Western Australian Planning Commission

“City” or “Local Government” means the City of Karratha

“Site”, “Subject land” or “Estate” means the land within the Structure Plan area.

1.7 Development

Development requirements within the Industrial Precinct A and B will be in accordance with the requirement of the Industry zone of the Scheme, and any relevant Local Planning Policy and other relevant requirements.

Design Guidelines will be applicable to development within the Gap Ridge Estate and adopted as planning policy by the City of Karratha. LandCorp will enforce the Design Guidelines, and other contractual matters prior to submission of individual Development Applications to the City of Karratha for Planning Approval. The Design Guidelines complement rather than change scheme requirements, however, should any discrepancy occur the requirements of the Scheme (and this Structure Plan) shall prevail.

1.8 Bushfire Management

Portions of the area to which this Structure Plan applies is considered to be located within a Bushfire Prone Area.

A Bushfire Management Plan was prepared in December 2018 in order to support the modification to the noxious industry precinct. A BAL contour map has been prepared on the assumption that the vegetation on site will be cleared and maintained as low threat as part of the final development of the estate. A minor encroachment of BAL -40/FZ by 9m along the eastern boundary with the adjacent vegetation noted to remain as hazardous.

All development must be undertaken in accordance with approved Bushfire Management Plan.

2 PART 2 - DETAIL

2.1 Introduction

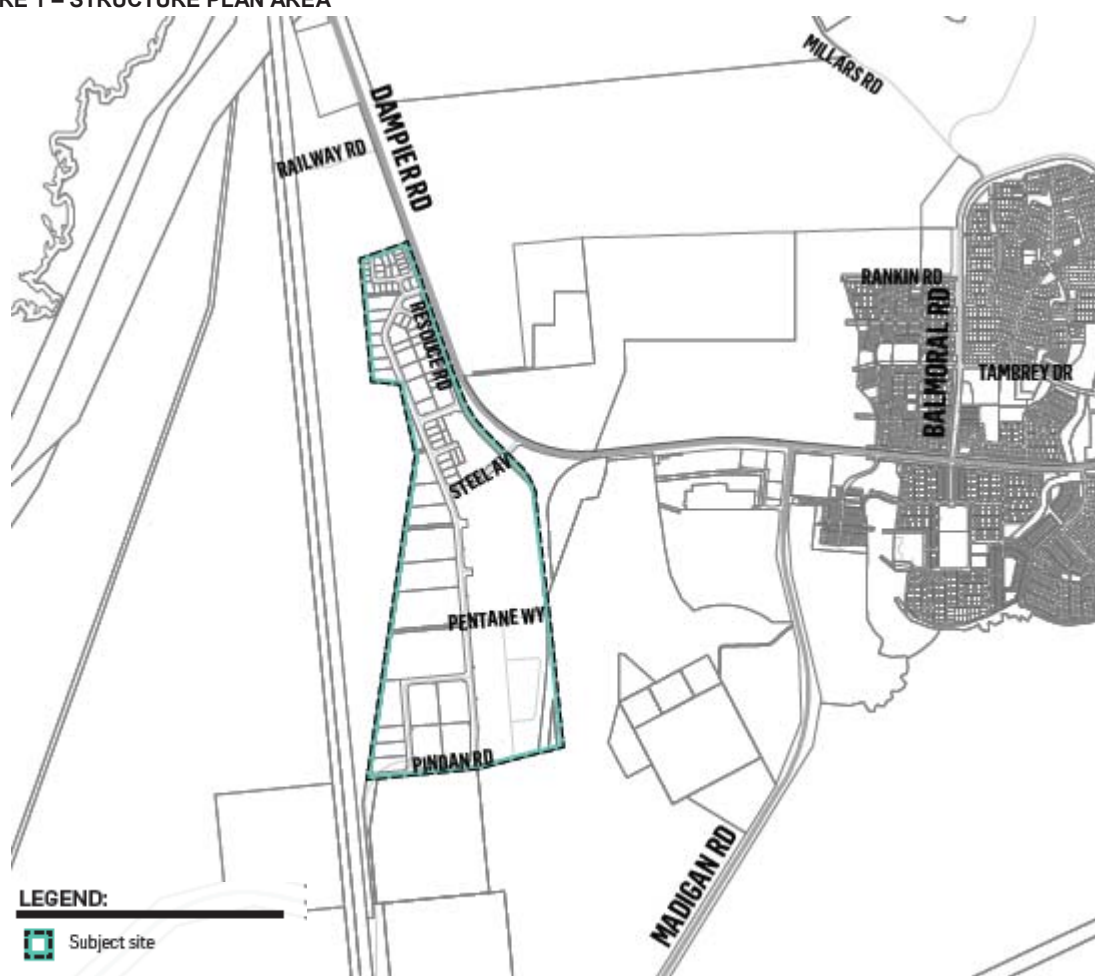
There is strong underlying and anticipated additional demand for industrial land in the Pilbara Region and the North-West of Australia generally. Major oil, gas and mining projects are driving this demand and in response LandCorp is seeking to create a new light and general industrial estate to cater for expanding industry and job creation in the Karratha region. The existing Karratha Industrial Estate is close to capacity and unable to expand due to geographical and environmental constraints. The new estate will offer easy access to Karratha and Dampier Port with the amenity of a modern industrial area, providing a diverse range of lot sizes to cater for a variety of industrial uses operating at a range of development intensities.

The Structure Plan outlines the key design principles for the Gap Ridge Industrial Estate and compliance with the scheme requirements in accordance with clause 6.7.12 of the *City of Karratha's Local Planning Scheme No. 8*.

2.1.1 Structure Plan Area

There are two lots affected by the Structure Plan area, as outlined in Figure 1 and 2 below. The site also includes the existing Seven Mile Road (also known as Rubbish Tip Road) reserve which has an area of approximately 8 hectares.

FIGURE 1 – STRUCTURE PLAN AREA

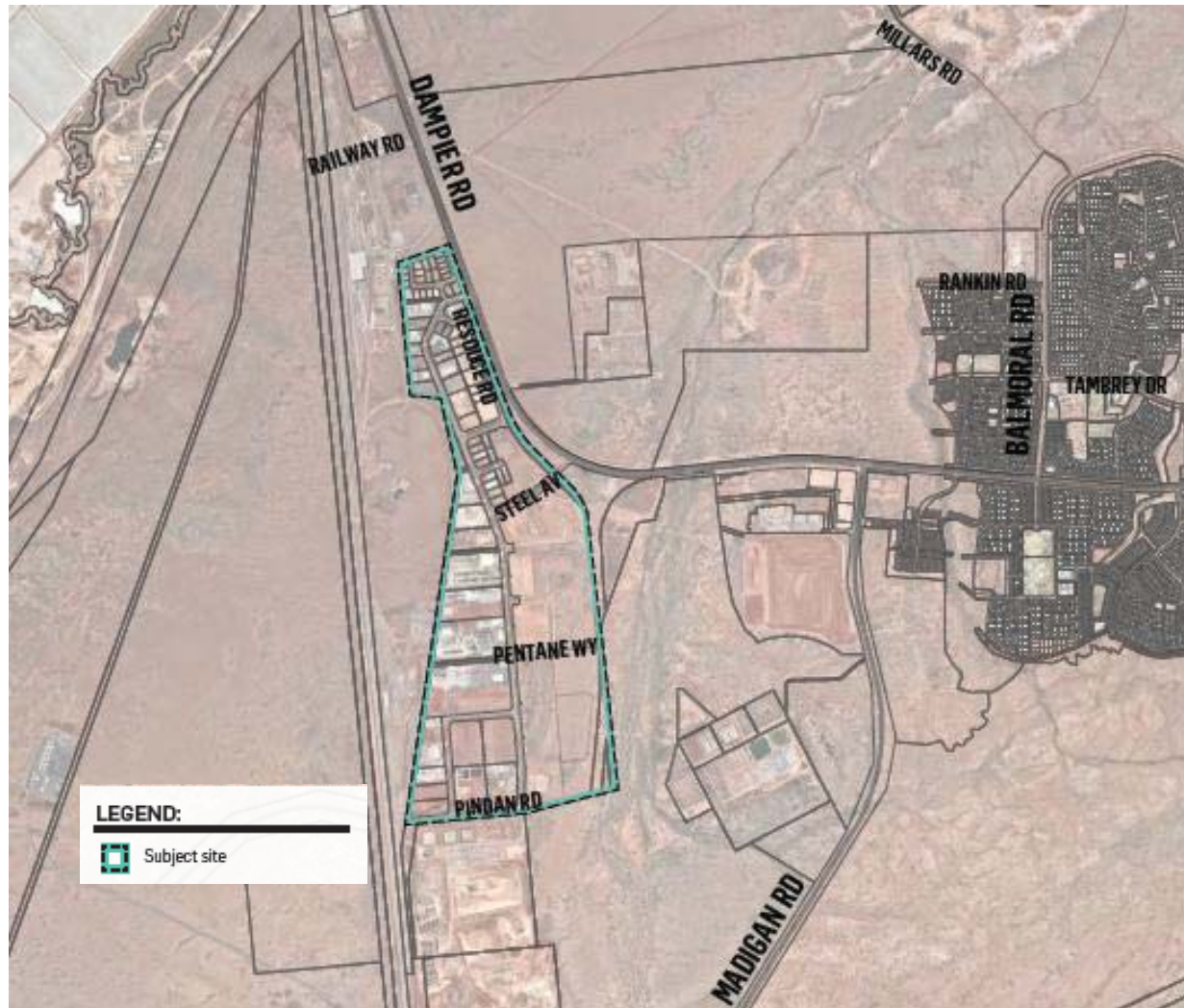


Source: Landgate

The site occupies a total of 267.59 hectares and is located several kilometres west of the Karratha town centre. The lot is irregular in shape, with the site narrowing from south to north. The lot boundary follows the curvature of Seven Mile Road therefore contributing to this irregular shape.

The site is flat in nature, with no notable topographical features. It slopes generally from the west to the east towards Seven Mile Creek.

FIGURE 2 – AERIAL PHOTOGRAPH



Source: Urbis

2.1.2 Location and Existing Uses

The proposed estate is located within an undeveloped area that is dominated by utilities and services.

TABLE 1 – SURROUNDING DEVELOPMENT

Direction	Immediately Adjacent	Further
North	Zoned Rural Land – primarily vacant with an aquaculture facility.	Karratha Airport (3 km)
East	Zoned Rural Land and Seven Mile Creek	Sewer Treatment Plant (1.5 km)
South	Rubbish Tip	Rural Land (2 km)
West	Railway sidings	Rural Land (1 km)

2.1.3 Heritage

Indigenous Heritage

LandCorp conducted heritage surveys with Aboriginal Groups in consultation with Department of Indigenous Affairs (DIA), which included the determined native title holders, the Ngarluma People. Heritage surveys were conducted separately on Part Lot 300 and Lot 507. One significant site was found on Lot 300, and a Section 18 to 'Approve use of the Land for the Purpose of Industry' was issued by the Minister for Indigenous Affairs. No significant sites were found on Lot 507 and DIA confirmed a Section 18 is not required for this land.

European Heritage

There are no European heritage listings in the Structure Plan area.

2.1.4 Environment

Landform

The Pilbara landscape consists of vast red sandy loam spinifex plains with iconic mounts, flat top butts, weathered mesa layered rock edges and ephemeral stony creek beds.

The subject site is part of an upper coastal plain and sits adjacent a stony tree lined creek, Seven Mile Creek, that experiences periodical water flows and broader flooding on a less infrequent basis.

Topography

The site is relatively flat with an elevation of between +10 and +18 metres AHD and appears to be in its natural state, with no evidence of previous bulk earthworks. However, there is evidence of road drainage line excavation draining towards the northern boundary creek line and shallow soil scrapes scattered throughout the subject possibly used for road construction.

The average slope across the site is approximately 0.3%, from the highest point at the south-west to the lowest point in the north-east.

Climate

Karratha rainfall is generally low and quite variable. Annual totals vary from 250-450mm and it is not uncommon for many years without significant rainfall to occur. Most of the summer rain comes from scattered thunderstorms and the occasional tropical cyclone. A secondary peak in the monthly rainfall occurs as a result of rainfall caused by tropical cloud bands which intermittently affect the area mostly in May and June. Thunderstorms average 15-20 near the coast. Almost all storms occur in the summer (wet season).

On the coast is there some relief to the summer heat provided by sea breezes. The maximum temperature range in summer is 35-39°C. Several days with 45°C maximum temperatures occur each year. Winter maximum temperatures are mild/warm with temperatures in the 23-27°C range in the south grading to 25-30°C in the north (ref: www.bom.gov.au).

Vegetation

There are no known endangered, protected or vulnerable species of flora or fauna in the Structure Plan area. The site is sparsely vegetated with pockets of arid low lying shrubs.

Spinifex and Kangaroo Grass is scattered across the site with a more even spread to the western boundary. Much of the vegetation will be removed as part of the subdivision works, however there is an opportunity to retain a healthy buffer of Themeda triandra - Kangaroo Grass and Triodia epactia - Soft Spinifex, Triodia intermedia - Lobed Spinifex, at this western edge. In addition, native seed is proposed to be collected from this native grassed buffer and along the treed creek line where Eucalyptus camaldulensis/victrix, Melaleuca sp. can be used for future re-vegetation in the development.

Earthworks will be required to be undertaken primarily to achieve minimum flood immunity levels and to control overland flow of stormwater to direct it into the drainage network.

Soils

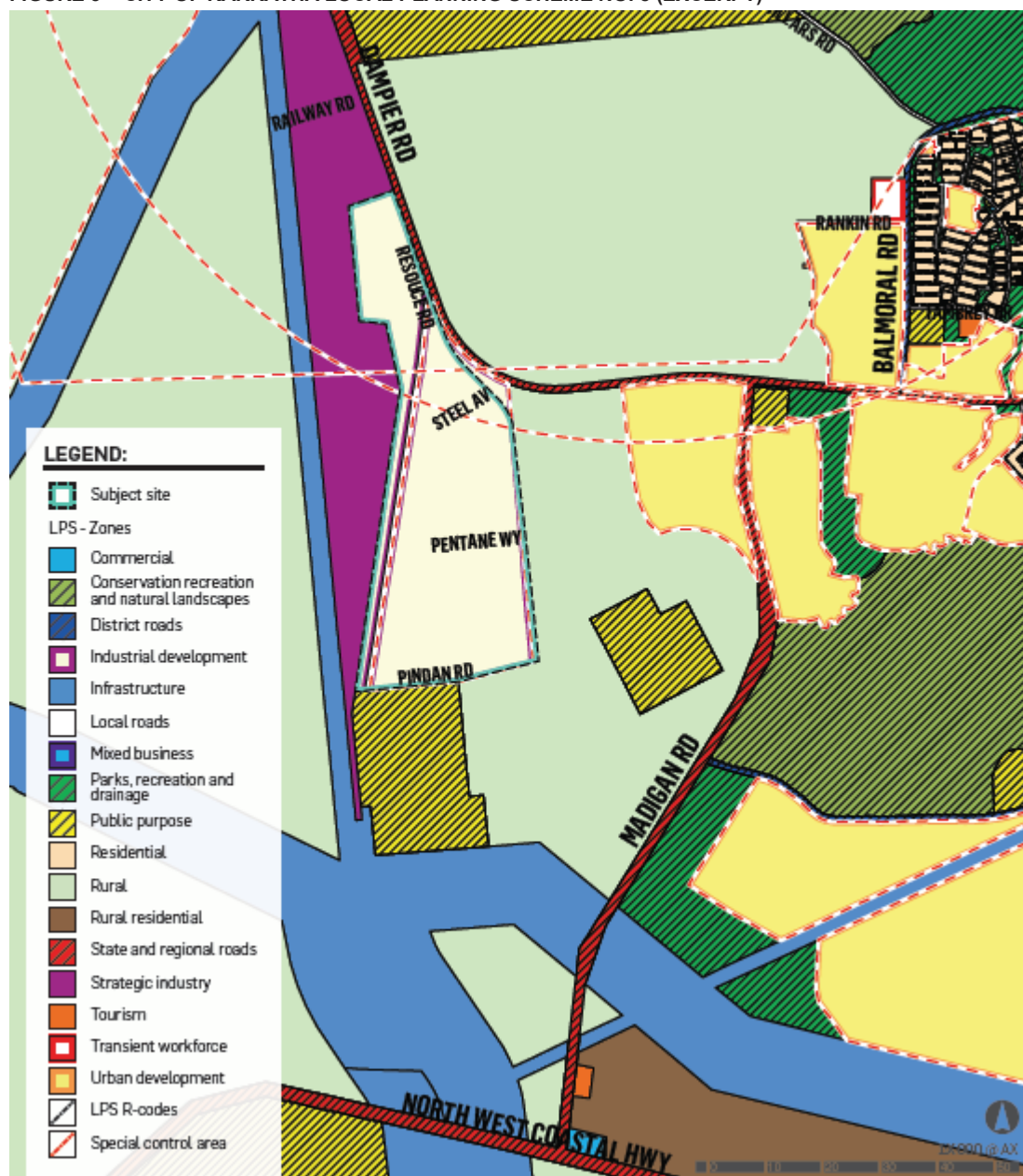
The soils within the site are a stony red sandy loam with little organic matter. Further away from the creek line the land gains elevation and here the soils become more shallow and rocky.

2.2 Relationship with Scheme

The City of Karratha's *Local Planning Scheme No. 8* (the Scheme) provides the statutory basis for the planning of Karratha and its surrounds.

The Structure Plan area, under both lots, is zoned for 'Industrial Development'. The Scheme states that the purpose of this zone is to "provide areas for future industrial estate development where development can occur, in accordance with an approved structure plan, prior to amending the Scheme to incorporate detailed zones and reserves for particular lots."

FIGURE 3 – CITY OF KARRATHA LOCAL PLANNING SCHEME NO. 8 (EXCERPT)



Source: WAPC

2.2.1 General Aims of the Scheme

The general aims of the Scheme are to:

- a) facilitate community input into planning for the appropriate balance between economic and social development, conservation of the natural environment, and improvements in lifestyle and amenity;
- b) respond to and implement strategic planning directions for the City by facilitating development in accordance with development objectives for precincts of the City;
- c) define the uses and types of development to be permitted on land within the Scheme Area; and
- d) control and regulate the development of land, erection and demolition of buildings and the carrying out of works.

The development acts to further the general objectives of the scheme and does not compromise any of the objectives.

2.2.2 Karratha Precinct Development Objectives

The City of Karratha has specific objectives for the different precincts identified within the Development Objectives Precinct Map, which indicate the local government's preferred land use and development outcomes for these specific areas. The precincts therefore provide additional guidance for the local government when determining applications for planning approval. The subject site is included with the Karratha Precinct, which includes the greater Karratha Area from North-West Coastal Highway to Nickol Bay.

There are a number of objectives set under clause 5.9 of the Scheme that set high level objectives for the development growth of the region, and are used to guide local government decision making. The key objectives that have particular relevance for the site are set out below:

- I. facilitate the continued growth of Karratha as the regional centre of the West Pilbara;*
- II. develop Karratha as the tourist entry for the West Pilbara built upon and taking into account the levels of commercial travellers associated with resource developments;*
- III. retain the Karratha Industrial Estate as the regional service industry centre whilst improving its presentation as part of the entry statement to Karratha.*

The development acts to further the Karratha Precinct Development Objectives of the scheme and does not compromise any of the objectives.

2.2.3 Industrial Development Zone

The 'Industrial Development' zoning is used to identify land for future industrial estate development. The zone does not permit any uses to occur until an endorsed Structure Plan is adopted over the site. The Scheme defers to this Structure Plan for the purpose of determining land use permissibility.

Appendix 8 of the scheme sets out the matters for inclusion within a Structure Plan, specifically:

- i. landform, topography, landscape, vegetation and soils of the area
- ii. location, existing roads, land uses an surrounding land uses and features
- iii. legal considerations, ownership, title description, area and encumbrances
- iv. existing and proposed services and infrastructure including reticulated or other potable water supply, sewerage, energy, communications, drainage and catchment considerations
- v. existing places and features of Aboriginal and non-Aboriginal heritage and/or cultural significance, including natural landscapes, flora and fauna in addition to built structures and other modified environments

- vi. road layouts and traffic assessments, communal and incidental parking areas, pedestrian/cycle network/underpasses, including impacts on the surrounding movement network
- vii. public open space and recreation provision, environmental protection areas, and relationships to natural features
- viii. assessment of the impact of the proposal on the natural environment, including management of potential effluent, emissions and other forms of pollution
- ix. comprehensive drainage systems for stormwater runoff and natural drainage lines
- x. indicate the design of the proposal including lot layout, major buildings, roads and landscaping proposals
- xi. the demand for the development in relation to the overall market for similar developments
- xii. the method of carrying out the development including the projected times of completion of each stage
- xiii. provide provisions, as may be considered appropriate by local government, for inclusion in the Policy Manual
- xiv. other information as may be required by local government

In addition, the following requirements apply within the Industrial Development Zone.

- i. location and characteristics of industrial precincts, including likely industrial uses, developments and material processing
- ii. on-site and off-site buffers required to separate uses within industrial areas and industrial uses from adjacent incompatible uses.

This Structure Plan is compliant with the provisions outlined for the 'Industrial Development' zone under the *City of Karratha's Local Planning Scheme No. 8*, with all matters required having been addressed within this document.

2.3 Design Process

In developing the concept design for the precinct, a range of considerations were taken into account to ensure the creation of a robust precinct that responded to the context and existing and future circumstances. The considerations were as follows:

2.3.1 Opportunities

- The site is well located to facilitate the delivery of new industrial land that is required in the Pilbara region, and to cater for future expansion. There is an immediate need to accommodate transportation and logistic enterprises that service the Port of Dampier, the Burrup Industrial Estate and, to a lesser extent, the Karratha Airport. The provision of suitable land in close proximity is made more pertinent due to the increased offshore activity and intended relocation of a number of users from the existing King Bay location.
- The site has a frontage to the Dampier Highway, the main connection between the Burrup Industrial Area and the Karratha township. This offers excellent access to the port, provides exposure to traffic along this busy stretch of road providing exposure for commercial uses and provides high accessibility for workforce. Dampier Highway is currently in the process of being upgraded to a dual carriageway, improving the road standard and increasing safety.
- The site has a frontage to a future Karratha Western Bypass currently proposed in the mid-term by Main Roads. This road will provide the most efficient route for access between Dampier Highway and the North West Coastal Highway. This road will be the designated Heavy Haulage Route and will attract significant number large road trains and be confidently located for main traffic by large vehicles accessing the Burrup Peninsular.
- The site is included within the 'Industrial Development' zone. This zone allows for the effective planning and design of a 'master planned' estate, allowing for the co-ordination of the various inputs into the development of the land and facilitating the long term roll out of the development. It also

provides a conduit between the Local Government and State Government to streamline future requisite approvals, particularly that of subdivision and development.

- The surrounding land uses are compatible with the proposed use for a wide range of varied Industrial purposes. The site provides the opportunity to make efficient use of land within close proximity of the landfill site and wastewater treatment plant. The site has significant separation from sensitive receiving environments and is not under long term pressure for development for residential uses.
- The site is relatively flat and will require minimal bulk earth works, other than those required with respect to flood immunity. The site is well suited to a range of industrial uses, including the much needed lay down areas.
- The site is well drained, flowing into Seven Mile Creek as the natural grade of the land is from south-west to north-east. There is an opportunity to apply water sensitive design that can reduce the flow rates, improve the quality of water leaving the site and provide sediment control measures as the water enters Seven Mile Creek.
- The site provides the opportunity for the incorporation of vegetation that is appropriate to the location, providing the ability to provide local character to the estate. The existing vegetation on the site can be retained where practical or used as a guide for future planting through the collection of seeds.
- The subject site abuts a rail line that terminates at the Dampier Port. Whilst this is private infrastructure, there could be linkages between the subject site and the railway siding in the future.
- The site has been granted a Section 18 to 'Approve use of the Land for the Purpose of Industry' was issued by the Minister for Indigenous Affairs and agreement has been reached with the determined native title holders for the use of the land.

2.3.2 Constraints

- The site is subject to flooding risk, with the 1 in 100 ARI flood level impacting on the eastern edge of the site. Significant amounts of fill will be required to be placed on the site in certain areas to raise the levels of the site to achieve flood immunity. This is due in part to the Seven Mile Creek bridge crossing, which constricts flows and increases the flooding impacts up stream.
- The geology and climate of the region results in high rainfall and low infiltration rates, meaning that the bulk of the water will need to be directed out of the site. Significant areas of the site will need to be dedicated to drainage infrastructure, resulting in reduced areas of developable land, as well as the imposition of potentially unsightly infrastructure designed to cater for peak flow.
- The geology and climate also impacts on the standard of construction that is required to be adopted throughout the estate, with civil works generally being more expensive than a metropolitan comparison as well as a tendency for restrained architecture in favour of cost efficiency.
- The Water Corporation wastewater treatment plant is located approximately 800 metres to the east of the site. The south eastern corner of the site is within the nominal 500 metre buffer zone. It is possible odour from the treatment plant may be an issue at the subject site during specific weather conditions.
- While the cost is predicted to be 'considerable' to deliver water, wastewater, power and telecommunication services to the site, no fatal flaws were determined to be present. Ultimately, all requites services are available to be provided to service the estate.
- Both 132 kV and 33kV power lines traverse site overhead. Both are required to be relocated to facilitate the development of the site. The existing 132 kV requires upgrade and reconfiguration, even if it were to be retained in the existing location. The 33 kV is required to be relocated and reticulated underground throughout the site to provide each lot with a power supply.

- The landfill facility abuts the subject site's southern boundary. This may cause issues relating to odour and dust. Rubbish blown onto the subject site from uncovered loads may also become a problem. Appropriate land uses should occur for lots within close proximity to the tip. Access to the landfill facility will be required to be maintained throughout the duration of the construction period and across the staging of the development.
- Main Roads are currently investigating the best manner to facilitate access for heavy vehicles between North West Coastal Highway and the Burrup Peninsular. A number of route options for the future Karratha Western Bypass have been identified. The key constraint is the uncertainty of an outcome, and the need to accommodate a range of possibilities that may never eventuate.
- There is limited available water for use on the irrigation of the vegetation to be established within the development. Underground reserves are too salty for irrigation use.
- The general cost of construction is significantly higher than the equivalent works in metropolitan Perth. This requires emphasis on efficient design to minimise duplication on infrastructure and maximise the effective use of the land.
- The nature of the likely end land uses are not conducive to aesthetic appeal, and therefore the overall structure of the estate needs to be designed in a manner that mitigates the impacts of visually displeasing aspects the future industrial uses.
- The key constraints were identified in a risk management workshop that was held by LandCorp in May 2009. The key constraints, including those identified above have been overcome or mitigated through the proposed design or management plans/strategies.
- The structure plan area is located within a Bushfire Prone Area. A Bushfire Management Plan has been prepared by Lushfire and has adequately identified issues raised within the bushfire risk assessment and appropriately outlined how the compliance with bushfire protection criteria can be achieved within the estate.

2.3.3 Design Objectives

There are a number of broad design objectives that were identified for the Structure Plan which needed to be considered in design development in association with the need to attenuate the constraints and build upon the opportunities. These objectives are identified below.

Use and Function

- Partition the estate into two precincts to cluster complementary uses and provide exposure to lots from Dampier Highway;
- Locate any large scale industry uses, uses with potential negative impacts, and uses that require large areas (such as laydown) in the southern portion of the site within the areas covered by the buffers from the Waste Water Treatment Plant and the Landfill site;
- Design street blocks that enables a high degree of flexibility in the manner in which they are subdivision to suit end user requirements, as they change over time;

Servicing

- Facilitate the upgrade of the 132 kV powerlines along Dampier Highway, including the provision of required easements;
- Orientate lots in a manner that minimises the number of drainage channel crossings;
- Create lots that have an appropriate level of flood immunity for major storm events;

Roads and Access

- Provide a central spine road to maximise legibility and accessibility through the estate;
- Maximise the efficiency of road construction and minimise unnecessary dual frontage;

- Maintain access to the land fill site and the Rio Tinto private road that runs along to rail line to North West Coastal Highway;
- Accommodate the future Karratha Western Bypass between Dampier Highway and North West Coastal Highway;
- Minimise the number of access points to the future Karratha Western Bypass from the estate;
- Ensure the structure of the estate works both before and after the introduction of the future Karratha Western Bypass;
- Provide high permeability to provide for the circulation of vehicles, strategically locating the location of crossovers, avoiding the incidence of four-way intersections, and providing safe distance between intersection staggers;
- Provide for swept path for large freight vehicles (triple road trains) to ensure that all vehicles that use the estate can navigate through safely;
- Create safe access onto Dampier Highway, including the provision of adequate sightlines;

Amenity and Environment

- Present lots that provide a high visibility to Dampier Highway to present an attractive façade and maximum the opportunities for exposure of the lots;
- Provide clear frontage and provide for screening of unsightly storage and operation areas to the street; and
- Facilitate drainage through the site to Seven Mile Creek and minimise pollutants (hydrocarbons, nutrients, sediment) entering the Creek.

2.4 Design Response

The design response is reflected in the Structure Plan, however more fully reflected in the Concept Plan included in Appendix B.

The design developed and applied for the estate addresses each of the considerations in a comprehensive manner as outlined below. The design has responded to the site requirements whilst ensuring a design which is robust. The concept plan applies greater detail in order to reflect an outcome based on current market indications; however the nature of industrial development requires a high level of flexibility. The core components of the plan relating to the location of light industrial uses, key road links and drainage reserves have been reflected in the Structure Plan.

2.4.1 Drainage

The drainage requirements were a key driver in the design of the estate, utilising natural drainage lines to facilitate the movement of water across the site to the outflow points at Seven Mile Creek. Comprehensive drainage systems for stormwater runoff have been accommodated throughout the estate to cater for peak flow. The design of the stormwater infrastructure has been undertaken in a manner that minimises the use of concrete channels, instead creating a more natural appearance, both when dry and when carrying water. The drainage system will be open, aside from the culverts that will be used for taking the water under the road. The drainage channels will run alongside the roads within the road reserves. One retention basin is planned to be created on the western boundary of the site, which will assist in the management of water at peak flow events.

The lots will be graded to direct flow either into the street system or into cut-off drains at the rear/side of properties that will then feed into the drainage network throughout the estate. The drainage system will be designed to ensure that the quality of water leaving the site will not impact on Seven Mile Creek.

2.4.2 Lot Layout

LandCorp are undertaking surveys and expressions of interest with potential end users to determine the lot mix and parameters that will best suit the end user. The broad structure of the industrial estate needs to be robust so that it can be developed to the specific needs of end users. This may include amalgamation or re-subdivision of lots to create lots that suit their needs. The subdivision should provide for a diversity of lot sizes that build upon the strategic location of the site and provide high access for interrelated business as well as good access for employees in both the Dampier and Karratha town centres. The lot design will be undertaken to minimise the number of crossings required over the drainage channels.

The lot design has been developed to ensure that the 'back of house' operations will not be visible from the street, particular along Dampier Highway, the future Karratha Western Bypass and the internal spine road. The Design Guidelines will be used to ensure the developments present an appropriate 'face' to the street.

2.4.3 Traffic and Route Options

The Karratha Town Structure Plan identifies the future realignment of Madigan Road such that it deviates from the existing alignment, passing around the north of the Waste Water Treatment Plant and to connecting into Dampier Highway adjacent to the frontage of the subject site. The diversion will assist in the development of the land at Gap Ridge shown as 'residential - future'. Main Roads have identified their intention to develop a link between North-West Coast Highway and Dampier Highway in the medium term.

This option was investigated and could be facilitated through the design of the subdivision over the subject site. However it was determined that the development of this route option would have significantly impacted on the flood immunity of the subject site due to the construction of a second bridge and the impact on the flows under the bridge.

More recent investigations identified a preferred route for the future Karratha Western Bypass to the south of the Waste Water Treatment Plant and to the west of the Landfill site, along the eastern edge of the subject site to Dampier Highway. This option would require a smaller bridge structure as it passes over Seven Mile Creek higher in the catchment. This option provides the most direct link between North-West Coastal Highway and Dampier Highway.

The Structure Plan allows for three future connections onto the Karratha Western Bypass road into the estate. However, as the timing of the future Karratha Western Bypass is uncertain, the estate has been designed to be fully functional if the bypass never eventuates. The initial connection into the estate before the development of the bypass will be through the northern intersection with Dampier Highway, controlled by traffic lights.

A service centre that has the capacity to accommodate road trains is intended to be located at the junction of Dampier Highway and the new spine road through the estate. This will provide a local convenience for the workers and visitors to the estate, as well as passing traffic along Dampier Highway. It is intended that the site will be subject to a strict controls, to ensure this building presents well to the street, and acts as an entry statement in its own rights.

Overall the estate has been designed to provide generous spacing between the access points and limit the incidence of four-way intersections. Circulation throughout the estate has been designed to be logical and facilitate a high level of permeability. The road connections are generally straight and there are no cul-de-sacs or dead ends in interim or the ultimate design.

2.4.4 Open Space

There is no public open space for recreation provided in this Structure Plan. Public open space of this nature is not generally required for industrial subdivision and it was determined that the nature of the proposed land uses, proposed lot sizes, potential worker numbers and local climatic conditions did not warrant the provision of any dedicated public open space. The design has sought to locate the numerous easements required for drainage and services in manner which will enable significant

landscape corridors that will offer opportunities for shade and will improve the overall amenity of the estate.

2.4.5 Landscape Design

The landscape design is to be consistent with current vegetation found on site, with a strong focus on waterwise planting. Landscaping and the entrance statement will encompass the natural form and features of the landscape.

The drainage and open space areas are simply to reflect the 'country', i.e. appropriate use of local materials and planting from the immediate area.

There is an opportunity to apply water sensitive design in the drainage design by use of low flow devices, encouraging infiltration, minimising erosion and releasing controlled water flow over a longer period.

At key entry points it would be proposed that iron ore relics and earth sculptures are revealed in collaboration with endemic Pilbara planting, spinifex, wildflowers, local boulders, stones and gravels to heighten the local landscape theming.

2.4.6 Buffers

The proposed development site is surrounded by rural zoned land (east and north) and is in close proximity to Karratha Airport (north), a waste disposal and treatment facility (south) and land zoned for industrial development (west). As such, the land is generally surrounded by compatible land uses and is unlikely to require stringent buffer requirements – particularly those which require off-site buffers on land not within the project site. Buffers should generally be contained within the lot, however, in some circumstances it may be appropriate for buffers to overlay complementary uses where no adverse effects can be demonstrated. Each proposal will be assessed on its merits at the Development Application stage when the specific nature and circumstances of the proposed land use are known. The City and relevant agencies will be consulted through the application process to clarify the need, if any, of buffer provisions – particularly in regards to the proposed future residential development to the east of the Gap Ridge Industrial Estate.

Refer Concept Plan attached at Appendix B.

2.5 Existing and Proposed Services

To ensure the proper functioning of the industrial estate, it is essential that appropriate services are provided. As such, a combination of using existing and proposed additional services is set out below.

2.5.1 Water

The Water Corporation is currently reviewing their overall planning for the Karratha townsite. However, there should be no constraints on the supply to the Gap Ridge Estate site.

It is envisaged that development of the Gap Ridge Estate will require the extension of a 250mm diameter water distribution main within the Dampier Highway road reserve to the site from an existing distribution main near the intersection of Brolga Road and Dampier Highway.

The proposed industrial lots will be fed by a network of reticulated mains which will connect to the distribution main and vary in size from 150mm diameter to 250mm diameter.

2.5.2 Power

It is envisaged that the high voltage power supply to the Gap Ridge Estate will be provided by connection to the Karratha Zone Substation located approximately 5.3km to the east on Balmoral Road near Rosemary Road.

It is anticipated that high voltage feeder cables will be required to be extended within the Dampier Highway road reserve from this zone substation to the site.

Horizon Power have indicated that as an interim strategy to service stage 1 of the site a new smaller substation with a 33kV/22kV step down transformer is likely to be established for the subdivision providing a connection point via the existing 33kV feeder which is fed from the Dampier Substation.

The area will be designed based on a minimum load of 50kVa per hectare.

A combination of transformers and switchgear will be required to be located throughout the development to reticulate three phase power to each proposed lot.

The existing 132kv line which traverses the site will be upgraded and relocated to the Dampier Highway road reserve as part of the development of the site.

2.5.3 Wastewater

Preliminary discussions with the Water Corporation indicate that sewer disposal will be achieved through the construction of a sewer pump station near the north east boundary of the subject site. This proposed Type 90 wastewater pumping station will service the entire Gap Ridge area via a network of DN225 reticulation sewers.

The pump station will discharge east via a proposed 200mm diameter pressure main located within the Dampier Highway Reserve to an existing Water Corporation access chamber near the intersection of Dampier Highway and Balmoral Drive. The existing pipework system will transfer effluent to the Water Corporation wastewater treatment facility located to the west of Madigan Road.

2.5.4 Stormwater

The Gap Ridge site is located within the catchment of the Seven Mile Creek and flood studies of the creek catchment during extreme (1:100 year events) have been indicated that some filling of the site will be necessary to preclude flooding.

The high intensity rainfall associated with being located in a cyclonic region requires the provision of a high capacity drainage network comprised of large open drains to cater for very high stormwater flows. These open drains will generally be located within road reserves or in some cases drainage easements within lots.

Minor storm events will be disposed by open gutter flow along road kerblines directed to open drains which will ultimately discharge into the Seven Mile Creek. This strategy is consistent with the pre development stormwater catchment regime.

2.5.5 Telecommunication

It is envisaged that Telstra's 'Smart Community' infrastructure would be provided within the development, which will allow for modern high speed digital communication to be available to all proposed lots.

2.5.6 Road Works

Main Roads have agreed in principle to the proposed access onto Dampier Highway. A full intersection is proposed to the north western end of the site which will be signalised. The location and configuration will enable extension to the east should development ultimately extend over Dampier Highway.

In the longer term (approximately 15 years) the Karratha Western Bypass, a heavy haulage route, may be constructed along the eastern boundary of the site and a flyover provided to the west bound carriageway of Dampier Highway to ensure the safe and efficient operation of the intersection of the Karratha Western Bypass Dampier Highway. The proposal shown in the Concept plan reflects the current design provided by Main Roads, although the works have not been formally considered or approved. Based on the most current advice from Main Roads the plan has maintained options for the future Karratha Western Bypass however is able to function independently as required.

The road pavement design for all roads within the subdivision will be in accordance with City of Karratha requirements and incorporate specialist geotechnical investigation to cater for the existing clay subgrade conditions.

Footpaths will be provided in a limited manner on key access routes within the Light Industrial Area. No provision for footpaths has been made in the General Industrial Precinct.

2.6 Precincts

The estate has been divided into two precincts for the purpose of creating appropriate land use clusters:

- Industrial Precinct A – Light Industrial Area
- Industrial Precinct B – General Industrial Area

The broad intent is to facilitate uses which are more intensive but with limited off site impacts to the north of the estate where accessibility and exposure to Dampier Highway is highest. The southern area is intended to be preserved for large scale users, with particular emphasis on logistics operations to support resource development (off and on-shore). The table below describes the desired characteristics of the uses for each precinct.

TABLE 2 – PRECINCT CHARACTERISTICS

Factor	Precinct A	Precinct B
Lot size	▪ Require small-moderate sized allotments (2,000 m ² to 2 ha).	▪ Require moderate-large allotments (1 ha +)
Impacts (Noise, odour, light)	▪ Do not have high impacts or require significant separation from other allotments	▪ Potential to impact on adjoining allotments or require significant separation from sensitive land uses
Exposure and Access (Dampier Road/Heavy Haulage Route)	▪ Benefit from exposure to main roads, higher traffic generation	▪ Little benefit gained from exposure to main roads, but access to heavy haulage essential
Employment	▪ Moderate to high levels of staff on site	▪ Low to Moderate levels of staff on site
Hours	▪ Generally Standard Business hours	▪ Up to 24 hour / 7 day operations
Visitors	▪ Generally have a requirement for visitors as part of an ancillary wholesale, display or sales component or for business interaction	▪ Generally have low visitor numbers

2.6.1 Industry Precinct A

The Light Industry Precinct is intended to foster activities that are generally of a small scale and low impact industrial uses. The light industry area has been located in the northern portion of the estate. This has been undertaken to allow for a high level of exposure to Dampier Highway, as well as to the internal spine road.

The lot size in this precinct will vary from 3,000m² or less, to around 2 hectares. They are intended to be designed to provide for suitable width (30-40 minimum) and depth (70-80 minimum) for the types of uses required within the estate. In total, it is anticipated that there will be in the order of 70 lots in Precinct A.

No 'shops', 'restaurants' or 'take-away food outlets' are allowed within the estate, except on nominated service centre lot.

2.6.2 Industry Precinct B

The General Industry Precinct is intended to foster activities that generally require large areas or have significant impacts that require buffering to adjoining uses, given the high level of separation and good access to regional transport.

The lot size in this precinct will vary from 1 hectare to approximately 15 hectares. They are intended to be designed to provide for suitable widths and depths for the types of uses required within the estate and in most cases facilitate the onsite manoeuvring of triple road trains. In total, it is anticipated that there will be in the order of 40 lots.

Noxious uses will only be permitted within the 'Noxious Use' sub-precinct, located at the southern end of the estate.

2.6.3 Residential Uses

Residential uses will not be permitted within the Structure Plan area unless it is accommodation provided in order to satisfy the requirements of section 48 of the *Transport Co-ordination Act 1966* being Drivers accommodation to meet fatigue management requirement for long distance truck drivers.

Facilities such as tea rooms may be provided for security personnel or other similar services that operate out of standard business hours, however they must not be provided in a manner that constitutes on-site accommodation.

2.7 Statement of Intent

2.7.1 Service Centre Site

A Service Centre site is provided at the entry to the estate, at the intersection of Dampier Highway and Exploration Drive. The centre is intended to provide amenity for the Gap Ridge Industrial Estate, allowing employees and visitors to the estate to undertake day-to-day tasks such as having a coffee, buying food and restocking basic supplies along with administrative tasks and conducting meetings (both business and informal) without the need to leave the estate given it is relatively isolated.

The Service Centre will also provide a convenience role to passing traffic along Dampier Highway. The service centre will have the capacity to service both heavy haulage vehicles as well as light commercial vehicles, caravans and cars for the purposes of refuelling and obtaining food and basic supplies.

2.7.2 Noxious Use Sub-Precinct

The Noxious Use Sub-Precinct has been created to allow for the clustering of high impact industrial uses so that they can benefit from co-location with similar or related activities within the Gap Ridge Industrial Estate, whilst being separated to an acceptable level to avoid land use conflict with low-impact uses.

Noxious uses represent an important part of any economy, particularly a resource focused one such as the Pilbara, and therefore it is important that land is available for the development of noxious uses. All Noxious Uses within the Gap Ridge Industrial Estate will be required to be located within the Noxious use sub-precinct and will be required to demonstrate that they can manage their impacts within their own site (or to an alternative agreed acceptable level) and do not constitute a hazard to adjoining land uses.

2.8 Land Use Permissibility

The zoning table contained within the Scheme for 'Industrial Development' states *"development and use of land shall have due regard to an approved structure plan"*.

The estate is divided into Industrials Precincts A and B as defined by the Structure Plan, each having separate land use permissibility.

The symbols used in Table 4 have the same meaning as clause 3.2.2 of the *City of Karratha's Local Planning Scheme No.8*, being:

P	the development is permitted
D	the development is not permitted unless local government has granted planning approval
A	the development is not permitted unless local government has granted planning approval after publicly advertising the application.
I	the development is not permitted unless the use to which it is put is incidental to the predominant use as decided by local government.
X	the development is not permitted

TABLE 3 – LAND USE PERMISSIBILITY

Land Use	Precinct A	Precinct B
Residential		
Aged or Dependent Persons Dwelling	X	X
Ancillary Accommodation	X	X
Caravan Park	X	X
Caretaker's Dwelling	X	X
Grouped Dwelling	X	X
Holiday Accommodation	X	X
Home Business	X	X
Home Occupation	X	X
Hotel	X	X
Motel	X	X
Multiple Dwelling	X	X
Residential Building	X	X
Park Home Park	X	X
Residential Building	X	X
Rural Settlement	X	X
Serviced Apartment	X	X
Short Stay Accommodation	X	X
Single House	X	X
Tourist Resort	X	X
Transient Workforce Accommodation	X	X
Industry		
Abattoir	X	D
Aerodrome	X	A
Agriculture	X	X
Intensive Agriculture	X	X
Harbour Installation	X	D
Hire Service (Industrial)	P	P
Industry - Extractive	X	X
Industry - General	D	D
Industry - Light	P	D
Industry - Noxious	X	X%

Industry - Rural	P	P
Industry - Service	P	D
Industry - Resource Processing	X	P
Road Freight Terminal	D	D
Stockyard	X	X
Storage facility/depot/laydown area	P	P
Commerce		
Animal Establishment	X	X
Display Home	X	X
Dry Cleaning Premises	D	X
Market	X	X
Motor Vehicle and/or Marine Repair	P	D
Motor Vehicle and/or Marine Sales or Hire	P	D
Motor Vehicle and/or Marine Service Station	X*	X
Motor Vehicle and/or Marine Wrecking	P	P
Motor Vehicle Wash	P	I
Office	D	I
On-site Canteen	I	I
Outdoor Display	P	D
Reception Centre	X	X
Restaurant	X*	X
Restricted Premises	X	X
Shop	X*	X
Showroom	X	X
Take-away Food Outlet	X*	X
Vehicle Store	P	P
Warehouse	P	P
Health, Welfare & Community Services		
Carpark	X	X
Child Care Premises	X	X
Community Use	X	X
Consulting Rooms	X	X
Corrective Institution	X	X
Education Establishment	X	X
Emergency Services	P	P
Funeral Parlour	X	X
Hospital	X	X
Juvenile Detention Centre	X	X
Medical Centre	X	X
Nursing Home	X	X
Place of Public Meeting, Assembly or Worship	X	X
Minor Utility Installation	P	P
Utility Installation	D	D
Veterinary Centre	P	X
Entertainment, Recreation and Culture		
Equestrian Centre	X	X
Entertainment Venue	X	X
Marina	X	X
Private Recreation	X	X
Public Recreation	X	X
Tavern	X	X

Miscellaneous		
Driver's Accommodation	I#	I#
Factory Unit Development	P	P
Wind Energy Facility	P	P

* except on the service centre lot where it is a 'P' use
only where accommodation provided in conjunction with a road freight terminal and is used to satisfy the fatigue management provision of the Transport Coordination Act 1966, and the accommodation is not used for more 24 hours by any single individual in a week.

% except where located within the 'Noxious Industry' sub-precinct, where it is a 'D' use.

2.9 Implementation and Staging

It is proposed that the development of the estate will occur in six stages. The staging may be further broken up or accelerated, dependant upon market demand.

TABLE 4 – STAGING PLAN

Stage	Total Area (ha)	Lots (No.)	Lot Area (ha)	Average Lot Size (ha)
1	98.60	34	69.56	2.05
2	10.09	23	6.52	0.28
3	34.62	10	27.09	2.71
4	14.43	9	8.79	0.98
5	58.45	48	45.01	0.94
6	40.42	5	37.27	7.45
TOTAL	256.61	129	194.24	1.51

Staging of the development of the estate has been proposed to ensure an adequate provision of industrial land and to achieve the desired form and function of the estate in a rational manner to avoid ad-hoc development.

The stages have been planned to ensure that appropriate sized lots are created as they are needed. Proposed Stage 1 contains lots in both Precinct A and B, with a mix of sizes to ensure that a good cross section of the estate is opened up. The lots fronting Dampier Highway are subject to the relocation of the 132kv line as part of the upgrade process, therefore the staging plan has allowed for stages 1 and 2 to be development before the works to this line are completed. The largest lots at the southern end of the estate will be developed last, length to which services need to be extended, as well as the distance from the entry to the estate, which will be at the traffic lit intersection, until the future Karratha Western Bypass has been constructed.

Changing market conditions and land supply considerations may alter the proposed staging.

Refer Staging plan attached at Appendix C.

2.10 Conclusion

The Structure Plan for Gap Ridge Industrial Estate sets out a development framework that is structured to respond to:












- the statutory requirements of local government and WAPC;
- the physical characteristics, opportunities and constraints of the site;
- lot and location requirements of the industries which are to be accommodated;
- immediate and long term access requirements; and
- the logical and feasible staging and development of the land.

The Structure Plan provides the basis for the achievement of a positive development outcome for the subject site. On maturity, the estate will provide for over 100 allotments of varied nature, to ensure that the existing gap in the provision of Industrial land supply is adequately addressed. It will also improve the distribution of industrial land across the Karratha, improving the synergies with associated land uses. The estate will directly improve the efficiency of the operation of the Burrup and the associated off-shore works that are currently occurring or planned.

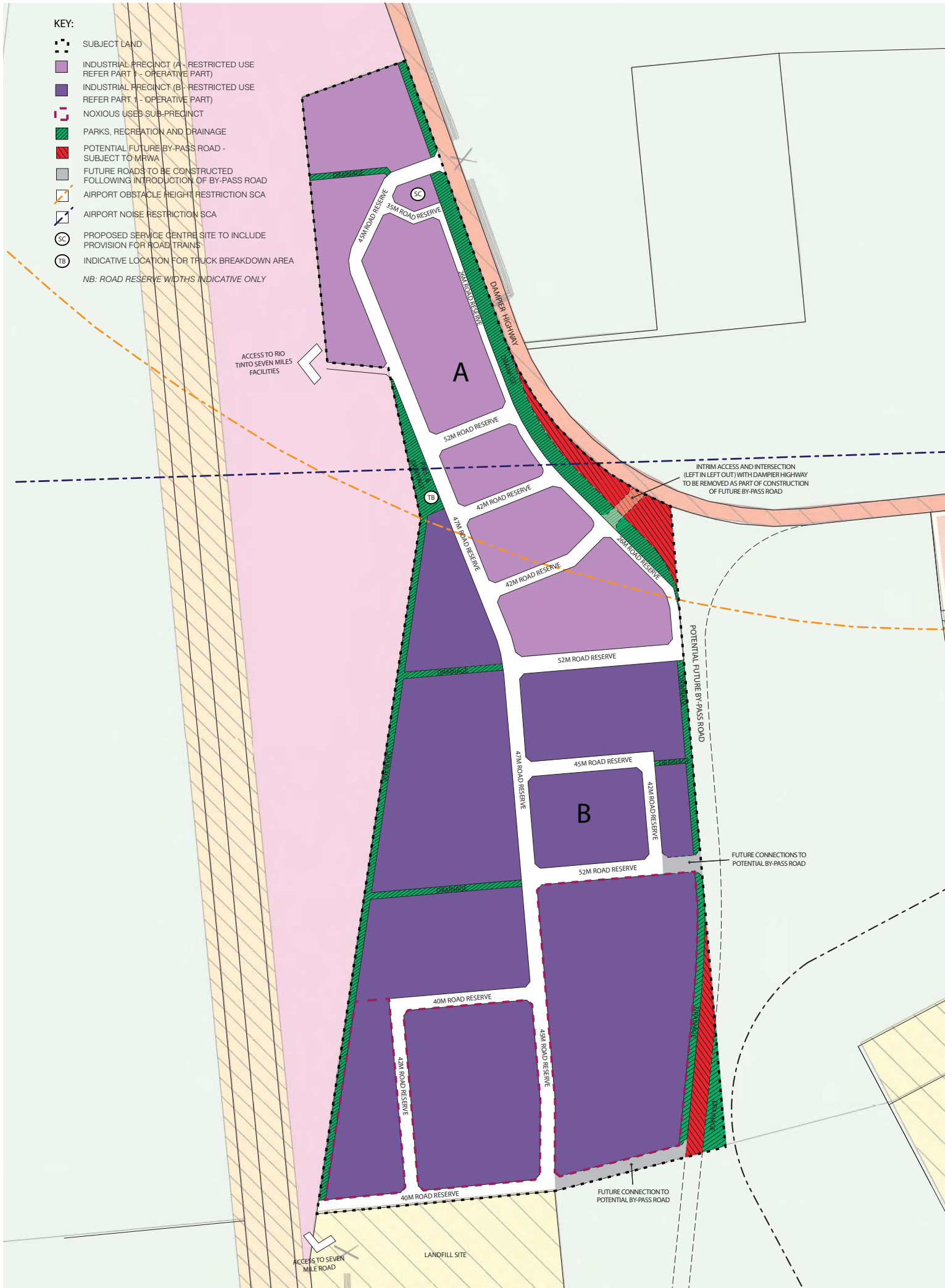
The Structure Plan provides a robust framework which enables timely and responsive land delivery whilst enabling clarity on the key components associated with land use intensity, servicing, drainage and key road networks.

Appendix A Structure Plan

KEY:

-  SUBJECT LAND
-  INDUSTRIAL PRECINCT (A - RESTRICTED USE REFER PART 1 - OPERATIVE PART)
-  INDUSTRIAL PRECINCT (B - RESTRICTED USE REFER PART 1 - OPERATIVE PART)
-  NOXIOUS USES SUB-PRECINCT
-  PARKS, RECREATION AND DRAINAGE
-  POTENTIAL FUTURE BY-PASS ROAD - SUBJECT TO MRWA
-  FUTURE ROADS TO BE CONSTRUCTED FOLLOWING INTRODUCTION OF BY-PASS ROAD
-  AIRPORT OBSTACLE HEIGHT RESTRICTION SCA
-  AIRPORT NOISE RESTRICTION SCA
-  PROPOSED SERVICE CENTRE SITE TO INCLUDE PROVISION FOR ROAD TRAINS
-  INDICATIVE LOCATION FOR TRUCK BREAKDOWN AREA

NB: ROAD RESERVE WIDTHS INDICATIVE ONLY



DEVELOPMENT PLAN

GAP RIDGE INDUSTRIAL ESTATE

DATE 11.10.2017

Level 1, 55 St George Terrace
Perth, WA 6000 Australia

DWG NO 001

Tel +618 9346 0500
Fax +618 9321 7790

REV L

info@urbis.com.au
www.urbis.com.au













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Appendix B Development Concept

KEY:

-  GAP RIDGE INDUSTRIAL ESTATE
-  LIGHT INDUSTRIAL ZONE
-  GENERAL INDUSTRIAL ZONE
-  NOXIOUS USES SUB-PRECINCT
-  132 KV POWER LINE AND EASEMENT
-  DRAINAGE
-  1 IN 100 YEAR FLOOD PLAIN
-  TRAFFIC LIGHT CONTROLLED AREA
-  1 LANDSCAPED ENTRY STATEMENT
-  2 SERVICE CENTRE SITE WITH PROVISION FOR ROAD TRAIN ASSEMBLY
-  3 TRUCK BREAK DOWN AREA
-  4 DETENTION BASE

Design Parameters:

Power

- 132Kv power lines relocated to the edge of the Dampier Road Reserve on a single pole configuration, with a minimum 20 metre easement, 10 of which is accommodated within the Dampier Road Reservation;
- No drainage within the Horizon Power Easement;
- Substation site provided adjacent to Dampier Highway.

Drainage

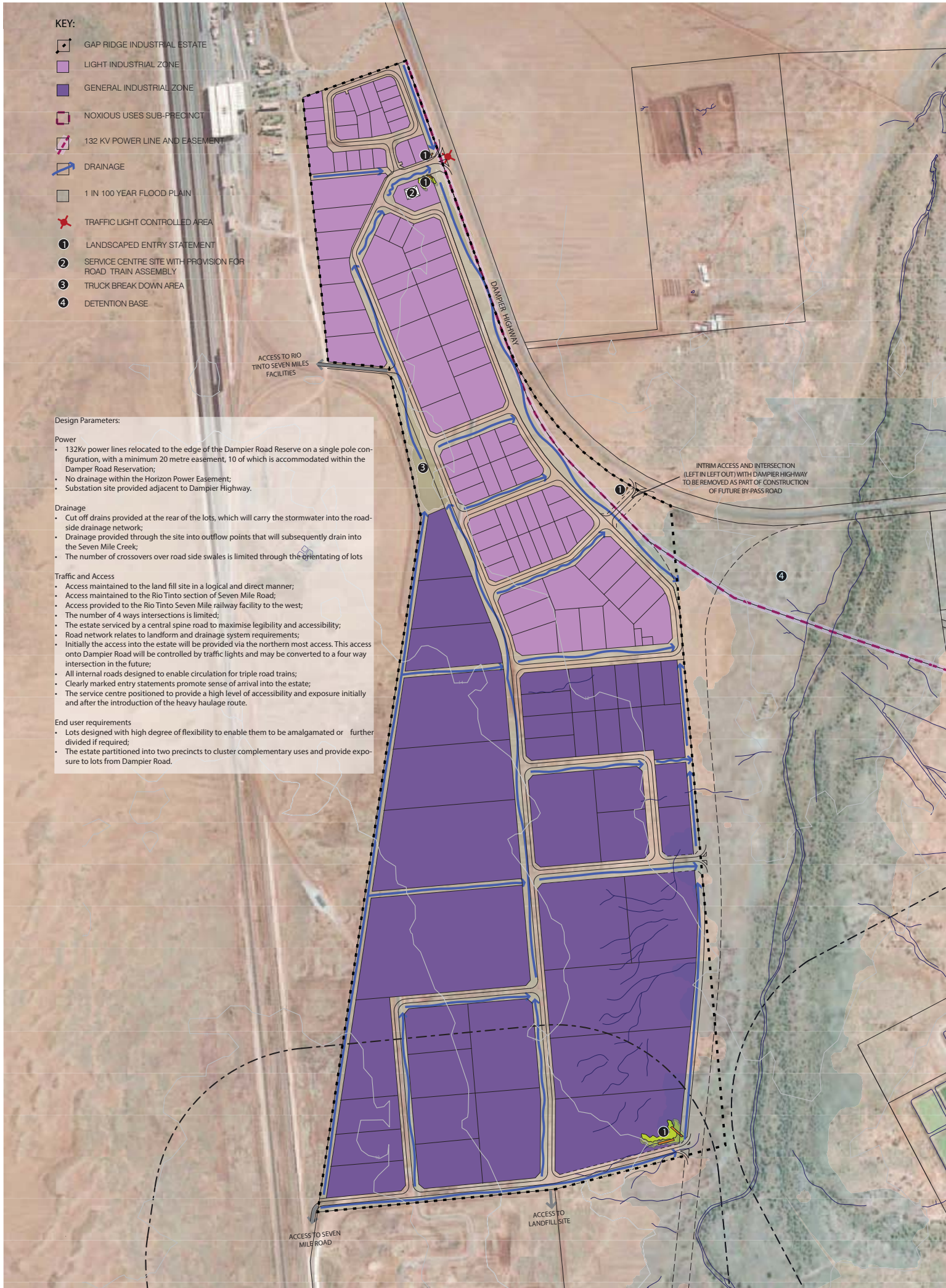
- Cut off drains provided at the rear of the lots, which will carry the stormwater into the road-side drainage network;
- Drainage provided through the site into outflow points that will subsequently drain into the Seven Mile Creek;
- The number of crossovers over road side swales is limited through the orientating of lots

Traffic and Access

- Access maintained to the land fill site in a logical and direct manner;
- Access maintained to the Rio Tinto section of Seven Mile Road;
- Access provided to the Rio Tinto Seven Mile railway facility to the west;
- The number of 4 ways intersections is limited;
- The estate serviced by a central spine road to maximise legibility and accessibility;
- Road network relates to landform and drainage system requirements;
- Initially the access into the estate will be provided via the northern most access. This access onto Dampier Road will be controlled by traffic lights and may be converted to a four way intersection in the future;
- All internal roads designed to enable circulation for triple road trains;
- Clearly marked entry statements promote sense of arrival into the estate;
- The service centre positioned to provide a high level of accessibility and exposure initially and after the introduction of the heavy haulage route.

End user requirements

- Lots designed with high degree of flexibility to enable them to be amalgamated or further divided if required;
- The estate partitioned into two precincts to cluster complementary uses and provide exposure to lots from Dampier Road.



DRAFT DESIGN CONCEPT

GAP RIDGE INDUSTRIAL ESTATE

DATE 15.03.2013

Level 1, 55 St George Terrace
Perth, WA 6000 Australia

DWG NO 002

Tel +618 9346 0500
Fax +618 9321 7790

REV D

info@urbis.com.au
www.urbis.com.au

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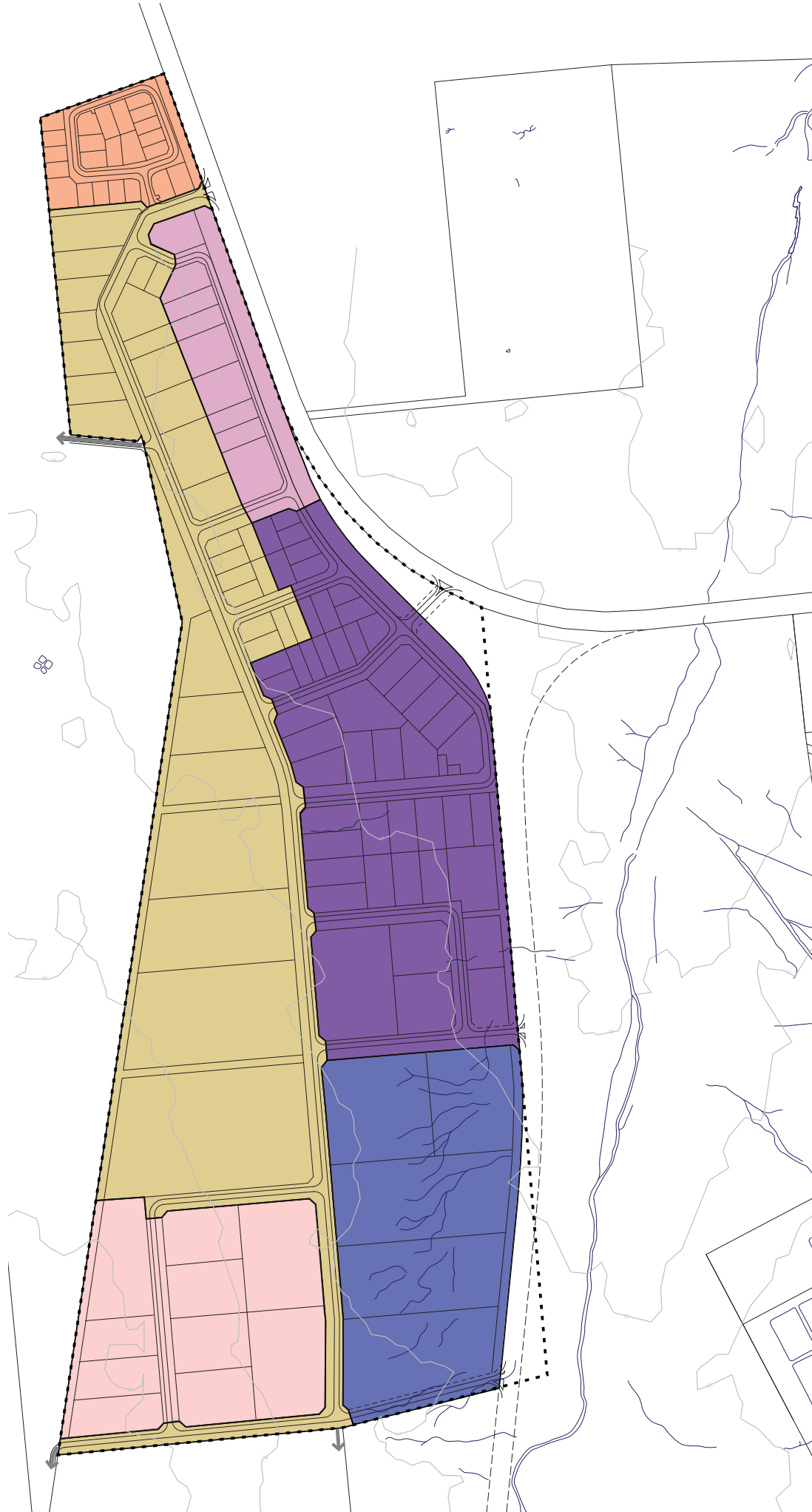
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Appendix C Indicative Staging Plan

KEY:

	GAP RIDGE INDUSTRIAL ESTATE TOTAL AREA: 267.59 ha		
	STAGE 1	TOTAL AREA:	98.60 ha
		NO. LOTS:	34
		LOT AREA:	69.56 ha
		AVERAGE LOT SIZE:	2.05 ha
	STAGE 2	TOTAL AREA:	10.09 ha
		NO. LOTS:	23
		LOT AREA:	6.52 ha
		AVERAGE LOT SIZE:	0.28 ha
	STAGE 3	TOTAL AREA:	34.62 ha
		NO. LOTS:	10
		LOT AREA:	27.09 ha
		AVERAGE LOT SIZE:	2.71 ha
	STAGE 4	TOTAL AREA:	14.43 ha
		NO. LOTS:	9
		LOT AREA:	8.79 ha
		AVERAGE LOT SIZE:	0.98 ha
	STAGE 5	TOTAL AREA:	58.45 ha
		NO. LOTS:	48
		LOT AREA:	45.01 ha
		AVERAGE LOT SIZE:	0.94 ha
	STAGE 6	TOTAL AREA:	40.42 ha
		NO. LOTS:	5
		LOT AREA:	37.27 ha
		AVERAGE LOT SIZE:	7.45 ha



INDICATIVE STAGING PLAN

GAP RIDGE INDUSTRIAL ESTATE

DATE 15.03.2013

Level 1, 55 St George Terrace
Perth, WA 6000 Australia

DWG NO 003

Tel +618 9346 0500
Fax +618 9321 7790

REV F

info@urbis.com.au
www.urbis.com.au

SCALE 1:5000

Urbis Pty Ltd ABN 50 105 256 288
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Appendix D Bushfire Management Plan



Bushfire Management Plan

(Structure Plan Modification)

Lot 9006 Exploration Drive

Gap Ridge

Ref 18-076
Ver B
November 2018



LUSH FIRE & PLANNING
3 Paterson Rd
Pinjarra WA 6208
0418 954 873
ABN 74 232 678 543

Bushfire Management Plan Coversheet

This Coversheet and accompanying Bushfire Management Plan has been prepared and issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme.

Bushfire Management Plan and Site Details

Site Address / Plan Reference:	Lot 9006 Exploration Drive		
Suburb:	Gap Ridge	State:	WA
P/code:	6714		
Local government area:	City of Karratha		
Description of the planning proposal:	Structure Plan minor modification to use		
BMP Plan / Reference Number:	18-076	Version:	B
Date of Issue:	22/11/2018		
Client / Business Name:	LandCorp		

Reason for referral to DFES

	Yes	No
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the BPC elements)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Is the proposal any of the following special development types (see SPP 3.7 for definitions)?

Unavoidable development (in BAL-40 or BAL-FZ)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Strategic planning proposal (including rezoning applications)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Minor development (in BAL-40 or BAL-FZ)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
High risk land-use	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Vulnerable land-use	<input type="checkbox"/>	<input checked="" type="checkbox"/>

If the development is a special development as listed above, explain why the proposal is considered to be one of the above listed classifications (E.g. considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?

The proposal is a minor modification to an approved structure plan. It only relates to land use and has no spatial implications.

Note: The decision maker (e.g. the local government or the WAPC) should only refer the proposal to DFES for comment if one (or more) of the above answers are ticked "Yes".

BPAD Accredited Practitioner Details and Declaration

Name	Accreditation Level	Accreditation No.	Accreditation Expiry
Geoffrey Lush	Level 2	BPAD 27682	28/02/2019
Company	Contact No.		
Lush Fire & Planning	0418 954 873		

I declare that the information provided in this bushfire management plan is to the best of my knowledge true and correct.

Signature of Practitioner



Date

22/11/2018

This bushfire management plan is prepared to support the proposed modification to the Gap Ridge Industrial Estate Development Plan. The modification seeks to expand the Noxious Industry Sub Precinct. This relates to land use only and does not alter the spatial design of the existing structure plan.

The structure plan was adopted by the Western Australian Planning Commission in November 2013.

Gap Ridge is one of the largest regional industrial estates in WA developed as part of the State Government's Pilbara Cities initiative located approximately 9kms west of Karratha. It is over 260ha in size with service, light and general industrial zonings. Lot 9006 has an area of 96ha and is stages 5 and 6 of the Estate. The modification to the structure plan affects the southern portion of Lot 9006.

Portions of the subject land are shown on the Map of Bush Fire Prone Areas as being bushfire prone. State Planning Policy SPP3.7 Planning in Bushfire Prone Areas requires that any strategic planning proposal is to be accompanied by a bushfire assessment including confirmation of compliance with the Bushfire Protection Criteria.

No detailed site inspection / assessment has been undertaken. The structure plan and other available information indicates that the vegetation on the site and surrounding land is predominantly Spinifex and Kangaroo Grass.

It is expected that the development will remove the vegetation within the subject land. The remaining hazard vegetation is then to the east and south of the site.

Upon completion of development the site will have a moderate or low bushfire hazard rating. This is on the basis that Class G Grassland vegetation has a moderate hazard rating and this extends for a distance of 100m from this vegetation. In accordance with clause 6.2(b) of SPP3.7 any strategic planning proposal, in an area that has or will, on completion, have a moderate BHL may be considered for approval.

A BAL Contour Map has been prepared on the assumption that the vegetation on the site will be cleared and maintained as low threat vegetation as part of the development. There will be a minor encroachment of BAL-40/FZ by 9m on the eastern boundary of the lots.

Acknowledging the history of the development of the Estate, the approved structure plan and the nature of the proposed modification it is considered that the proposal:

- a) Complies with the objectives of SPP3.7 Planning in Bushfire Prone Areas;
- b) The hazard level on the subject land will reduced and permanently altered by the site being developed; and
- c) The Bushfire Protection Criteria in the Guidelines can be achieved now or in subsequent planning stages.

Document Reference

Property Details

Street No	Lot No's	Plan	Street Name
	9006	75062	Exploration Drive
Locality	Karratha West	State WA	Postcode 6714
Local Government Area	City of Karratha		
Description of the building or works	Structure Plan Modification		

Report Details

Revision	Date	Job No 18-076
A	15/11/2018	Preliminary Draft
B	22/11/2018	Final

Practitioner Details

BPAD	Level 2 Practitioner	Accreditation No	27682
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Disclaimer

The measures contained in this report do not guarantee that a building will not be damaged in a bushfire. The ultimate level of protection will be dependent upon the design and construction of the building and the level of fire preparedness and maintenance undertaken by the landowner. The severity of a bushfire will depend upon the vegetation fuel loadings; the prevailing weather conditions and the implementation of appropriate fire management measures.



Geoffrey Lush
22 November 2018
geoffrey@lushfire.com.au



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1.0 PROPOSAL DETAILS

1.1 Introduction

This bushfire management plan is prepared to support the proposed modification to the Gap Ridge Industrial Estate Development Plan. The modification seeks to expand the Noxious Industry Sub Precinct. This relates to land use only and does not alter the spatial design of the existing structure plan.

The structure plan was adopted by the Western Australian Planning Commission in November 2013.

The subject land is located approximately 9.0 kilometres west of the Karratha townsite as shown in Figure 1.

1.2 Existing Conditions

The subject land is Lot 9006 Exploration Drive Gap Ridge. It has a total area of 96.2982 hectares as documented in Table 1 and it is comprised of two portions being:

- 7.7982ha north of Steel Ave; and
- 88.323ha south of Steel Ave.

The site is elongated extending for approximately 2,300m and being approximately 500m wide.

The existing conditions are shown in Figure 2 and portions of the Estate have already been developed for industrial purposes.

The Dampier to Tom Price railway line is to the west of the site while Seven Mile Creek is to the east. The Estate has access from Dampier Highway to the north. South of the site is the City land fill site being R32987 having an area of 58 hectares. East of the site is a large area of Unallocated Crown Land (UCL), R51927 (Drainage) and R36633.

Seven Mile Road / Tip Road extends south from the site along the railway line to the North West Coastal Highway.

The Estate is serviced by a reticulated water supply and fire hydrants.

The site is flat in nature, with no notable topographical features. It slopes generally from the west to the east towards Seven Mile Creek. It has an elevation between +10 and +18 metres AHD. The average slope across the site is approximately 0.3%, from the highest point at the south-west to the lowest point in the north-east.

Table 1 Lot Details

Lot	Plan	Vol	Folio	Registered Proprietor	Area(ha)
9006	75062	2813	280	WA Land Authority	96.2982



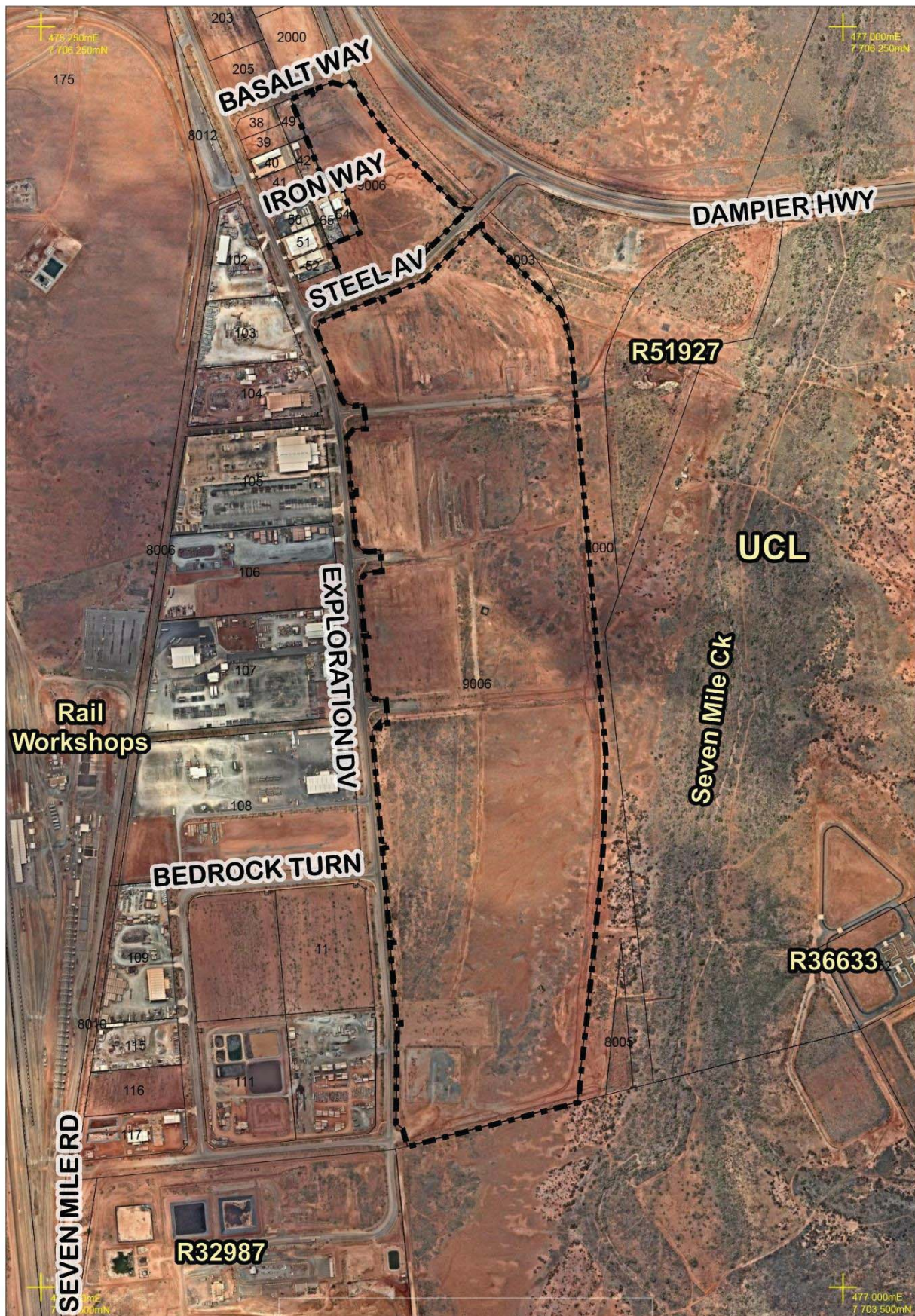
FIGURE 1
LOCATION AND CONTEXT

SUBJECT
LAND



Job No 18-076
Rev Description
A Preliminary

Date
14/11/2018



LEGEND

SUBJECT LAND - - - - -

FIGURE 2
EXISTING CONDITIONS



Job No 18-076

Rev Description
A Preliminary

Date
14/11/2018

1.3 Bushfire Prone Land

Portions of the subject land are shown on the Map of Bush Fire Prone Areas as being bushfire prone (Figure 3). Bushfire prone areas are comprised of (1):

- Bushfire prone vegetation; and
- A 100m wide bushfire prone buffer.

The designation of bushfire prone areas triggers:

- The application of Australian Standard AS3959 Construction of Buildings in Bushfire Prone Areas under the Building Code of Australia;
- The provisions of the Planning and Development (Local Planning Schemes) 2015; and
- The application of SPP3.7 Planning in Bushfire Prone Areas.

1.4 SPP3.7 Planning in Bushfire Prone Areas

State Planning Policy SPP3.7 Planning in Bushfire Prone Areas (clause 6.3) requires that any strategic planning proposal is to be accompanied by the following information:

- a) a bushfire hazard level assessment determining the applicable hazard level(s) across the subject land, or
- b) where the lot layout of the proposal is known, a BAL Contour Map to determine the indicative acceptable BAL ratings across the subject site,
- c) the identification of any bushfire hazard issues arising from the relevant assessment; and
- d) clear demonstration that compliance with the bushfire protection criteria in the Guidelines can be achieved in subsequent planning stages.

This is further reinforced in Table 7 Bushfire Management Plan Section Checklist; Appendix 5 of the Guidelines.

1.5 Fire Prevention Order

The City's Fire Break Notice requires that Rural and Town-site Land (includes residential, commercial and industrial) shall be maintained as follows:

- (a) Where the area of land is 2024m² (approximately half an acre) or less, remove all flammable material on the land except living standing trees from the whole of the land.
- (b) Where the area of the land exceeds 2024m², provide fire breaks at least three (3) metres wide, immediately inside all external boundaries of the land and also immediately surrounding all buildings and haystacks situated on the land. Where several adjoining lots are held or used by the owner/occupier, the firebreaks may be provided inside and along the external boundaries of the group or lot.

1 DFES (2015) Mapping Standard for Bush Fire Prone Areas.



LEGEND

- SUBJECT LAND —
- BUSHFIRE PRONE LAND (2018)

FIGURE 3
BUSHFIRE PRONE LAND



Job No 18-076
Rev A Description Preliminary

Date 14/11/2018

1.6 Proposed Development

The existing development from the approved structure plan is shown in Figure 4. The modification to the structure plan is to modify the noxious industry precinct as shown.

The modification will allow noxious industries to be considered within the precinct. This only relates to land use permissibility and does not alter the spatial design of the site in any way.

Local Planning Scheme No 8 defines 'industry – noxious' as anything that is a "Prescribed Premises" under the Environmental Protection Regulations 1987. This covers a large range of activities some of which may be considered as a high risk land uses including:

- Chemical manufacturing;
- Oil or gas refining;
- Metal smelting or refining;
- Biomedical waste incineration.

Noxious industry is proposed to be an 'AA' use requiring Council's development approval.

2.0 ENVIRONMENTAL CONSIDERATIONS

2.1 Native Vegetation Modification and Clearing

Native vegetation on the subject land will be cleared for development.

2.2 Re-vegetation / Landscape Plans

There is no re-vegetation associated with the proposal.



 **LUSHfire**
and planning
geoffrey@lushfire.com.au
0418 954873

3.0 BUSHFIRE ASSESSMENT RESULTS

3.1 Assessment Inputs - Vegetation Classification

The classification of the vegetation on the subject land and the adjacent area is shown in Figure 5.

The classification is based upon AS3959 and considers The Visual Guide for Bushfire Risk Assessment in Western Australia (WAPC 2016).

No detailed site inspection / assessment has been undertaken. The structure plan indicates that site is sparsely vegetated with pockets of arid low lying shrubs. Spinifex and Kangaroo Grass is scattered across the site with a more even spread to the western boundary. This can be classified as either:

- Class G Grassland – Hummock grassland G-20; or
- Class G Grassland – Open tussock G-23.

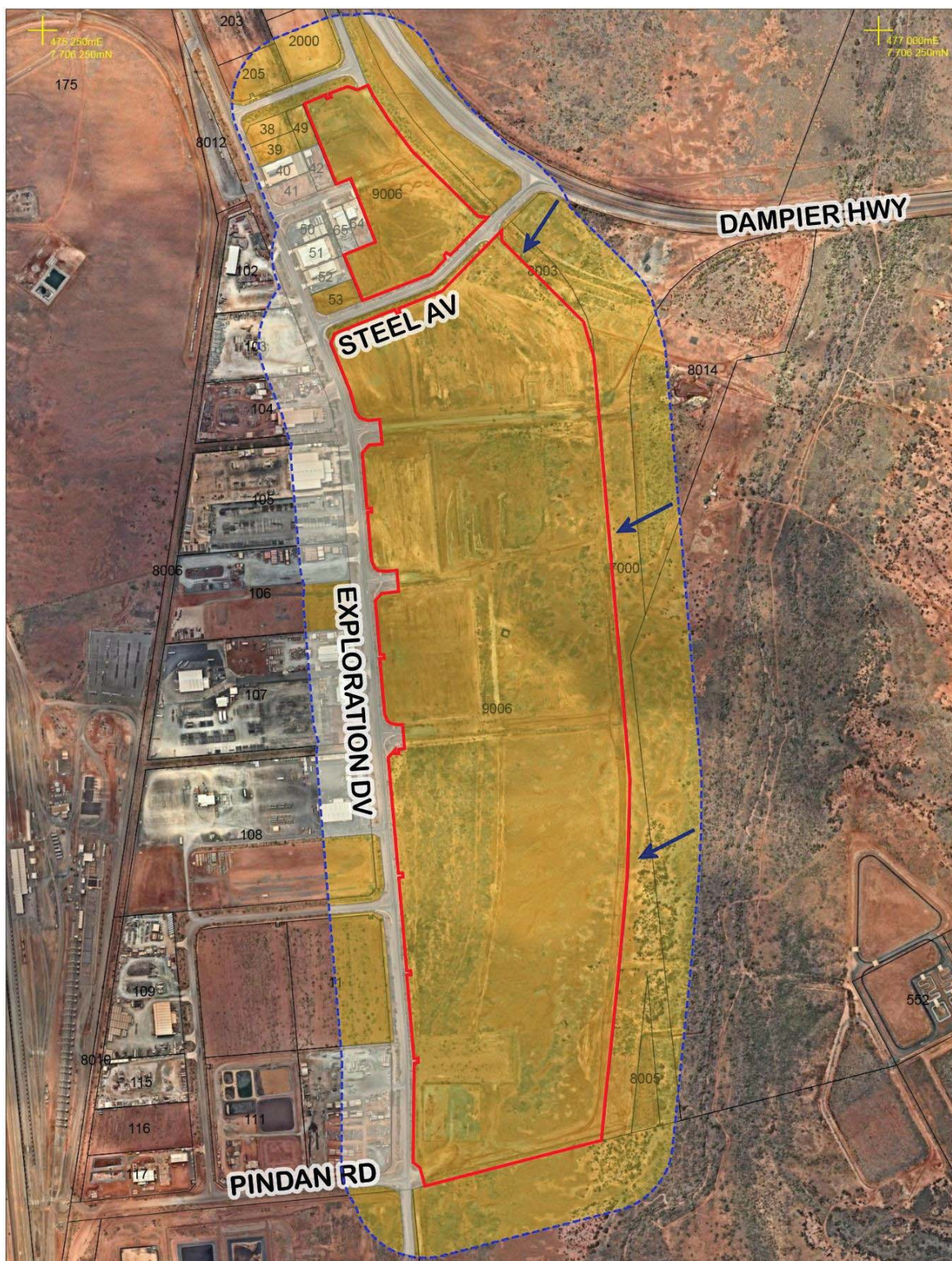
The vegetation classifications will be required to be confirmed with any BAL Assessment done for a development application.

The expected modifications to the existing vegetation are shown in Figure 6 being:

- Clearing of the site for development; and
- Revegetation of the proposed drainage reserves as grassland.



Looking south west across the site from the corner of Steel Av and Dampier Highway



LEGEND

SUBJECT LAND



VEGETATION
ASSESSMENT AREA
(150m from boundary
of the subject land)



UPSLOPE



VEGETATION CLASSIFICATION

A FOREST



B WOODLAND



C SHRUBLAND



D SCRUB



G GRASSLAND



MANAGED LAND
(Low Threat Vegetation)



Location Details:

Lot 9006 Exploration Dv Gap Ridge

Assessment Date:

14/11/2018 - desktop

Prepared by:

G Lush

Accreditation Level:

Level 2

Accreditation Number:

BPAD 27682

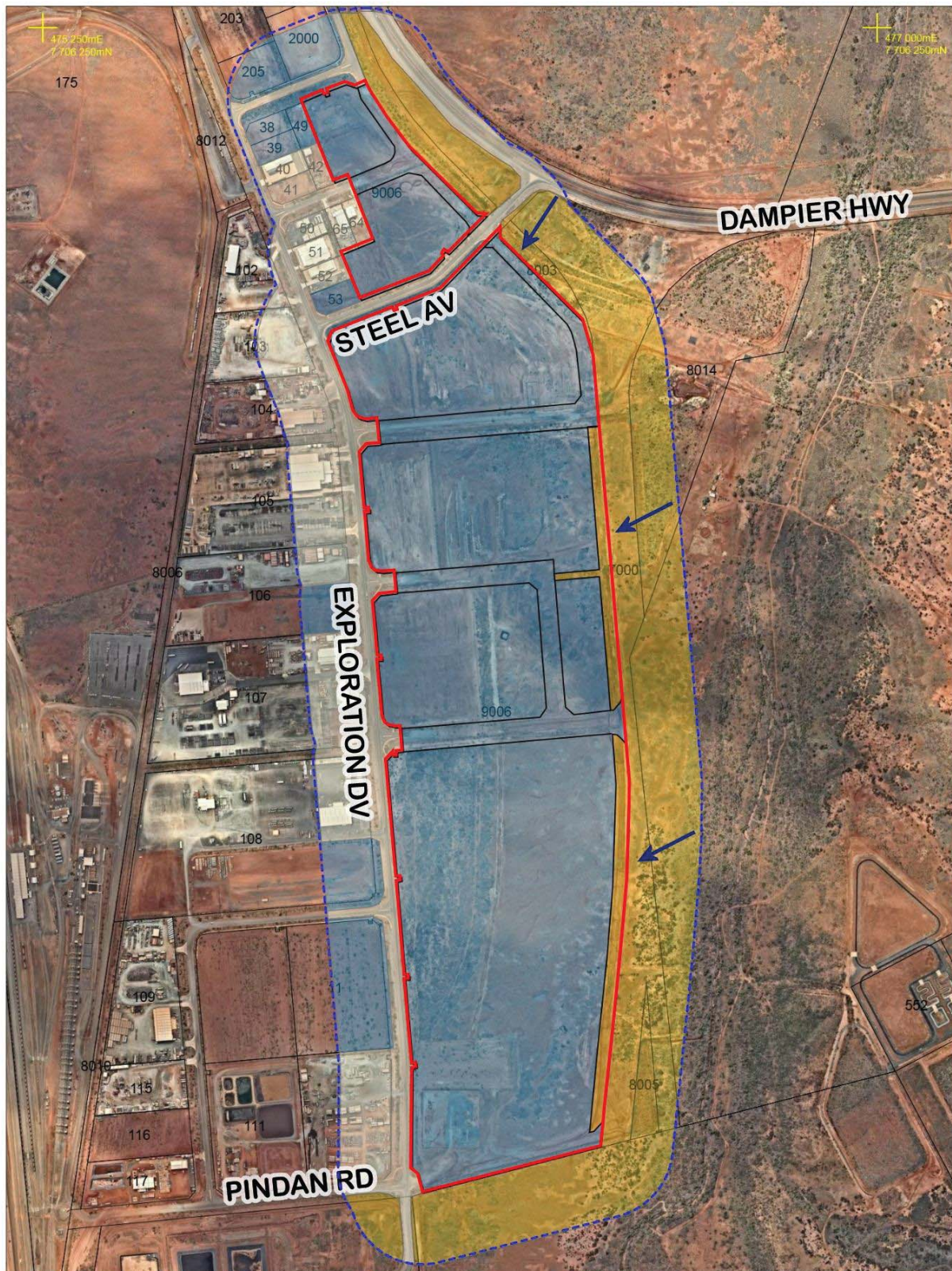
Accreditation Expiry Date:

February 2019

Date of Aerial Photo:

September 2018

FIGURE 5
VEGETATION
CLASSIFICATION



LEGEND

SUBJECT LAND



VEGETATION
ASSESSMENT AREA
(150m from boundary
of the subject land)



UPSLOPE



PROPOSED
CADASTRE



VEGETATION CLASSIFICATION

G GRASSLAND



AREA TO BE MODIFIED
LOW THREAT STATE



EXCLUDED AS PER
2.2.3.2 (f)



Location Details:

Lot 9006 Exploration Dv Gap Ridge

Assessment Date:

14/11/2018 - desktop

Prepared by:

G Lush

Accreditation Level:

Level 2

Accreditation Number:

BPAD 27682

Accreditation Expiry Date:

February 2019

Date of Aerial Photo:

September 2018

FIGURE 6
MODIFIED VEGETATION

3.2 Assessment Outputs

3.2.1 Bushfire Hazard Level Assessment

A Bushfire Hazard Level assessment provides a 'broadbrush' means of determining the potential intensity of a bushfire for a particular area. The bush fire hazard primarily relates to the vegetation on the site, the type and extent (area) of vegetation and its characteristics.

The bushfire hazard levels for the final development are shown in Figure 7.

Upon completion of development the site will have a moderate or low bushfire hazard rating. This is on the basis that Class G Grassland vegetation has a moderate hazard rating and this extends for a distance of 100m from this vegetation.

In accordance with clause 6.2(b) of SPP3.7 any strategic planning proposal, in an area that has or will, on completion, have a moderate BHL may be considered for approval.

3.2.2 BAL Contour Map

A BAL Contour Map is a plan of the subject lot/s illustrating the potential radiant heat impacts and associated indicative BAL ratings in reference to any classified vegetation remaining within 100 metres of the assessment area after the development is completed.

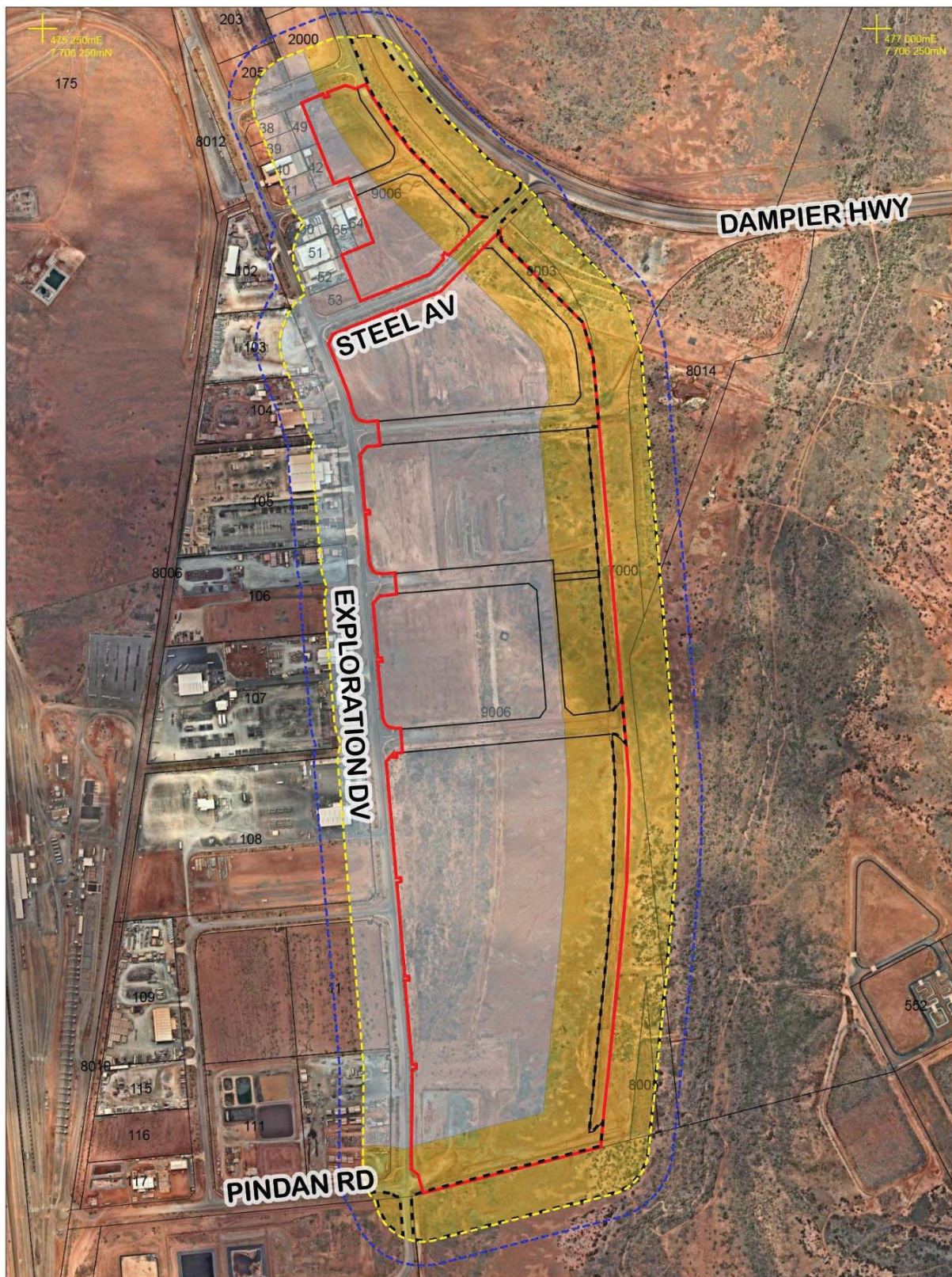
The BAL Contour Map is shown in Figure 8 and the BAL setbacks are documented in Table 2.

The assumption for the BAL Contour Map is that the vegetation on the site will be cleared and maintained as low threat vegetation as part of the development.

As shown in Figure 8 there will be a minor encroachment of BAL-40/FZ by 9m on the eastern boundary of the lots.

Table 2 BAL Setbacks

	Downslope >0 to 5 degrees				
	BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
A Forest	< 20	20 - < 27	27 - < 37	37 - < 50	50 - < 100
B Woodland	< 13	13 - < 17	17 - < 25	25 - < 35	35 - < 100
C Shrubland	< 7	7 - < 10	10 - < 15	15 - < 22	22 - < 100
D Scrub	< 11	11 - < 15	15 - < 22	22 - < 31	31 - < 100
E Mallee/Mulga	< 7	7 - < 9	9 - < 13	13 - < 20	20 - < 100
F Rainforest	< 8	8 - < 11	11 - < 17	17 - < 24	24 - < 100
G Grassland	< 7	7 - < 9	9 - < 14	14 - < 20	20 - < 50



LEGEND

SUBJECT LAND

VEGETATION
ASSESSMENT AREA
(150m from boundary
of the subject land)

BAL CONTOUR
ASSESSMENT AREA
(100m from boundary
of the subject land)



VEGETATION PLOTS

BUSHFIRE HAZARD LEVELS

EXTREME

MODERATE

LOW



Location Details:

Assessment Date:

Prepared by:

Accreditation Level:

Accreditation Number:

Accreditation Expiry Date:

Date of Aerial Photo:

Lot 9006 Exploration Dv Gap Ridge

14/11/2018 - desktop

G Lush

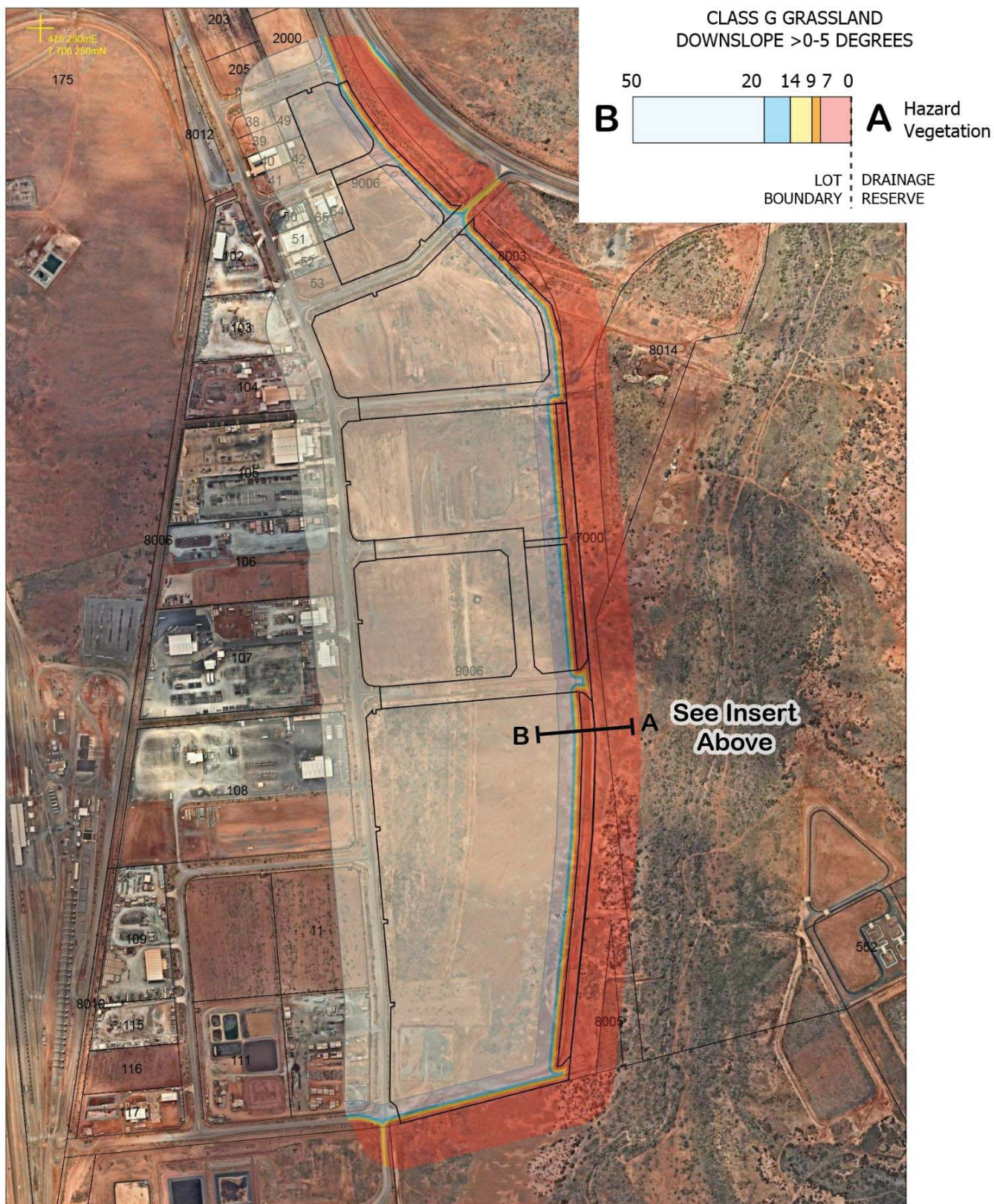
Level 2

BPAD 27682

February 2019

September 2018

FIGURE 7
BUSHFIRE HAZARD
LEVELS



LEGEND

SUBJECT LAND



INDICATIVE BAL/ RATING

VEGETATION



BAL-FZ

ASSESSMENT AREA
(150m from boundary
of the subject land)

BAL-40

BAL-29

BAL CONTOUR
ASSESSMENT AREA
(100m from boundary
of the subject land)



BAL-19

BAL-12.5

BAL-Low

Location Details:

Lot 9006 Exploration Dv Gap Ridge

Assessment Date:

14/11/2018 - desktop

Prepared by:

G Lush

Accreditation Level:

Level 2

Accreditation Number:

BPAD 27682

Accreditation Expiry Date:

February 2019

Date of Aerial Photo:

September 2018

FIGURE 8
BAL CONTOUR MAP

4.0 IDENTIFICATION OF BUSHFIRE HAZARD ISSUES

4.1 Site Context

The context of the site to the surrounding district is shown in Figure 1.

The primary bushfire hazard is from a fast moving grass fire from the nearby large areas of UCL and undeveloped land. This can have the potential to be a destructive fire threatening life and property. The likelihood of this occurring increases when there is a high chance of ignition due to the amount of fuel, the extent of vegetation curing (drying out) the temperature; relative humidity and wind speed.

The landfill site south of the subject land is a potential high risk land use which could impact on the site if a fire escapes from the facility.

4.2 Siting and Design

The most efficient and cost effective fire management measure is to separate development from hazard areas. The greater the separation distance the lower the hazard or BAL rating for the development.

This principle is reflected in the SPP 3.7 and the Guidelines by seeking:

1. To locate development in areas with either a low or moderate hazard level rating; and/or
2. To ensure that a maximum BAL-29 rating is applied to any development.

The anticipated bushfire hazard levels for the completed development are shown in Figure 7. This illustrates that the majority of the subject is expected to have a Low Hazard rating with a Moderate Hazard rating around the perimeter.

4.3 Proposed Land Use and Development

Inclusion of the subject land in the noxious industry precinct allows for a range of discretionary uses.

The bushfire construction requirements of the Building Code of Australia as reflected in AS3959 do not apply to industrial buildings or structures. However, any industrial buildings with a floor area of more than 500m² must be referred to DFES for an assessment of compliance with the Fire and Emergency Services Commissioner's operational requirements.

Industrial buildings often utilise construction methods and materials that are likely meet elements of the BAL-12.5 ember protection requirements.

4.4 High Risk Land Uses

High risk land uses are those uses which may lead to the potential ignition, prolonged duration and/or increased intensity of a bushfire. Such uses may also expose the community, fire fighters and the surrounding environment to dangerous, uncontrolled substances during a bushfire event. Examples of high risk land uses include service stations, landfill sites, bulk storage of hazardous materials, fuel depots.

Potential high risk land uses within the Industrial Business zone include:

- Industry General; and
- Industry Noxious (as per the Amended structure plan).

SPP 3.7 requires that a development application for any high risk land use is to be accompanied by a Bushfire Management Plan jointly endorsed by the local government and the Department of Fire and Emergency Services. This may include establishing an appropriate Asset Protection Zone or Hazard Separation Zone, and should be supported by a risk management plan that addresses bushfire risk management measures for any flammable on-site hazards. It may also determine that a reduction in on-site flammable material or appropriate storage of such material, is required to reduce the bushfire threat.

These provisions only apply when the development site has a rating of between BAL-12.5 and BAL-29.

5.0 ASSESSMENT AGAINST THE BUSHFIRE PROTECTION CRITERIA

5.1 Compliance Table

A summary of the compliance with the Bushfire Protection Criteria is documented in Table 3. This demonstrates how the Criteria are expected to be complied with at the various planning stages being:

1. Local Structure Plan;
2. A subdivision application; and
3. A development application.

Demonstration of compliance with the Bushfire Protection Criteria would include a bushfire management plan prepared in conjunction with any subdivision or development application.

Lot 9006 Exploration Way

Table 3 BPC Compliance

Design Requirement \ Development Stage	Structure Plan	Subdivision Application	Development Application
Element 1 Location			
A1.1 Development Location	Was approved before the introduction of SPP3.7 and the current Guidelines.	Would confirm vegetation indicative BAL ratings and compliance with Bushfire Protection Criteria. Any staging would require interim measures.	Approval of any development application is to have regard to SPP 3.7 and the Guidelines and can control the siting of development.
Element 2 Siting and Design			
A2.1 Asset Protection zone	Was approved before the introduction of SPP3.7 and the current Guidelines.	The proposed development will be for large lots that should be capable of accommodating any APZ which would have a maximum distance of 20m.	Approval of any development application is to have regard to SPP 3.7 and the Guidelines and can control the siting of development in accordance with an approved bushfire management plan.
Element 3 Vehicular Access			
A3.1 Two Access Routes	The Estate has multiple access routes, with Seven Mile Road connecting to the North West Coastal Hwy to the south.	Would confirm access provisions as part of any bushfire management plan. Any staging would require interim access measures.	Approval of any development application is to have regard to access under an approved bushfire management plan
A3.2 Public Road	The road design is expected to comply with design requirements.	The road design is expected to comply with design requirements.	Is not applicable.
A3.3 Cul-de-sac	Is not applicable.	Is not applicable.	Is not applicable.
A3.4 Battle-axe	Is not applicable.	Is not applicable.	Is not applicable.
A3.5 Driveway more than 50m	Is not applicable.	Is not applicable.	Is not applicable.
A3.6 Emergency Access Way	Is not applicable.	Is not applicable.	Is not applicable.
A3.7 Fire Service Access Route	Is not applicable.	Is not applicable.	Is not applicable.
A3.8 Firebreaks for lots greater than 0.5 ha	Is not applicable.	It is subject to the proposed lot size and Council's firebreak notice.	It is subject to the proposed lot size and Council's firebreak notice.
Element 4 Water			
A4.1 Reticulated Areas	Existing reticulated water supply.	Existing reticulated water supply. Location of hydrants to be confirmed in any application.	Building permit application will assess water supply for structural fire fighting.
A4.2 Non-reticulated Areas	Is not applicable.	Is not applicable.	Is not applicable.
A4.3 Single Lot Non-reticulated	Is not applicable.	Is not applicable.	Is not applicable.
High Risk Land Uses			
Proposed high risk land uses need special consideration.	Promotes industrial development which can include high risk land uses.	Is not applicable.	Can require a BMP and risk evaluation plan to be lodged as part of any development application.



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