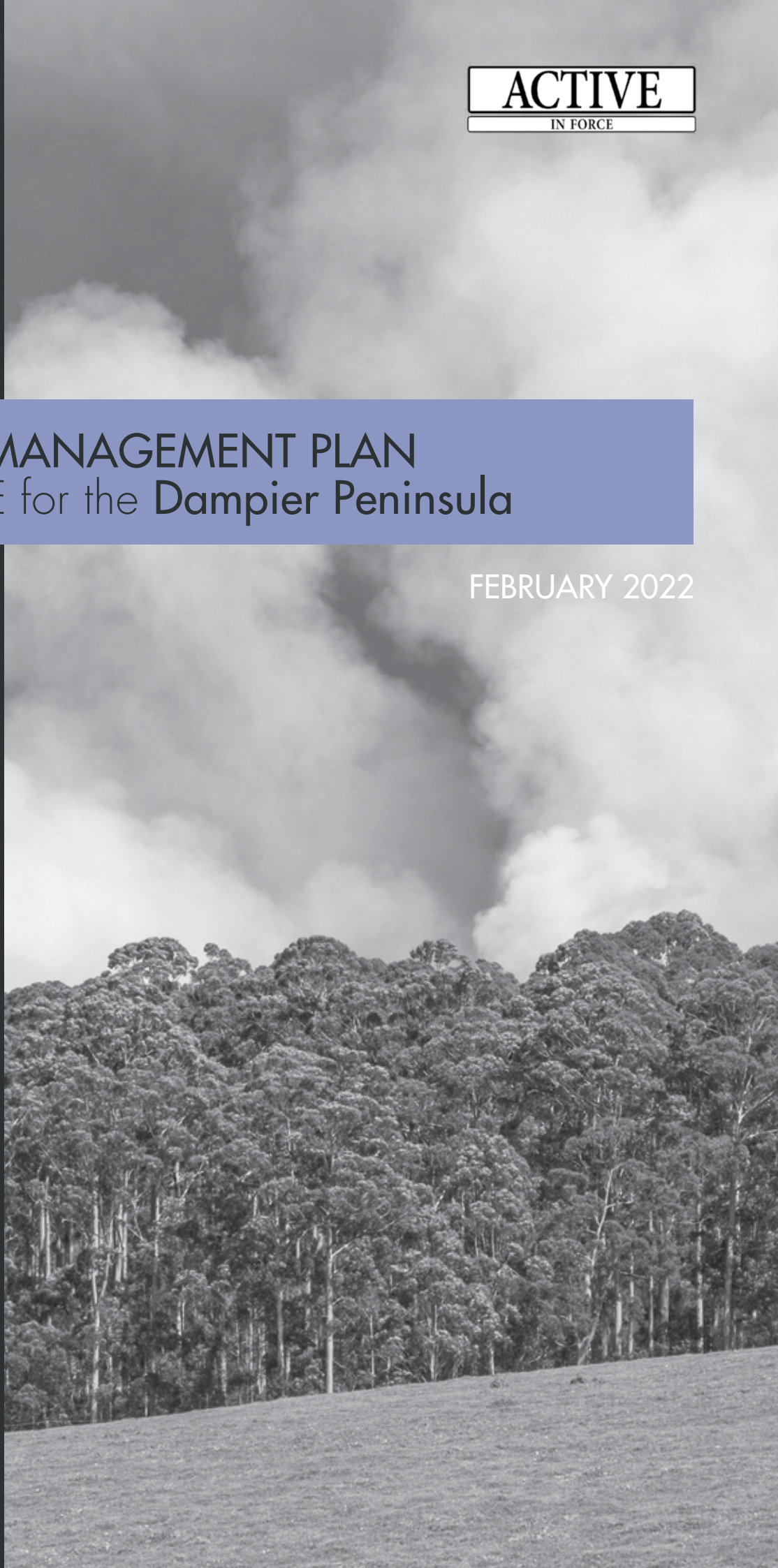
Department of **Planning, Lands and Heritage**

GOVERNMENT OF WESTERN AUSTRALIA

ACTIVE
IN FORCE

BUSHFIRE MANAGEMENT PLAN
GUIDANCE for the Dampier Peninsula

FEBRUARY 2022



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1 EXECUTIVE SUMMARY

TThe Department of Planning, Lands and Heritage (DPLH) engaged R1SK Consulting to develop strategic guidance for the preparation of detailed site-specific Bushfire Management Plans (BMP) and emergency Evacuation Plans (EEP) for areas that have been identified for future tourism land uses.

Natural hazards such as fire and cyclones have been identified as significant risks to people living or visiting the Dampier Peninsula and so there is a need to ensure that all developments prepare for these types of events. While the need to prepare for cyclonic conditions has long been an element of construction codes and standards, the preparation for bush fire is relatively new and poorly understood by many.

Fire is a conspicuous element of the natural environment on the Dampier Peninsula with wildfires occurring during the "Dry Season" (April to November) and a long history of introduced fire.

The fundamental purpose of this project is to prepare strategic guidance for tourism proposals on the Dampier Peninsula to meet the objectives of *State Planning Policy 3.7 (Planning in Bushfire Prone Areas)* and the Guidelines for Planning in Bushfire Prone Areas.

The guidance document comprises two parts, firstly providing the technical information describing bushfire prone areas of the Dampier Peninsula and strategic consideration of access, egress, water and location of safer place options. The second part contains high-level recommendations for reducing risk on the peninsula and guidance for the preparation of BMPS and EEPs for tourism developments on the DP (please see Appendix 3 and 4).

These recommendations are strategic in nature and will require input from all levels of Government as well as local stakeholders to achieve. However, a holistic approach to bushfire risk is considered critical to creating resilient communities within the Peninsula.

Reliance on any particular strategy, such as planning regulations, will only address part of the problem and the difficulties surrounding land tenure, cultural awareness and engagement will make full compliance difficult to achieve for all but the largest developers. A wide-ranging holistic approach will build resilience within communities and strengthen ties between Government and the Traditional Owner groups which will enable the provision of better support for smaller property developers to achieve outcomes that align with State guidelines.

The primary consideration of the BMP is life safety. All the measures outlined below must contribute directly to keeping staff and visitors safe, either by preventing the impact of bushfire, or more likely, reducing the impact should a bushfire occur. Ideally the BMP for the site will be created in concert with development plans. Bushfire risk mitigation measures MUST be designed into the development from the very beginning, the layout of the site, the way that buildings are clustered together, the type of vegetation and landscaping, are all key elements of reducing bushfire risk.

2 INTRODUCTION

The Department of Planning, Lands and Heritage (DPLH) engaged R1SK Consulting to develop strategic guidance for the preparation of detailed site-specific Bushfire Management Plans (BMP) and emergency Evacuation Plans (EEP) for areas that have been identified for future tourism land uses.

Development of this guidance document involved extensive site visits and desktop assessments, to identify hazards and quantify the risk. The guidance is the culmination of a series of previously prepared reports including:

- a Sub-Regional Bushfire Hazard Level Assessment
- a Sub-Regional Bushfire Risk Assessment
- an Assessment of Access and Egress
- an Assessment of Water Supplies and Firefighting Capability and
- an Assessment of Places of Last Resort.

Data provided in these reports is not extensively reproduced in this guidance; rather, key elements are quoted, and findings referenced. It is however recommended that the reports be read in their entirety, in conjunction with this guidance, to ensure that the correct context is maintained throughout.

Establishing this guidance involved a large number of stakeholders across the Dampier Peninsula which increases the complexity of implementing any proposed mitigation strategies due to the need for wide agreement.

The stakeholders that have been engaged with during the project include:

- Department of Planning, Lands and Heritage
- Department of Communities
- Department of Fire and Emergency Services (DFES)
- Department of Biodiversity, Conservation and Attractions (DBCA)
- Main Roads WA
- Tourism WA
- Shire of Broome
- Kimberley Development Commission (KDC)
- Kimberley Land Council (KLC)
- Rangelands NRM;
- Beagle Bay Community
- Lombadina Community
- Djarindjin Community
- Ardyaloon Community and
- smaller communities and tourist operators on the peninsula.

Finally, as a large percentage of the land across the peninsula is under some form of Native Title, it is imperative that guidance and subsequent plans recognise and support traditional fire practices and land use. Engagement with Traditional Owners throughout the implementation phase is critical as, without their support, engagement and cooperation, any measures to manage the risks associated with fire on the peninsula are unlikely to be effective.

2.1 PURPOSE OF THE STRATEGIC BUSHFIRE MANAGEMENT GUIDANCE

The fundamental purpose of this project is to prepare strategic guidance for tourism proposals on the Dampier Peninsula to meet the objectives of State Planning Policy 3.7 (Planning in Bushfire Prone Areas). The principals of this guidance can be applied to any proposed development on the Dampier Peninsula.

To achieve this, the project provides:

A. technical information describing the bushfire prone areas of the Dampier Peninsula (preparation of sub-regional bushfire hazard level assessment and bushfire risk assessment)

B. strategic consideration of access and egress, provision of water and location of suitable shelter in place options and

C. information to guide future proponents in preparation of site-specific bushfire management plans and emergency evacuation bushfire emergency plans to support applications for local government's development approval.

The guidance document comprises two parts. The first part provides technical information that describes bushfire prone areas of the Dampier Peninsula and strategic consideration of access, egress, water and location of safer place options.

The second part contains high level recommendations for reducing risk on the peninsula and guidance for the preparation of BMPS and EEPs for tourism developments.

Preparation of this guidance has considered the emerging trends and factors expected to play an increasing role in bushfire risk management in the foreseeable future, including:

- a likely increase in visitor numbers to the area
- the increased use of technology and data in bushfire management
- adaptation to changing climate
- the role of Aboriginal cultural practices in land and fire management and
- the need for resilience and rapid recovery from bushfire or other emergencies.

2.2 LOCAL PLANNING CONTEXT

Several planning instruments operate on the Dampier Peninsula including, the *Dampier Peninsula Planning Strategy*, the *Shire of Broome's Local Planning Strategy, Community Layout Plans* and the *Shire of Broome's Local Planning Scheme*.

Development on the Dampier Peninsula is guided by the Shire of Broome's Local Planning Scheme.

The Scheme is the principal statutory tool for implementing the Shire's local planning strategy and achieving the aims and objectives with respect to development in the local area. While schemes deal mainly with land use, development control and infrastructure coordination, this should be seen in the context of the strategic framework and the broader environmental, social, and economic goals and objectives.

Several of the communities on the Dampier Peninsula are covered by either or a combination of the 'Settlement' zone and/or special control area within the Shire's Scheme, specifically 'Special Control Area 8' (Aboriginal Communities). These provisions are used to ensure orderly and proper planning, noting that proposed development within these areas should (in addition to other matters including compliance with *State Planning Policy 3.7 - Planning in Bushfire Prone Areas)* comply with the *Layout Plan* prepared in accordance with *State Planning Policy 3.2 - Aboriginal Settlements*.

2.3 BUSHFIRE POLICY CONTEXT

State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7) and the associated *Guidelines for Planning in Bushfire Prone Areas*, provide the overarching bushfire policy framework for land use proposals within areas identified as bushfire prone under the Fire and Emergency Services Commissioner's Map of Bushfire Prone Areas.

In addition to any local government requirements, a development application for a tourism land use within a bushfire prone area will trigger the requirement for consideration and assessment under SPP 3.7.
This includes the preparation of a BMP and where the land use is considered 'vulnerable', the preparation of an Emergency Evacuation Plan (EEP). It should be noted that all tourism land uses within bushfire prone areas are considered as vulnerable as they involve visitors who may be unaware of the area and need guidance on how and where to evacuate to in the event of a bushfire.

The Guidelines provides the policy guidance specifically for tourism land uses, including siting and design, vehicular access and water. The Guidelines recognise that many tourism land uses are intrinsically linked to the natural landscape values of an area and often, to the remoteness of the location. This link to natural amenity and remote locations makes it difficult for many tourism land uses to meet the acceptable solutions. As such, the guidelines provide for the preparation of a risk assessment, as part of a performance principle-based solution, where vehicular access cannot be achieved in accordance with the acceptable solutions.

The guidance provides a strategic assessment of the Dampier Peninsular, including a strategic risk assessment, and a guide for the preparation of a BMP and EEP (refer APPENDIX 3 and 4).

In the event the policy framework changes, or conditions on the Dampier Peninsular change, this document may be reviewed.

3 CONTEXT AND RISK MANAGMENT

3.1 LOCALITY

The Dampier Peninsula is located north of Broome in the Kimberley Region of Western Australia.

The peninsula forms a transition zone between the Great Sandy Desert to the south and the monsoonal tropics to the north. The western coast stretches north from Broome to Cape Leveque and is exposed to the Indian Ocean, the eastern boundary extends from the delta that forms the mouth of the Fitzroy River up King Sound into the Buccaneer Archipelago at Ardyaloon (formerly One Arm Point).

Today, the bulk of the 1,100 permanent residents live at Beagle Bay, Lombadina, Djarindjin, which is adjacent to Lombadina, and Ardyaloon. However, many small areas, some of which are seasonal, house family groups or station workers and tourist accommodation.

Tourism is a key element of the Dampier Peninsula's economy and it is estimated that more than 33,000[1] people access the northern part of the area each year. There are potentially as many again who restrict their access to day trips to the southern west coast, e.g., Willie Creek, Barred Creek, Quondong, etc. without venturing further north.

In addition, there are some endeavours into other industries, for example:

- several pastoral leases that operate cattle
- Sheffield Resources is developing a mineral sand mine in the south east of the peninsula
- the Adyaloon Hatchery is supporting a commercial *Trochus niloticus* shell harvesting industry
- several commercial pearl farms operating and
- the Lombadina Airport is supporting the offshore oil and gas industry through providing landing and hot-refuelling facilities for large helicopters.

The area does not currently have any State utility infrastructure; however, the State Government pledged $38.9 million to water service upgrades to Aboriginal communities, including the four main communities on the Dampier Peninsula, and projects are currently underway to improve water quality, water distribution and wastewater treatment.

Coordinated emergency response is primarily restricted to the immediate Broome area, but may be deployed to the Dampier Peninsula as required.

3.2 CLIMATE AND BUSHFIRE SEASON

The Dampier Peninsula has a distinct 'monsoonal' climate with a 'dry' season from April to November and a 'wet' season between December and March. Almost all the regions annual rainfall occurs during the 'wet', but the rain is generally short duration, with heavy falls often in the evening.

The maximum temperature year-round is generally in the high 20Cs to mid-30Cs, with overnight lows in the high teens during the dry and mid-20Cs during the wet. The main variable is the humidity which can range from less than 10 per cent during the dry to more than 85 per cent in the wet.

Recorded data shows that the predominant prevailing winds are light and easterly in the wet season and westerly in the dry, although they can be variable, especially close to the coast.

The region is cyclone-prone and can receive significant wind and rainfall events. Since 1910 more than 22 cyclones have resulted in gale-force winds being recorded at Broome.

Assessment of available historical climate data from the Bureau of Meteorology indicates reasonably stable weather across the sub-region with no significant local variables.[2]

Due to the tropical climate, bushfires predominantly occur during the dry season, usually between May and November.

Information available from the Climate Change in Australia website[3] indicates that the Northwest region may see increasing average temperatures in coming decades, with more hot days and longer dry spells.

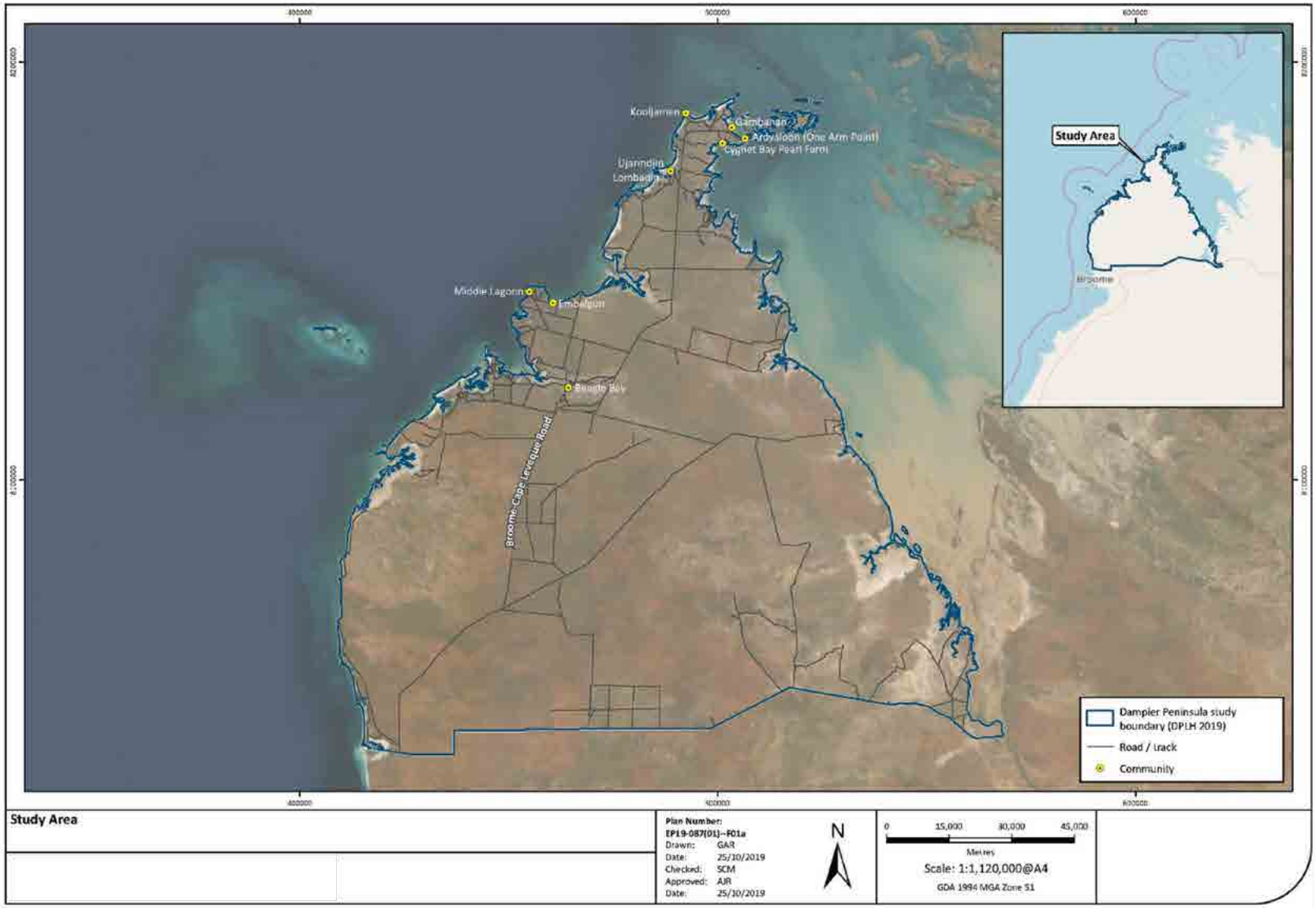
It is possible that changes to rainfall patterns will occur, although the exact nature of this is unclear. There is high confidence that there will be more extreme rainfall events in the area, and these are likely to be coupled

[1] Dampier Peninsula Visitation and Tourism Infrastructure Assessment – KPP Business Development 2017.

[2] Sub-Regional Bushfire Risk Assessment for the Dampier Peninsula (R1SK Consulting 2020).

[3] www.climatechangeinaustralia.gov.au

Figure 1: Dampier Peninsula (with study areas shown)



with fewer, but more intense, tropical cyclones. Humidity however is not expected to change significantly until late in the century when it will begin to drop.

Fire behaviour is dependent on a range of climatic factors including drought (soil dryness), wind, temperature, humidity and atmospheric stability. While the interactions can be complex in how they affect fire behaviour, generally, the hotter, dryer and windier it is, the more likely it is that fires will start and spread beyond their point of origin.

The 'build-up' to the wet season in October and November is characterised by unstable atmospheres, illustrated by tall stacks of cumulous cloud forming to the east, often accompanied by gusty winds and lightning, but little rain. This is the most common time for environmental fires to start, although the high humidity usually restricts their forward rate of spread.

The primary determinant of bushfire in the region is fuel availability, which varies primarily with rainfall. In the North Kimberley there is high confidence that climate change is not expected to change fire frequency. However, in the Southern and Western Kimberley the effect of climate change on rainfall is less easy to predict. In these areas it is expected that the change will be variable, when dry periods occur there is high confidence that fires will be more frequent and of higher intensity than those currently experienced.[4]

Anecdotal evidence provided by residents of the region indicates that there is already an evident drying trend and that they are experiencing hotter fires than in the past.

3.3 TOPOGRAPHY AND VEGETATION

The Dampier Peninsula is located within the Fitzroy Trough, a significant component of the greater sedimentary Canning Basin. The area is predominantly red Pindan sandplains with low hills and alluvia and local outcroppings of sandstone and reef limestone.

The ground water in the region is from the Kimberley-Canning Groundwater Management Area which includes an unconfined local aquifer called Broome Sandstone with a water table at approximately 55 metres in depth. While the aquifer provides water of reasonably low salinity, much of the surface water is either coastal inlets and lagoons with high salinity, or shallow lakes topped up by rainfall and subject to evaporation.

The predominant vegetation across the peninsula is open eucalypt or acacia woodland. Darwin Box (*Eucalyptus testifica*) and Ochre Bloodwood (*Corymbia dampieri*) dominate, forming a canopy 8 – 12 metres high. A sparse layer of small trees and tall shrubs typically occurs below, with Acacia, Ficus and Hakea species competing for nutrients and sparse water resources.

The understory is dominated by native grasses and small Acacia shrubs. These low ground covers abound in areas where trees were cleared for grazing, on the pastoral leases to the south and east.

These vegetation types carry fire readily, and most require a regime of infrequent, low-intensity fires for germination.

The coastal areas are especially varied with thick mangrove swamps and white sandy beaches clumped with spinifex and other hummock grasses. Behind the dunes are large tidal mudflats dominated by fields of samphire and saline grasslands. Behind these nestle dense vine thickets and, where the ground is wet and swampy, groves of paperbark sheltering banks of feathery ferns.

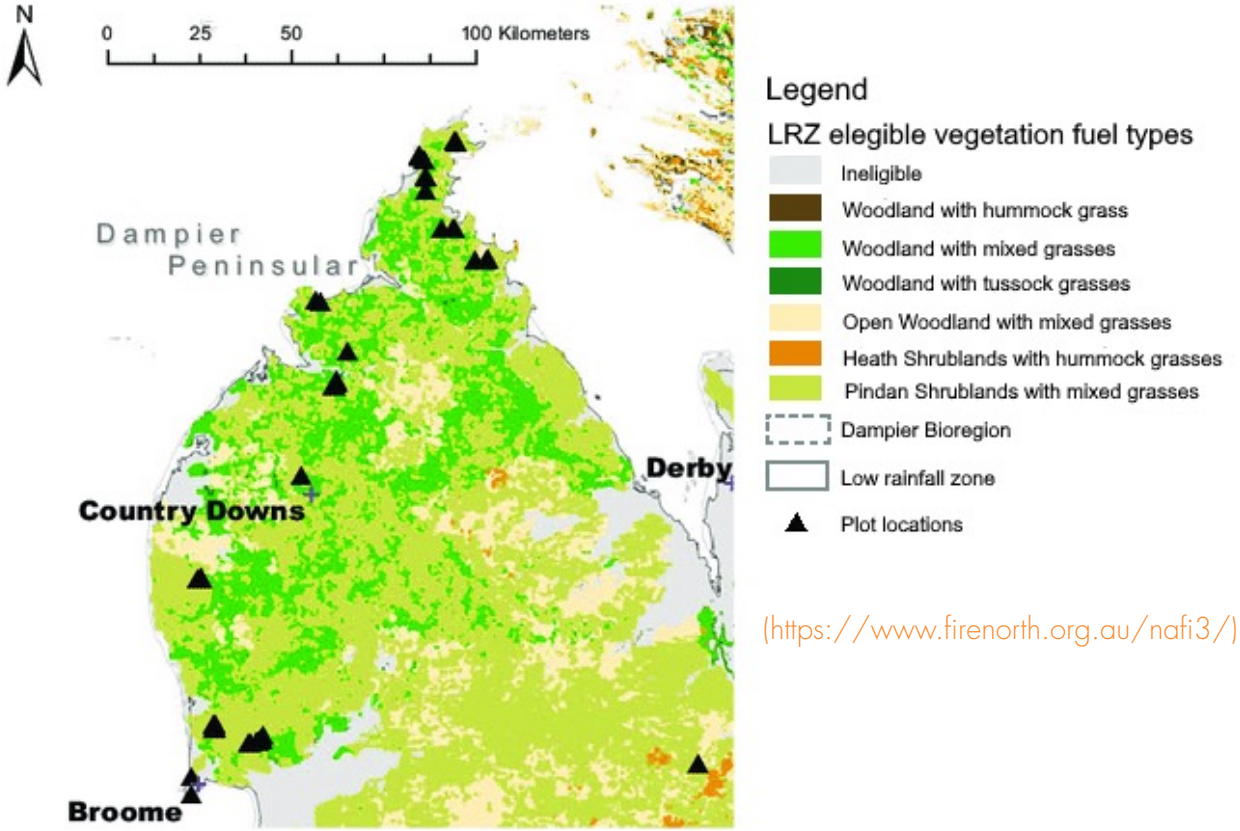
Whilst the majority of the larger wetland species, especially those in tidal regions, do not carry fire readily, grasses will still cure and carry fire during the dry season and larger species may burn in periods of drought.

Some 717 different species of flora have been recorded on the Dampier Peninsula, which includes 68 naturalised alien species. Most of the native species are fire tolerant, however if the fire is too hot, or too frequent, some can be negatively impacted. The recovery from fire and the density of the vegetation is dependent on wet season rains.

Figure 2 and 3 show the classified vegetation (that vegetation that contributes to fire spread) for the region. The data within Figure 2 is based on satellite imagery collated by the Northern Australian and Rangelands Fire Information (NAFI) project.

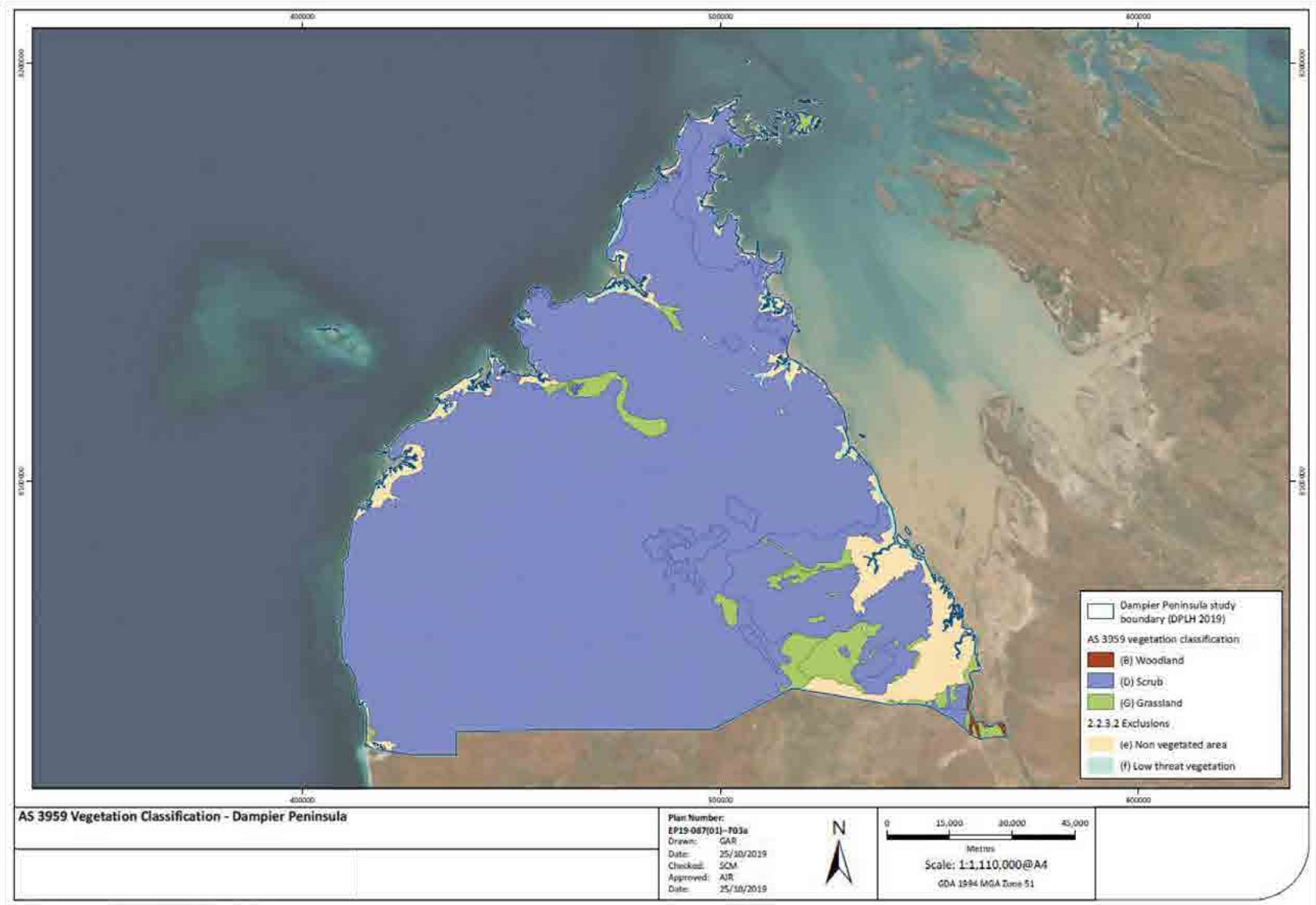
[4] www.climatechangeinaustralia.gov.au

Figure 2: Vegetation distribution



(https://www.firenorth.org.au/nafi3/)

Figure 3: Classified vegetation (per AS3959 2018)



3.4 BUSHFIRE HISTORY AND CAUSES OF IGNITION

Fire is a conspicuous element of the natural environment on the Dampier Peninsula with a long history of introduced fire. Traditional Aboriginal burning practices were likely low-intensity, small-scale fires occurring across a range of habitats, creating a mosaic of patchy burns.

Whilst there has been a concerted effort to re-introduce traditional burning practices to the region in recent years, most of the past century has been dominated by white settlers who cleared native scrub, introduced grasses for cattle feed and tried to exclude fire from pastoral leases to allow cattle to graze. This has potentially led to an increase in hot, intensive and broad-scale fires in the late dry season.

These hot fires result in canopy scorching which can affect tree regeneration. If the frequency is too high there will be a subsequent decline in those species that depend on fire for germination, as the seedlings do not have enough time to establish themselves between fires.

Environmental factors are a key ignition factor toward the end of the dry season, the 'build-up' comes with unstable atmospheres and towering cumulus clouds which bring lightning. If there has not been any rain, and there is enough wind to keep humidity low, these strikes can ignite fires that will run throughout the day. They will usually die off overnight, predominantly because of the increased humidity, but may re-ignite on the following day, if conditions are conducive.

These lightning ignitions are the only natural fires that occur in the region and their intensity and rate-of-spread are controlled by the amount of available fuel and soil/fuel moisture content. Prior to any rains, these factors are dependent solely on the relative humidity.

Non-natural ignition factors are all due to human action – during the mid to late dry season these may be caused by: campfires, discarded cigarettes, faulty machinery or vehicles being driven through long grass, as well as deliberate arson throughout the year.

3.5 HOW BUSHFIRE RISK IS MANAGED ON THE DAMPIER PENINSULA

Generally, the responsibility for bushfire management in Western Australia rests with the landowner. State-owned land is managed by the relevant authority, i.e. DBCA for land it controls and DFES for unallocated Crown land.

DFES has a program of mechanical clearing and hazard and fuel reduction burning across the region, but this is largely restricted to Crown land and road verges outside of Native Title leased areas.

DBCA conducts burns with environmental objectives in the Coulomb Point Nature Reserve and may assist other groups to burn adjacent to the reserve.

The Kimberley Land Council (KLC) operates Ranger programs that undertake a range of land management, environmental and fire management tasks and are a critical source of local fire knowledge and employment.

The Bardi Jawi Ranger program is based at Ardyaloon and the Nyul Nyul Ranger program is based at Beagle Bay and Djarindjin, there are plans for an additional program, Jabirr Jabirr to be based in the south west of the peninsula north of Broome.

These ranger groups utilise fire management plans that are endorsed by the DFES Office of Bushfire Risk Management (OBRM) to predominantly burn around their own communities and community assets but may also burn around adjacent properties provided permission can be obtained.

Since 2009 there has been a Fire and Biodiversity project in the region, managed by Environs Kimberley in partnership with the *Bardi Jawi* and *Nyul Nyul* Rangers aimed at understanding how fire and introduced weeds impact on threatened vine species in the Northern peninsula.

Early work in this space has since been taken up by the Rangelands NRM (a not-for-profit, non-government organisation funded through Landcare grants) and expanded to support the appropriate land management of the area and to reintroduce the use of traditional land management practices, including the use of fire.

Rangelands NRM works with several partner groups and agencies to implement programs around land management and many of these focus on the use of fire and the prevention of hot late season wildfires. It also promotes the science and study of fire in the region.

Additionally, fire observations and fire scar history have been mapped by the Northern Australia and Rangelands Fire Information Site (https://firenorth.org.au/nafi3/), a Charles Darwin University project that utilises satellite imagery and vegetation mapping to track fire activity. This data also feeds the Savannah Monitoring and Evaluation Framework (https://smerf.net.au) which analyses fire data and provides statistical information that supports fire management strategies.

While there are several agencies supporting these projects, the majority are based in the Northern Territory or Queensland.

Vegetation mapping in remote areas of Western Australia is generally of a low resolution. As part of the State Government Bushfire Review which commenced in 2019, the CSIRO is preparing a new Map of Bushfire Prone Areas, which will include improved vegetation mapping across the state.

The Dampier Peninsula Fire Working Group coordinates burning and, where feasible mitigation activities, on the peninsula. This group brings together all major stakeholders including KLC, Shire of Broome, DFES, DBCA, Aboriginal communities, miners and pastoralists The Dampier Peninsula Fire Working Group was formed in 2016 to better plan, deliver and monitor fire management over different tenured lands throughout the peninsula, with the aim of increasing the amount of strategic prescribed burning with small, low intensity fires in the late wet and early dry season. The current objective is to burn 10 to 20 per cent of the landscape using small (<25km^2), low-intensity prescribed fires in the late wet/ early dry season each year (Dampier Peninsula FWG 2020).

Planned burning undertaken by other Fire Working Group members varies in quality and effectiveness but is generally part of the overall strategy and builds upon previous burning.

When planned as part of a wider land management strategy, the introduction of fire to the landscape in a controlled manner significantly reduces the chances of large wildfires occurring. The work being undertaken by rangers and coordinated through the Fire Working Group is a critical element of bushfire management within the region.

However, there is anecdotal evidence provided by locals that the use of fire for fuel reduction has often been haphazard with various groups 'lighting up' the scrub when grasses are dry. It is unlikely this relates to the coordinated burning being undertaken by the rangers, rather to those burns initiated by individuals which may also relate to 'hunting' fires, which are lit late in the season to make hunting of wild turkeys easier.

The four large communities (Beagle Bay, Lombadina, Djarandjin and Ardyaloon) and Middle Lagoon have compliant fire breaks and asset protection zones, but Kooljaman and the smaller tourist facilities have insufficient or poorly maintained controls.

There is information provided to tourists in the form of pamphlets related to the risks of bushfire in the area at the Broome Tourist Bureau, DFES and some service stations; and information signage for locals is installed beside the roads at several locations. However, observations of where people are illegally camping indicates a poor assessment of the risk of fire by most campers.

The four large communities have areas where people can move to for protection from fire, either inner properties or community facilities, however smaller communities and tourism operators rely on moving onto the beach. At this stage only Cygnet Bay, Embalgun and Gumbanan have approved bushfire management plans and evacuation plans.

4 ASSETS, HAZARD AND RISK ON THE DAMPIER PENINSULA

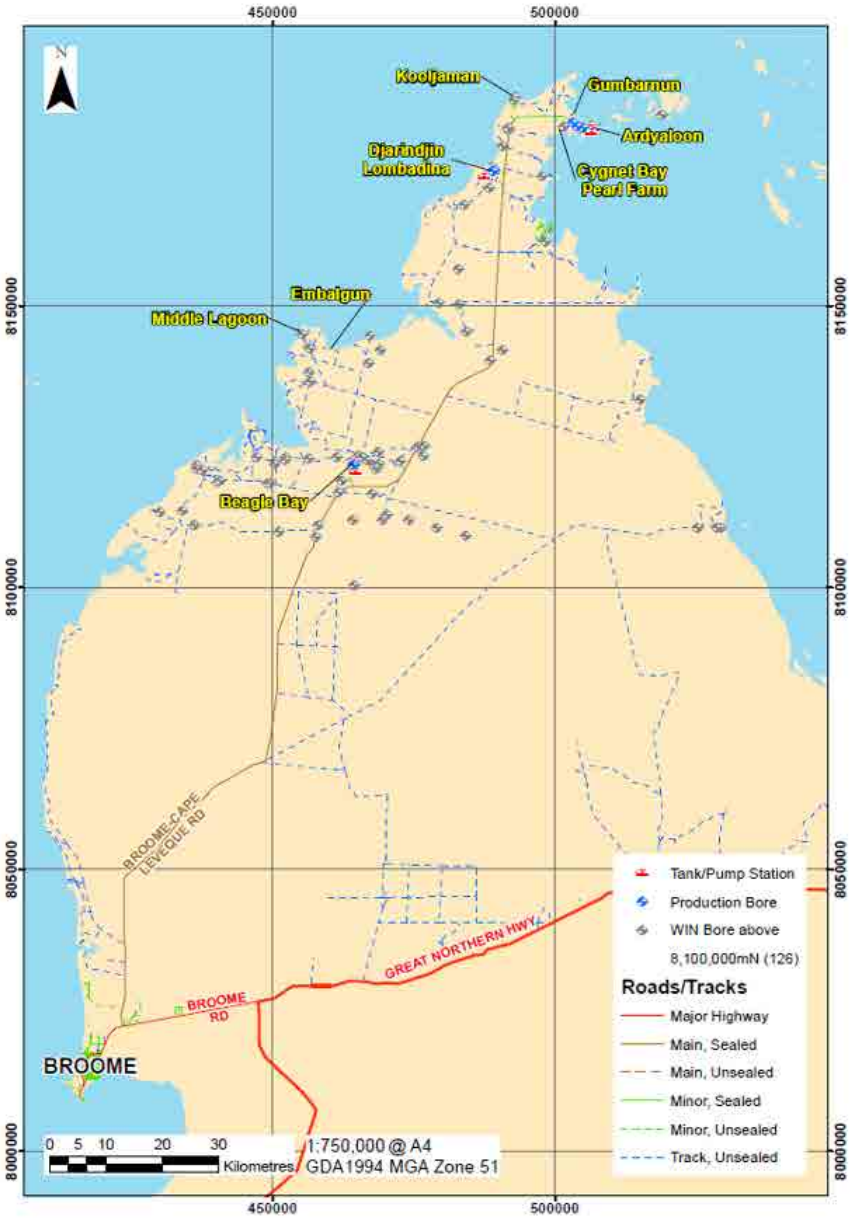
4.1 STRATEGIC WATER

Groundwater (bores) from the mostly fresh unconfined Broome Sandstone aquifer are the primary water source for the peninsula. The Broome Sandstone aquifer is a large shallow aquifer, typically within 20 metres of the surface near the coast and more than 80 metres over much of the inland extent of the aquifer.

Water supplies for the Beagle Bay, Lombadina, Djarindjin and Ardyaloon communities are owned by the respective community and maintained by Kimberley Regional Service Providers (KRSP) as part of the Remote Area Essential Services Program, a Royalties for Regions Program initiated by the Department of Primary Industries and Regional Development and administered by the Department of Housing.

Large tanks/pump stations are available at Beagle Bay (2 x 225,000 Litres plus a new 340,000 Litre Tank under construction during 2020), Djarindjin (265,000 Litres) Lombadina (196,000 Litres) and Ardyaloon (500,000 Litres), however these are the sole drinking water supply for the community.

Figure 4: Water services distribution



There are in-ground fire hydrants at Ardyaloon that appear to be functional and have adequate distribution, although it has been suggested that an additional hydrant near the store would be beneficial for structural firefighting.

Beagle Bay only has two accessible fire hydrants – there may be others, however these could not be located. This is insufficient for a community of this size and provide little support to firefighting operations.

Djarindjin only has two fire hydrants, this is insufficient for a community of this size and provide little support to firefighting operations.

There are no fire hydrants at the Lombadina community.

Concerns have been raised regarding water quality and as such, Water Corporation has initiated a project to assess, upgrade and then operate and maintain the water supplies for the four large communities. The installation of additional fire hydrants at the communities is part of the planned works to be undertaken by Water Corporation.

Smaller communities and tourist operators rely on local bores, some of which do not appear to be registered with the Department of Water and Environmental Regulation (DWER).

Local reticulation was observed to generally be achieved using black polyethylene (PE) pipe. This pipe is (at least partially) buried at larger tourist operators such as Kooljamon and Middle Lagoon, however the most common configuration was laid along the surface exposing it to radiant heat from bushfire.

Main Roads WA has utilised several bores during construction of the Broome Cape Leveque Road, many supplied with Turkey's Nests and Pumps by the civil contractor, however these are likely to be decommissioned when the contractors have completed all works.

The use of water for firefighting is not common on the Dampier Peninsula. Firefighting comprises a hybrid dry-firefighting style that includes the use of machinery and hand tools to create a perimeter around the fire to contain its spread; and then a combination of tools and portable blowers to remove fuel, combined with small amounts of water to extinguish the fire.

There is limited formal firefighting capability on the Dampier Peninsula, with two DFES light tankers and several fire trailers operated by the Ranger groups.

There is an Austral Ultra-Large Mark 5 Aviation Rescue and Firefighting appliance based at the Djarindjin Airport. This vehicle carries 7000 litres of water plus 1400 litres of foam and is crewed by locals who work for the airport.

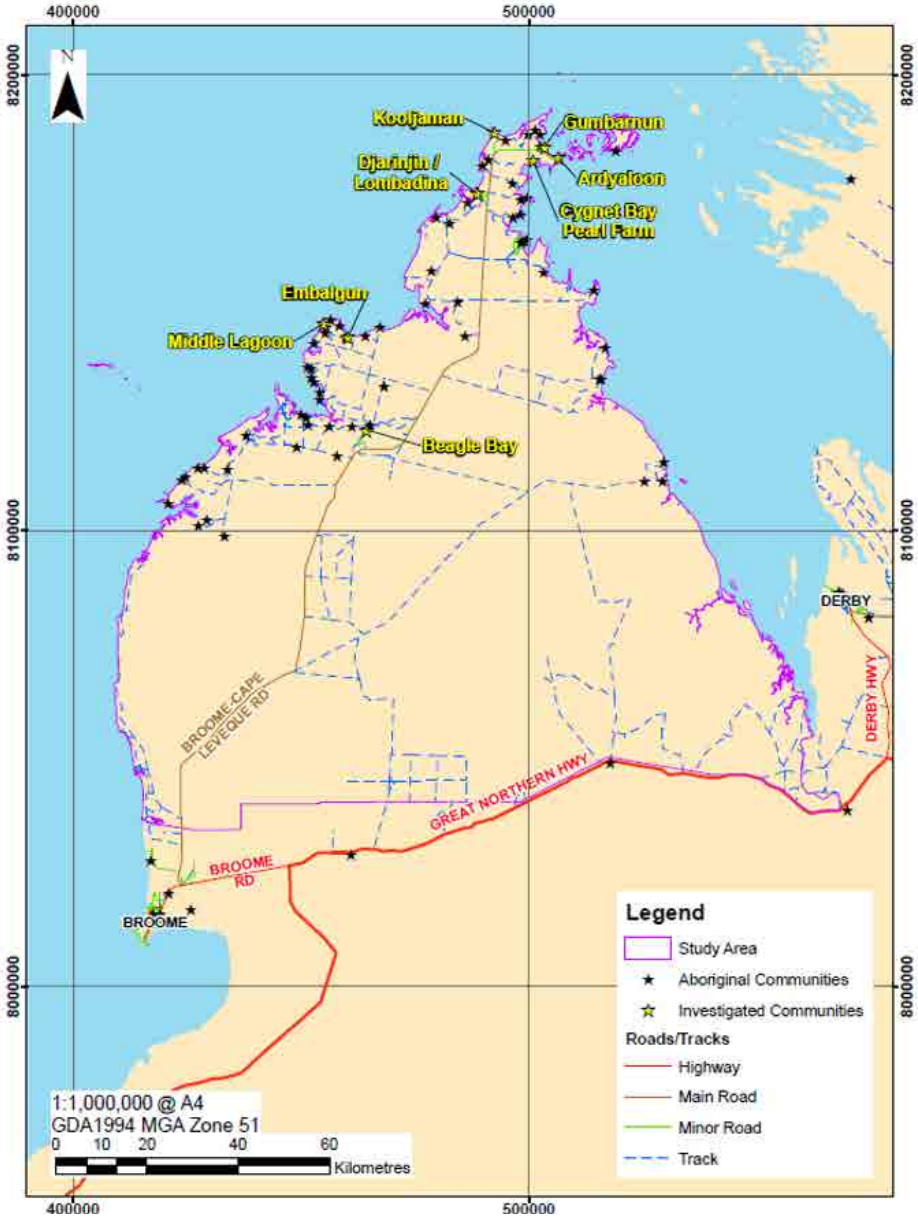
The appliance could be utilised locally for fire protection; however, its size and weight make it difficult to manoeuvre off-road. It is likely the airport requires the appliance to be on standby whenever jet aircraft (including helicopters) take-off or land so it is likely that it would stay fairly close to the airport.

Some communities have fire trailers and access to machinery that can be used to cut fire lines to allow back-burning, but any structured response must come from Broome and be coordinated by DFES.

4.2 COMMUNITY ACCESS AND EGRESS

The existing road network comprises minor roads and tracks, the majority of which are in poor condition and become impassable during the wet season. The Interim Report – Secondary Road Strategy and Community Access Dampier Peninsula (ATEA) identified 27 roads; of which only seven are gazetted, at least for part of their length, and a further three are part of the local road register without being gazetted.

Figure 5: Dampier Peninsula road networks



The Broome – Cape Leveque Road is the main north/south access road to the communities at the top of the Peninsula and is sealed from Waterbank, approximately 90 kilometres north of Broome, to Ardyaloon at the north-eastern tip. Full sealing of the road will significantly increase the volume of traffic accessing the Dampier Peninsula.

The entire length of the Broome - Cape Leveque Road is sealed with a full 12-metre road reserve and a six-metre trafficable section. The road appears to have adequate drainage and is considered to provide all-weather access, resulting in improved community access and egress onto the Dampier Peninsula.

Aside from access roads into Beagle Bay and Ardyaloon, all other roads and tracks are unsealed, mostly loose sand that are not regularly graded and are prone to becoming boggy when dry, and impassable when flooded.

Most of the minor roads and tracks are single width (3 – 4 metres) and have no verge; with acacia scrub growing directly adjacent to the road, close enough to brush against vehicles in many places. There are few locations where passing is possible and so vehicles must push off into the scrub or reverse up to a wider section to allow another vehicle past.

These roads are not suitable for heavy vehicles or caravans, however as they are the sole access to some properties, they do carry this type of traffic. This further deteriorates the surface and further limits accessibility.

Figure 6: Broome – Cape Leveque Road

Figure 7: Middle Lagoon Road

As most of the roads and tracks are not gazetted, ownership or accountability for upkeep is a significant issue, with many falling on property boundaries or crossing multiple land tenures, with the additional issue of native title it is difficult to determine who is responsible for maintenance.

The little maintenance that is undertaken is generally ad-hoc and aimed at 'smoothing out the bumps' rather than properly forming the track. Anecdotal evidence provided during site inspections indicate that some traditional owners dragged tyres behind four-wheel drives to level out the sand. Many also rely on rains to 'fix' the track, meaning that when the wet season rains fall, the tracks become rivers, the pindan soil levels out and becomes harder, thereby providing a firm surface for the first few months of the dry season until traffic breaks the crust and loosens it up again.

Figure 8: Malaburra Track

4.3 COMMUNITY ISOLATION

Due to the nature of fire on the Dampier Peninsula, predominantly large scale and fast moving, it is likely that any community could be isolated for a period. The exact location of the fire and its direction of travel will determine the exact impact to a community or outstation.

For example, a fire cutting the Cape Leveque Road, south of Beagle Bay would isolate almost all of the people on the Dampier Peninsula from Broome but would not affect travel between communities to the North, or potentially the use of Jowelanga Road to the east to get onto the Great Northern Highway.

At a more localised level, individual properties could be isolated, especially some of those on the eastern coastline. While there are many tracks, some of which link communities, only locals know which ones are trafficable and where they lead. Additionally, the nature of the terrain means that old tracks grow over quickly, and new tracks can be pushed through easily.

The nature of fires in the region is that they are fast-moving and so, unless there is a build-up of vegetation close to the road or track, the impact on the track or community is likely to be short. It is expected that fire impact would be no more than a few hours, probably considerably less, however smoke may still impact the area for some time after the fire front has passed, making movement on roads dangerous.

Fires may burn on the Dampier Peninsula for days or weeks, but the impact on any one location is likely to be a few hours at most. However, people who may be traversing one of the unmade tracks on the Dampier Peninsula are at risk from these fast-moving fires because they will be surrounded, and while the actual time that they may be exposed is brief, the radiant heat and smoke pose an extreme risk to their health and safety.

4.4 BUSHFIRE HAZARD LEVEL ASSESSMENT

The Bushfire Hazard Level (BHL) assessment provides a broad-brush means of determining the potential intensity of a bushfire in a particular area. It is a pre-development tool used to inform the suitability of future development The BHL is limited when assessing risk against existing assets as it does not consider any existing treatment measures other than permanent vegetation modification.

To best understand bushfire risk across the Dampier Peninsula, nine nodes of interest were identified based on their indicative nature, population density, or the expressed desire to expand operations in the future (see Appendix 1 for Bushfire Hazard Level Assessments):

- Kooljaman
- Gumbanan
- Ardyaloon community
- Cygnet Bay Pearl Farm
- Djarindjin community
- Lombadina community
- Embalgun
- Middle Lagoon
- Beagle Bay community

Bushfire threat assessment

The full range of fire behaviours can occur across the region and localised effects will differ significantly dependent on the conditions.

The CSIRO has developed a Fire Spread Model for Northern Australia which calculates the potential rate of spread of a fire, based on the temperature, humidity, wind speed and curing of the grasses. While the trees are a factor, the bulk of the available fuel is grass, and this results in a fast moving, wind-driven fire, which has less intensity (radiant heat) than that of forest fire in the south west of the state.

Under expected conditions, a fire on the peninsula could achieve rates-of-spread around 5,000 metres per hour, this implies a relatively short dwell time, i.e. the time that any particular property or asset will be exposed to the worst of the radiant heat, smoke and direct flame. This reduces the risk in actively defending properties and reduces the likelihood of damage.

The fire behaviour model does not consider the weight of available fuel, and so concentrates only on rate-of-spread as the indicator of fire behaviour. Localised pockets of heavier vegetation can potentially remain burning for longer periods and generate high levels of radiant heat. Due to the patchy nature of the vegetation, none of the standard models can be relied upon to predict fire behaviour accurately.

The quantity of available fuel will differ significantly and is dependent on the amount of rainfall received. The average fuel age across the peninsular appeared to be 3 – 5 years, although small areas where active management/mitigation has eliminated fire activity, results in fuel ages of more than 20 years.

The DFES threat assessment model[5] uses Vegetation category, Slope category and Separation Distance to calculate the threat of bushfire against a particular asset and this method has been used for this assessment to ensure consistency.

Threat categories are based on the calculated Bushfire Attack level (BAL) for the asset and are Low (BAL 12.5), Moderate (BAL 19), High (BAL 29) or Very High (BAL 40).

These are combined with a vulnerability category, based on either preparedness or operational/economic impact should the asset be damaged, in order to determine a consequence assessment.

Table 1: Bushfire Consequence Ratings

VULNERABILITY \ THREAT BAL	LOW 12.5	MEDIUM 19	HIGH 29	VERY HIGH 40
HIGH VULNERABILITY	MODERATE	MAJOR	CATASTROPHIC	CATASTROPHIC
MEDIUM VULNERABILITY	MINOR	MODERATE	MAJOR	CATASTROPHIC
LOW VULNERABILITY	MINOR	MEDIUM	MODERATE	MAJOR

High vulnerability relates to properties that are not prepared for fire, have vulnerable occupants, poor access or egress or are particularly vulnerable to ember attack.

Moderate vulnerability relates to properties that are not prepared, however do have good access/egress, and where residents are able to actively defend their properties.

Low vulnerability properties are those that are well prepared, have protection zones and suitably qualified people present and able to actively defend.

[5] DFES Guidelines for Preparing a Risk Management Plan 2015

Table 2: Consequence Determination for Assets

LOCATION	RATIONALE	THREAT LEVEL	VULNERABILITY
Koojaman	The resort has limited separation from bush, breaks and APZs are currently poorly maintained. Staff have limited knowledge and training; guests (up to 300) have little or no knowledge regarding fire and access is restricted to a single road in poor condition. The resort can be easily cut-off by fire.	HIGH	HIGH
Gambanan	The camp has insufficient separation from bush. Cleared areas are well maintained, however the site is not manned, and guests (up to 60) will have little or no knowledge of fire. There is limited access, however with sufficient warning guests can evacuate to Ardyaloon easily.	MEDIUM	HIGH
Ardyaloon/ One Arm Point	The community is exposed to continuous bush to the west. While outlying properties are likely to be affected, the community is large enough to provide protection to residents (up to 400). There are trained rangers in the community with firefighting capability, well-made roads and maintained fire breaks.	MEDIUM	MODERATE
Cygnet Bay	The site is surrounded by bush, whilst permanent assets have some protection, there are limited APZs and firebreaks around temporary assets. The site is manned, and staff have good knowledge of fire procedures. Guests (up to 120) will have little or no knowledge. The site can be cut off by fire, however there are sufficient cleared areas and boats to protect occupants if required.	MEDIUM	MODERATE
Djarindjin	The community is exposed to continuous bush to three sides. While outlying properties are likely to be affected, the community is large enough to provide protection to residents (up to 200). There are trained rangers in the community with firefighting capability, well-made roads and maintained fire breakss.	MEDIUM	MODERATE
Lombadina	The community is exposed to continuous bush to three sides. While outlying properties are likely to be affected, the community is large enough to provide protection to residents (up to 200). There are trained rangers in the community with firefighting capability, well-made roads and maintained fire breaks.	MEDIUM	MODERATE
Embalgun	The camp has insufficient separation from bush. Cleared areas are well maintained, the manager lives on-site, and guests (up to 60) will have little or no knowledge of fire. There is limited access and the site could be cut off by fire.	MEDIUM	HIGH
Middle Lagoon	The resort has limited separation from bush, however fire breaks and APZs are well maintained. Staff have limited knowledge and training; guests (up to 300) have little or no knowledge regarding fire and access is restricted to a single road in poor condition. The resort can be easily cut-off by fire but has sufficient cleared areas to protect staff and guests.	MEDIUM	MODERATE
Beagle Bay	The community is exposed to continuous bush to three sides. While outlying properties are likely to be affected, the community is large enough to provide protection to residents (up to 200). There are trained rangers in the community with firefighting capability, well-made roads and maintained fire breaks.	LOW	MODERATE

4.5 RISK EVALUATION

While the overall risk of fire is EXTREME across the Dampier Peninsula, the consequences of bushfire at a particular site vary considerably depending on the direction from which the fire approaches and the separation distances that have been achieved.

In the case of smaller sites or communities or tourism operations, the risk is essentially the same across the entire site. However, at larger communities and campgrounds there is significant variation and in the event of a bushfire, the outlying structures closest to the vegetation, are likely to be impacted, however the bulk of the community or camping area will likely be spared.

The Risk (consultants) evaluation considered consequence and likelihood to determine a risk rating for each community (see Table 3). The bushfire risk levels were determined to be largely in the medium to extreme range, based primarily on the lack of preparation and poor access/egress on the Dampier Peninsula. Overall, the level of risk is unacceptable however, this does not account for the fact that, in most instances, the impact of fire will be of short duration and people would have the ability to avoid the impacts by moving to acceptably safe areas within the site or onto adjacent beaches.

Ratings in this scale generally require some form of treatment and, in most instances, this could be as simple as providing a larger asset protection zone (APZ) or strategic fire breaks in the path of oncoming fires.

Further treatment priorities were identified (see Table 3). Using the Bushfire Risk Management model, a reduction in the BAL significantly reduces the overall risk for any given site, hence prioritising treatments which achieve or work toward achieving a reduction in the BAL, are most effective. All sites, nodes and structures on the Dampier Peninsula should at least have the following protection in accordance with the Shire of Broome Firebreak Notice:

- Asset Protection Zones: A 25-30 metre APZ would in most instances reduce the BAL to 12.5 or LOW.
- Ember protection: The design and construction of structures can have a major impact on its susceptibility to ember attack. Gutters, roof valleys, verandas, exposed beams, louvres or vents and breezeways can be locations where flammable materials can gather and then be affected by burning embers.
- General maintenance: It is critical that any bushfire protection measures be regularly maintained, ideally at the beginning of the fire season. In this region, it is recommended that any maintenance be undertaken in April/May so that the fuels have time to dry out and stop growing following the wet season.
  - Firebreak maintenance
  - Asset Protection Zone maintenance
  - Garden maintenance
  - Building maintenance
- Fuel reduction: The reduction in fuel levels has been clearly shown by the Department of Biodiversity, Conservation and Attractions to be the most effective method of reducing the intensity and spread of bushfires, and hence the damage that they cause.

Methods for reducing fuel loads include clearing strategic firebreaks, hazard reduction burns and chemical defoliation.

While extremely effective in large landscape-sized areas, the targeted reduction in fuel levels within a site can also significantly reduce the likelihood of accidental fires spreading to assets.

Table 3: Asset Treatment Priorities

LOCATION	CONSEQUENCE	LIKELIHOOD	RISK RATING	PRIORITY
Koojaman	CATASTROPHIC	ALMOST CERTAIN	EXTREME	1A
Gambanan	MAJOR	POSSIBLE	HIGH	3B
Ardyaloon/One Arm Point	MODERATE	POSSIBLE	MEDIUM	4A
Cygnet Bay	MODERATE	POSSIBLE	MEDIUM	4A
Djarindjin/Lombadina	MODERATE	POSSIBLE	MEDIUM	4A
Embalgun	MAJOR	POSSIBLE	HIGH	3B
Middle Lagoon	MODERATE	POSSIBLE	MEDIUM	4A
Beagle Bay	MINOR	POSSIBLE	LOW	5A

5 IDENTIFIED POTENTIAL STRATEGIC SAFER PLACES

The early evacuation of visitors and staff based on an imminent bushfire threat should always be the first consideration and will form the basis of a successful Emergency Evacuation Plan (EEP). However, it is important to provide several shelter options in the event that it is no longer safe to evacuate to an area not prone to bushfire risk.

Shelter should be provided with sufficient space for the maximum number of employees and visitors that could be on site at any given time.

An accredited level 3 Bushfire Planning Practitioner undertook an assessment of potential Safer Places options. The assessed locations were Beagle Bay Community, Middle Lagoon Camping Area, Djarindjin and Lombadina Communities, Kooljaman at Cape Leveque, Ardyaloon Community and Gumbanan Wilderness Retreat (See APPENDIX 2. for Bushfire Safer Place assessments). Cygnet Bay and Embalgun have Bushfire Safer Places already approved by the Shire of Broome from previous assessments in current Bushfire Management Plans.

The objectives of the assessment were to identify potential areas where people can shelter during 1 in 200-year bushfire weather conditions and shelter outside exposed to safe levels of radiant heat flux, considered to be 2kW/m^2 or less. Detailed design fire modelling was undertaken at each site. The methodology used to assess the Bushfire Safer Places utilises the methodology developed by Douglas and Tan (2005) 'Integrating Site Assessment and Performance Planning Outcomes for Bushfire Prone Areas'. A fire weather analysis and assessment of published fuel loads in the vegetation types was assessed to determine the design bushfire conditions at each location.

The identified potential Bushfire Safer Places can offer improved protection if people are caught by a fire and cannot evacuate early away from the threat to an area that is not being threatened. It is important for people to understand that there are risks associated with sheltering in Safer Places even when assessed to the accepted standards. Safer Place locations do not guarantee peoples safety, but from a risk mitigation perspective, the 2009 Victorian Bushfire Royal Commission Final Report identified the need for a range of community shelter and relocation options in the event of a bushfire.

This is particularly important in an area with existing communities, increasing tourism numbers and only one access road.

It is expected that the identification of these Bushfire Safer Places will assist people in the communities, tourism operators and independent travellers. Additional areas may need to be assessed in the future.

All sites were visited in September 2020, with permission to enter communities during the Covid-19 restricted period. Permission to access areas around the campsites and communities was approved by the appropriate representative and many areas had cultural sites and bushland zones into which entry was not permitted.

The assessment identified that five of the six assessed locations could accommodate a Bushfire Safer Place or place-of-last-resort, with existing fuel management and maintenance arrangements. There was insufficient fuel management at Gumbanan Wilderness Retreat to identify a potential Bushfire Safer Place without extensive works to establish a large APZ. Further consultation with the Shire of Broome is required regarding the establishment of the APZ standards at Gumbanan. This report does not provide permission to do any clearing or work to reduce fuel load.

6 RECOMMENDATIONS AND GUIDANCE FOR BMPS AND EEPS ON DAMPIER PENINSULA

Undertaking tourist developments in remote locations involves significant investment, especially where external expert advice is needed for the preparation of bushfire management plans (BMPs). While many of the larger properties on the Dampier Peninsula have some form of fire management plan in place, such as Cygnet Bay, guidance is required on how new BMPs can achieve the desired outcomes of SPP 3.7, for tourism enterprises in bushfire prone areas.

This guidance aims to provide information that can be used as a first step in project planning for bushfire management; outlining to applicants what is required for the preparation of a BMP and EEP on the Dampier Peninsula. This guidance, while providing a straightforward pathway for the preparation of a BMP, will not negate the potential to engage suitably qualified bushfire planning practitioners.

The templates and best practice guides within APPENDIX 3. and APPENDIX 4. will assist land holders and external consultants on the Dampier Peninsula, to achieve both the policy objectives in SPP 3.7 as well as addressing the relevant Elements within the Guidelines for Planning in Bushfire Prone Areas.

In addition to the templates and guidance contained in the appendices, high-level recommendations are provided below. Implementation of these recommendations aim to reduce bushfire risk on the Dampier Peninsula and achieve better outcomes during the preparation of BMPs or EEPs. These recommendations will however require further consultation and consideration by relevant stakeholders prior to any implementation being achieved.

6.1 SAFER COMMUNITIES

6.1.1 REDUCE BUSHFIRE IGNITIONS

- Community information programs related to reducing careless or negligent ignitions could be renewed and refreshed. There are some signs warning of fire and fire impacts along the Cape Leveque Road, but many of these are faded and may not have the required impact.
- Tourist information should be provided that not only espouses the dangers of fire, but also the environmental and cultural impacts.
- Known informal camping areas should have cleared areas and fire pits, and organised camp sites should provide adequate facilities to allow people to use (and learn to use) fire safely.
- Targeted programs related to the deliberate introduction of fire, either for hazard reduction or the frequent "hunting fires", should be developed. Where practical, local knowledge and resources should be used to implement targeted programs.

6.1.2 IMPROVED COMMUNITY PREPARATION

- Identifying a funding model that allows Rangelands and the local Ranger groups supported by the Kimberley Land Council to continue with a longer-term source of funds. This will help to increase certainty for the communities they operate with and will have benefits beyond the region.

6.2 FIRE RESPONSE

6.2.1 IMPROVED LOCAL FIRE RESPONSE CAPABILITY

- Strategic firefighting water supplies should be identified and located close to the Cape Leveque Road, and ideally one bulk water carrier, plus transportable collar tanks or bladders, to be located on the Dampier Peninsula to improve fire response. It is recommended strategic supplies be located approximately every 50km along the main road, but critically near the turnoff to Beagle Bay, at the Lombadina Services and at the Cape Leveque/Kooljamon turnoff.
- These emergency water supplies should be bore-fed and not impact the local community potable water scheme. Ideally, they will be either a small dam or turkey nest, or a tank, however measures for duplicate use – e.g. dust suppression, civil construction work or irrigation should be implemented to ensure that the water does not stagnate.
- For effective local reporting and warning to work there must be reliable communications across the Dampier Peninsula. Currently the Telstra mobile phone coverage is the only reliable service at the major communities. While mobile phone coverage is most desirable since most people carry a phone, radio communication may be a suitable alternative.

- Many of the vehicles travelling in the area have CB Radios fitted, and these are relatively cheap and easy to install. The public CB network has a dedicated emergency channel (Ch 5) which is designed to operate through a fixed radio repeater.
- The size of the area would require several repeaters to be installed, however this may not be insurmountable as DFES already has two WA Emergency Radio Network (WAERN) repeaters installed on the Dampier Peninsula, a VHF Hi-Band (Ch 194) repeater at Waterbank that covers much of the south west of the peninsula, almost to Beagle Bay, and another VHF Hi-Band repeater (Ch 176) at Lombadina that covers much of the northern half from Beagle Bay to Ardyaloon.
- It should be possible to add a UHF (Ch 5) Repeater on the same tower, to achieve similar coverage, without impacting on existing emergency radio communications. There may be a need to upgrade power supplies, etc. but again this should not be overly difficult and having the repeaters co-located would reduce maintenance costs.
- If a public emergency radio network can be provided, then this must be advertised to travelers, but also monitored so that reports or requests for help can be responded to.

6.3 BUSHFIRE HAZARD MANAGEMENT

6.3.1 IMPROVED BROAD-AREA FUEL REDUCTION

Significant planned burning already occurs within the sub-region, conducted by many of the key stakeholders, however there are opportunities to better coordinate the various burning programs and ensure that introduced fire meets specific objectives for hazard reduction and environmental management. Burn plans must look forward for up to 10 years and be supported by GIS mapping and satellite data to achieve the optimum benefits of environmental sustainability and hazard reduction.

Burning should be supplemented with mechanical or chemical treatments where practical to provide a multi-layered defence against wildfire.

Hazard reduction programs should support the following broad strategic goals:

- implement early season prescribed burns that effectively pull up or reduce late season wildfires
- reduce severe late season wildfire by limiting the availability of fuels in high-risk areas (road verges and around camp sites)
- reduce the frequency of fire and increase the variety of areas that burn from year to year
- increase the amount of 'long unburnt' vegetation to meet biodiversity goals and protect threatened species
- increase burn patchiness (enhance the mosaic effect of burns)
- reduce the size of individual burnt patches (more smaller burns) and
- promote natural and cultural asset protection from fire.

6.3.2 IMPROVED LOCAL ACCESS AND STRATEGIC FIREBREAKS

The Dampier Peninsula currently has one effective strategic north-south fire break along the new wider Broome Cape Leveque Road, however almost all side roads are narrow and poorly maintained which does not offer much impediment to fires.

Poor tracks not only make stopping fires more difficult, but they also make it more difficult for firefighters to access fires and increase the danger to road users who may get caught in a fire situation.

One of the primary difficulties in maintaining and improving access tracks or creating fire breaks is local access to earth-moving machinery. As previously outlined, the promotion of a locally-operated resource or business that can undertake the work at a reasonable cost will have a positive effect not only on the maintenance of access (and egress) tracks, but also the local economy.

Where possible, some east-west tracks should be widened to improve safe access, but also act as strategic fire breaks to limit fire spread. Consideration should be given to the widening of the following roads to at least 10 metres to provide additional strategic fire breaks and to improve access:

1. Morard Road
2. Middle Lagoon Road
3. Pender Bay Road
4. Kooljamon Access Track
5. Kinney Road
6. Malaburra Access Track

6.4 ADAPTIVE MANAGEMENT AND CLIMATE CHANGE

6.4.1 MONITOR AND REVIEW BUSHFIRE RISKS

The fire risk on the Dampier Peninsula is prevalent, fueled by annual wet season rains, which promote growth that becomes the fuel for fires the following year. While the overall risk is consistent, there can be significant variation at a local level depending on rainfall, mitigation works that have been completed, or changes to the way the land is being used.

Additionally, climate change is having a measurable effect in the region and so the ability to adapt to changing conditions is critical.

To account for this variation, it is important that monitoring of local conditions, and review of the effectiveness of plans be undertaken continuously. Ideally this would be a task undertaken by someone who is involved in the coordination of the various groups across the Dampier Peninsula, to ensure effective integration of lessons learned or adaptation of modifications required across all stakeholders.

This ongoing monitoring and review must be supported by periodic major reviews that measure the effectiveness of the strategy and plans against the desired outcomes. It is recommended that plans receive a major review at least every five years.

As has been previously noted, the current (almost) annual grants process that many of the land care and ranger groups work within, make long-term planning and review difficult to manage. Identifying ways that the funding arrangements work, could provide avenues to ensure effective ongoing management of fire.

6.5 SAFER PLACES

It is recommended that identified potential Safer Places (refer Section 5. and APPENDIX 2. be formalised with the Shire of Broome Local Emergency Management Committee.

There will need to be significant consultation prior to formalisation with stakeholders including the Shire of Broome, the Local Emergency Management Committee, the Department of Fire and Emergency Services and the land holders and managers, with the aim of registering these sites as Safer Places and establishing a framework for roles and responsibilities.

APPENDICES

APPENDIX 1 – BUSHFIRE HAZARD LEVEL ASSESSMENTS

The images below are taken from the Dampier Peninsula Bushfire Hazard Level Assessment produced by R1sk.

Figure 1: Kooljaman BHL

Figure 2: Gumbanan BHL

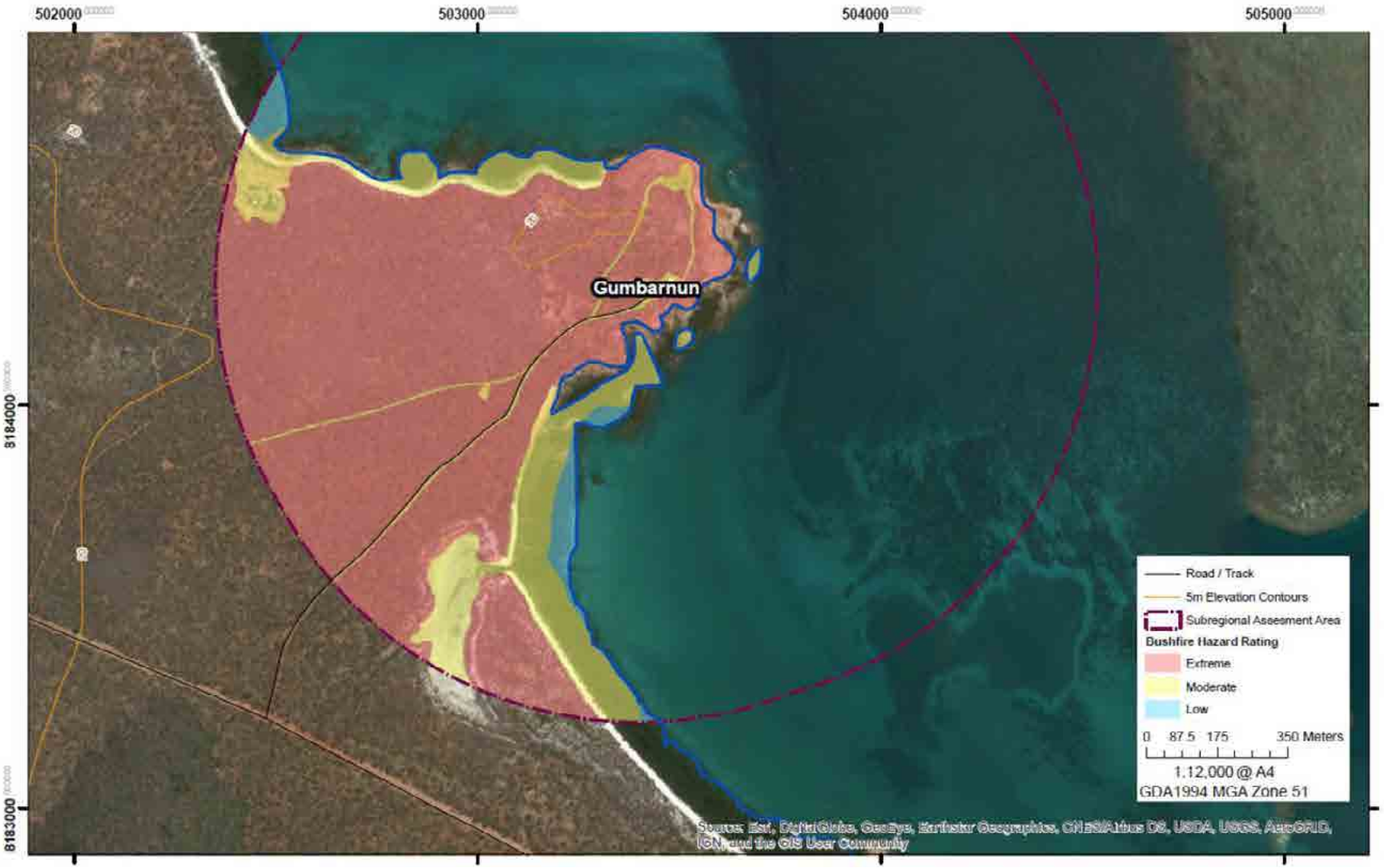


Figure 3: Ardyaloon BHL

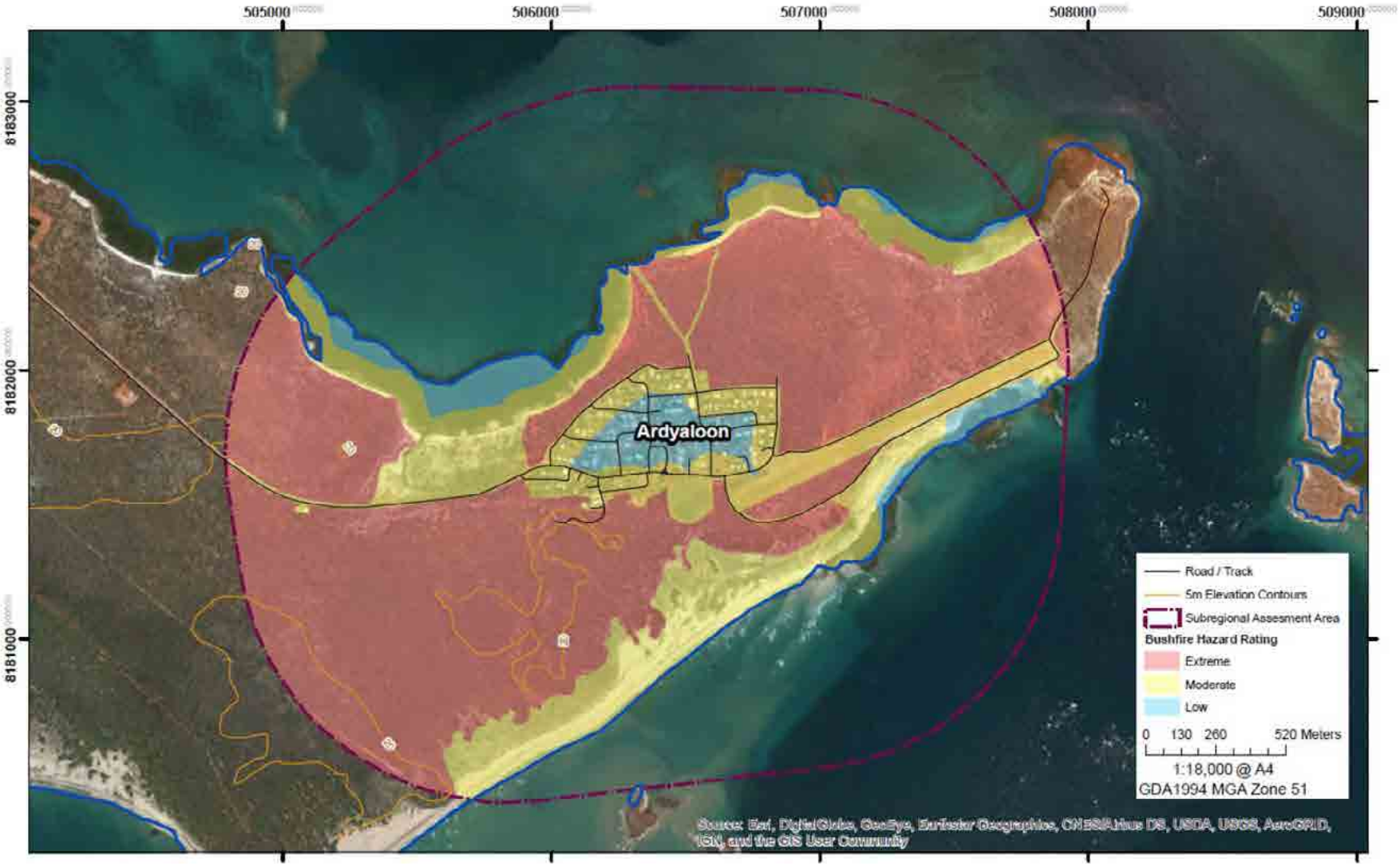


Figure 4: Cygnet Bay Pearl Farm BHL

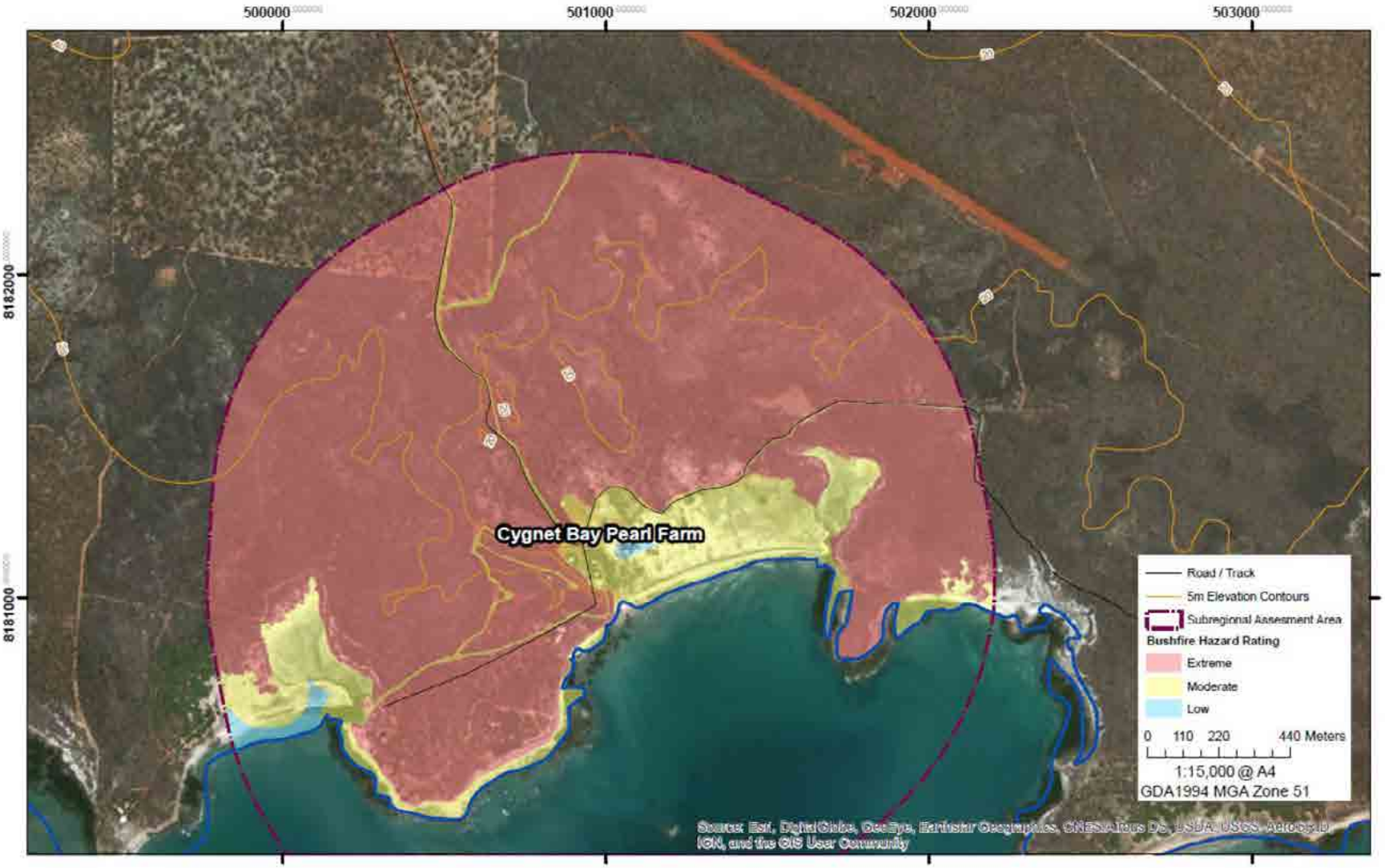


Figure 5: Djarindjin / Lombadina BHL

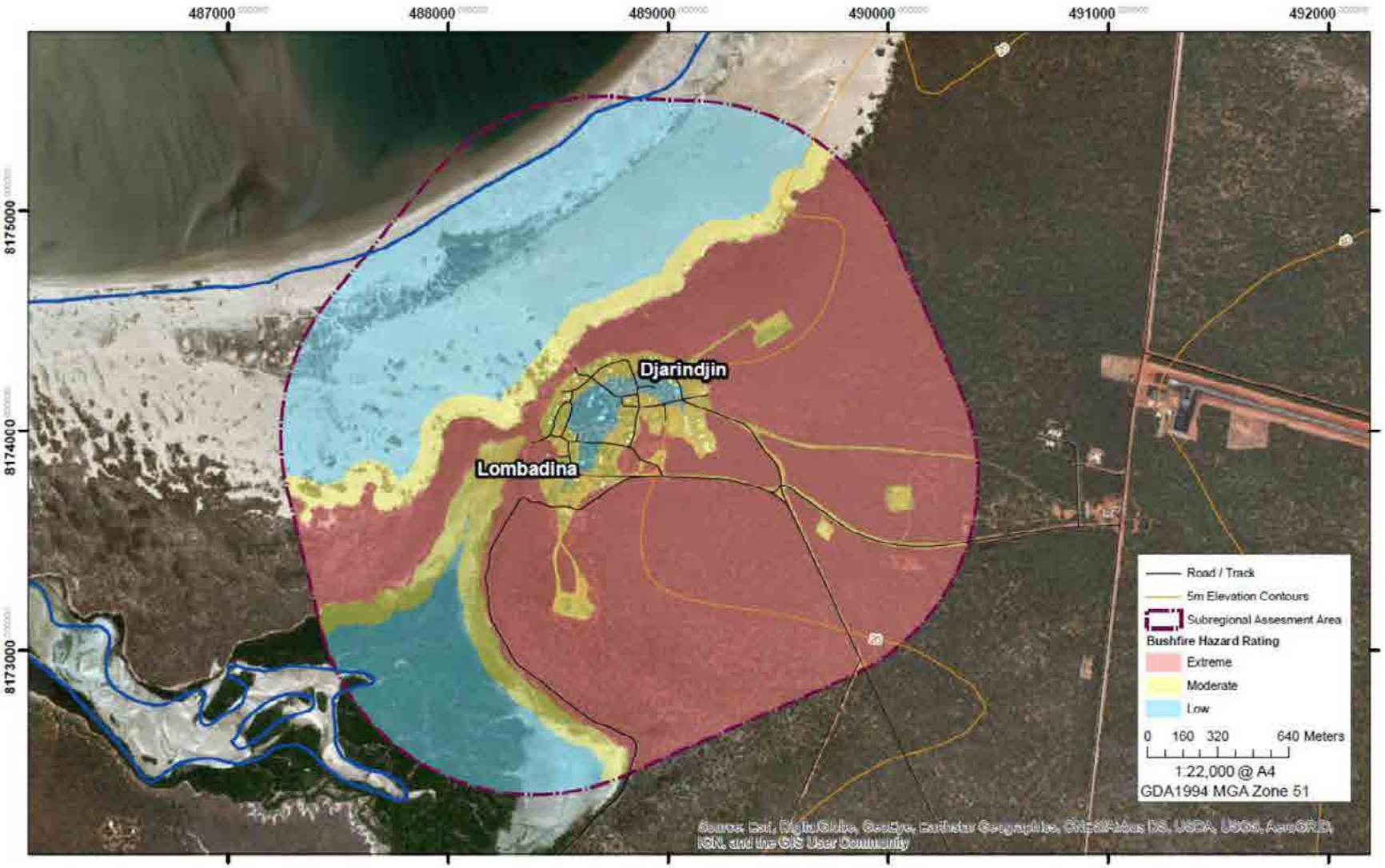


Figure 6: Embalgun BHL

Figure 7: Middle Lagoon BHL

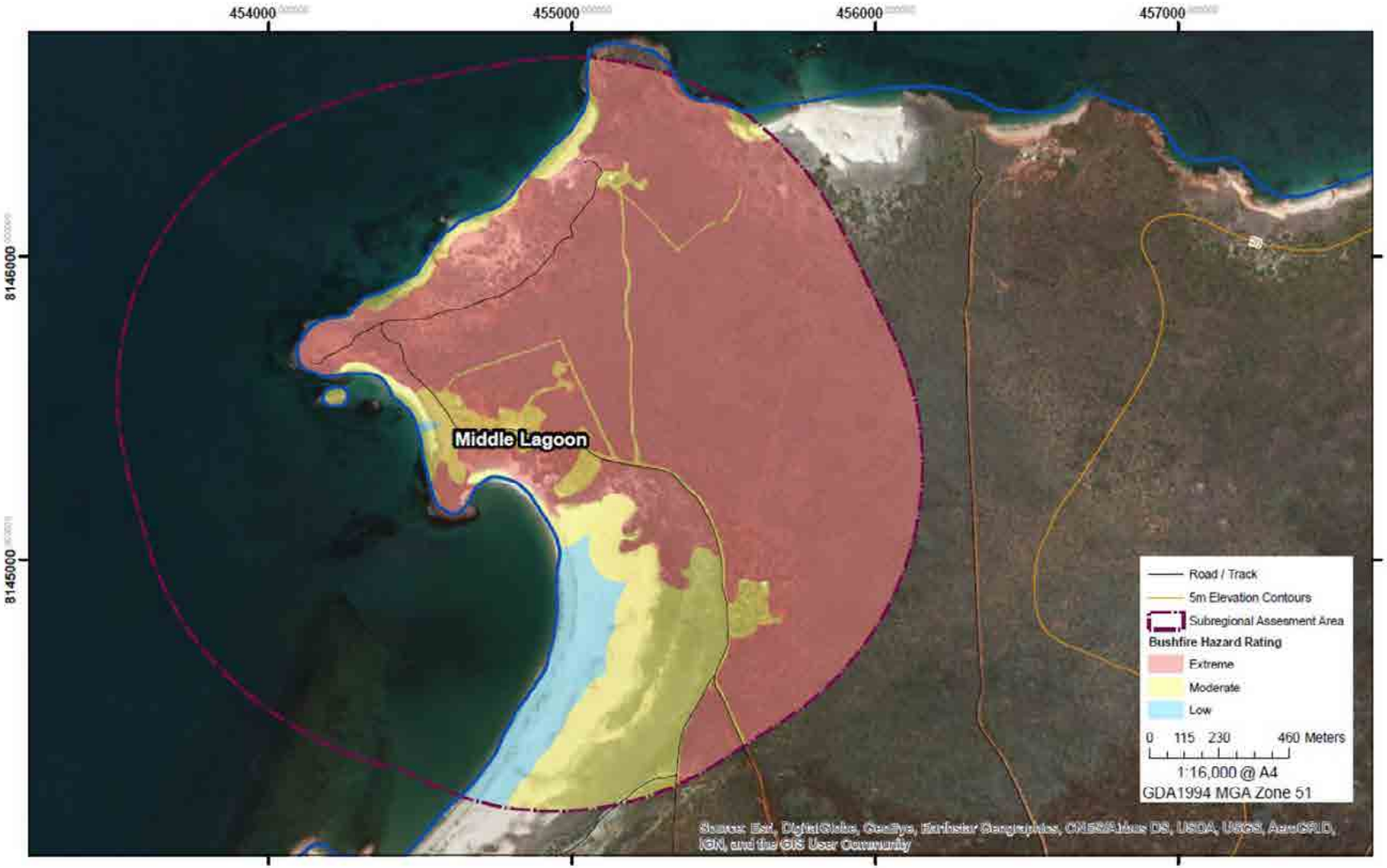
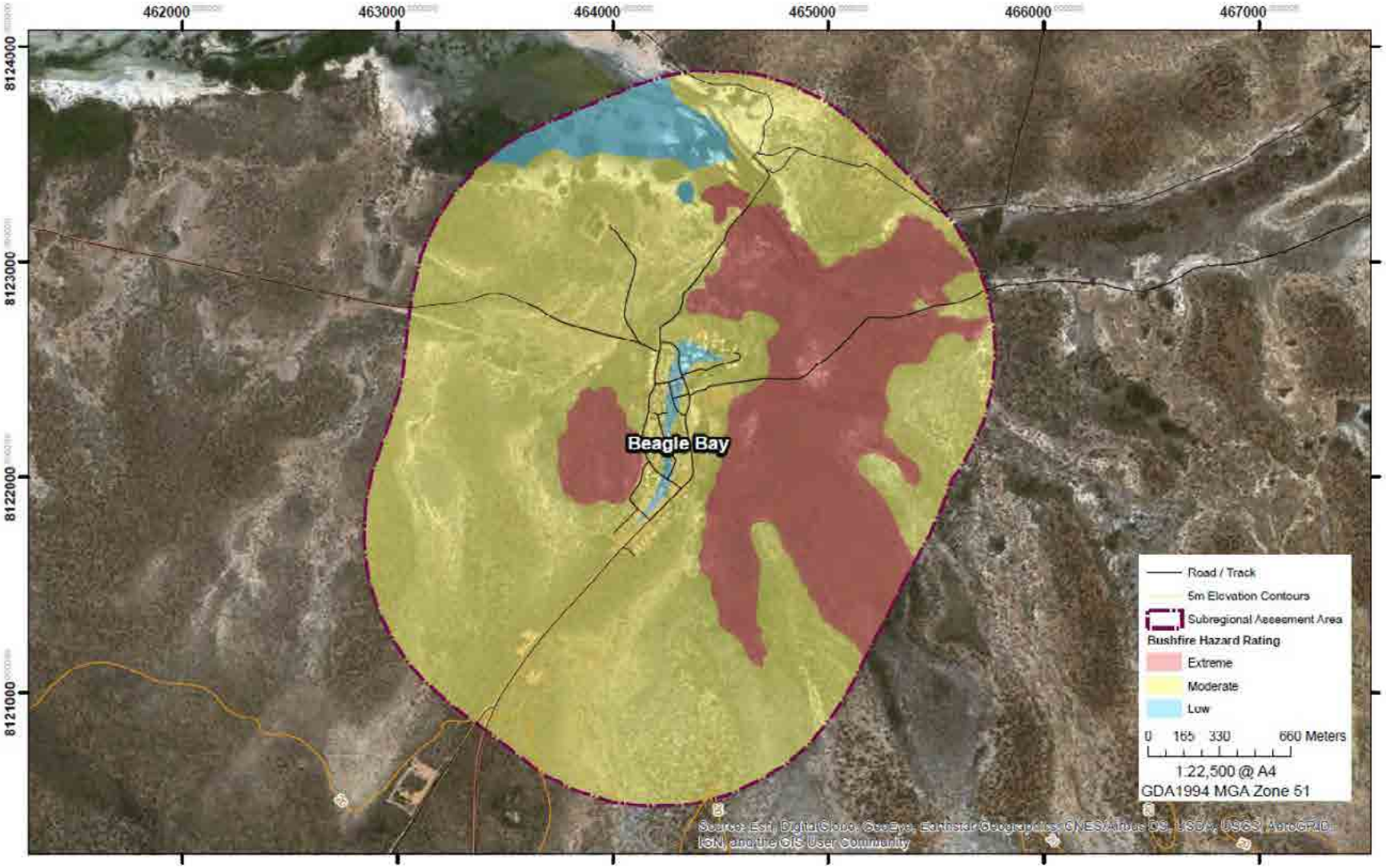


Figure 8: Beagle Bay BHL



APPENDIX 2 – IDENTIFIED SAFER PLACES

The images below are taken from the Dampier Peninsula Bushfire Safer Places Report undertaken by Bushfire Safety Consulting, based on a review of inspections carried out by a Level 3 BPAD Consultant.

Location details:	Dampier Peninsula
Assessment date:	August, 2020
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2021

FIGURE 1
SITE LOCATIONS

SCALE 1:500 000 @ A3
DATE: OCTOBER 2020

SOURCE: GOOGLE MAPS

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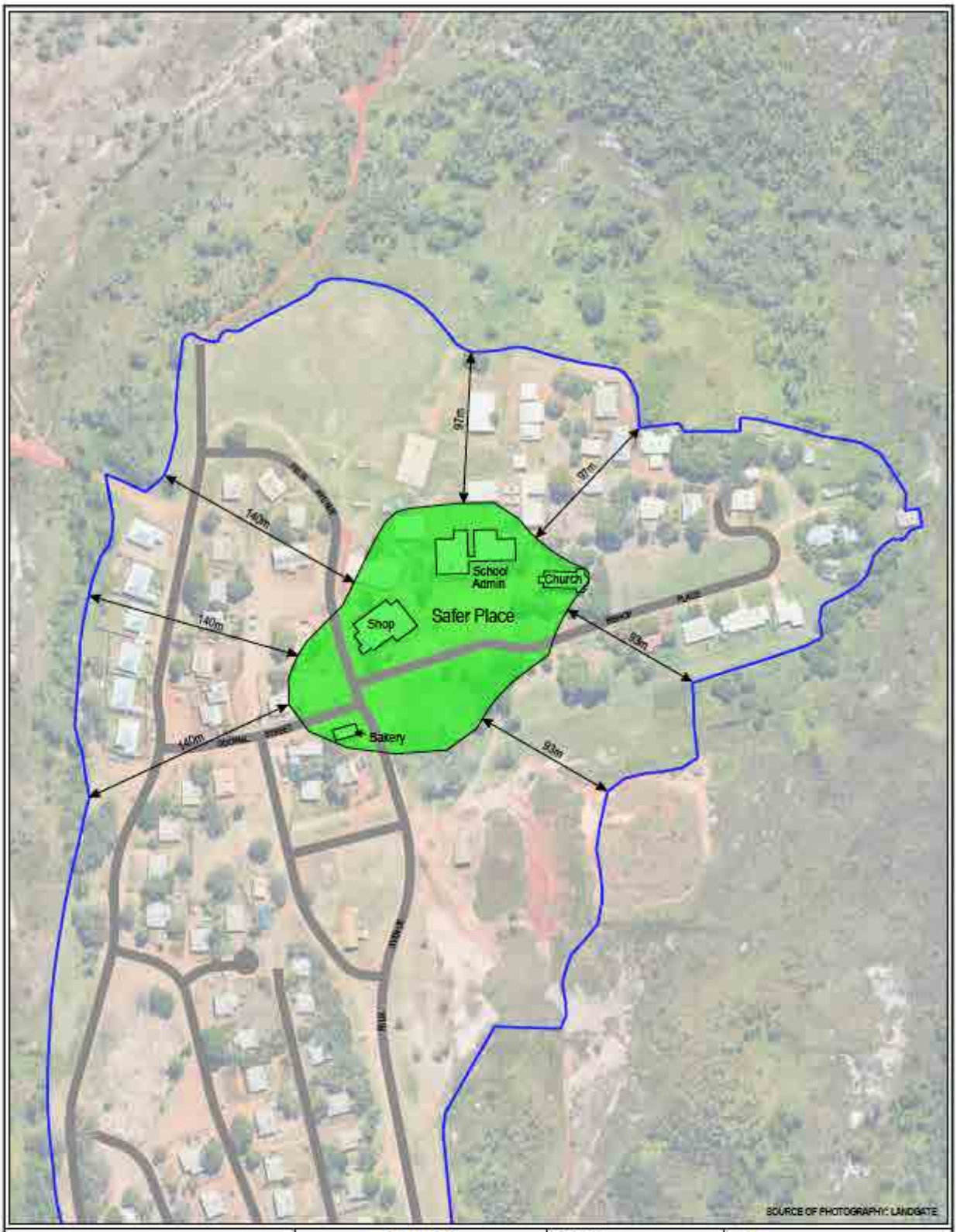
APPENDIX 2 – IDENTIFIED SAFER PLACES



Location details:	Beagle Bay
Assessment date:	August, 2020
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2021
Date aerial photo:	Unknown

FIGURE 3
BEAGLE BAY BUSHFIRE SAFER PLACE

SCALE 1:2200 @ A3
DATE: NOVEMBER 2020

LEGEND

SAFER PLACE (EXPOSED < 2WM/M2)

BUSHLAND EDGE AROUND BEAGLE BAY

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Cabins and camping area
Office
Caretaker
93m
148m
116m
148m
110m
Area could be exposed at low tide increasing access and shelter options
Safer Place
Location details: Middle Lagoon
Assessment date: August, 2020
Prepared by: Bushfire Safety Consulting
Accreditation level: Level 3 BPAD Practitioner
Accreditation number: BPAD 23160
Accreditation expiry date: 31st January, 2021
Date aerial photo: Unknown
FIGURE 5
MIDDLE LAGOON
BUSHFIRE SAFER PLACE
SCALE 1:3000 @ A3
DATE: SEPTEMBER 2020
LEGEND
SAFER PLACE (EXPOSED < 2kW/M2)
4WD AND WALKING ACCESS TO SHELTERING AREA
BUSHLAND EDGE
EXPOSED AREA AT LOW TIDE WILL INCREASE ACCESS & SAFETY
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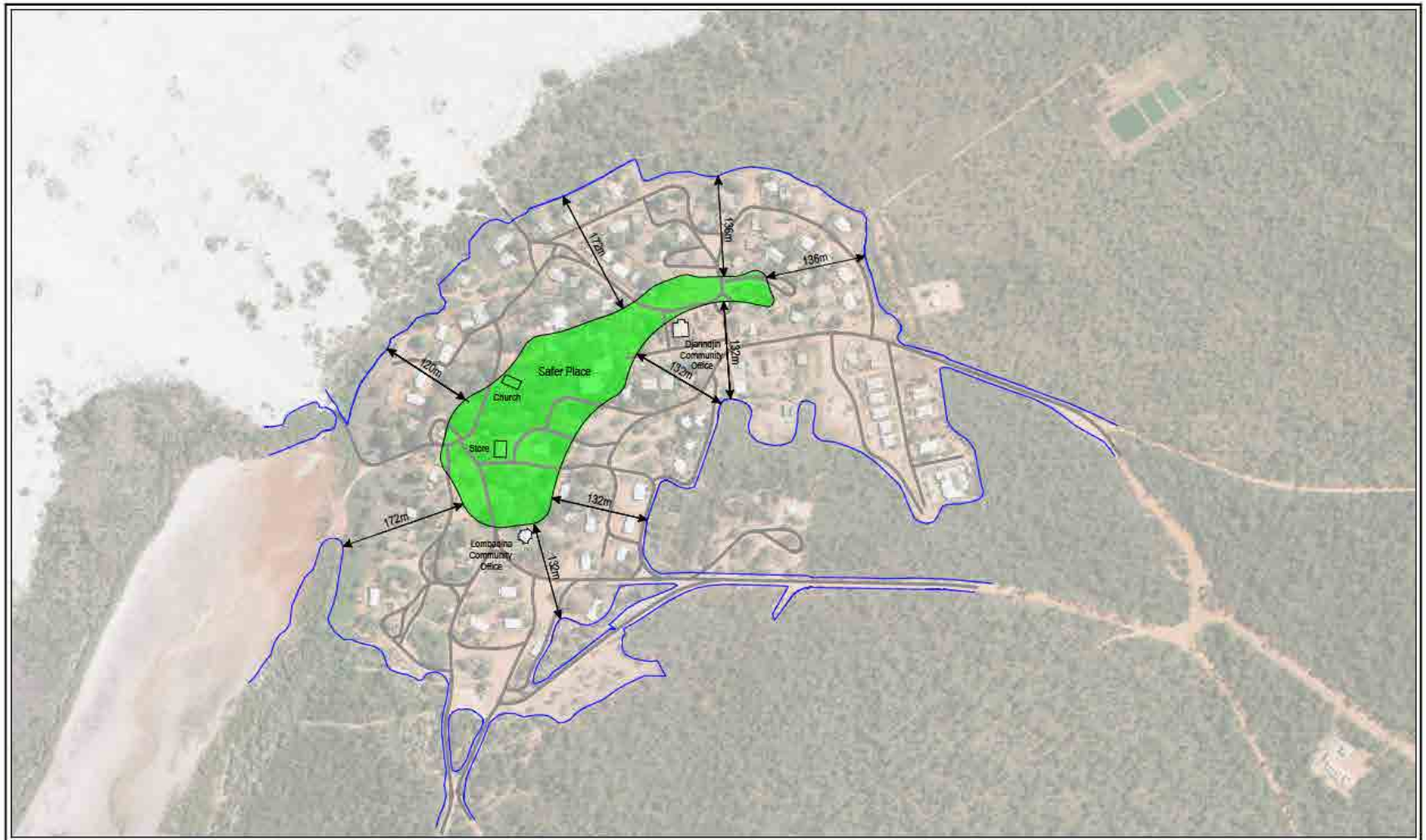
APPENDIX 2 – IDENTIFIED SAFER PLACES



Location details:	Djarindjin and Lombadina
Assessment date:	August, 2020
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2021
Date aerial photo:	Unknown

FIGURE 7
DJARINDJIN / LOMBADINA
SAFER PLACE

SCALE 1:4800 @ A3
DATE: SEPTEMBER 2020

LEGEND

- SAFER PLACE (EXPOSED < 2kW/M2)
- ACCESS ROADS
- BUSHLAND EDGE

SOURCE OF PHOTOGRAPHY: LANDGATE

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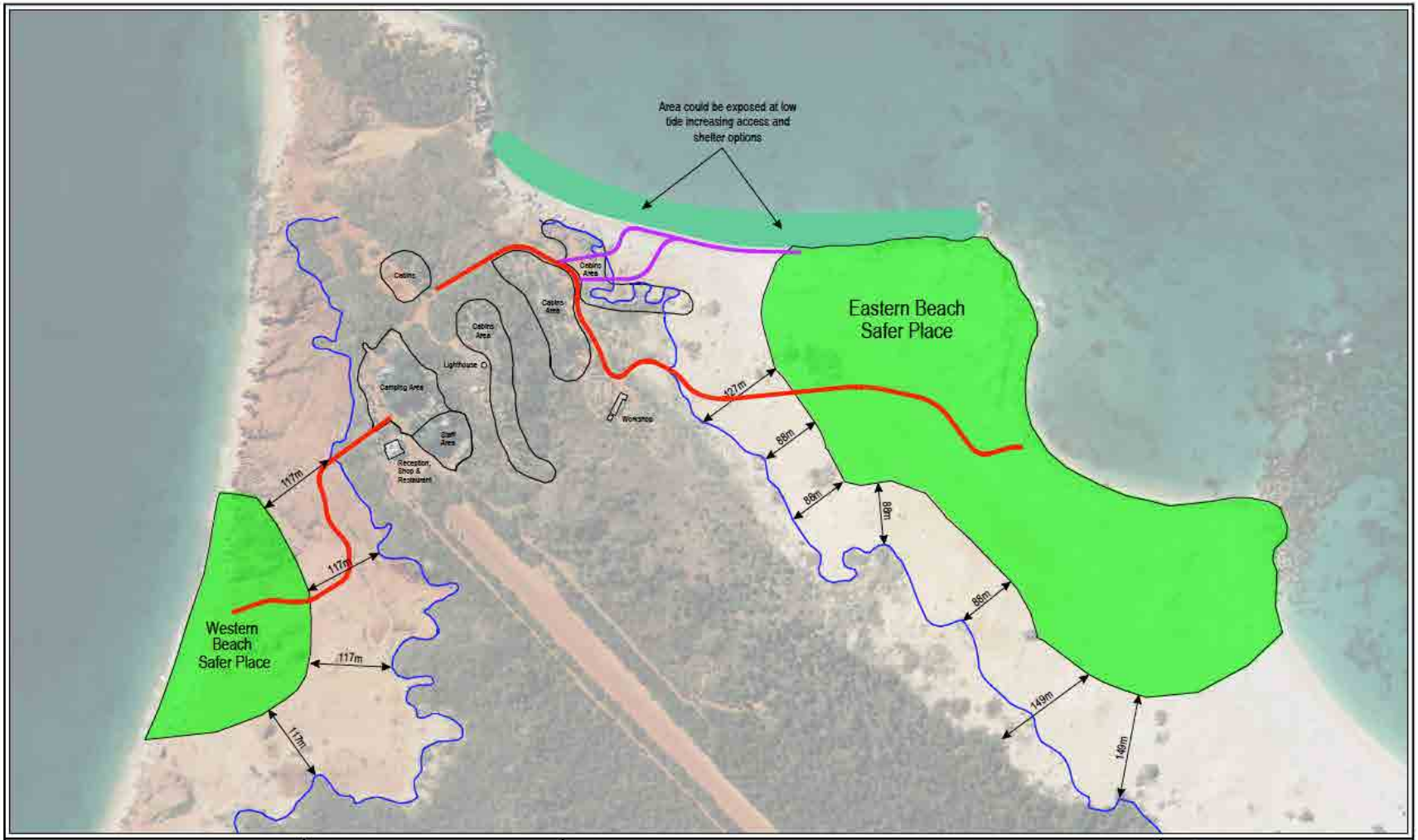
APPENDIX 2 – IDENTIFIED SAFER PLACES



Location details:	Kooljaman Resort
Assessment date:	August, 2020
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2021
Date aerial photo:	Unknown

FIGURE 9
KOOLJAMAN SAFER PLACES

SCALE 1:5000 @ A3
DATE: NOVEMBER 2020

LEGEND

- SAFER PLACE (EXPOSED TO < 2kW/M2)
- 4WD AND WALKING ACCESS TO SAFER PLACE
- BUSHLAND EDGE
- EXPOSED AREA AT LOW TIDE WILL INCREASE ACCESS & SAFETY
- WALKING ACCESS TO SAFER PLACE

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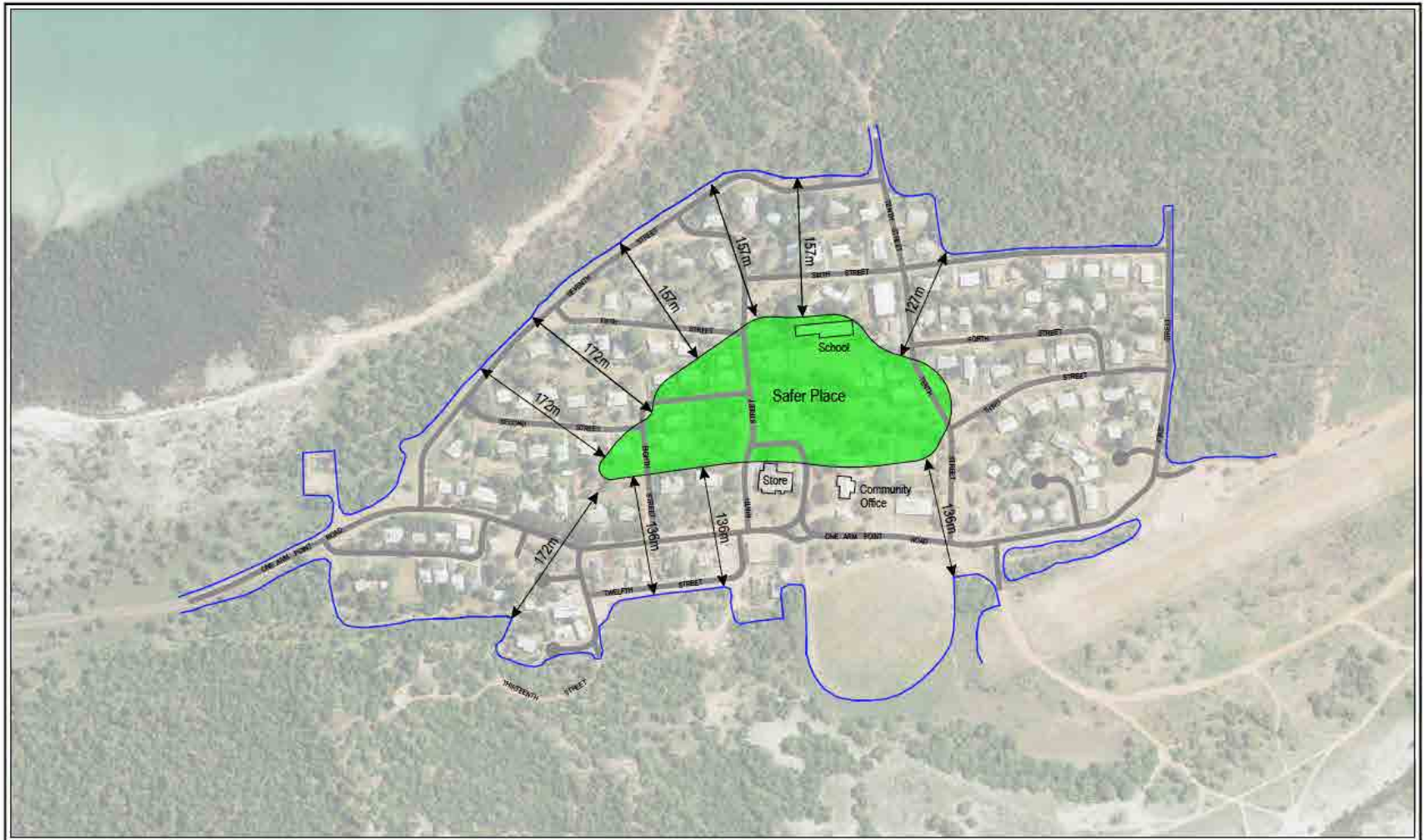
APPENDIX 2 – IDENTIFIED SAFER PLACES



Location details:	Ardyaloon / One Arm Point
Assessment date:	August, 2020
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2021
Date aerial photo:	Unknown

FIGURE 11
ARDYALOON BUSHFIRE SAFER PLACE

SCALE 1:4000 @ A3
DATE: SEPTEMBER 2020

LEGEND

- SAFER PLACE (EXPOSED TO < 2kW/M2)
- ACCESS ROAD
- BUSHLAND EDGE

SOURCE OF PHOTOGRAPHY: LANDGATE

bushfire safety CONSULTING
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APPENDIX 2 – IDENTIFIED SAFER PLACES

Location details:	Gumbanan Wilderness Retreat
Assessment date:	August, 2020
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2021
Date aerial photo:	Unknown

FIGURE 13
GUMBANAN POTENTIAL BUSHFIRE SAFER PLACE

SCALE 1:2000 @ A3
DATE: AUGUST 2020

LEGEND
- SAFER PLACE (EXPOSED TO < 3kW/M2)
- 4WD AND WALKING ACCESS TO SAFER PLACE
- BUSHLAND EDGE
- ASSET PROTECTION ZONE (Fuel Reduction Works required)

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APPENDIX 3 – GUIDANCE FOR THE PREPARATION OF BUSHFIRE MANAGEMENT PLANS ON THE DAMPIER PENINSULA

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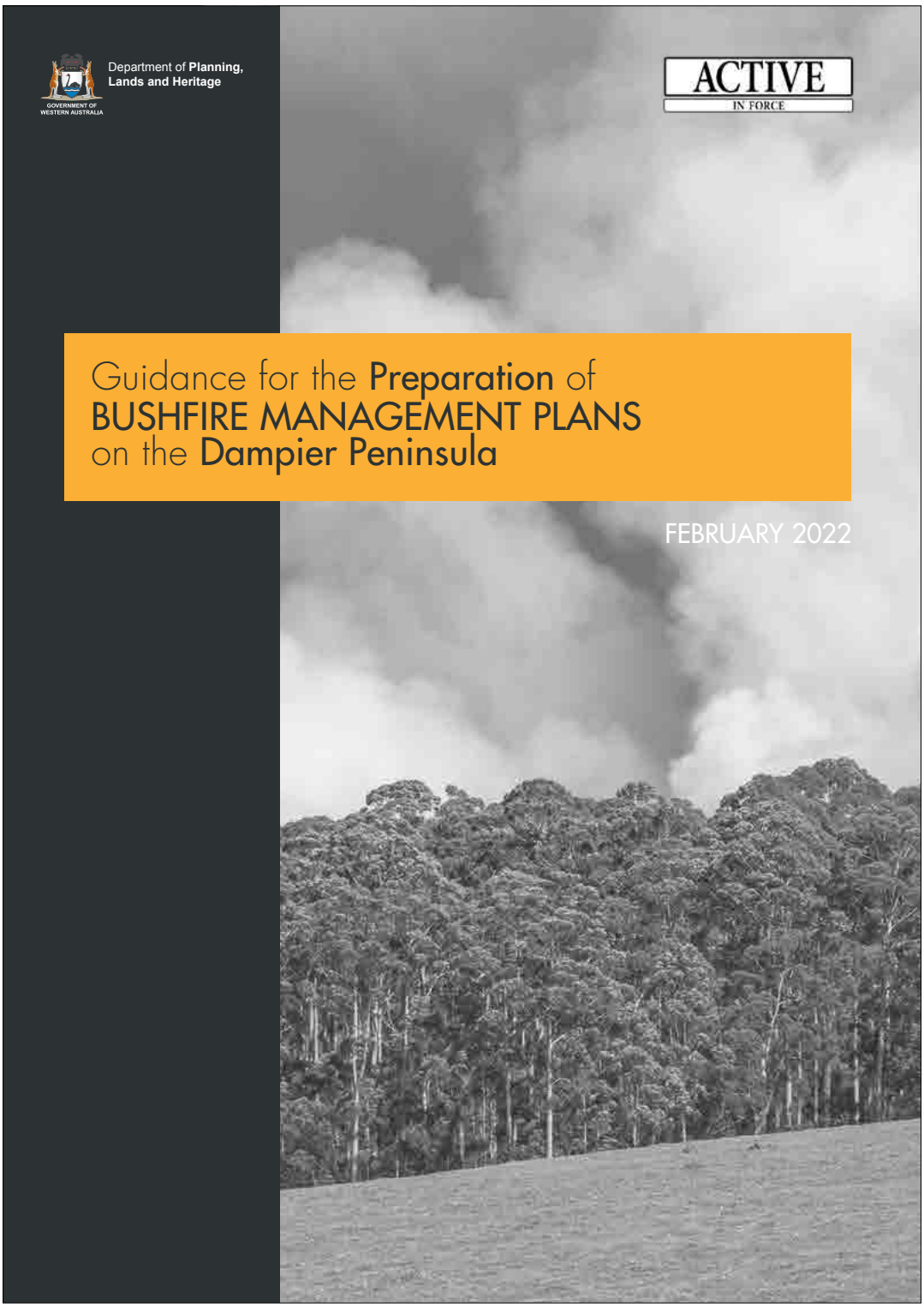

APPENDIX 4 – GUIDANCE FOR THE PREPARATION OF AN EMERGENCY EVACUATION PLAN FOR TOURISM DEVELOPMENTS ON THE DAMPIER PENINSULA

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