

SHIRE of DUNDAS BUSHFIRE RISK MANAGEMENT PLAN. Integrated method. V1 2022-2027



(Photo Shire of Dundas 2020).

Shire of Dundas BRM Plan endorsement 22nd November 2022



Norseman Woodlands to Eucla Coast

Acknowledgement of Country



(Photo Shire of Dundas 2022)

The Shire of Dundas recognises the Ngadju and Mirning people as traditional custodians, and acknowledges their Elders past, present and emerging.

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PART A

BUSHFIRE RISK MANAGEMENT PLAN

1. Forward

It is a pleasure to present his plan to the people, communities, businesses, authorities, and visitors to the Shire of Dundas. It is because of this plan that we look forward to reducing the risk posed by bushfires to the things we value, and increasing the resilience and wellbeing of our people, and the economy, environment and services that are delivered or serviced through our Shire.

You will appreciate that the Shire of Dundas occupies a unique place in Western Australia. We are a small population, in a large space. We include a large portion of the Great Western Woodlands, home of the Ngadju people, and the Nullarbor plain, home of the Mirning people. Our towns and communities are dispersed from Eucla in the east across, pastoral leases, mines and service centres of the Eyre Highway that connects the continent, to the administration centre at Norseman. Norseman is connected by highway two hours to Esperance or Kalgoorlie or 3 hours to Hyden.

Fire has a long history in our community. A song of the women of Fraser Range sings of the role of Karrgain¹ the blue pigeon.

Karrgain goolain bal	Karrgain brought the
nambal nambal, eemalalla	smoke
geen geen, eemalalla	and the fire,
geen, geen	the smoke and the fire

The greater story of how Karrgain bought the fire to the people, and the story of fire is further explained in Ngadju kala: Ngadju fire knowledge and contemporary fire management in the Great Western Woodlands.²

¹ Prober SM, Yuen E, O'Connor MH, Shultz L (2013, p.3). Ngadju kala: Ngadju fire knowledge and contemporary fire management in the Great Western Woodlands

² Prober SM, Yuen E, O'Connor MH, Shultz L (2013). Ngadju kala: Ngadju fire knowledge and contemporary fire management in the Great Western Woodlands

The frightening power of fire has been experienced recently though too. Council and the community experience is highlighted in the 2019/20 annual report³.

Just prior to Christmas 2019, our world was suddenly impacted by a series of fires, all started by lightning strikes. The number of fires continued to grow until we had nine (9) active at once throughout the Shire. As the number of fires increased, so the number of roads open for travel decreased, until we had all four access roads to town closed to all traffic. The impact of the fires was not noticed amongst the disaster taking place in the Eastern States until the Eyre Hwy was closed for a period of 12 days. Whilst we were not impacted by any means to the degree of those in the East, (in relation to built infrastructure), we suffered significant natural and cultural damage as a result of the fires and lost over 500,000ha of our precious woodlands. Businesses were also impacted by the fires in the lack of through traffic. The fires also took a significant toll on our Shire staff as well as the many, many volunteers who found themselves away from their families over Christmas and New Year. The 'boots on the ground' did an outstanding job of keeping us safe and we extend heartfelt thanks for the significant efforts they put in on our behalf. There was also considerable effort from our staff in dealing with unending queries about road closures, people being 'stranded' in town and the requirement to assist families stranded in other parts of the country without accommodation or the means to pay for the unexpected requirement. Several Community briefing sessions were held which alleviated the anxiety to a degree but, it was certainly a stressful time for many of our community as well as travelers and emergency services personnel.

Whilst we experienced damage and disruption in 19/20, this is hard to compare to the experience of our closest neighbor who in 2015 lost four loved members of its community in the Scadden Esperance Fires and the families of the 3 truck drivers who sadly died on the Great Easter Highway at Boorabbin in 2007. Our future is likely to experience more such fires as climate change is forecast to reduce moisture in the woodlands. Through working together to implement this plan we can reduce the chance of these happening again.

Laurene Bonza. President. Shire of Dundas

³ Shire of Dundas Annual Report 2019-2020. (2020) Shire of Dundas
Shire of Dundas Bushfire Risk Management Plan

2. Introduction

2.1. Background

Under the State Hazard Plan Fire⁴ a Bushfire Risk Management Plan (BRMP) is to be developed for local government areas with significant bushfire risk. The Shire of Dundas is **not one** of the 45 council areas listed in the State Emergency Management Procedure as having a high or extreme bushfire risk⁵. The Shire of Dundas has received discretionary funding, from Department of Fire and Emergency Services (DFES) to prepare this plan following the 2019/20 Norseman complex of fires which burnt more than 500 000 hectares and severely disrupted national supply chains and travel routes.

This plan will enhance and enable the Shire in its role as custodian of the plan to work in partnership with the Shire of Dundas community, members of its LEMC and the Goldfields Esperance DEMC to reduce the incidence of and impact of bushfire on the local community, and the assets and values in the Shire area.

2.2. The Shire of Dundas

Located in the southeast of Western Australia, the Shire of Dundas has a rich and rugged environment. Over 92,725km² of diverse landscapes, including the remote coastline of the Southern Ocean; world-famous Nullarbor Plains, massive granite outcrops and long stretches of dry salt lakes, and the ecologically significant Great Western Woodlands. Figure 1.

The town of Eucla supports the operation of the State border, whilst Pastoral Lease Stations, service centres and mining villages are spaced along the Eyre Highway to South Australia. Norseman is the main residential and administrative centre for the Shire.

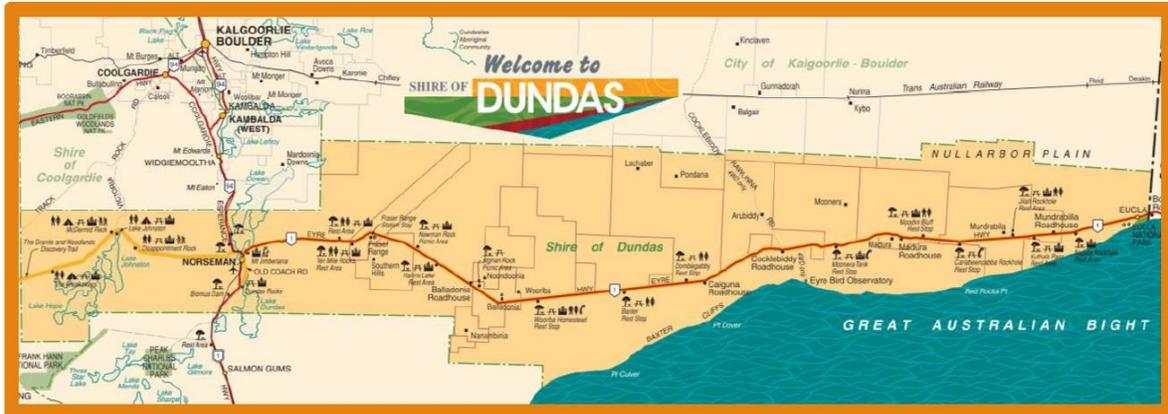
Ngadju, and Mirning are the Traditional Owners connected to Country across and beyond the Shire's boundaries. The Ngadju Native Title Aboriginal Corporation and Mirning Traditional Lands Aboriginal Corporation are the Cultural and Native Title representatives. Cultural values are embedded across the landscape and the role of fire has been extensively explored in Ngadju

⁴ Government of Western Australia State Emergency Management Committee (Dec. 2020) STATE HAZARD PLAN Fire V01.01

⁵ State Emergency Management Committee State (Oct 2021) Emergency management procedure. Version 3.01
Shire of Dundas Bushfire Risk Management Plan

Kala, Ngadju fire knowledge and contemporary fire management in the Great Western Woodlands⁶

Figure 1 Shire of Dundas is 1000 kilometres long.



The Shire of Dundas Council maintains strong working relationships with all local governments in the Goldfields Esperance region and is an active member of the Goldfields Voluntary Regional Organisation Councils (GVROC). Collaboration with the emergency sector is through the Goldfields Esperance District Emergency Management Committee and community stakeholders in the Local Emergency Management Committee.

Classed as 'very remote' by ARIA, the Shire is ranked the 11th most disadvantaged LGA in Western Australia and 62nd nationally from 564 LGA's (SEIFA). The Regional Price Index states that, on average, the residents of Dundas pay 11% more for daily items such as food and health and personal care. Although faced with the challenges of remote living and industry cycles of boom and bust, the community has an inner strength of resilience, working to meet challenges through innovation, advocacy, and determination.

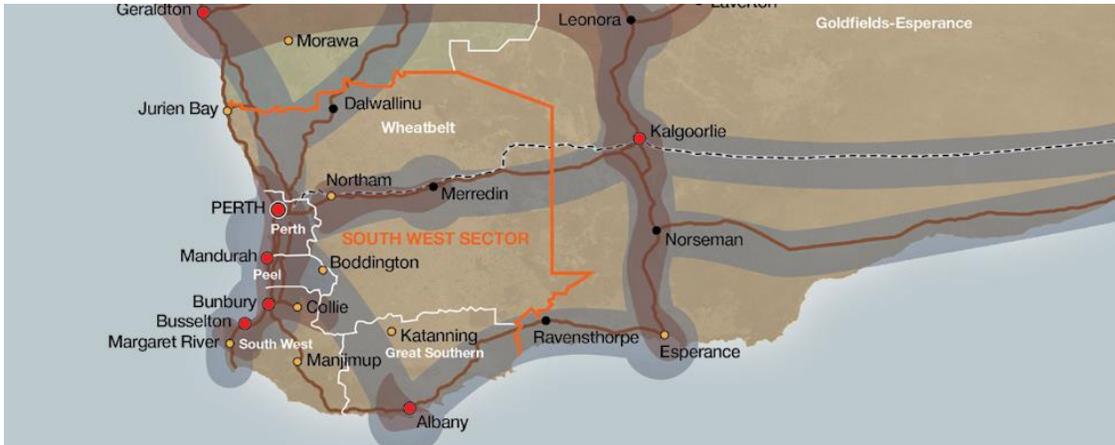
The Shire of Dundas economy is integrated into the broader Goldfields economy and underpinned through the mining sector, inter-state transport, agriculture, government services and tourism. The State Planning Strategy 2050⁷ identifies the Southern Goldfields and Shire of Dundas as a focus area for infrastructure and economic activity. Significant infrastructure

⁶ Prober SM, Yuen E, O'Connor MH, Shultz L (2013, p.16). Ngadju kala: Ngadju fire knowledge and contemporary fire management in the Great Western Woodlands. CSIRO Ecosystem Sciences, Floreat, WA

⁷ Western Australian Planning Commission. State Planning Strategy 2050. (2014) Planning for sustained growth and prosperity

services this economy including the Eyre Highway, Fibre Optic Backbone, and north south rail links. Figure 2.

Figure 2 Essential economic and infrastructure corridors in the Shire of Dundas

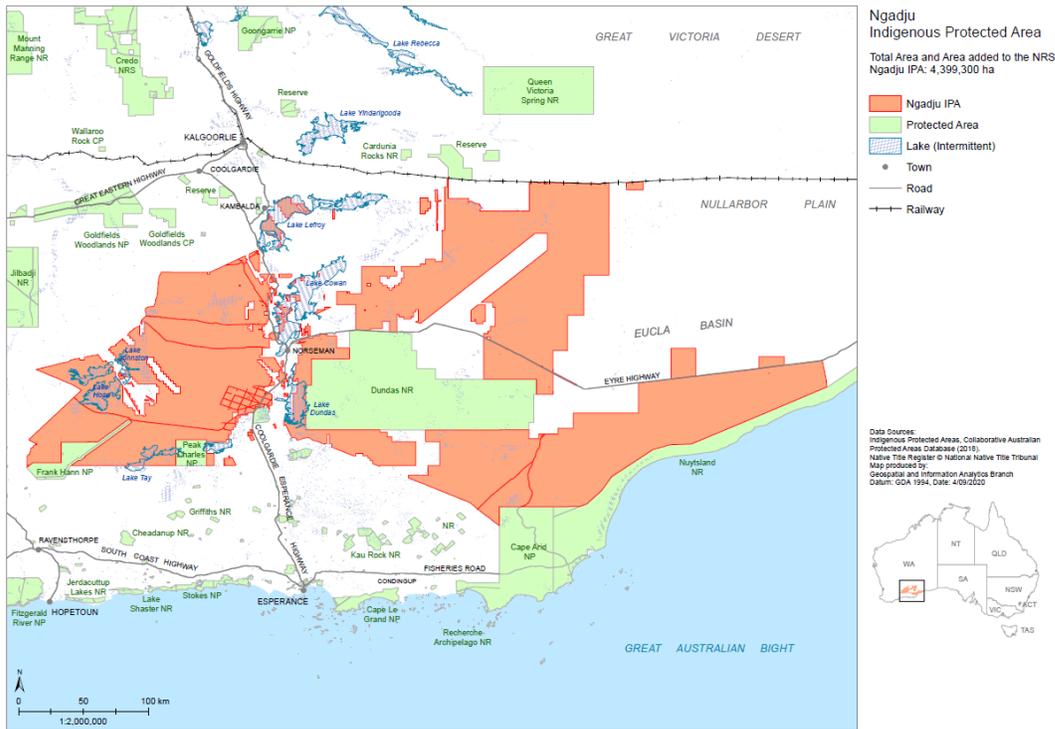


The environmental values of the Shire of Dundas are extensive and include the coastal communities of the Great Australian Bight, the world's largest Karst system of the Nullarbor plain and the world's largest remaining Mediterranean woodlands of the Great Western Woodlands. Recently 4.4 million hectares of the woodland areas have been designated the Ngadju Indigenous Protected Area (IPA) that connects Dundas and Nuytsland conservation reserves. Figure 3.⁸

Greater details of the Shires Land Use, People, Economy, Social Setting, Governance, Infrastructure and Environment are described in Part B of this plan in Chapter 5 "Establishing the Context".

⁸ Indigenous protected areas. Australian protected areas database (2018)
Shire of Dundas Bushfire Risk Management Plan

Figure 3 Conservation network including Ngadju Indigenous Protected Area.



2.3. Legislation, policy, standards, and guidelines

The development of this plan is subject to a range of legislation, policy, guidelines, and standards which enable Bushfire Risk Management Planning and used in this Plan. These are listed in Appendix 1.

2.4. Aim and Objectives

The aim of bushfire management is to reduce the consequence of bushfires in the Shire of Dundas. This is particularly important to the Shire of Dundas’s 700 community members and 1000 visitors/travelers it hosts per day, the State economy and essential supply chains that contribute to the State Planning Strategy 2050⁹. Figure 4.

To achieve this, the State Core Objectives for Emergency Management¹⁰ have been adopted and will be applied in the local context. Figure 5.

⁹ Western Australian Planning Commission. State Planning Strategy 2050. (2014) Planning for sustained growth and prosperity

¹⁰ State Emergency Management Committee State (Dec 2021) State Emergency Management Plan. A Strategic Framework for Emergency Management in Western Australia. Version 3.02

Figure 4 State Planning Strategy 2050

State Planning Strategy structure

VISION: SUSTAINED GROWTH AND PROSPERITY			
Diverse	Liveable	Connected	Collaborative
PRINCIPLES			
Community	Infrastructure	Economy	Regional development
	Environment	Governance	
STRATEGIC GOALS			
Global competitiveness	Strong and resilient regions	Sustainable communities	
	Infrastructure planning and coordination	Conservation	
STRATEGIC DIRECTIONS			
1. Economic development	2. Physical infrastructure	3. Social infrastructure	
1.1 Resource economy	2.1 Movement	3.1 Spaces and places	
1.2 Knowledge transfer	2.2 Water	3.2 Affordable living	
1.3 Tourism	2.3 Energy	3.3 Health and wellbeing	
1.4 Agriculture and food	2.4 Waste	4. Environment	
1.5 Remote settlements	2.5 Telecommunications	5. Security	
1.6 Land availability			
ACTION PLANNING			
	Implementation	Evaluation	

The State Core Objectives being.

PEOPLE: Protect lives and wellbeing of persons

ECONOMY: Maintain and grow the State's productive capacity, employment, and government revenue

SOCIAL SETTING: Ensure that there is public order, that people are housed and fed in a safe and sanitary manner and have access to social amenities including education and health services, and that things of cultural importance are preserved

GOVERNANCE: Ensure that there is, at all times, an effective and functioning system of government and societal respect for rule of law

INFRASTRUCTURE: Maintain the functionality of infrastructure, particularly key transport infrastructure and utilities required for community health, economic production and effective management of emergencies

ENVIRONMENT: Protect ecosystem and biodiversity

Figure 5 Strategic planning relationships to develop the Shire of Dundas Bushfire Risk Management Plan



The local strategic context is set by the Shire of Dundas Community Strategic Plan which describes its **Community Vision** is to be **Diverse Inclusive Sustainable Accountable**.

In doing so it has the following goals

- **Community:** A healthy, safe, resilient, and engaged Community. A place where people thrive, and diversity is celebrated. A place of belonging.
- **Natural environment:** Our natural environment is viewed as a precious asset that is protected and enjoyed. A place where sustainable opportunities and collaboration is nurtured.
- **Built environment:** Planning and development of infrastructure supports liveable, sustainable, and connected communities.
- **Economic Development and Financial Sustainability:** A thriving local economy & economic base supports economic growth and business opportunity.
- **Governance and Leadership:** We are a trusted local government who are a strong advocate for our community; we lead with respect and accountability.

The plan is to enable those objectives to be achieved in the Shire of Dundas when managing the risks posed by bushfire. Figure 6. This plan has been prepared to support the collaboration of stakeholders in reducing the risk in an evidence based and systemic manner. Consequently, the objectives of this **BRM Plan** are to:

- guide and coordinate a tenure blind, multi-agency BRM program over a five-year period:
- document the process used to identify, analyze and evaluate risk, determine priorities and develop a plan to systematically treat risk.
- facilitate the effective use of the financial and physical resources available for BRM activities.
- integrate BRM into the business processes of local government, landowners, occupiers, service deliverers and other agencies.
- ensure there is integration between landowners, BRM programs and activities; and
- document processes used to monitor and review the implementation of treatment plans to ensure they are adaptable, and that risk is managed at an acceptable level.

Strategy and action are the purpose of this plan, and these are described in this chapter. For further information on how these actions were identified go to;

- Part B that describes the risk assessment process
- Part C that is the risk register and consequence table. The Register identified the risks (statements) to be managed, their potential likelihood and consequence and the priority for action.

Actions of a tangible nature will be captured in a treatment schedule and the Bushfire Risk Management System for ongoing coordination and monitoring by the Shire of Dundas LEMC.

Figure 6 Large bushfires threaten community's objectives. (Photo Shire of Dundas)



2.5. Bushfire management in the Shire of Dundas

Bushfire management in the Shire of Dundas and the broader southern goldfields has its own unique challenges. The Statewide arrangements, doctrine and tactics that are in place have evolved from the tall forest of the southwest, the collective response arrangements of the wheatbelt and the high demand peri urban environments of Perth. The assumptions that underpin those approaches are generally less effective when applied in Southern Goldfields. Characteristics that influence fire management in the Shire of Dundas includes.

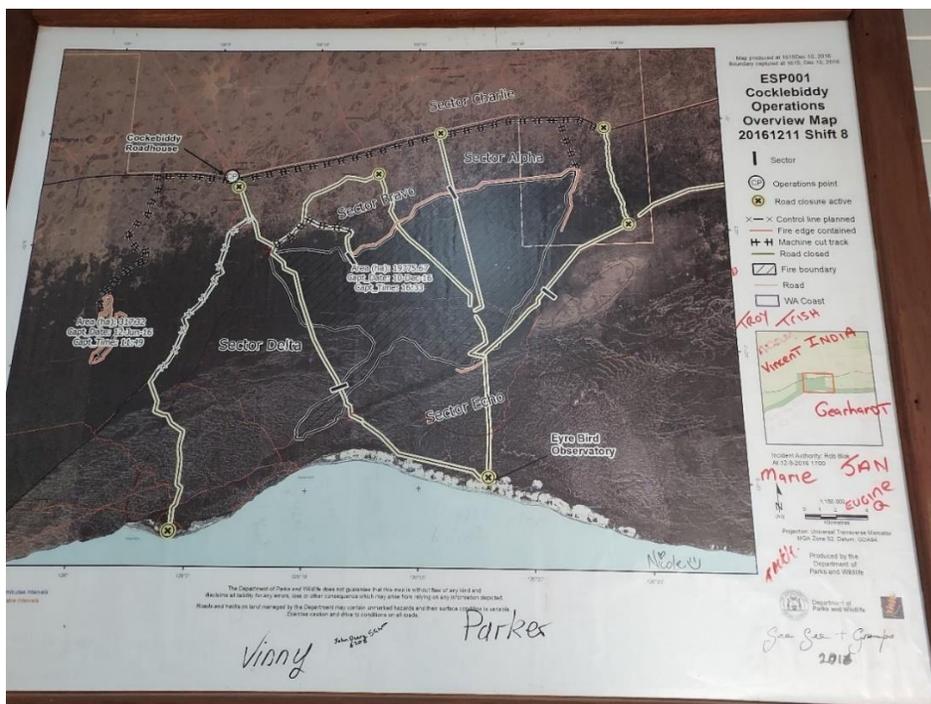
- The size of the areas - The bushfire prone Great Western Woodlands extends over 160 000 square kilometres (16 million hectares) - about the same size as England. The Shire of Dundas is 90 000 square kilometres.
- Complex occupation – over 99.9% of the land in Dundas Shire is State owned, but then subject to extensive pastoral leases in the west and mining and exploration leases in the central and eastern areas. Aboriginal lands of the Ngadju or Mirning Communities, through partial or exclusive native title, occupy most of the State lands. The Commonwealth Government has designated 4.4 million hectares of Aboriginal land as an Indigenous Protected Area in the heart of the Dundas Shire¹¹, that connects the Dundas Nature Reserve, Nuytsland Reserve and other conservation lands. and
- Fire history. – When fires start in the Dundas Shire, they tend to be larger than the average. Of the 165 recorded fires in the last 10 years, 5 (3%) are over 100,000 hectares, 7 (4%) are 10 000 to 100 000 hectares and 9 (5.5%) are between 1000 and 10 000 hectares¹². Larger fires have significant consequences to people’s lives, cultural and natural values, property, supply chains and critical infrastructure. Such fires in the neighboring Shires of Coolgardie in 2007 took three lives, and in Esperance in 2015 took four lives.

¹¹ The Hon Sussan Ley MP Minister for the Environment. Media Release “Indigenous Protected Areas expanded by 7 million hectares” 10 October 2020

¹² Operational Information Systems Branch of the Department of Fire and Emergency Services 19/07/2021 All Bushfires – Locality of Dundas. 2011-21.

- Fire behavior – four bushfire landscapes occur in the Shire of Dundas: Scrublands, Woodlands, Grasslands, and bare areas¹³. These each have distinctive fire behaviors. Shrublands, mallee and hummock /grassland are historically more prone to bushfires¹⁴. Woodlands are less so. A characteristic of the woodlands is that they do not have contiguous ground fuels, but under severe fire weather conditions, flame lengths may bridge the gaps. The gaps are wider in old growth woodland with extensive bare ground, but shorter in regrowth and intermediate succession communities. Consequently, these fuel types are more unpredictable and volatile under heavy wind, Severe, Extreme or Catastrophic fire danger ratings¹⁵. Figure 7. The chenopod shrublands and grasslands of the Nullarbor are seasonally variable dependent on winter rains. Maintaining the balance and quality of the more fire-resistant Chenopod shrublands with grasslands, reduces the bushfire risk.¹⁶ .

Figure 7 Woodlands bushfires are very volatile under severe, extreme or catastrophic conditions



¹³ Department of Environment and Conservation.(2010) Bushfire Threat Analysis of the Great Western Woodlands.

¹⁴ Woodland. Recovery after fire. Landscape. Gosper, Prober and Yates.

¹⁵ Gosper, Prober and Yates Landscape. Woodland Recovery after fire.

¹⁶ Department of Primary Industry and Regional Development. Arid zone rangeland pastures and fire March 2021 Shire of Dundas Bushfire Risk Management Plan

- Recovery - When woodlands are burnt, even under mild conditions, the key eucalypt overstorey species die and generate prolific eucalypt seedling regeneration¹⁷. Repeat fires before seeding maturity can transform woodlands to grasslands. Fires or burns in woodlands can increase fuel loads unless the overstorey stems are protected. Figure 8.

Figure 8 Dense regeneration and high fuel loads in 15-year woodland regrowth



2.6. Roles and Responsibilities in the Shire of Dundas

Landowners and Occupiers

The role of the landowner or occupier of land are principle in the delivery of this plan as owners and occupiers have a responsibility to prepare for, prevent and respond to fires on their land. Approximate measures in Table 1 demonstrates that the State of West Australia is the largest land holder in the Shire of Dundas through the Department of Planning Lands and Heritage (DPLH), 91.4% and the Department of Biodiversity, Conservation and Heritage (DBCH) 8.6%.

¹⁷ Gosper, Prober and Yates Landscape. Woodland Recovery after fire
Shire of Dundas Bushfire Risk Management Plan

DPLH divest some of their interest through occupation leases to pastoralists (38%), service station owners and commercial fishers. Further to this the State through the Department of Mining, Industry Regulation and Safety issues a range of “mining licenses” (40%) over lands of any status which provides the holder occupancy. Exclusive (approx. 40%) and non-exclusive (approx. 40%) Native Title is held by Mirning and Ngadjju people across the Shire. Exclusive title held by the Ngadjju people has been designated as an Indigenous Protected Area. The Marlinyu Ghoorlie Native Title application involves relatively small areas in the far west of the Shire.

National and State utilities and services cross the Shire. Main Roads is a relatively small but critical land holder occupying some 150 square kilometres. The Eyre Highway is 200 metres wide and 700 km long and the Coolgardie Esperance Highway is 100m wide, Figure 9. Rail reserves vary from 40 to 100 metres wide. Communications, water, gas and electricity providers often share these corridors. Water Corporation maintains an easement for the water pipeline and pumps. Historic designation identifies many of the 140 granite outcrops in the Shire as water reserves. Communications providers have leases for their towers, on which multiple services may reside; these are small and rarely provide space for mitigation work. Telstra’s “long haul fibre back-bone” shares space with the Eyre Highway and the Optus “long haul fibre backbone” follows the Eyre Highway and the Old Telegraph Track.

Figure 9 Main Roads is a major stakeholder with 800kms of critical infrastructure in the Shire



Table 1 Land owners and occupiers in the Shire of Dundas

Land Manager/Agency	Approximate square km's	Area	Approximate percent of Local Government Area
Local Government	10		0.01
Private	1		0.001
Department of Biodiversity, Conservation and Attractions	8000		8.6
Department of Planning, Lands and Heritage	85000		91.4
<ul style="list-style-type: none"> • <i>Subject to Pastoral Lease</i> 	35000		38
<ul style="list-style-type: none"> • <i>Subject to Mining and exploration lease</i> 	30000 live 10000 pending		40
<ul style="list-style-type: none"> • <i>Subject to service station lease</i> 	3		< 1
<ul style="list-style-type: none"> • <i>Subject to Fishing lease</i> 	2		< 1
<ul style="list-style-type: none"> • <i>Subject to telecommunications lease?</i> 			
Main Roads	150		.16
Rail	6		.006
Water Corporation			
Native title Ngadju / IPA	35000/20000		
Native title Mirning	15000		
Total			

Bushfire management in this context is difficult, as occupation as the premise that underpins the arrangements, are not consistent in logic or application. Pieces of land may be occupied by multiple parties for different purposes, or occupiers are remote, particularly with mining leases. In practice of all the mining leases only 2 are effectively occupied with a limited capacity to manage fire responsibilities.

Bushfire Management; Programs Capability and Capacity

Response

The Shire of Dundas is designated an extra small to small remote Shire¹⁸. It has a very limited emergency management capability and no accredited Incident Controllers or IMT members. The Shire maintains a Chief and Deputy Chief Bushfire Control Officer, manages fire break notices, grants programs, and the shared emergency service facility. The Shire is responsible to administer the brigades and Eyre Highway based Fire Control Officers (FCO's). The Local Emergency Management Committee is the primary conduit for emergency management planning and activity.

The State Hazard Plan Fire,¹⁹ makes the Shire of Dundas responsible for Bushfire response for level 1 and level 2 fires for Unmanaged Reserves and Unallocated Crown Land, outside of town boundaries and the conservation reserve network. This effectively is all the land owned by the State and administered by the DPLH. Costs for this response are born by the Shire, according to State EM Policy section 5.12²⁰.

This task is beyond the capability and resources of local Government, FCO's and its 2 brigades. The Shire has two volunteer bushfire brigades, The Dundas Volunteer BFB, generously serviced by the Ngadju Rangers and the Dundas Pastoral BFB serviced by the station owners of the Nullarbor. A number of pastoral lease holders (7) act as Fire Control Officer's. Community volunteers in the Norseman and Eucla Volunteer Fire and Emergency Brigades manage response within their respective town limits. Neither Shire of Coolgardie nor City of Kalgoorlie Boulder have Volunteer Bushfire Brigades to provide mutual support. Esperance Shire has an extensive brigade network distributed through its agricultural lands. The Department of Fire and Emergency Services (Kalgoorlie) may provide support based on a "section 13" declaration and will take control if it becomes a level 3 incident. Fire response for the Dundas Nature Reserve is from Parks and Wildlife, Esperance. Aerial support is unlikely unless a level 3 incident is declared. Many fires are routinely monitored through earth observation, Landgate Fire Pro. Emergency management response teams with bushfire equipment are held by IGO Nova and Pantoro for

¹⁸ SEMC 2021 EMERGENCY MANAGEMENT CAPABILITY SUMMARY State-wide overview of Local Governments.

¹⁹ SEMC 2020 State Hazard Plan Fire V1.01

²⁰ <https://semc.wa.gov.au/funding/other-funding-opportunities/Pages/default.aspx>

bushfire response on their mining leases. Pastoral lease holders are responsible to instigate and manage a first response to fires on their leases. Shire of Dundas has further responsibility under the Emergency Management Arrangements for planning and coordination through its LEMC and Recovery. Effective and safe bush fire response under the current arrangements is unachievable and not sustainable.

Preparedness and mitigation

The Parks and Wildlife service have a MOU with the Department of Planning Lands and Heritage for bushfire mitigation work on the UCL. This is only activated when funding is made available. Currently a Mitigations Activity Fund resource is available. The Department of Fire and Emergency Services have a MOU with the Department of Lands Planning and Heritage for bushfire mitigation work on the UCL and unmanaged reserves within town sites. Currently a Mitigations Activity Fund resource is available.

The Department of Mining, Industry Regulation and Safety provides a unique planning regulatory environment for licenses issued under the Mining Act 1978²¹. All risk, resilience, and emergency planning stems from the Mines Project Plan at application. Bushfire response and the application of appropriate building planning codes, whilst a presumption as an occupier, is not within the scope of the project plan review and endorsement process. FIFO and 12-hour shift arrangements means mine workers are precluded from volunteer emergency response activities. Broad strategies and typical risk controls for the management of fire by the different parties are described in Table 2, and current controls and their effectiveness are attached in Appendix 5.

Subject to approval of this plan the Shire of Dundas may have access to competitive Mitigation Activity Fund for use fuel reduction activities on state owned land under the management of the Shire.

²¹ Department of Justice 2022 Mining Act 1978
Shire of Dundas Bushfire Risk Management Plan

Table 2 Typical risk controls

Phase	Objective	Actions
Prevention	Ignition control Spread control	Maintenance of assets Regulation, protocols, and standards for fire use Fire breaks Fuel reduced buffers
Preparedness	Capability Resilient assets Safe access	Planning policy – Bushfire prone area Hardened and resilient assets. Personal, business, organization, community planning. Regulation, protocols and standards for activities on high-risk days. Training and accreditation of responders. Appropriate resources (people, plant, and equipment). Insurances. Safe access road and track network . Response protocols. Community awareness and capability.
Response	Identification Incident management Respond Review Relief	Monitor remote sensors. Coordinate, plan, resource, IMT. Warnings. Source and deploy resources. Manage evacuation and relief After action review Community impact assessment Adapt plans and arrangements
Recovery	Relief Rehabilitation Reconstruction	Manage recovery centre/group Recover insurances Reassess asset use and resilience Reconstruct resilient asset Rehabilitate environment Rehabilitate community

Where fuel reduction is identified as a strategy the controls are typically applied in zones. DFES identifies these as Asset Protection Zone; Hazard Separation Zone; and Land Management Zone.

²². Figure 10.

Figure 10 Asset protection, hazard separation, and landscape management zones



<p>Fuel load requirements: No specific fuel load requirements. Land is managed in accordance with the land management objectives to reduce the risk of large-scale, high intensity bushfires. (E.g. Broad scale mosaic burning.)</p>	<p>Fuel load requirements: Fuel load to be maintained at 5-8 t/ha for jarrah/marri forest and woodland, 12-15 t/ha for mallee heath and <15 t/ha for karri forest.</p>	<p>Fuel load requirements: Fuel load to be reduced and maintained at 2 tonnes per hectare (t/ha).</p>
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Fuel load may be reduced through a number of means.

- Mechanical means through; slashing, mulching, scrub rolling, parkland clearing and fire breaks ²³ Figure 11
- Fire through; broadscale landscape burns, targeted traditional burning, cultural burning, wildfires. Figure 12.

²² BRM Planning Handbook. DFES

²³ Department of Fire & Emergency Services March 2022 Guide to mechanical vegetation structure modification
Shire of Dundas Bushfire Risk Management Plan

Figure 11 Parkland clearing in woodlands reduce ladder fuels (Shire of Coolgardie)



Figure 12 Targeted traditional burning is a practice being developed by traditional owners for use in mallee, hummock grass and woodlands



2.7. Information, data, plans and programs

Some 50 policies, plans and arrangements that are specific to the Shire of Dundas and / or directly influence this plan have been identified as part of the plan document review. These are listed in alphabetical order in Appendix 2.

Information in spatial data form is also sourced from the Bushfire Risk Management System. Not all relevant asset information held by DFES is available for Bushfire Risk Management Plans in the current arrangements. Additional information needs to be sourced through individual data sharing agreements and added locally or by request to the BRMS administrator. Fourteen local layers sourced by the Shire of Dundas or additionally sourced by BRMS used in the development of the Plan are listed in Appendix 3. These included data from telecommunications and power companies, Main Roads, Parks and Wildlife, Shire of Dundas and other Landgate lease information.

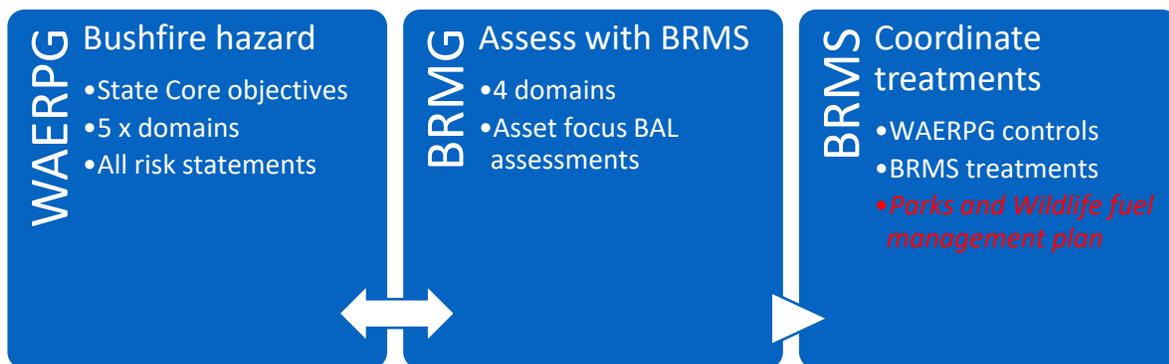
Not all data or information was made available, despite the requirements of the State Hazard Plan Fire and the BRMP guidance. Some organisations, particularly utilities which contract and subcontract maintenance programs for their assets were reluctant to share specific information on fire management policy's, plans and programs as they were perceived as being commercial in confidence arrangements. Of note is the inability to access the asset information of Telstra whose relay towers and national fibre-optic lines traverse the council footprint. Fortunately, investigation of the public access Radio Frequency National Site Archive(database) of AMTA, did allow identification of the tower network and providers in the council area. The Department of Fire and Emergency Service were unable to share information on the emergency communication network on which Council first responders rely and these have not been assessed.

3. The Risk Management Process

3.1. Integrating risk management process's

The risk management processes used to identify and address risk in this BRM Plan are aligned with the international standard for risk management, *AS/NZ ISO 31000:2009 Risk Management – Principles and Guidelines*, and combines the approaches outlined in the WA Emergency Risk Management Guide²⁴ and the Bushfire Risk Management Planning Guide²⁵. These two processes work together as per Figure 13 and the primary steps taken to achieve this are described in Figure 14. The details of the risk management process are at Part B, Chapter 5.

Figure 13 Integrating risk management process's



Parks and Wildlife applies the Department of Biodiversity, Conservation and Attractions Draft Bushfire Risk Management Framework, to its lands in the Kalgoorlie and South Coast Region.

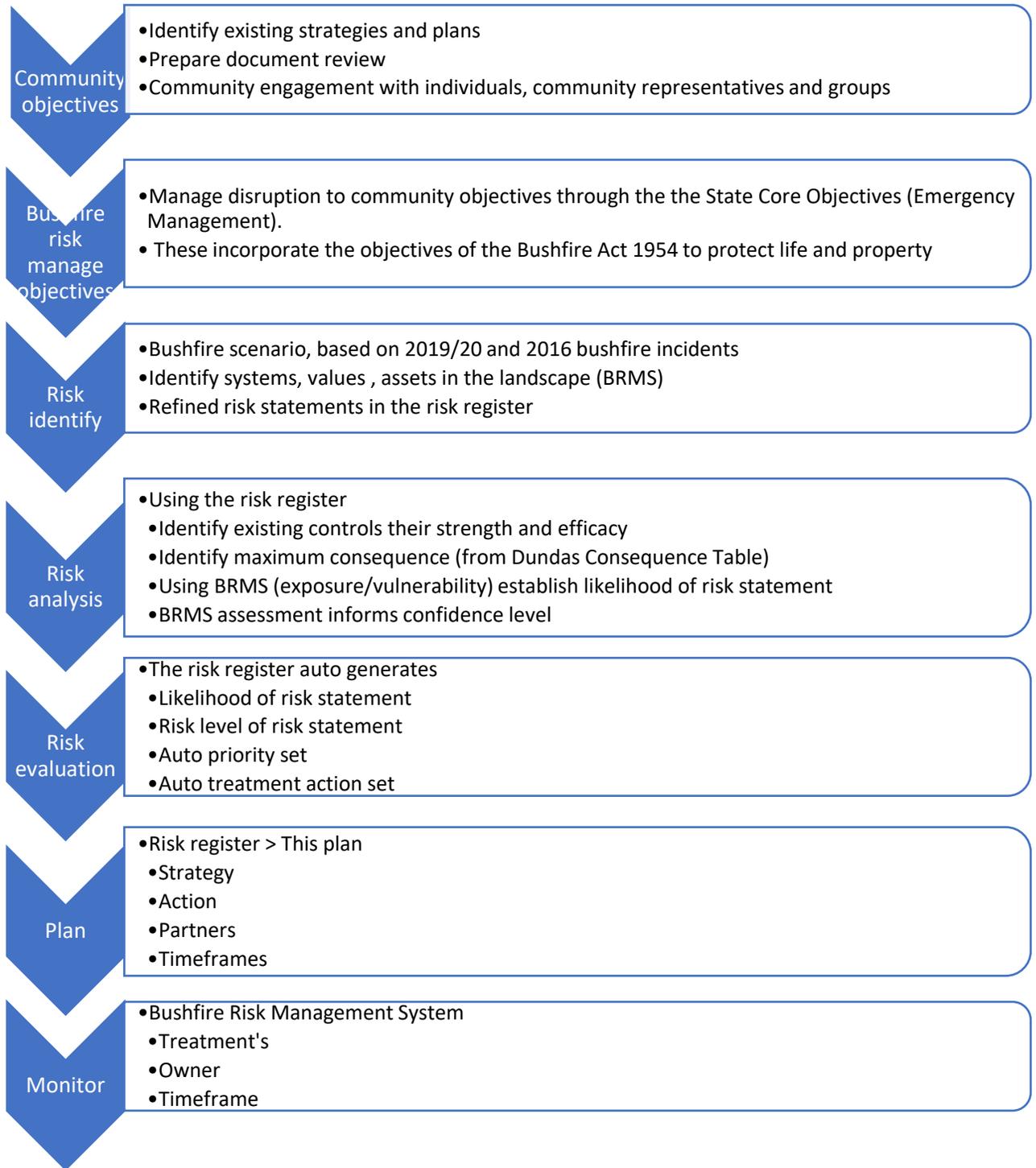
This BRM Plan facilitates a coordinated approach towards the identification, assessment and treatment of assets and values exposed to bushfire risk. The Treatment Schedule in the BRMS sets out a broad program of coordinated multi-agency treatments to address risks identified in the BRM Plan. Through the LEMC, Government agencies and other land managers responsible for implementing treatments participate in developing the BRM Plan and Treatment Schedule to ensure treatment strategies are collaborative and efficient, regardless of land tenure. The

²⁴ SEMC WA Emergency Risk Management Guide, 2015

²⁵ OBRM (2020) Bushfire Risk Management Planning Guide 2020

specific roles and responsibilities of the key stakeholders involved in the development of this BRM Plan are outlined in Appendix 4.

Figure 14 Integrated bushfire risk management planning process



3.2. Communication and Consultation

Communication and consultation throughout the risk management process is fundamental to the development, implementation, and review of the BRM Plan. To ensure appropriate and effective communication occurred with relevant stakeholders at each stage of the BRM planning process, a *Communication Strategy* was prepared Appendix 8.

Of particular importance is engagement with the community and land occupiers. To this end several key activities have been undertaken; including

- One on one discussions and site visits
- Presentations to key mining stakeholders through the Kalgoorlie Chamber of Mines
- Presentation and participation through the Local Emergency Management Committee
- Workshop with Shire Councilors, and executive of the Shire of Dundas to:
 - engage the elected members in development of the Bushfire Risk Management Plan
 - gather expert information of assets, systems and values that were important to the community. Figure 15.
- Online surveys with Pastoral lease holders, Service station owners and Mining lease holders.
- Regular reporting to LEMC and Shire Councilors
- Targeted consultations with utilities and occupiers
- Consultation on draft plan with LEMC, Shire Councilors and the community

Figure 15 Community values workshop with Shire of Dundas Councilors



3.3. Risk Assessment results.

When considering the Shire of Dundas context (Chapter 5) and the State Core Objectives, 81 risks were identified regarding a bushfire igniting, spreading and impacting on “assets”. The 223 assets are spatially identified in the Bushfire Risk Management System and an initial assessment made as to the type of asset and its category, (Appendix 7), their exposure to the bushfire hazard and how vulnerable they are to impact dependent on type, rarity or purpose. Assets can be things, places or values, and may be grouped or individual. Table 3. The BRMS Asset Register is attached in Appendix 9.

Assets may have multiple categories, for example the Eyre Bird Observatory is a listed building on the State Heritage Register, is an environmental research station and is temporary accommodation for visitors

Table 3 Assets by type and number in the BRMS

Asset types	Asset Number
Economic	71
Human Settlement	61
Cultural	36
Environmental	19
Environmental, Human Settlement	16
Economic, Human Settlement	8
Economic, Environmental	6
Cultural, Environmental	3
Cultural, Environmental, Human Settlement	1
Grand Total	221

The assets identified in the BRMS were used to refine the risk statements. The risk statements have been placed in the Risk Register (Part C). Broadly the risk identified are:

PEOPLE: Protect lives and wellbeing of persons

- A bushfire will impact the health of people and cause death(s), injury and/or serious illness to;
 - Residents of Norseman and Eucla townships, and occupations at Red Rock and Wanteen
 - Visitors to the Shire
 - Transport workers
 - Mining sector workers
 - Agriculture sector workers
 - First Responders/ Fire fighters
 - People through secondary impacts caused by disruption to essential services or release of toxins

ECONOMY: Maintain and grow the State's productive capacity, employment, and government revenue

- A bushfire will impact economic activity resulting in a reduction of production, recovery costs and/or financial losses for
 - The mining sector
 - The pastoral lease holders
 - The transport sector
 - The tourism sector
 - Business, services and supply sector
 - Local government
 - Homeowners

SOCIAL SETTING: Ensure that there is public order, that people are housed and fed in a safe and sanitary manner and have access to social amenities including education and health services, and that things of cultural importance are preserved.

- A bushfire will result in impacts to the community wellbeing through
 - social disruption and separation due to housing loss
 - social disruption and separation due to loss of critical services or employment
 - deaths and injury of community members, volunteer fire fighters or employees
 - damage to culturally important places from bushfire, and response or mitigation activities

GOVERNANCE: Ensure that there is, at all times, an effective and functioning system of government and societal respect for rule of law

- A bushfire will cause an increased demand (surge) at the local level, impacting their ability to maintain core services of
 - The emergency services
 - Local Government
 - Government services
- A bushfire will impact communications and other infrastructure, resulting in major disruption to communications and the ability to maintain core services
 - The emergency services
 - Local Government

- Government services

INFRASTRUCTURE: Maintain the functionality of infrastructure, particularly key transport infrastructure and utilities required for community health, economic production, and effective management of emergencies

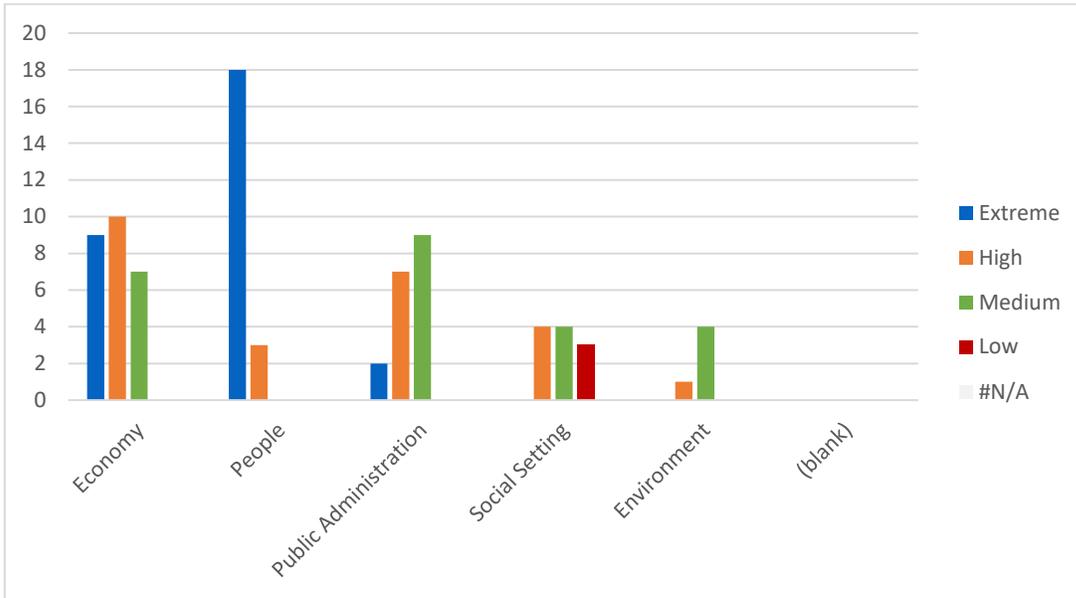
- A bushfire will impact infrastructure resulting in repair costs and/or financial losses and disrupt national/state supply chain of
 - The national / state road transport system / supply chain
 - The state rail transport system / supply chain
 - The national long haul fibre backbone
 - Mobile phone communication towers/infrastructure
 - Regional water supply
 - Local power supply

ENVIRONMENT: Protect ecosystem and biodiversity

- A bushfire will impact on vulnerable environmental ecosystems and/or identified critically endangered species.
 - Listed ecological communities at Fraser Range and Lake Johnstone
 - Old growth woodlands
 - Young woodlands in recovery from previous fires
 - Mallee Fowl habitat
- Create contamination of the land, water or air through releasing toxins or contaminants.

Fundamental in the risk assessment, is to appreciate that the assessment is the measure of the “risk statement” occurring. Consequence is set by the Shire of Dundas Consequence Table (Part C). The return period was set at 1 in 10 given the history of large fires, fatality rate and impacts on communities and national supply chains in the region. The 81 risk statements were assessed with consideration of the relevant controls and their strength (Appendix 5) and the exposure identified through the BRMS. Risk results summary are in Figure 16

Figure 16 Risk level by domain for 81 risk statements in the Shire of Dundas



Those risk that are rated Extreme and High are a priority for action, those that are rated Medium should be considered for further treatment.

3.4. Risk assessment discussion

Economy/Infrastructure

Row Labels	Extreme	High	Medium	Low	Grand Total
Economy	9	10	7		26

Impacts to the economy can come from loss of assets or disruption to services on which the economy relies. The assessment considered 26 risk statements for the economy, these included those for infrastructure also. Nine were identified as Extreme risk and 10 as High.

Those extreme risk that were the highest priority for treatment included \

- The fibre optic backbone relay stations of NBN and Telstra, and road and rail communications and signaling. These are a high priority due to the uncertainty of their

locations. The Optus relay stations on Telegraph track are identified but still at extreme risk.

- The National supply chain service provided by the Eyre Highway and Coolgardie Esperance Highway
- The State mineral supply chain of the West Kalgoorlie Esperance Rail
- IGO Nova mine and supply chain

Those rated at high risk

- Telstra managed communications towers.
- Commercial buildings and services, including power and water at Eucla, Madura, Cocklebiddy and Balladonia
- Nullarbor stations with Mallee and Woodland vegetation types at Southern Hills, Balladonia, Fraser Range, Noondoonia, Woolba and Mundrabilla.
- Mines in development or on care and maintenance including Maggie Hays and Audalia
- Private buildings and property including property at Eucla and south Norseman, Red Rocks and Wanteen.

Those identified as medium risk that need to review and maintain current controls include

- Shire of Dundas services at the tip and cemetery.
- Horizon Power supply distribution network at Norseman including power supply to Optus communication tower
- Tourism brand of the region

People

Impacts to people can come from direct contact with flame or radiant heat or indirect sources including smoke, released toxins or loss of life sustaining apparatus. The people risk assessment considered 21 risk statements for the risk to life or serious injury. Eighteen were identified as Extreme risk and 3 as High.

Row Labels	Extreme	High	Medium	Low	Grand Total
People	18	3			21

Those extreme risk that were the highest priority for treatment included

- People conducting mining exploration in remote locations as little is known as to the location of drillers and contractors on exploration leases on a daily basis, communication and access is limited.
- Visitors, prospectors, 4x4 enthusiasts and campers at remote locations on the IPA, Parks and Wildlife Conservation Reserves, including Eyre Bird Observatory Granites and Woodlands trail, the Old Coach Road trail and unallocated crown land.
- Residents of mine camps including the IGO Nova mine camp.
- Residents and visitors of the towns of Norseman or Eucla
- Residents and travelers at the service centres on the Eyre Highway, Eucla, Madura, Balladonia and Cocklebiddy.
- Travelers at Main Roads parking and camping areas on the Eyre Highway, particularly from Balladonia to Norseman
- Travelers at Main Roads parking and camping areas on the Coolgardie Esperance Highway.
- First responders from Volunteer Bushfire Brigade, Pastoral Brigade, landholders, Shire of Dundas, contractors, or Mine Emergency teams
- Residents and visitors to shacks / settlements at Red Rock, Wanteen or Eucla west.

Those rated at high risk

- Residents and visitors to station homesteads.
- First responders and residents from smoke and other toxins released from burning contaminated sites, mines or industrial areas.
- Norseman hospital precinct. Figure 17

Public Administration

Public administration includes all the Government services on which the community relies. The role of the internet whilst privately operated is now heavily relied on for Government service to the community. Of the eighteen risk statements considered two were noted as extreme, seven as high and nine as medium.

Row Labels	Extreme	High	Medium	Low	Grand Total
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Public Administration	2	7	9	18
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Those of extreme risk that were the highest priority for treatment included;

- Water supply to Norseman. This is a high priority for further investigation as the power supply source for the pumps of the pipeline are not included in Water Corps risk assessment and the power supplier Western Power do not have a program to manage fire risk to the power supply.
- Communications towers and systems of the emergency services have not been assessed by this assessment as the information is not available to the program.

Those rated at high risk

- All Government services that rely on the internet or telecommunications, including the police, DFES, health, hospital and school.
- Government services supplied by Shire of Dundas including Transport, Medicare, ABC radio and television relay.
- Shire of Dundas service including the works depot, waste services and cemetery
- Quarantine services at the West Australian / South Australian border.

Those identified as medium risk that need to review and maintain current controls include

- Surge planning and resourcing for police, emergency services, health.
- Emergency airstrips on the Eyre Highway
- Council capacity to manage recovery

Social setting

The social setting considers several social factors including community wellbeing, community services, and culturally important objects, places or events. Of the eleven risk statements considered four were assessed as high and four as medium

Row Labels	Extreme	High	Medium	Low	Grand Total
Social Setting		4	4	3	11

Those rated at high risk

- House and property losses leading to homelessness and long-term family separation
- Fire response or mitigation activities damaging culturally significant places on aboriginal lands and impacting community wellbeing
- Fire damaging culturally significant places or fire sensitive places including water trees, old growth woodland on aboriginal lands and impacting community wellbeing

Those identified as medium risk that need to maintain current controls include

- Health impacts or deaths of community members impacting wellbeing
- Disruption to essential government services on which community members rely on impacting wellbeing
- Damage to assets listed on the State heritage register including the 3 telegraph stations.

Environment

The environment includes natural values and the risk of pollution to the land, water or air. The extent of the Great Western Woodlands makes them highly ecologically functional and quite resilient to bushfire, but individual stems are highly sensitive

Figure 18 . Of the five risk statements considered one was assessed as high and four as medium.

Row Labels	Extreme	High	Medium	Low	Grand Total
Environment		1	4		5

Those rated at high risk

- Existing vulnerable ecosystems at Lake Johnston and Fraser Ranger and endangered species

Those identified as medium risk that need to review and maintain current controls include

- Wildlife and flora. Repeat fire events in regenerating woodlands at less than ten years.
- Contamination of air or land through disturbing existing contaminated sites including old mines holdings, or asbestos from damaged buildings or structures.

4. Strategies and actions.

4.1. Strategies

To effectively manage the identified risk posed by bushfire, 3 key objectives have been identified;

1. Reduce the number of manmade ignitions
2. Reduce the size of bushfires
3. Reduce the consequence of bushfires on assets and values

To achieve this will require

- Collaboration and coordination between the emergency services, landowners, and occupiers
- Increase in the capacity and capability of the response network
- Safe access to the high fire risk landscape of the Great Western Woodlands
- Ongoing cultural burning to protect cultural assets
- Strategic fuel reduction in high volatile landscapes
- Targeted and tactical fuel reduction to protect critical assets and communities
- Coordinated regulation activity
- Increasing resilience of built asset with high bushfire exposures
- Increasing community capability and awareness through education
- Improving preparedness through response planning
- Increase business and industry resilience through supply chain and business continuity planning
- Updating of lease regulators assurance practices
- Reduce hazardous artifacts and contaminations in the landscape

4.2. Actions

Table 4 outline actions to be taken to manage the risks identified in the Risk Register. These actions may have a risk reduction influence over multiple State Core Objectives as they are presented in the Shire of Dundas. The Risk Register will include reference to the specific asset being treated and the location of specific assets and treatments is identified in the BRMS.

Figure 17 Norseman Hospital is a critical community asset



Table 4- Actions to reduce the consequence of Bushfire in the Shire of Dundas

#	Action	
1	SoD	Shire of Dundas to improve safety of fire fighters through single training standards and fire ground access arrangements for level 1 and 2 bushfires for Council Staff, Bushfire Brigades, Mine Site Emergency Response Teams, Fire Control Officers and Pastoral Lease Staff
2	SoD	Shire of Dundas seek funding for a green waste chipper to reduce risk of tip green waste ignition, and support community/ business disposal of high-risk vegetation.
3	SoD	Shire of Dundas establish a program of maintenance and improvement to increase asset resilience of its building stock
4	Partner	Shire of Dundas in association with traditional owners, create asset protection zones on visitor nodes of the Granite and Woodlands trails (Hyden Rd) through; <ul style="list-style-type: none"> • <i>fuel reduction through targeted traditional burning of woodland and shrub communities</i> • <i>fuel reduction through mechanical means of woodland communities</i>
5	SoD	Shire of Dundas develop shelter in place plans with residents of Norseman pensioner units
6	Partner	Department of Planning Lands and Heritage, in collaboration with traditional owners and Parks and Wildlife and occupiers to enable a safe fire response to state and Aboriginal Lands by; <ul style="list-style-type: none"> • <i>Building on existing routes and ways establish a safe network of bushfire access routes for first responders in the Great Western Woodlands</i> • <i>Signposting and mapping such routes</i> • <i>Maintaining accurate records and data of fire history and fire fuel conditions</i> • <i>Establish and maintain a mechanism to share with first responders and occupiers</i>
7	Partner	DFES in association with traditional owners, Shire of Dundas, Parks, and Wildlife, Dundas and Pastoral Brigades and Pastoral FCO's, Mine Emergency Management Teams establish clear bushfire response protocol, guidelines and priority zones to guide response activation to minimize fire spread or unnecessary damage to assets and values for; <ul style="list-style-type: none"> • <i>Places of congregation - Camp sites, transport routes, towns, mines, service centres</i> • <i>Essential infrastructure – Communication towers, fibre optic, highways, power supply, water supply, railway lines</i> • <i>Culturally important places</i> • <i>Environmentally sensitive places – Mallee fowl habitat, old growth woodland, woodlands regrowth < 20 years, Lake Johnstone, and Fraser Range environmental areas.</i> • <i>Economic drivers and infrastructure – Pastoral leases, tourist routes</i>
8	Partner	The Shire of Dundas work with DFES, Parks and Wildlife, Pantoro Mine and the Department of Planning, Lands and Heritage to establish and maintain settlement ring fire breaks at Norseman, Eucla and Red Rocks.
9	Partner	DFES, Shire of Dundas, neighbouring councils, Parks and Wildlife, Main Roads, DMIRS, regional tourism bodies, freight and logistics council work together for a consistent and targeted bushfire regulation and education program for road and rail users.
10	Partner	DFES, Shire of Dundas and employers enable fire fighters and Chief, deputy, and fire control officers to acquire and maintain appropriate training and accreditation for their roles.
11	Partner	The DFES and Shire of Dundas build community capability at Norseman, Eucla, Red Rocks and Nullarbor Service Centres <ul style="list-style-type: none"> • <i>Understand the bushfire risk in Shire of Dundas</i> • <i>Maintain fire resilient properties</i> • <i>Develop personal resilience</i>

12	Partner	DFES, Department of Planning Land and Heritage and Shire of Dundas work with residents of Red Rocks and Wanteen to establish evacuation plans
13	Partner	Shire of Dundas and Shire of Kondinin create and exercise evacuation plans for visitor sites on the Hyden Norseman Road
14	Partner	ARTC, Shire of Dundas, Main Roads and the Freight and Logistics Council advocate for resources and investment in high priority locations of potential supply chain disruption.
15	Partner	The Department of Planning, Lands and Heritage in association with traditional owners, DFES undertake vegetation management on hazard separation zones on township unmanaged reserves and UCL at Norseman; <ul style="list-style-type: none"> • <i>fuel reduction through mechanical means of house blocks prior to the restricted period</i> • <i>fuel reduction and strata management through mechanical means of woodland communities</i> • <i>fuel reduction through targeted traditional burning of woodland and hummock grass communities</i>
16	Partner	Shire of Dundas in association with traditional owners, undertake vegetation management on asset management and hazard separation zones abutting the tip and cemetery at Norseman, areas abutting Norseman town fire break, Telegraph Track (west of lake), Dundas Rocks Track through; <ul style="list-style-type: none"> • <i>fuel reduction through targeted traditional burning of woodland communities</i> • <i>fuel reduction through mechanical means of woodland communities</i>
17	Partner	Small Business Development Corp and DFES build business and industry capability in the Shire to; <ul style="list-style-type: none"> • <i>Understand the bushfire risk in Shire of Dundas</i> • <i>Understand the fire management responsibilities of occupiers, asset and business owners</i> • <i>Maintain fire resilient properties</i> • <i>Develop business continuity plans</i>
18	Partner	Department of Planning Lands and Heritage, in collaboration with traditional owners and Parks and Wildlife and occupiers reduce the risk of large landscape wildfires impacting values and assets by develop and implement an ongoing landscape fuel reduction program that targets highly volatile scrub lands in the west of the Shire and Mallee landscapes in the east and the south
19	Advoc	Homeowners and landlords to establish a program of maintenance and improvement to increase asset resilience of its building stock
20	Advoc	Main Roads work with the federal Government to improve bushfire safety on the Eyre Highway corridor through <ul style="list-style-type: none"> • <i>limiting camping to the reserve area,</i> • <i>regulate campfire use</i> • <i>establishing unique parking site identifiers (similar to Beach Emergency Network (BEN) system)</i> • <i>establishing clearly identified turnaround points suitable for heavy vehicles up to Class 12 (triple trailers) west of Balladonia</i> • <i>Create asset protection zone</i> <ul style="list-style-type: none"> ○ <i>Removing fine fuels from road side shoulders to 5 meters</i> ○ <i>Fuel reduction and strata management through mechanical means of woodland communities</i> ○ <i>Fuel reduction through shrubland communities</i> ○ <i>Identify and remove hazardous trees within 2 tree length of highway</i> • <i>In association with WAPol, DFES and Shire of Dundas establish a Bushfire response protocol, diversion and evacuation plan</i>

21	Advoc	<p>Main Roads work with the State Government to improve bushfire safety on the Coolgardie Esperance Highway corridor through;</p> <ul style="list-style-type: none"> • <i>limiting camping to the reserve area,</i> • <i>regulate campfire use</i> • <i>establishing unique parking site identifiers (similar to Beach Emergency Network (BEN) system)</i> • <i>establishing clearly identified turnaround points suitable for heavy vehicles up to Class 12 (triple trailers)</i> • <i>Create asset protection zone</i> <ul style="list-style-type: none"> ○ <i>Removing fine fuels from roadside shoulders to 5 meters</i> ○ <i>Fuel reduction and strata management through mechanical means of woodland communities</i> ○ <i>Fuel reduction through shrubland communities</i> ○ <i>Identify and remove hazardous trees within 2 tree length of highway</i> • <i>In association with WAPol, DFES and Shires of Dundas, Coolgardie and Esperance establish a Bushfire response protocol, diversion and evacuation plan</i>
22	Advoc	<p>Department of Fire and Emergency Services provide assurance to bushfire first responders and the Shire of Dundas as to the resilience of essential emergency radio assets and their mitigation and maintenance programs in place that support response of the Shire of Dundas brigades.</p>
23	Advoc	<p>Department of Planning Lands and Heritage to enable fire management by establishing an ongoing funding stream and mechanism for planning, coordination, mitigation, response, and recovery activities on State lands they administer.</p>
24	Advoc	<p>NBN, Telstra and Optus work together to build resilience of shared / independent mobile phone tower facilities, through;</p> <ul style="list-style-type: none"> • <i>Site hardening, based on the OPTUS CSIRO site hardening study</i> • <i>Create asset protection zone. Working with neighbours to</i> <ul style="list-style-type: none"> ○ <i>establish fuel reduction through mechanical means of woodland communities</i> ○ <i>establish fuel reduction through targeted traditional burning of woodland communities</i> ○ <i>fuel reduction through shrubland communities</i> • <i>Establishing and applying fuel management and site maintenance standards for assets prior to restricted period</i>
25	Advoc	<p>State Gov and local business develop business continuity plans for essential services, food, water, fuel</p>
26	Advoc	<p>Traditional owners undertake vegetation management fuel reduction in asset, hazard and land management zones on Aboriginal lands near Norseman through targeted traditional burning of woodland and hummock grass communities</p>
27	Advoc	<p>Horizon Power enhances the resilience of critical infrastructure, businesses and homes through establishing and applying fuel, pole, and insulator management maintenance program prior to the restricted period.</p>
28	Advoc	<p>Horizon Power work with neighbours to enhance the resilience of critical infrastructure site Communication tower 6443002 Norseman through</p> <ul style="list-style-type: none"> • <i>Maintain asset protection zone of power supply</i> • <i>Fuel reduction and strata management through mechanical means of woodland communities</i>
29	Advoc	<p>DMIRS to include bushfire within its scope of considerations for Mine project plans and exploration plans approvals and facilitate the incorporation of land occupier bushfire management responsibilities and EMT training requirements.</p>

30	Advoc	<p>Department of Primary Industries and Regional Development build resilience of WA/SA border facilities, through</p> <ul style="list-style-type: none"> • <i>Site hardening,</i> • <i>Working with neighbours to establish fuel reduction through mechanical means of mallee, woodland communities</i> • <i>Establishing and applying fuel management maintenance standards for assets prior to restricted period</i>
31	Advoc	<p>Proprietors of Madura, Balladonia, and Eucla Service Centres create asset protection zone and</p> <ul style="list-style-type: none"> • <i>Undertake fuel reduction and strata management through mechanical means of woodland communities</i> • <i>Establishing and applying fuel management maintenance standards for assets prior to bushfire season.</i>
32	Advoc	<p>ARTC work with railway easement neighbours to build resilience of their West Kalgoorlie Esperance rail assets, through creating asset protection zone</p> <ul style="list-style-type: none"> • <i>Removing fine fuels from rail side shoulders to 5 mts</i> • <i>Fuel reduction and strata management through mechanical means of woodland communities</i> • <i>Fuel reduction through shrubland communities</i> • <i>Replace wooden sleepers with fire resilient alternatives in forested environment</i>
33	Advoc	<p>ARTC to build resilience of communications and signalling facilities and other safety assets on the rail easement through</p> <ul style="list-style-type: none"> • <i>Create asset protection zones</i> <ul style="list-style-type: none"> ○ <i>Fuel reduction and strata management through mechanical means of woodland communities</i> ○ <i>Fuel reduction through shrubland communities</i> ○ <i>Site hardening of communication and signalling facilities</i> ○ <i>Establishing and applying fuel management maintenance standards for assets</i>
35	Advoc	<p>Esperance Pipeline Company to build resilience of its gas pipe delivery system, infrastructure and controls on the Kambalda Esperance Gas easement through;</p> <ul style="list-style-type: none"> • <i>Site hardening of communication and valve facilities</i> • <i>Create asset protection zone for valve station, and work with neighbours to undertake fuel reduction through mechanical means of woodland, heath and shrubland communities</i> • <i>Establishing and applying fuel management maintenance standards for assets prior to bushfire season</i> • <i>Develop pipeline easement access protocols for bushfire response</i>
36	Advoc	<p>Mining enterprise at Nova IGO build resilience of infrastructure by</p> <ul style="list-style-type: none"> • <i>Site hardening camp, mine, and processing assets to fire impact</i> • <i>Create asset protection zones</i> <ul style="list-style-type: none"> ○ <i>Fuel reduction and strata management through mechanical means of woodland communities</i> ○ <i>Fuel reduction through shrubland communities</i> • <i>Establishing and applying fuel management and site maintenance standards for assets prior to restricted period</i>
37	Advoc	<p>RAM's establish a program of maintenance and improvement to increase asset resilience of its building stock</p>

38	Advoc	<p>Department of Health at Norseman Hospital build resilience of infrastructure by Site hardening of hospital infrastructure to fire impact</p> <ul style="list-style-type: none"> • <i>Create asset protection zones</i> <ul style="list-style-type: none"> ○ <i>Fuel reduction and strata management through mechanical means of woodland communities</i> ○ <i>Fuel reduction through shrubland communities</i> • <i>Establishing and applying fuel management and site maintenance standards for assets prior to restricted period</i> • <i>In association with WAPol, St John Ambulance the Department of Health and the Shire of Dundas LEMC Review and exercise hospital evacuation plan</i>
39	Advoc	Insurance of people's homes and businesses
40	Advoc	The Department of Minerals and Industry Regulation work with lease holders and land managers to identify legacy unsafe and contaminated mine sites that are a hazard to first responders and the community and make them safe.
41	Advoc	Parks and Wildlife to update and exercise evacuation plans for remote and coastal visitor sites including Eyre Bird Observatory
42	Advoc	Health sector work with clients on personal preparedness plans to shelter in place in times of bushfire
43	Advoc	<p>NBN, Telstra and Optus work together and with neighbours to build resilience of their long-haul fibre backbone assets, (Fibre Optic) relay stations through</p> <ul style="list-style-type: none"> • <i>Create asset protection zone</i> <ul style="list-style-type: none"> ○ <i>Fuel reduction and strata management through mechanical means of woodland communities</i> ○ <i>fuel reduction through targeted traditional burning of woodland communities</i> ○ <i>fuel reduction through shrubland communities</i>
44	Advoc	Businesses to establish a program of maintenance and improvement to increase asset resilience of its building stock
45	Advoc	State Emergency Management Committee work with the Freight and Logistics Council to improve supply chain resilience
46	Advoc	Traditional owners undertake vegetation management to protect culturally important places through hand clearing and targeted traditional burning of woodland and hummock grass communities.
47	Advoc	<p>Parks and Wildlife and traditional owners consider the needs of environmentally sensitive places by</p> <ul style="list-style-type: none"> • <i>Balanced fuel ages for Mallee fowl habitat <10 and >40,</i> • <i>Protect old growth woodland,</i> • <i>Protect woodlands regrowth < 20 years,</i> • <i>manage balanced fuel ages for Lake Johnstone and Fraser Range environmental areas in landscape fire programs</i>
48	Advoc	<p>Water Corporation WA to increase resilience of supply through partnership with Western Power to manage vegetation abutting power lines supplying critical water pumps on the Goldfields pipeline by.</p> <ul style="list-style-type: none"> • <i>Site hardening of communication and pump facilities</i> • <i>Create asset protection zone for power supply and communications to pump stations through</i> <ul style="list-style-type: none"> ○ <i>Fuel reduction and strata management through mechanical means of woodland communities</i> ○ <i>fuel reduction through targeted traditional burning of woodland communities</i> ○ <i>fuel reduction through shrubland communities</i> • <i>Establishing and applying fuel management maintenance standards for assets prior to bushfire season</i>

- *Develop pipeline easement access protocols for bushfire response*

Figure 18 Woodlands old growth are highly sensitive to even low intensity fire.



PART B - Technical report.

THE BUSHFIRE RISK MANAGEMENT PROCESS.

5. The Risk Management Process

5.1. Integrating risk management processes

Under the Emergency Management Arrangements Local Governments are to maintain Local Emergency Management Arrangements including plans for hazards relevant to their locality. In 2017/18, using the West Australia Emergency Risk Management, Local Government Handbook (WAERM LGH)²⁶ the Department of Fire and Emergency Services (DFES), facilitated risk assessments for relevant hazards at District level producing the Goldfields – Esperance Emergency Management District, Risk assessment report²⁷. Bushfire was one of scenarios considered. In 2018, the Shire of Dundas Local Emergency Management Committee (LEMC) worked with the DFES to undertake local emergency risk assessment of bushfire risk, using the WA Emergency Risk Management Local Government Handbook, and included in a Dundas Emergency Management Risk Register. The Emergency Risk Assessment process is intended to address the six State Core Objectives and uses scenario-based assessments as per the National Emergency Risk Assessment Guidelines

The Bushfire Risk Management System, (BRMS), the tool to undertake the risk assessments for the BRMP, is intended to reflect the Bushfires Act 1954²⁸ legislation purpose “to the protect life and property” and consequently uses Bushfire Attack Level BAL style methodology to assess assets exposure and purpose-based vulnerability.

This BRM Plan has been prepared for the Shire of Dundas applying both methodologies in mutually supportive manner, to reflect the lived experience of 2019/20 and 2016 bushfires, Figure 19. This approach supports the requirements of the Guidelines for Preparing a Bushfire Risk Management Plan²⁹ (the Guidelines) from the Office of Bushfire Risk Management (OBRM) within the Department of Fire and Emergency Services (DFES) and the process’s prescribed by

²⁶ SEMC (2017) WA Emergency Risk Management Local Government Handbook

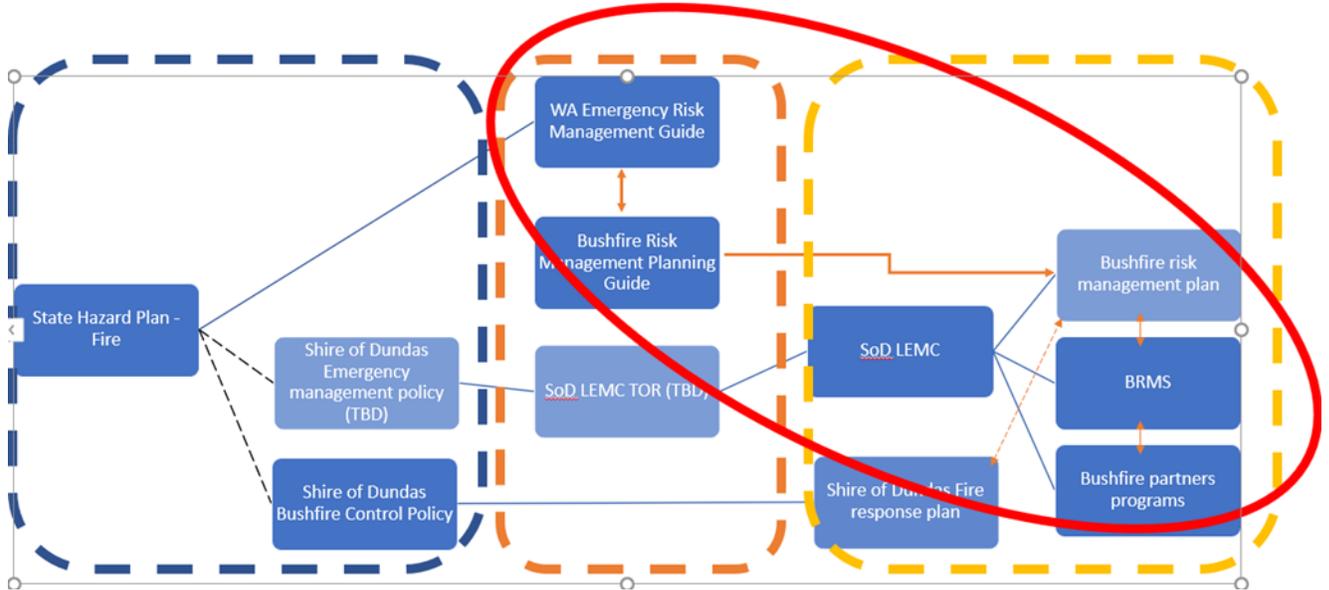
²⁷ Goldfields Esperance. DEMC (2017). GOLDFIELDS-ESPERANCE EMERGENCY MANAGEMENT DISTRICT Risk assessment report

²⁸ Department of Justice (2021) Bush Fires Act 1954

²⁹ Office of Bushfire Risk Management (OBRM) 2018 Guidelines for Preparing a Bushfire Risk Management Plan

the State Emergency Management Committee and the Risk and Resilience branch of DFES in its Risk Management for Local Government Handbook³⁰.

Figure 19 Integrating Western Australia Emergency Risk Management processes



The risk management processes, Figure 20, used to develop this BRM Plan are aligned to the key principles of AS/NZ ISO 31000:2018 Risk Management – Guidelines³¹ and those described in the National Emergency Risk Assessment Guidelines³². This approach is consistent with State Emergency Management (SEM) Policy³³ and SEM Prevention and Mitigation Procedure 1³⁴.

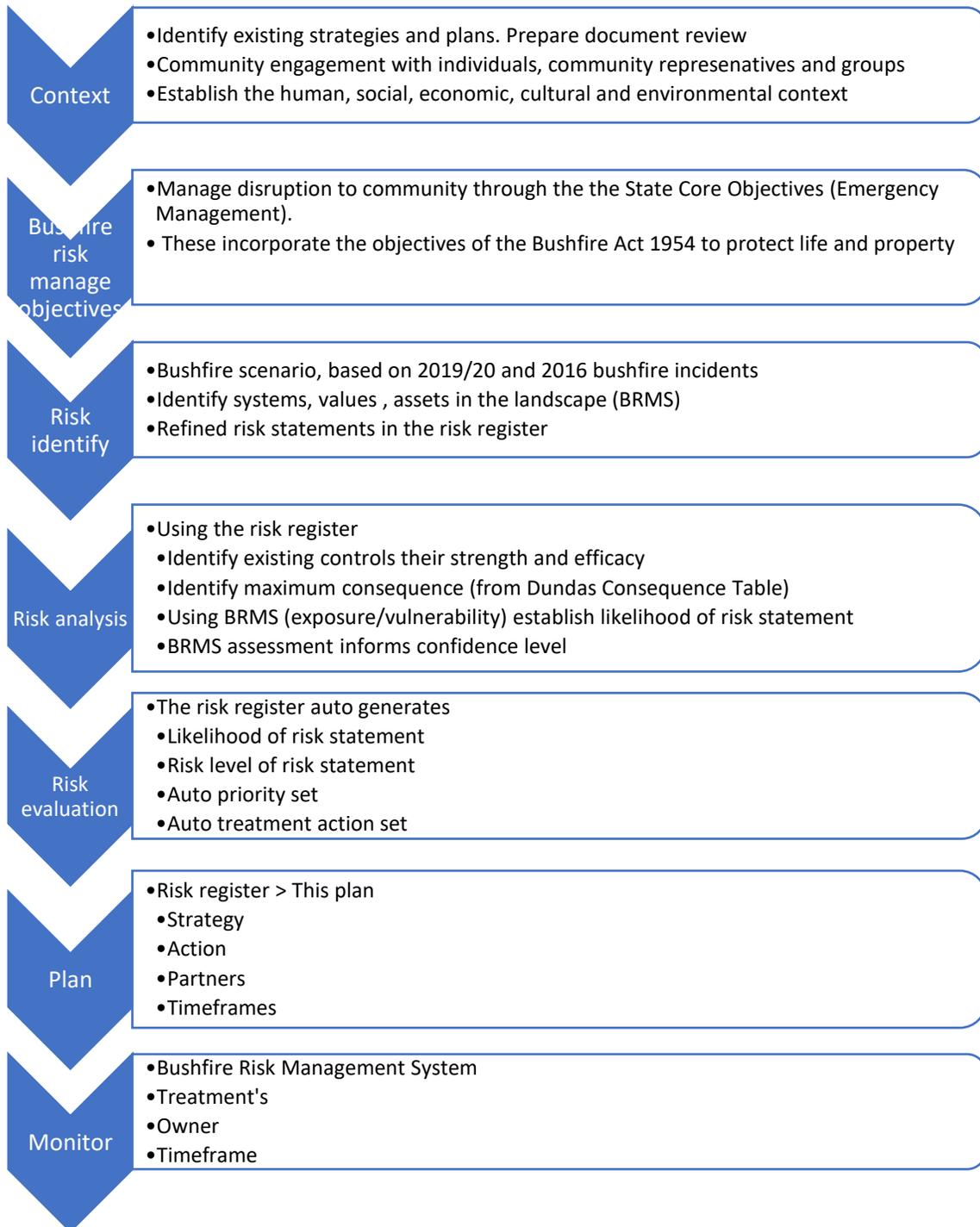
This BRM Plan facilitates a coordinated approach towards the identification, assessment and treatment of assets and values exposed to bushfire risk. The Treatment Schedule in the BRMS sets out a broad program of coordinated multi-agency treatments to address risks identified in the BRM Plan. Through the LEMC, Government agencies and other land managers responsible for implementing treatments participate in developing the BRM Plan and Treatment Schedule to ensure treatment strategies are collaborative and efficient, regardless of land tenure. The

³⁰ SEMC 2017 Risk Management Local Government Handbook 2017
³¹ International Organization for Standardization 2018. ISO 31000:2018(en) Risk management — Guidelines
³² AIDR 2020 National Emergency Risk Assessment Guidelines (NERAG) Handbook
³³ SEMC 2021 State Emergency Management Policy A Strategic Framework for Emergency Management in Western Australia.
³⁴ SEMC. 2020. State EM Prevention and Mitigation Procedure 2.1

specific roles and responsibilities of the key stakeholders involved in the development of this BRM Plan are outlined in Appendix 4.

5.2. Bushfire risk management planning flowchart

Figure 20 Integrated bushfire risk management planning flow chart for the Shire of Dundas



6. Establishing the Context (what's important)

6.1. Shire of Dundas

Located in the Southeast of WA the Shire of Dundas has a rich environment. Covering 92,725km² of diverse landscapes including the remote and rugged coastline of the Southern Ocean; world famous Nullarbor plains, massive granite outcrops and long stretches of dry salt lakes, as well as the ecologically significant Great Western Woodlands. The Ngadju, and Mirning people both recognize areas of Country across the Shire, and beyond the Shire's boundaries.

Figure 21 Shire of Dundas is nearly 1000km long



The Shire of Dundas Council maintains strong working relationships through the Goldfields Voluntary Organization of Councils (GVROC), the Goldfields Esperance District Emergency Management Committee (DEMC) and the Shire of Dundas Local Emergency Management Committee (LEMC). The Shire shares its landscapes with neighboring Shires of Esperance to the south, Coolgardie and City of Kalgoorlie Boulder to the north and west along the Hyden-Norseman Road, the Shire of Kondinin³⁵. Figure 21

A workshop with Shire of Dundas Councillors and Executive in 2021 explored the values and assets that are important to the community to guide the context setting.³⁶ This workshop explored.

1. What and where are our **Community Connections**

³⁵ Shire of Dundas Annual Report 2019-2020. (2020) Shire of Dundas

³⁶ Shire of Dundas 2/11/2021, Bushfire risk management plan Councillors and Executive; Assets and values rapid fire workshop. Workshop report

2. What makes our community **Livable**
3. What drives our and the State's **Economy**
4. What's important to us in the **Environment**

The results of the workshop help guide the context setting for this plan.

6.2. Aboriginal Lands - Ngadju Country

Ngadju ancestral country stretches from Western Australia's southern coast to the northern limit of the tall southern woodlands. To the east it takes in the arid fringe of the Nullarbor and to the west it is bounded by the more fertile soils of what is now Western Australia's Wheatbelt. To the south it stretches to the coast, roughly from Point Malcolm to Twilight Cove.³⁷

In 2014 and 2017 Ngadju native title was determined to exist over some 9 million hectares of southern-central Western Australia. This legislative recognition allows Ngadju to reinstate proactive use and care of their country.³⁸ In 2020 the Commonwealth government supported the establishment of an Indigenous Protected Area (the IPA) of almost 4.4 million hectares of exclusive title lands to be managed as a Category VI Managed Resource Protected Area, consistent with the International Union of the Conservation of Nature (IUCN) definition of.

*"An area containing predominantly unmodified natural systems, managed to ensure long-term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs"*³⁹

The ongoing robust ecological function and cultural connections of Ngadju community to woodlands are one of its greatest strengths. Understandably the role of fire in the land is long term and has framed its ecology and holds a core relationship to Ngadju people. This relationship is extensively explored in the report "Ngadju kala: Ngadju fire knowledge and contemporary fire management in the Great Western Woodlands"⁴⁰. It is not possible to do the

³⁷ Ngadju Indigenous Protected Area Plan of Management 2020–2030. 2020 Ngadju Conservation Aboriginal Corporation

³⁸ Ngadju Indigenous Protected Area Plan of Management 2020–2030. 2020 Ngadju Conservation Aboriginal Corporation

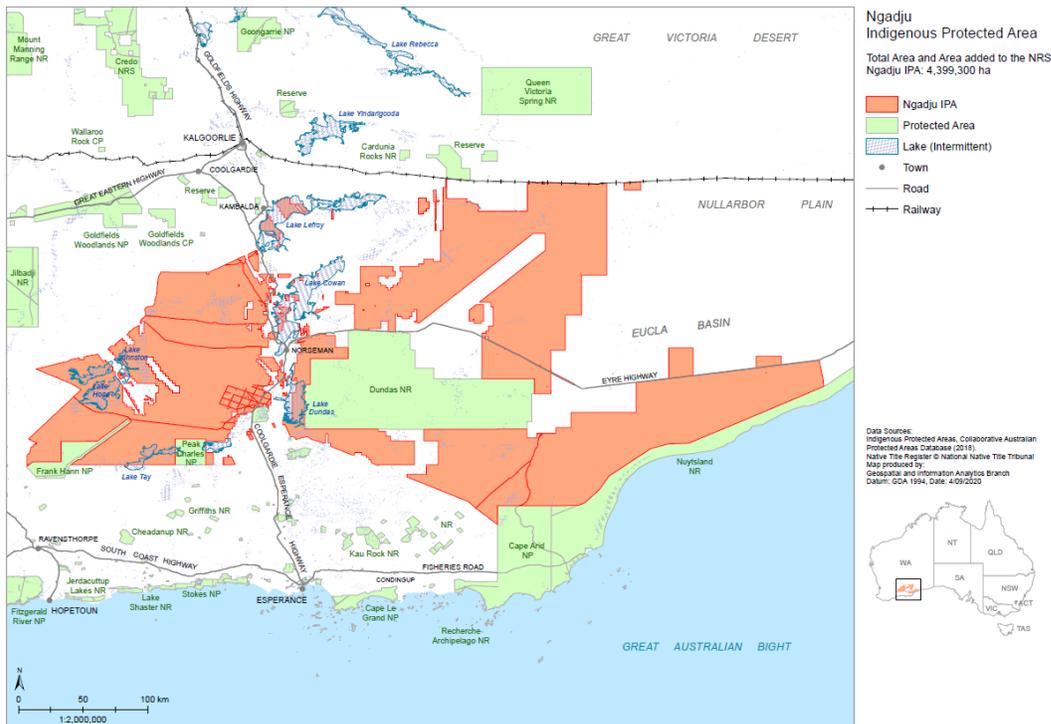
³⁹ Ngadju Indigenous Protected Area Plan of Management 2020–2030. 2020 Ngadju Conservation Aboriginal Corporation

⁴⁰ Prober SM, Yuen E, O'Connor MH, Shultz L (2013, p.41). Ngadju kala: Ngadju fire knowledge and contemporary fire management in the Great Western Woodlands. CSIRO Ecosystem Sciences, Floreat, WA

Ngadju kala plan justice within this plan and it recommended that it be read as a companion piece.

Ngadju IPA makes key landscape connections between the existing conservation reserve network and covers 4 council areas. Shire of Dundas, Esperance and Coolgardie and the City of Kalgoorlie Boulder. Figure 22.

Figure 22 Ngadju Indigenous Protected Area



To support the management to of the IPA the Ngadju Indigenous Protected Area Plan of Management 2020–2030, was developed. This is of critical importance in how it relates to threat of bushfires to the values within and outside Aboriginal lands⁴¹. The 4 highest threats to values of the land identified by Ngadju during healthy country planning are associated with fire management. These are

- Poor Fire Management
- Lack of Ngadju management capacity

⁴¹ Ngadju Indigenous Protected Area Plan of Management 2020–2030. 2020 Ngadju Conservation Aboriginal Corporation

- Respect for Ngadju Culture /Values
- Climate change.

Ngadju kala

Ngadju kala helps us understand how fire has been used on country for millennia, how the country behaves in fires and some of ecological fire sensitivities of the landscape.

“Ngadju country is unique. Up north is different to here. Central Australia is different to here. But here — if you burn the gimlets (joorderee) or salmon gums (marrlinja) it takes hundreds or thousands of years to come back. So Ngadju didn’t burn much in the old growth woodlands. Some areas need to be burnt a lot, but not everything does. Ngadju just burn in specific places. Les Shultz”⁴²

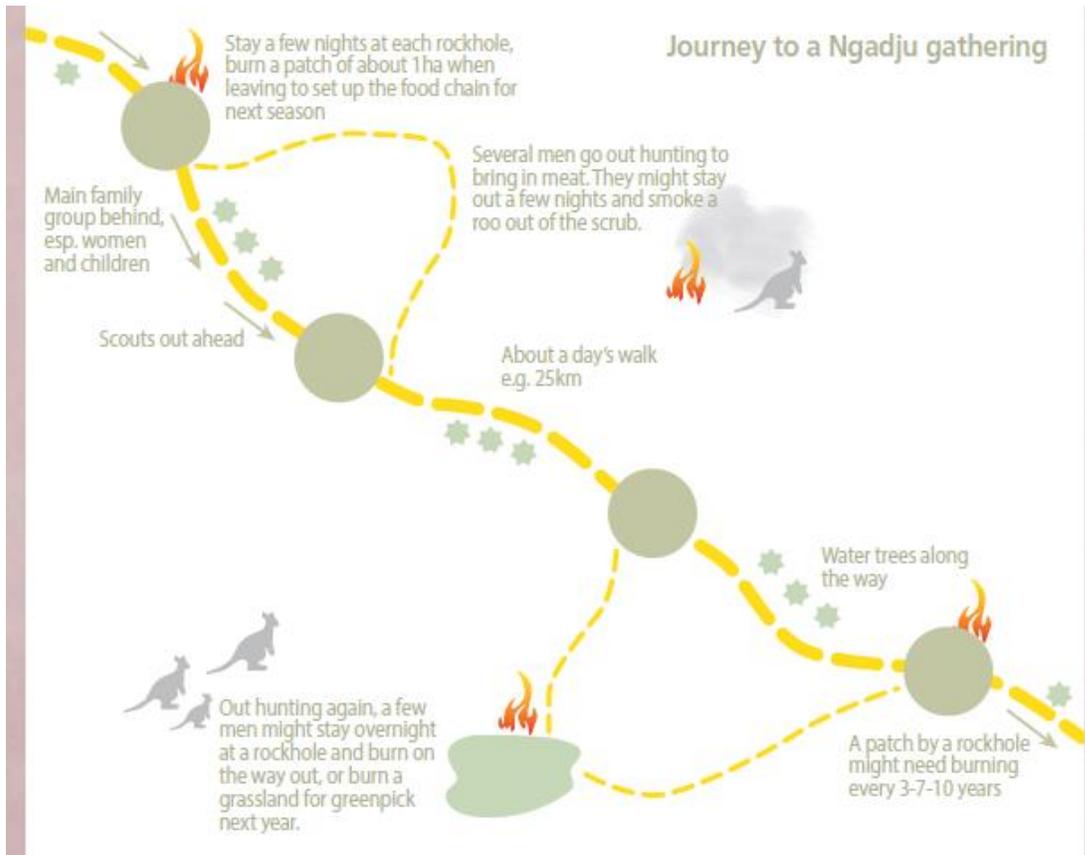
It also helps appreciate the everyday dynamics of moving on country, hunting, camping, tools, foods, lore, health and wellbeing and the role that fire took in this. Figure 14. These movements led to a pattern of occupation in the landscape and the development of cultural, shelter, food and water sources. Some of these are particularly vulnerable to damage from bushfires, or bushfire mitigation or response activities. Over time the use of fire aggregated to influence fire movement and the impact of wildfires on important values, assets and places

“On regular journeys to gatherings, people might light fires for smoking out animals, to clean up the rock holes, to freshen up grasslands, for campfires and for communications.”⁴³

⁴² Les Shultz in Prober SM, Yuen E, O’Connor MH, Shultz L (2013, p.16). Ngadju kala: Ngadju fire knowledge and contemporary fire management in the Great Western Woodlands. CSIRO Ecosystem Sciences, Floreat, WA

⁴³ Prober SM, Yuen E, O’Connor MH, Shultz L (2013, p.41). Ngadju kala: Ngadju fire knowledge and contemporary fire management in the Great Western Woodlands. CSIRO Ecosystem Sciences, Floreat, WA

Figure 23 Typical fire use when moving on country



These fire connections are highlighted by Ngadjumaya language with a host of fire related words⁴⁴, that have been translated to English in Table 5.

Table 5 Ngadjumaya language words describing fire

Ngadju – kala/kaya	English - Fire
puyu	smoke
kampani	Heat/hot
kala babbarn	flame
purrku	charcoal
kafa	firewood
ilkalyu	hot ashes
kujurra	ashes

⁴⁴ Prober SM, Yuen E, O'Connor MH, Shultz L (2013, p 6). Ngadju kala: Ngadju fire knowledge and contemporary fire management in the Great Western Woodlands. CSIRO Ecosystem Sciences, Floreat, WA

Many opportunities are identified in the IPA plan and Ngadju kala that relate to bushfire risk/land management. These activities rely on a strong cultural and scientific basis and respectful partnerships with the CSIRO, the Department of Biodiversity Conservation and Attractions (Parks and Wildlife), Department of Fire and Emergency Services, the 4 Councils and organisations with occupations and leases.

6.3. Aboriginal Lands - Mirning Country

Mirning ancestral country lies to the east of the Ngadju country.

In 2019 native title came into effect over 32700 square kilometers of land on the far southeast coast and Nullarbor plain.⁴⁵ The title area starts at Caiguna / Point Dover in the west and stretches to the South Australian Border. Figure 24. The Mirning clans have common bonds through to Streaky Bay in South Australia.

Figure 24 Mirning country of the far south-east



⁴⁵ WCD2017/008 - WA Mirning People

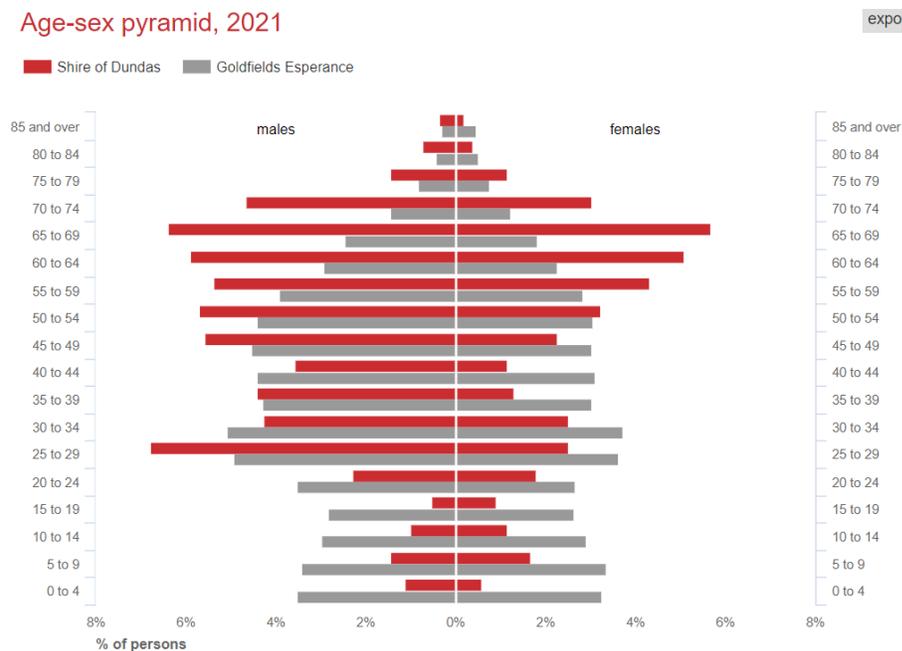
6.4. Who are the people:

OBJECTIVE - Protect lives and wellbeing of persons

The 699 residents of the Shire of Dundas are focused in the two small towns of Norseman and Eucla, and dispersed through the communities of the pastoral leases, service stations and fishing leases. This equates to less than 0.01 persons / km. Population statistics do not include the 500 or so FIFO residents of the IGO Nova, Pantora Mine and exploration camps, nor 450 vehicles (average) a day traversing the Shire on the Eyre Highway⁴⁶. Daily population is estimated to be some 2000 persons.

In 2021 our resident population, Figure 25, had the median age of 50 and had a lower proportion of children (under 18) and a higher proportion of persons aged 60 or older⁴⁷ than Goldfields Esperance⁴⁸. 7% of the population identify as Aboriginal or Torres Strait Islanders. Within our FIFO community 200 to 300 are at the NOVA mine and another 200 + will be housed in the workers village within Norseman.

Figure 25 Age sex profile for Shire of Dundas 2021



⁴⁶ <https://trafficmap.mainroads.wa.gov.au/map>

⁴⁷ <https://profile.id.com.au/rdage/age-sex-pyramid?WebID=110&BMID=10>

⁴⁸ profile.id.com.au/rdage/population?WebID=110

The people of the community come together through monthly markets, youth group activities, craft group, men's shed and pensioners lunches. Six of our community live in supported accommodation.

The isolated nature of Dundas Shire means that any location of congregation particularly in the woodlands and shrublands is particularly vulnerable to fire. Towns, service station and mine camps need to be self-reliant and resilient to fire as options for evacuation or leave early are not appropriate. Norseman is over 100 years old and has many buildings that are vulnerable to spotting or even low intensity grass fires. Areas of temporary occupation such as highway park areas and camping areas are particularly vulnerable as they often have limited access and poor communications. Elderly and those with existing health conditions may be susceptible to smoke, toxins, stress and heatwave conditions often associated with large fire events.

6.5. What drive the ECONOMY:

Objective - Maintain and grow the State's productive capacity, employment and government revenue

The Local Emergency Management Committee valued the Goldfields Esperance economy at \$244 million dollars based on the Gross Area Product (2015/16)⁴⁹.

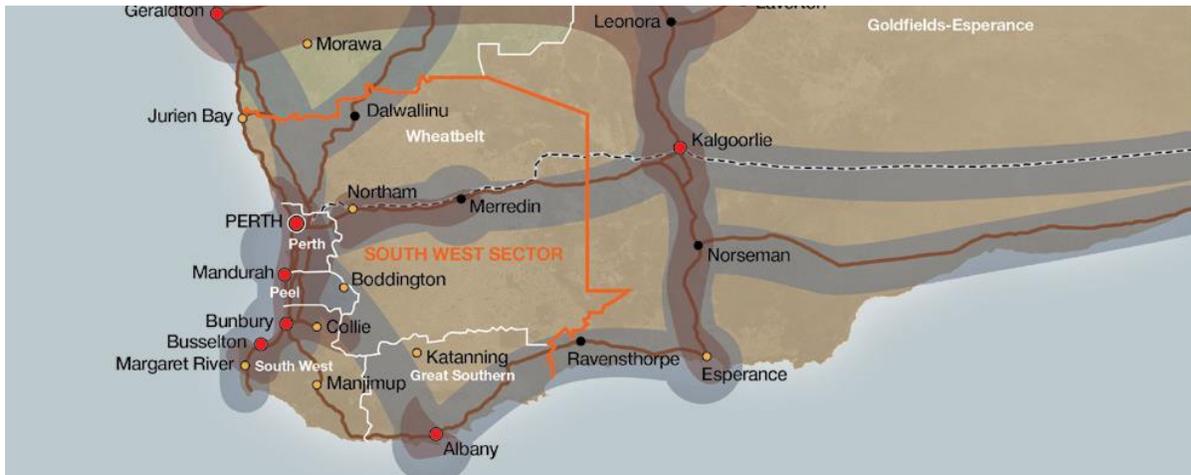
The State Planning Strategy 2050⁵⁰ identifies the Southern Goldfields and Shire of Dundas as a focus area for infrastructure and economic activity, Figure 26, and places particular emphasis on ensuring that;

“Movement of people, resources and information – managing the movement of people, goods and services through an integrated network connected locally, regionally, nationally and globally.”

⁴⁹ Shire of Dundas Local Emergency Management Committee. Dundas Consequence Table 2016

⁵⁰ Western Australian Planning Commission. State Planning Strategy 2050. (2014) Planning for sustained growth and prosperity

Figure 26 Dundas is identified as both a significant infrastructure and economic activity area.



The Goldfields Voluntary Regional Organisation of Councils is the local Government partnership that develops economic strategy and projects for the region. Shire of Dundas is a key partner in the group. In its recently released infrastructure strategy for economic growth,⁵¹ it highlighted its vision of

“In 2050, the Goldfields-Esperance Region enjoys exceptional lifestyle opportunities and a prosperous, diverse economy built upon our skills, natural resources and rich cultural heritage.”

This vision is to be achieved through 3 key domains, which highlight the interconnectivity of the local and regional economy

- The GVROC Mining and Minerals Processing Industry
- The GVROC Agricultural Industry
- The GVROC Tourism Industry

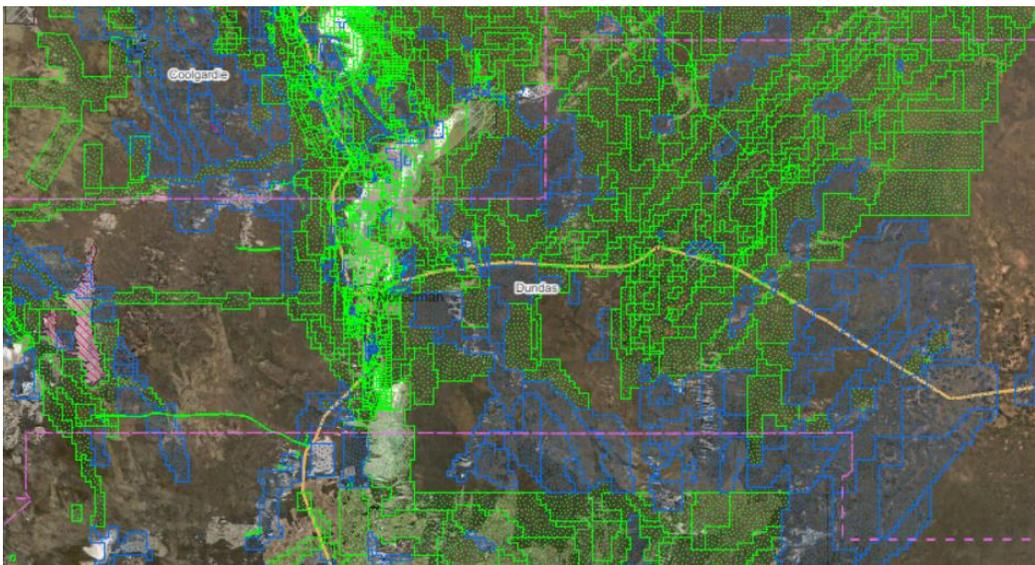
⁵¹ Goldfields Voluntary Regional Organisation of Councils. An infrastructure strategy for industry growth. Opportunities identification study. January 2020

In the Shire of Dundas this economy is reflected by;

Mining

- Nova IGO, a large nickel mine in the Fraser Range, Pantora ,100 year gold mine at Norseman.
- Extensive mining lease and exploration licenses across the west of the Shire, Figure 27.

Figure 27 Extensive mining leases in the Shire of Dundas



- The rail transport of Koolyanobbing iron ore through Dundas to the Port of Esperance.
- The road transport of Nickel and Copper ore, Spodumene and Lithium along the Eyre and Coolgardie Esperance Highways and the Norseman Hyden Rd
- Rail and road transport of fuels to the Goldfields north out of Esperance Port.
- Feasibility studies and initial consultations are being undertaken for large scale green hydrogen production on the south coast.

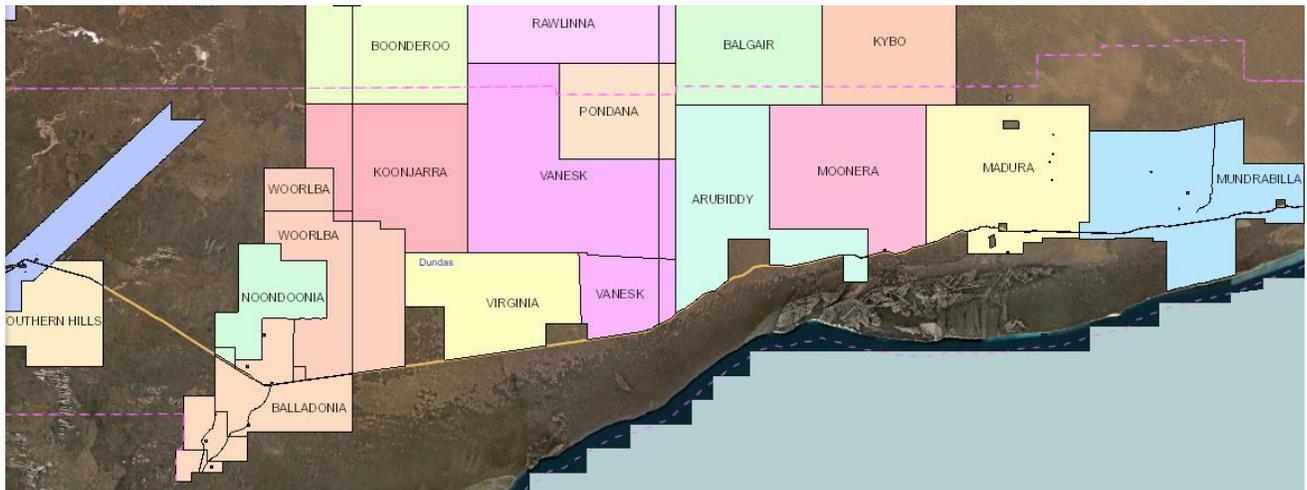
The mining sector is highly reliant on secure supply chain transport routes to send its product to market and to receive “just in time” supplies of material and labour. These supply chains are vulnerable to extended fire threats.

Agriculture

Extensive pastoral leases are in the eastern Great Western Woodlands and Nullarbor grasslands.

Figure 28. These 13 enterprises are in low rainfall ranging from 300 to 150mm / year.⁵²

Figure 28 Pastoral leases of the Nullarbor and Woodlands



The pastoral sector relies on sustainable levels of fodder to graze its stock. Fire, grazing, and weather interacting have complex effects on land condition and animal production. For any given type of country⁵³. In general, it is better to restrict wildfires on grazed areas as they may transition the more fire resistant Chenopod Shrublands to more fire vulnerable grasslands, leading to a more irregular fodder regime, and jeopardizing the sustainability of pastoral production.

⁵² Rangelands NRM. Website <https://rangelandswa.com.au/who-we-are-2/what-are-the-rangelands/goldfields-nullarbor>

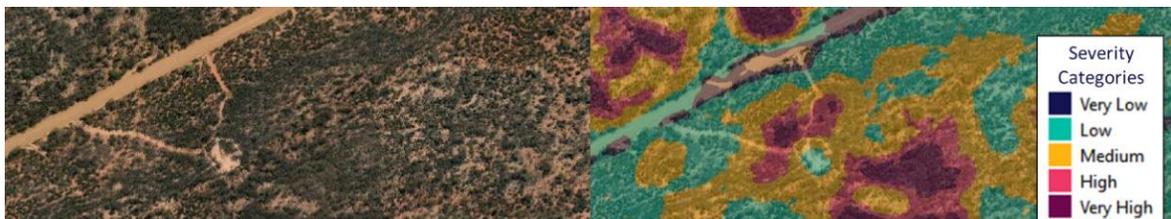
⁵³ Department of Primary Industry and Regional Development. Arid zone rangeland pastures and fire March 2021

Freight and fire study

The Shire of Dundas secured funds from the Australian Government National Disaster Risk Reduction Program, to undertake a Freight and Supply Chain Risk from Bushfire Study in the Southern Goldfields. The proof-of-concept project assessed the exposure and vulnerability of a sample of the supply chains that connect east with west and north south through the Southern Goldfields. The Shire partnered with the Freight and Logistics Council of WA along with Geoneon, a specialist disaster risk geospatial analyst company to undertake the task.

The project used cutting edge techniques of earth observation data and machine learning combined with supply chain value/flow analysis to assess supply chain infrastructure exposure and vulnerability to bushfire in the Southern Goldfields. Analysis products developed included

A fuel “severity” model suitable for dispersed fuels and volatile buildings



An asset value model



A vulnerability model.



This project can generate the evidence required to bring together disparate national, state and local stakeholders to establish common strategies and coordinated action to reduce future supply chain disruption from bushfire.

Tourism

Eucla, as the southern entrance to Western Australia and the seven service centre's of the Eyre Highway are providing for the increasing number of travelers, grey nomads and adventure tourist. National Parks and conservation reserves on the Shires remote southeast coast are a magnet for 4x4 enthusiast who visit the Eucla National Park, Red Rocks, Nuytsland, Eyre Bird Observatory, Baxter Cliffs and Bilbunya Dunes. Travelers can use the camping and visitor nodes of the Granite and Woodlands Trail, or the Dundas heritage trails. Many travelers push into unofficial camp areas behind Main Roads parking bays on the highways. Tourists and travelers may be a source of fire ignition and are vulnerable to bushfires due to poor communications, limited access routes and unfamiliarity with bushfire.

Norseman includes caravan park, overnight RV camp and motels for travelers, whilst The Woodlands Centre provides tourist information, with a particular focus on the Great Western Woodlands.

Employment in the Shire is high, where in addition to the key economic driver's local business and Community services from Government and Shire provide regular steady employment. Household incomes though are still very low, and real wealth leave the area to other locations.

6.6. What is our SOCIAL SETTING:

Objective - Ensure that there is public order, that people are housed and fed in a safe and sanitary manner and have access to social amenities including education and health services, and that things of cultural importance are preserved)

The Shire of Dundas is 'very remote' on Australia's Accessibility and Remoteness Index,⁵⁴ the extreme end of the scale. Norseman is considered to have very little accessibility of goods, services, and opportunities for social interaction.

The Socio-Economic Indexes for Areas (SEIFA) is designed to gauge relative socio-economic disadvantage in areas throughout Australia. The Shire of Dundas is the 11th most socio-

⁵⁴ <https://www.abs.gov.au/websitedbs/d3310114.nsf/home/remoteness+structure>

economically disadvantaged Shire out of 139 Western Australian local government areas and 62nd in Australia out of 560 local government areas.⁵⁵

Dundas great strength is its strong cultural connections to the Aboriginal Lands of the Shire. Most of the Shire is under full or partial native title. Some of these lands are managed through the traditional owners who are actively undertaking work to protect sites of cultural significance from fire. The 2019/20 fires damaged and destroyed things and places that were important to the Ngadju people. The loss of artifacts like water trees and old growth woodlands created great distress to elders and other community members. Cultural sites may be damaged in fires but are also sensitive to mitigation works. Granite outcrops, water sources and grave sites are particularly vulnerable.

Aboriginal people face significant disadvantage in indicators such as health, education, employment, housing, and justice. Therefore, targeted, and sustainable actions must be in place to address the health impacts disadvantage presents.

The Regional Price Index states that, on average, the residents of Dundas pay 11% more for daily items such as food and health and personal care. Median weekly household income for Norseman was \$776 in 2016, less than half the Western Australian median of \$1595, and whilst home ownership is around 65%, its median value of \$45,000 means house losses cannot be realistically replaced, and homelessness ensues. Approximately 80% of buildings across the Shire include significant amounts of asbestos in their walls or roofs.

The Australian Early Development Index (AEDI)⁵⁶ is a measure of young children's development (as they enter school and at the community level) across five domains. The Shire of Dundas had the second highest percentage of young people developmentally vulnerable in the region, with 43.6% of children developmentally vulnerable in one or more domains and a further 31.6% of children developmentally vulnerable two or more domains (%). The disruption from bushfire places extra pressure on children's development. These figures are reinforced by the Australian National Disaster Resilience Index score of 0.1814 for the Norseman, Kambalda, Coolgardie SA2

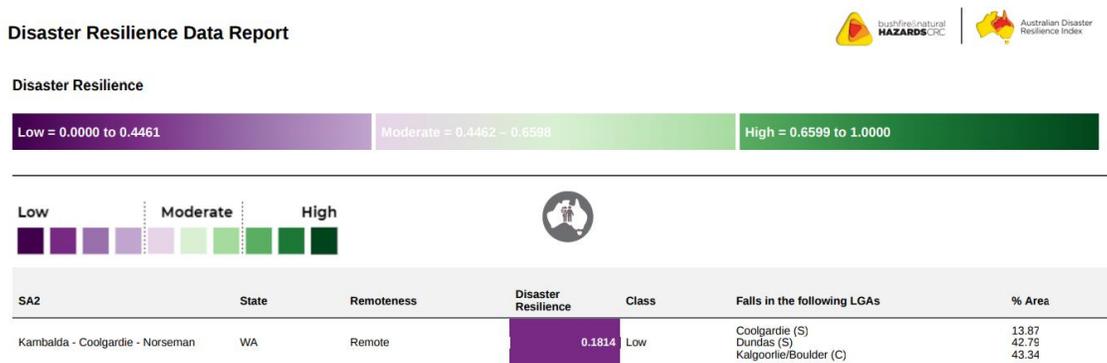
⁵⁵ 2033.0.55.001 Socio-Economic Indexes for Australia (SEIFA), 2016

⁵⁶ <https://www.aedc.gov.au/about-the-aedc/how-to-understand-the-aedc-results>

area. This score indicates a low disaster resilience for the Shire of Dundas communities. Figure 29.

“Communities in areas of low disaster resilience may be limited in their capacity to use available resources to cope with adverse events and are limited in their capacity to adjust to change through learning, adaptation, and transformation. Limitations to disaster resilience may be contributed by entrenched social and economic disadvantage, less access to or provision of resources and services, lower community cohesion and limited opportunities for adaptive learning and problem solving⁵⁷”.

Figure 29 Disaster resilience data report Norseman, Kambalda, Coolgardie SA2



The Disaster Resilience Index relies on 8 determinants, drawn from nationally consistent data. When considered against similar type SA2’s in the State and Nationally, Dundas is significantly below them in all elements other than “information access” and emergency services. Figure 30. This access to communications and emergency services (police and ambulance) is most likely the privilege of being on a major national transport junction.⁵⁸

⁵⁷ ADRI Bushfire Natural Hazards CRC April 2022. Disaster Resilience Factors Report Coolgardie Norseman Kambalda

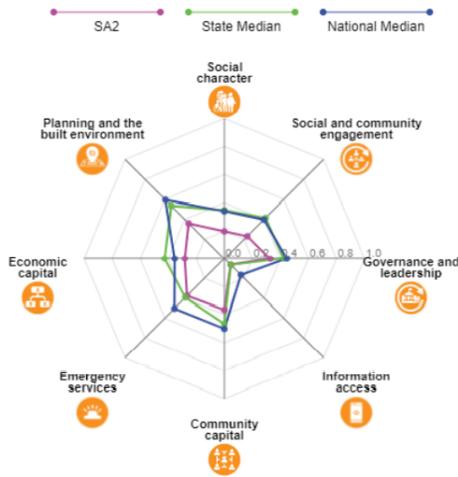
⁵⁸ ADRI Bushfire Natural Hazards CRC April 2022. Disaster Resilience Factors Report Coolgardie Norseman Kambalda.

Figure 30 Disaster resilience factors report

Disaster Resilience Factors Report

The graphs show the factors influencing disaster resilience in a SA2 in relation to the State and National medians for the same group.

SA2 Name	Kambalda - Coolgardie - Norseman
Group	3
Remoteness	Remote



Dundas includes important health service infrastructure for the community

- Norseman Hospital /Doctors Surgery
- Silver Chain Nursing Station, Eucla
- St John Ambulance Norseman and Eucla

The Norseman District High School is a Level 4 District High School catering for around 100 children from Kindergarten to Year 12. Children living on the pastoral stations, highway service centre’s and at Eucla receive schooling from the school of the air at Kalgoorlie. Council provides rubbish collection and public health services and Water Corporation water from the Goldfields system. Damage or destruction of these assets by fire would significantly disrupt effective function of essential services in the Shire.

The long history of mining at Norseman, including its omnipresent tailings dam over the town, indicates the likely presence of arsenic dust through most structures. Registered contaminated

sites and abandoned mine-sites are close to Norseman also. Fire damaged buildings with asbestos content would be considered contaminate sites.

6.7. How are we GOVERNED?

Objective - Ensure that there is, at all times, an effective and functioning system of government and societal respect for rule of law

The Shire of Dundas is designated as regional and remote. It has a police station and hospital as its only resident Government service. Other Government services to the community are delivered through a Community Resource Centre, run by the Shire or remote access internet.

Council has 5 councilors and a President. The President is the chair of the Local Emergency Management Committee. Like most level four Shires, the requirements for emergency management are particularly onerous. Council undertakes aspects of coordination, planning response and recovery for all hazards that may occur in its boundary. The bushfire requirements extend to full response and suppression on all unallocated crown land.

Community resources are limited and supports the Volunteer Fire and Emergency Brigade and the St John Ambulance, the Ngadju Rangers are the Volunteer Bushfire Brigade, and pastoralist combine to form Pastoral Bushfire Brigade. Council has very limited resources to deliver emergency response. The nature of the 12-hour shift work undertaken by the mine workers leaves little scope for community participation.

Ongoing annual DFES capability studies reinforce the limits of the existing model for such significant expectations.⁵⁹ Figure 31 compares the Shire's capability scores in 2021 with the averaged capability scores for extra small to small remote LGs in the same year⁶⁰. Noting that extra small and remote are already disproportionately disadvantaged. The strengths that are shown reflect areas where the activity has been able to be integrated into other core business spaces such as community development, communications, and planning. The weaknesses are

⁵⁹ SEMC. 2021 Survey EM capability summary supplement – prepared for the Shire of Dundas

⁶⁰ SEMC. 2021 Survey EM capability summary – prepared for the Shire of Dundas.

activities that require additional investment and access to ongoing funding resources that are not available.

Figure 31 Emergency Management Capability for the Shire of Dundas

Capability topics	Shire of Dundas 2021	Similar LG average 2021	Difference
Recovery Plans	100%	71%	29%
Situational Assessment	95%	9%	86%
Public Information Quality	82%	49%	33%
Business Continuity Plans	80%	35%	45%
Horizon Scanning	75%	35%	40%
Impact Assessment	75%	55%	20%
Agency Interoperability	69%	34%	35%
Public Information Tools	69%	38%	31%
Sector Information Sharing	67%	33%	34%
Evacuations	66%	31%	35%
Lessons Management	63%	39%	24%
Infrastructure Protection	60%	41%	19%
Essential Services Protection	60%	55%	5%
Natural Buffers	45%	32%	13%
Risk Assessment	45%	46%	-1%
Finance and Administration	30%	50%	-20%
EM Personnel	27%	33%	-6%
Evacuation/Welfare Centres	25%	43%	-18%
Recovery Resources	20%	26%	-6%
Recovery Skills	20%	28%	-8%
Sustained Recovery	5%	22%	-17%
Community Welfare	5%	28%	-23%
Equipment and Infrastructure	0%	18%	-18%

6.8. INFRASTRUCTURE in the Council area:

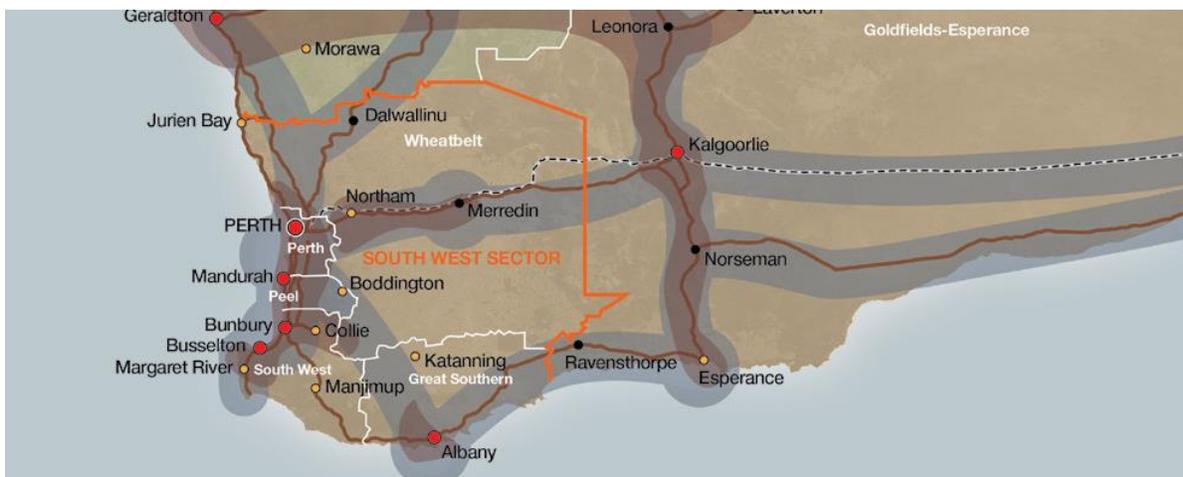
Objective - Maintain the functionality of infrastructure, particularly key transport infrastructure and utilities required for community health, economic production and effective management of emergencies

The Shire of Dundas is a clear choke point for freight, telecommunications, and community connections, as it includes some of the most important transport and communication

infrastructure in the nation. ⁶¹ . These facilities, Figure 32, are the primary connection of WA with the eastern states and includes three of national importance.

- The Eyre Highway
- Telstra fibre optic cable
- NBN Fibre optic Cable (co-located with Telstra)
- Optus Fibre optic cable

Figure 32 Norseman is a choke point for nationally significant supply chains and infrastructure



Of state significance includes

- Coolgardie Esperance Highway
- Koolyanobbing Esperance rail route
- Telstra mobile phone tower network

Regional significance

- Optus Mobile Tower network

⁶¹ Western Australian Planning Commission. State Planning Strategy 2050. (2014) Planning for sustained growth and prosperity

- Horizon power supply network (Norseman)
- Water Corporation Goldfields Water Supply Scheme
- Norseman Airstrip
- Eucla Airstrip
- *Emergency services radio network*

Of local significance

- Eucla power supply
- Eucla water supply

The linear and isolated nature of these infrastructure makes them particularly vulnerable to large fires, particularly in the woodlands and shrublands areas of the Shire. These assets are often concentrated along single corridors, either east west along the Eyre Highway or north south along the Coolgardie Esperance Highway. Nous Consulting in their review of the impacts of the 2019/20 bushfires observed⁶² Figure 33.

“The confluence of a largescale natural hazard and the extended closure of a critical inter-state road is a relatively unique phenomenon in WA and has highlighted the need for the mitigation of future disruption to WA’s inter-state roads due to natural hazards”

The WA Implementation Plan 2020 for National Disaster Risk Reduction⁶³ highlights the need to build resilience of Supply Chains, and includes an action to;

“Identify points of failure in supply chain at the community, local government and state levels.”

A separate project has been supported with a grant from the SEMC to better understand the aggregated value and commodity flow of freight and services in the Shire. This project will

⁶² Nous Group | Review of the Norseman West Complex of Bushfires | 27 November 2020

⁶³ WA Implementation Plan 2020 for National Disaster Risk Reduction, 2020, State Emergency Management Committee

identify the locations of greatest exposure to bushfire hazard, using earth observation and machine learning techniques. The learnings from that project will be incorporated in the final version of this plan.

Figure 33 2019 /20 Norseman complex of fires paralysed interstate truck traffic for 12 days



Influenced by the impacts of the 19/20 bushfires in the Eastern States, Optus/CSIRO has undertaken a national review of its existing sites and the improvements to be had through site hardening, where the site is protected from ember attack or nearby consequential fires from **within the footprint**.⁶⁴ Of the 12 tower sites within the region, OPTUS have reported significant reduction potential in building loss probability from 30 – 45 % to 2 – 6%.⁶⁵ The region also includes the west to east – “long haul fibre backbone”., that transits the Nullarbor in the Shire of Dundas and the City of Kalgoorlie Boulder⁶⁶. Figure 34.

Communications resilience in our region was raised during the consultation for the 2021 Regional Telecommunications Review. A step change in demand.⁶⁷ Concerns regarding site resilience and maintenance influenced Recommendation 3;

⁶⁴ Steve Crowley Optus 2021. Optus Mobile Network Bushfire Resiliency Report. Optus and CSIRO collaboration.

⁶⁵ Steve Crowley, Optus. Per comm.

⁶⁶ 2021 Regional Telecommunications Review. A step change in demand. ritco. Commonwealth of Australia

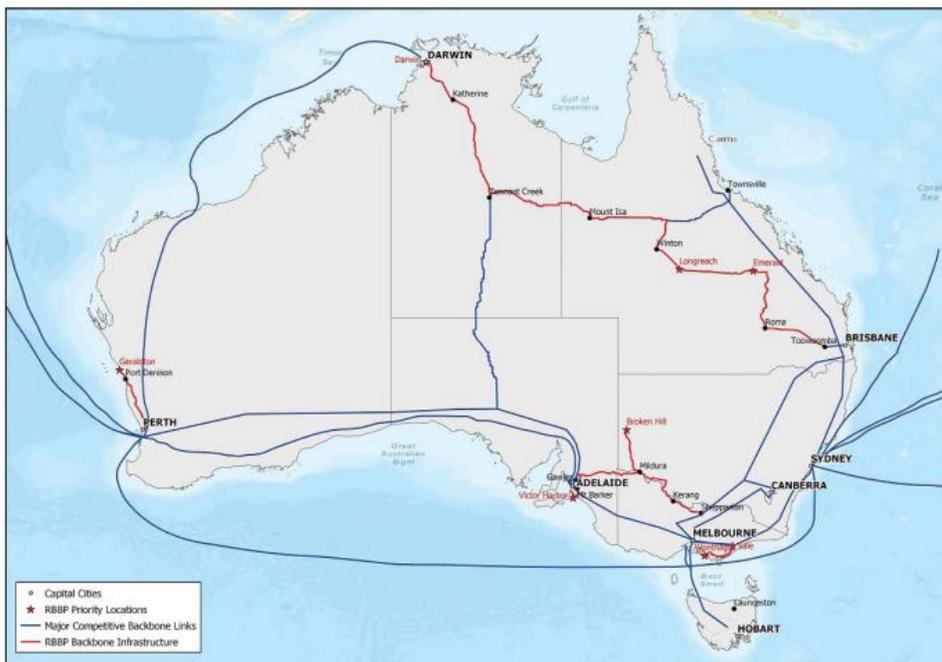
⁶⁷ 2021 Regional Telecommunications Review. A step change in demand. ritco. Commonwealth of Australia

“The Committee recommends that Government commits to a substantial Regional Telecommunications Resilience Fund, targeted towards initiatives to improve emergency and network resilience across vulnerable communities, enhancing funding for the Strengthening Telecommunications Against Natural Disasters (STAND) package, including the Mobile Network Hardening Program.

The Committee further recommends that a focus be given to:

- better coordination between the telecommunications industry, energy providers and emergency services; and*
- standards of maintenance and preparation for emergency events.”*

Figure 34 Long haul fibre backbone through the Shire of Dundas and southern goldfields.



Whilst most of these assets are clearly identifiable in the landscape, not all parties were willing to share data for the purpose of this assessment. Many tower sites have been manually identified through the public access Radio Frequency National Site Archive(database) and assessed. DFES would not share the location of the emergency management radio network infrastructure, and this has not been determined.

6.9. Our ENVIRONMENT:

Objective - Protect ecosystem and biodiversity

The Shire of Dundas is at the heart of the Great Western Woodlands (the Woodlands).

“The Woodlands is an area of great biological richness that extends over 16 million hectares - about the same size as England. It is regarded as the largest remaining area of intact Mediterranean-climate woodland left on Earth and contains about 3000 species of flowering plants, about a fifth of all known flora in Australia. It includes nearly a quarter of Australia's eucalypt species, many of which grow nowhere else in the world, and its varied habitats are home to a diverse array of mammals, reptiles, frogs, and birds” DBCA 2022.⁶⁸

A large portion of the Woodlands is Aboriginal Land of the Ngadju people and has been recently designated an Indigenous Protected Area (Cth), to be managed for natural and cultural values. This creates continuity for conservation purposes between Aboriginal lands and the States reserve system. The Dundas Nature Reserve and Nuytsland Nature Reserve are the largest of the system

Management of the Woodlands for conservation purposes is well explored in the

- Ngadju Indigenous Protected Area Plan of Management 2020–2030. Ngadju Conservation.⁶⁹
- A Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands, CaLM.⁷⁰
- Birds of the Great Western Woodlands. The Nature Conservancy. BirdLife Australia.⁷¹

⁶⁸ <https://www.dpaw.wa.gov.au/management/off-reserve-conservation/the-great-western-woodlands>

⁶⁹ Prober SM, Yuen E, O'Connor MH, Shultz L (2013, p.41). Ngadju kala: Ngadju fire knowledge and contemporary fire management in the Great Western Woodlands. CSIRO Ecosystem Sciences, Floreat, WA

⁷⁰ CaLM. A Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands,(undated)

⁷¹ Fox, E., McNee, S., Douglas, T. (2016) *Birds of the Great Western Woodlands*. Report for The Nature Conservancy. BirdLife Australia, Melbourne.

- Bushfire Threat Analysis of the Great Western Woodlands 2010 CaLM.⁷²

Less references are to be found for areas in the east of the Shire outside of the Nuytsland Nature Reserve and the Eucla National Park. Much of the eastern portion of the Shire is the Nullarbor Plain Karst system, the largest exposed karst system in the world where many subterranean ecologies exist. The far east is also home to West Australia's largest population of the Southern Hairy Nosed Wombat.

Whilst the woodlands and plains are vast, they have suffered several significant disturbances, including

- Widespread extinctions of small and medium mammals from cats and foxes
- Widespread losses of flora values through pest animals and introduced grazers
- Changed vegetation structures through timber collection (tram lines), mining, grazing, repeat wildfires
- Changed fire regimes
- Focused areas of potential contamination from historic mining activities. Figure 35

The Bushfire Threat Analysis of the Great Western Woodlands discusses at length the interrelationship between fire and the environment at part 3.2.2 The Environment. This should be read as a companion document. Fundamental in this discussion is the vegetation associations and how they reproduce/recover from fire. Surprisingly many dominant woodland eucalypts are highly sensitive to fire and die under low fire intensity conditions. Their response is to release large amounts of seed to regenerate. Figure 36. As lignotuber/ resprouters the shrublands, mallee and grasses respond more quickly.

⁷² CaLM 2010. Bushfire Threat Analysis of the Great Western Woodlands

Figure 35 Abandoned mine sites are a common health and safety concern and may include historic contamination

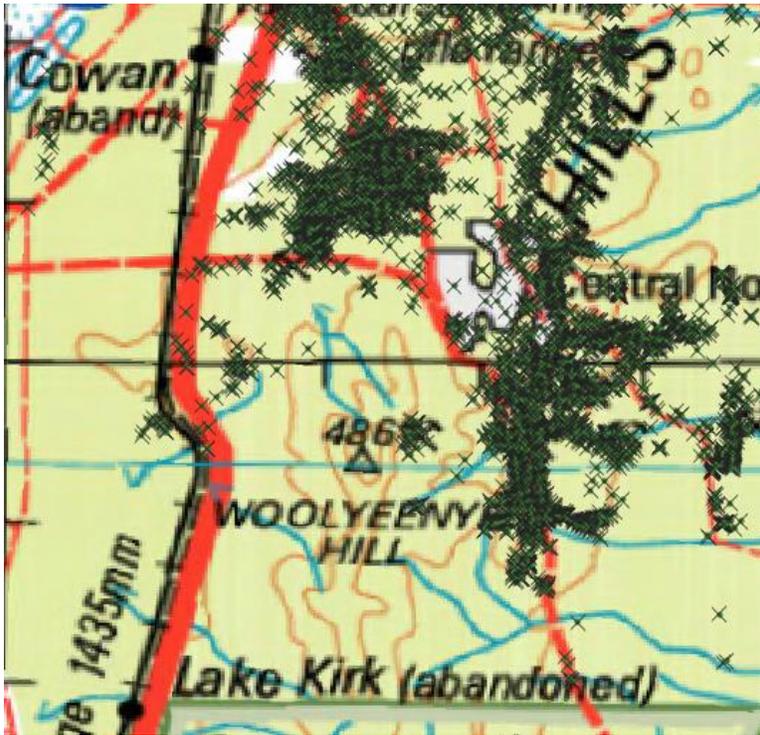
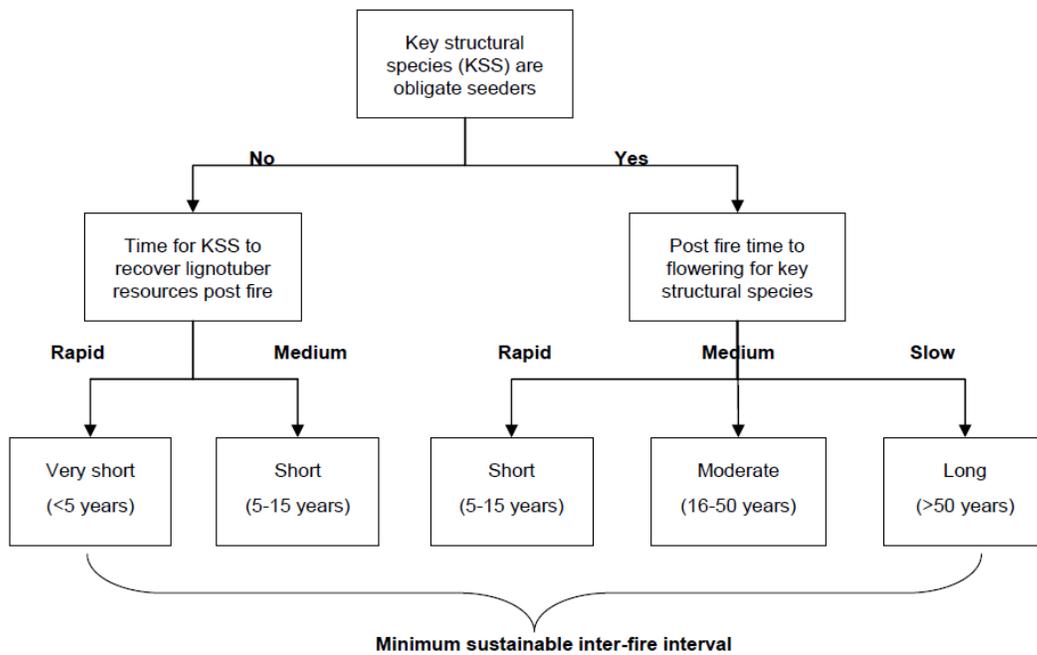


Figure 36 Key overstory species response to fire



The scale of the landscape here makes it difficult to nominate specific locations where biodiversity is at risk from fire, but large old growth woodland is particularly susceptible to loss of elevated hollows and heavy ground habitat from fire. It is known that rare and priority flora and fauna as restricted taxa are both important and vulnerable. Their persistence often depends on the alleviation of threatening processes that have caused a reduction in range and/or population size. Inappropriate fire regimes can contribute to these declines⁷³. Other particularly fire sensitive ecologies include.

- Mature Woodland Communities
- Regrowth Woodland Communities
- Mallee Fowl habitat

Collaboration and coordination were historically seen as being foundational to the management of the Woodlands⁷⁴. The need for an integrated fire management plan was identified in 2010.

“An integrated fire management plan for the Great Western Woodlands. This will be developed incrementally, starting with the coordination of the fire prevention and bushfire suppression activities of the three DEC regions in the area, and the activities of local authorities and FESA. Further development will occur through voluntary partnerships to coordinate fire management activities across the landscape, improving protection of life and property, and natural and cultural values, as well as maximising the area’s potential for carbon storage.”

Further to the natural values of the area, the Woodlands are a great repository of biomass carbon in vegetation and soils⁷⁵. The ANU in 2009 estimated of nearly one billion tonnes across the Woodlands⁷⁶ This is a significant asset and is at risk of inappropriate fire regimes.

⁷³ Bushfire Threat Analysis of the Great Western Woodlands 2010 CaLM

⁷⁴ CaLM A Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands,

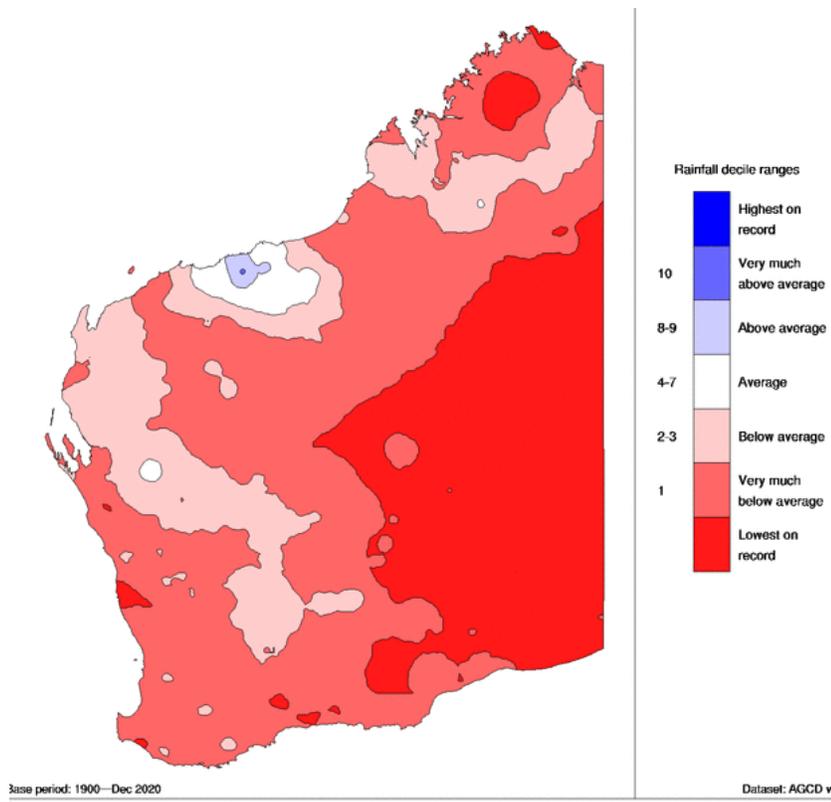
⁷⁵ A Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands, CaLM

⁷⁶ Berry S, Keith H, Mackey B, Brookhouse M and Jonson J, 2009. Biomass carbon stocks in the Great Western Woodlands. Report for The Wilderness Society by ANU Enterprise Pty Ltd.

7. The Bushfire Hazard.

The bushfire hazard in the Dundas Shire is complex and extensive and sits within the Southern Rangelands Bushfire Risk Management Zone for Public Land⁷⁷. All of the 90 000 + sq km is flammable and subject to the bushfire prone overlay⁷⁸, (with the exception of salt lakes clay pans and approximately 1sq km of central Norseman). This bushfire hazard occurs in two broad forms: the grasslands of the Nullarbor Plain and the Woodlands/shrublands of the Great Western Woodland. The Mediterranean climate is characterized by low rainfall, 250 – 300mm, and long dry summers. Indicative of the bushfire season is a restricted burning period from 1st October to 31st May.⁷⁹ Drought conditions in 2019 led to some of the most severe fires on record in the woodlands.**Figure 37**

Figure 37 2019's lowest on record drought conditions led to severe fires in the woodlands



⁷⁷ A framework for prioritising prescribed burning on public land in Western Australia.

⁷⁸ <https://dfes.wa.gov.au/site/bushfire/bushfireproneareas.html>

⁷⁹ Shire of Dundas. 2021. 2021-2022 FIREBREAK NOTICE BUSH FIRES ACT 1954 SHIRE OF DUNDAS.

7.1. Nullarbor Chenopod Shrubland and Grasslands

The Nullarbor Chenopod Shrubland and grasslands stretch from east of Balladonia to the SA border at Eucla, broadly following the elevated Karst landscapes. Most is subject to pastoral leases and are grazed by cattle, occasionally sheep, kangaroos and pest animals, rabbits, donkeys, camels, and goats. Fire, grazing, and weather interacting have complex effects on land condition and animal production⁸⁰.

These grasslands are heavily influenced by seasonal conditions. Drought years mean little fire hazard is present whilst wet seasons can propagate native shrubs and grasses. In general, it is better to restrict wildfires on grazed areas as they may transition the more fire-resistant Chenopod Shrublands to more fire vulnerable grasslands.⁸¹

7.2. Great Western Woodlands

The Woodlands, Figure 38, are a complex bushfire hazard that is made up of 5 primary vegetation types.⁸²

- Bare areas; often associated with lakes, granite outcrops
- Woodland; associated with red soils through the centre of the Shire
- Shrubland and mallee, on yellow and white sands to the west and south
- Mallee, on yellow and white sands to the east and south
- Hummock Grassland, on red sands to the north

Shrublands, mallee and hummock grassland are historically more prone to bushfires. Woodlands are less so. A characteristic of the woodlands fuels is that they do not have contiguous ground fuels, consequently the fuel types are more unpredictable and volatile under heavy wind, Severe, Extreme or Catastrophic fire danger ratings.

⁸⁰ Department of Primary Industry and Regional Development. Arid zone rangeland pastures and fire March 2021

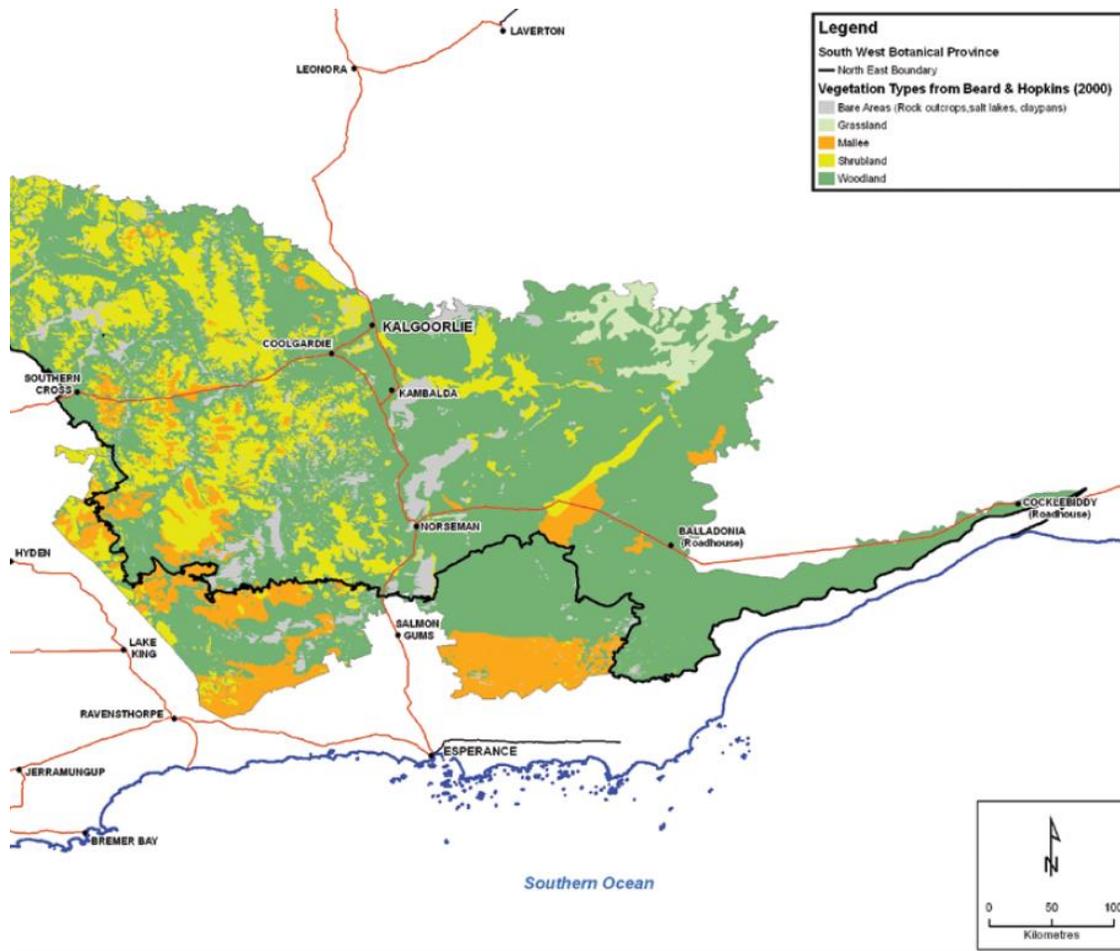
⁸¹ Department of Primary Industry and Regional Development. Arid zone rangeland pastures and fire March 2021

⁸² Bushfire Threat Analysis of the Great Western Woodlands. Department of Environment and Conservation. 2010

These vegetation / fuel associations are described in the Bushfire Threat Analysis of the Great Western Woodlands.⁸³ and replicated as a table in Figure 39. Vegetation types with common structural components have been aggregated into twelve fuel categories. Each fuel category has been broken down into classes that describe the vegetation structure; ground cover, mid-stratum and overstorey in a manner that reflects fire behavior. These fuel types have then been described as to the anticipated fire behavior characteristics. Figure 40.

A data layer of these fuel categories has been included in the BRMS and used to segment fuel types in the risk assessment component.

Figure 38 Great western woodlands broad vegetation types, from Beard and Hopkins 2000⁸⁴



⁸³ Bushfire Threat Analysis of the Great Western Woodlands. Department of Environment and Conservation.2010

⁸⁴ Bushfire Threat Analysis of the Great Western Woodlands. Department of Environment and Conservation.2010

Figure 39 Fuel categorisation of the Great Western Woodlands

Fuel Category	Vegetation Description	Fuel Description
B	Bare Ground or succulent steppe	No fuel: bare ground or succulents only
W1	Medium woodland	No groundcover, no mid stratum and: <ul style="list-style-type: none"> • Tall mallee or medium tree overstorey or • Sparse low tree or mallee overstorey
W2	Low woodland	No groundcover, no mid stratum and: <ul style="list-style-type: none"> • Open-closed low-medium mallee overstorey or • Open-closed low tree overstorey
W3	Woodland with sparse shrub understorey	No groundcover, sparse tall shrub midstorey and sparse to open tree overstorey
W4	Woodland with open shrub understorey	No groundcover, open shrub midstorey and sparse to open tree or mallee overstorey
S1	Open shrubland / mallee shrubland without groundcover	<ul style="list-style-type: none"> • Bare-sparse groundcover and open medium-tall shrub midstorey or • No groundcover, sparse midstorey and open low shrub overstorey +/- tree or mallee component in overstorey
S2	Open shrubland / mallee shrubland with groundcover	Open groundcover with open vegetation in at least one other stratum +/- tree or mallee component in overstorey
S3	Shrub thicket / thicket with mallee	Bare-sparse groundcover and dense-closed shrubs in either mid or upper stratum +/- tree or mallee component in overstorey
S4	Dense, low shrubland / mallee shrubland	<ul style="list-style-type: none"> • Dense-closed groundcover with bare-sparse mid and upper stratum or • Open groundcover with dense mid or upper stratum +/- tree or mallee component in overstorey
S5	Very dense, low shrubland / mallee shrubland	Dense groundcover plus dense vegetation in either mid or upper stratum +/- tree or mallee component in overstorey
H1	Open hummock grassland	Open hummock grass +/- tree or mallee overstorey
H2	Dense hummock grassland	Dense hummock grass +/- tree or mallee overstorey

Figure 40 Fuel categorisation bushfire behaviour descriptions

<p>Fuel category B: naturally bare areas such as salt lakes and rock outcrops; nonflammable vegetation such as succulent steppe and recently burnt areas. B areas will not burn under any conditions.</p>
<p>Fuel category W1: areas dominated by sparse medium trees or tall mallee. They have very little understorey or midstorey or an understorey of succulent plants, and so, contain virtually no surface or near surface fuels. W1 areas are highly unlikely to burn, except for short fire runs under the most extreme conditions.</p>
<p>Fuel category W2: areas dominated by low, dense trees or medium, open mallee. The denser canopy means that more litter is likely to accumulate than in category W1. The canopy is also more likely to be ignited by ground fires because it is lower. Surface and near surface fuels are still sparse, however, so W2 areas will usually only burn if a fire enters them on a broad front from a more flammable vegetation type. Even if this occurs, long fire runs in W2 fuels are unlikely except if a period of high rainfall encourages a flush of annual plant growth.</p>
<p>Fuel category W3: tree or mallee dominated areas that have an understorey of sparse, tall shrubs. W3 areas have some surface fuels and near surface fuels beneath a low to medium tree canopy. They may burn if winds are sufficient to allow fire to spread through the discontinuous fuels. It is likely, however, that fires in these fuels will self-extinguish when winds drop or relative humidity begins to rise.</p>
<p>Fuel Category W4: tree or mallee dominated areas with an open, shrubby understorey. W4 areas lack significant groundcover, although the greater density of midstorey shrubs may provide some litter to the surface fuel load. The midstorey is low enough to be ignited by a fire burning in the surface fuels. Although W4 areas usually only burn under extreme weather conditions, it is possible that fire in them may continue to spread slowly even after weather conditions moderate.</p>
<p>Fuel Category S1: areas with a sparse to open cover of medium to tall shrubs, with very little groundcover. They generally also feature mallee or trees in the overstorey, but these may not be structurally dominant. As with categories W3 and W4, fire is significantly wind driven and is likely to self-extinguish if winds drop.</p>
<p>Fuel category S2: areas with 25-50% canopy cover of shrubs in the lowest, and at least one other, stratum. They may also have an open mallee or low tree overstorey. S2 fuels are relatively continuous, allowing fires to spread rapidly and burn with great intensity. Moderate winds will still be required, however, as significant areas of bare ground will be present.</p>
<p>Fuel category S3: thickets; very dense, single age stands of shrubs, often with significant litter accumulated beneath them. Some thickets may also have emergent mallee. The density of vegetation within thickets tends to significantly reduce wind strength within them. This, combined with a lack of near ground fuel, can reduce fire behavior in thickets below what may be expected based on the biomass that is present. When conditions are suitable, however, thickets may burn with great intensity.</p>
<p>Fuel category S4: areas with dense ground cover and sparse shrubs in the upper strata or open groundcover with dense, low shrubs in the mid or upper strata. Significant litter is likely to be present. This, combined with low, dense vegetation, allows fires to spread readily under relatively mild conditions and rapidly under more extreme conditions.</p>
<p>Fuel category S5: areas with dense groundcover and dense shrubs in at least one of the other two strata. They also usually feature sparse to open mallee in the overstorey. S5 are the most continuous fuels, in both the horizontal and vertical planes. Fires will burn very rapidly and with great intensity under a range of weather conditions.</p>
<p>Category H1: open hummock grasslands, with 20-50% cover of hummocks. H1 fuels will burn rapidly if winds are sufficient to allow flame contact between hummocks.</p>
<p>Category H2: dense hummock grassland, with greater than 50% cover of hummocks. The relative continuity of hummocks allows fire to spread through H2 fuels and burn with great intensity when wind strength is moderate</p>

7.3. Regenerating Woodlands Hazard

Shrublands, mallee and hummock grasslands regenerate as resprouters or from lignotubers, in general fuel hazard loads are reduced in these landscapes when fire is applied or naturally occurs.

Many Woodlands key species though are highly fire sensitive and are prolific obligate seeders. Fires in these landscapes can lead to significant increased bushfire hazard through dense regeneration. Figure 41. If fires repeat prior to seeding maturity woodlands can become grasslands, as observed on Virginia station in the 1990's.⁸⁵

Figure 41 Dense woodland regeneration, 15 years near the Dundas Nature Reserve



⁸⁵ History of the Nullarbor Plain. Compiled by Jill Campbell

7.4. Bushfire History

The Shire of Dundas has a long history of fire and a climate that supports extended fire seasons, from October through to April. It has generally less than 300mm of rain and has many days of high heat and high wind. A limited Fire danger index history exists from 2015. The Fire Danger Ratings system is changing in 2022/23 fire season as are the Fire Weather Districts for the Shire. Based on this recent history the Goldfields Fire Weather District would experience 97.7 days of FDR at very high or above including 7.1 days of extreme or catastrophic and the Eucla Fire Weather District would experience 67.7 days at FDR very high or above including 8.8 days of extreme or catastrophic. Table 6

Table 6 Fire danger ratings in the Shire of Dundas

	Very high		Severe		Extreme		Catastrophic	
	Gold	Eucla	Gold	Eucla	Gold	Eucla	Gold	Eucla
Last year	86	47	26	16	1	2	3	4
Average from 2015	61.8	39.3	28.8	19.6	4.8	5.9	2.3	2.9
Highest	86	57	43	28	9	14	5	6

Future Climates

Climate forecasts for the Rangelands of WA ⁸⁶, in which Dundas sits indicate that

“A substantial increase in the temperature reached on the hottest days and the frequency of hot days is projected with very high confidence.”

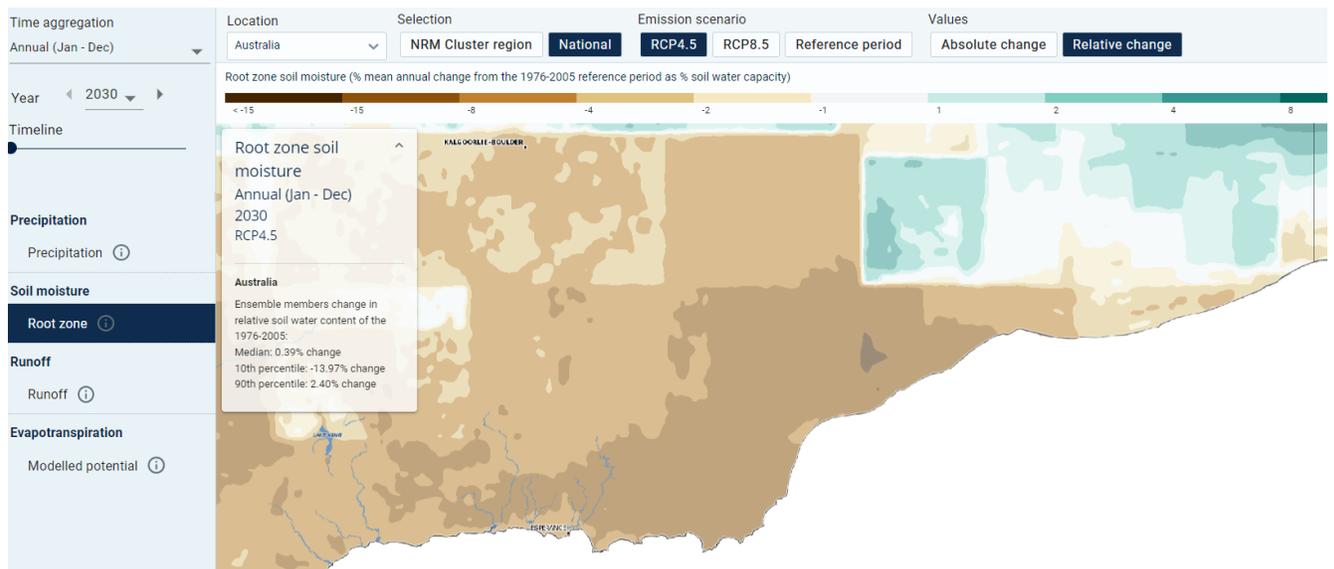
Under intermediate climate conditions (RCP4.5) at Kalgoorlie, the number of days above 35 °C is expected to increase from 42 to 54 by 2030, and the number of days over 40 °C is expected to increase from 9 to 15.⁸⁷

⁸⁶ Department of Water and Environmental Regulation 2021 Western Australia Climate Projections Summary.

⁸⁷ Department of Water and Environmental Regulation 2021 Western Australia Climate Projections Summary

Without balancing increases in precipitation, root zone moisture contents (0 > 1.0 metre depth) will reduce 8 to 15% across large areas of the woodlands and in the Southern Mallee and Coastal regions.⁸⁸ Figure 42. Small increases in the northern grassland of the Nullarbor may occur. Reduced root zone soil moisture increases the length of bushfire season, increases fire intensity, changes vegetation types and impacts fire regeneration and recovery. Future weather instability may lead to an increase in thunder-storms and lightning induced bushfire ignitions.

Figure 42 BOM Australian water outlook indicates significant reduction in soil root zone moisture availability at 2030 under RCP 4.5.



Ignition

DFES has recorded 165 fires from 2011 to 2021 in the Shire of Dundas, Table 7. Generally, fires are only recorded, and an associated fire number is allocated if an action is undertaken. It is common practice for remote fires with no immediate threat to life or property assets to be monitored remotely by satellite or by Fire Control Officers from the Shire or pastoralists. Of the fires that were recorded, 44% did not report a causation, whilst fifty fires (30%) were recorded as being from lightning strikes. Twelve (7%) were suspicious or deliberate fires. 89

⁸⁸ Australian Government. Bureau of Meteorology July 2022. Australian Water Outlook.

⁸⁹ All Bushfires – Locality of Dundas. 2011-21. Operational Information Systems Branch of the Department of Fire and Emergency Services 19/07/2021

Table 7 Bushfire ignition causation 2011 -2021

Row Labels	Count of Incident Number
Burn off fires	2
Campfires/bonfires/outdoor cooking	4
Heat from other hot objects or friction	1
Human Error (Left on, knock over, unattended etc.)	1
Improper Fuelling/Cleaning/Storage/Use of material ignited	2
Other open flames or fire	1
Power lines	1
Reignition of previous fire	6
Suspicious/Deliberate	12
Undetermined	10
Unreported	73
Vehicles (incl. Farming Equipment/Activities)	2
Weather Conditions - Lightning	50
Grand Total	165

Fire size

When fires start in the Shire of Dundas, they tend to be larger than the average. Dundas has recorded five fires over 100, 000 hectare in the last ten years with the largest being 230, 413 hectares. Four were associated with the Norseman Complex in 2019, and the 2017 Madura fire on the south coast was 140,000 Hectares.

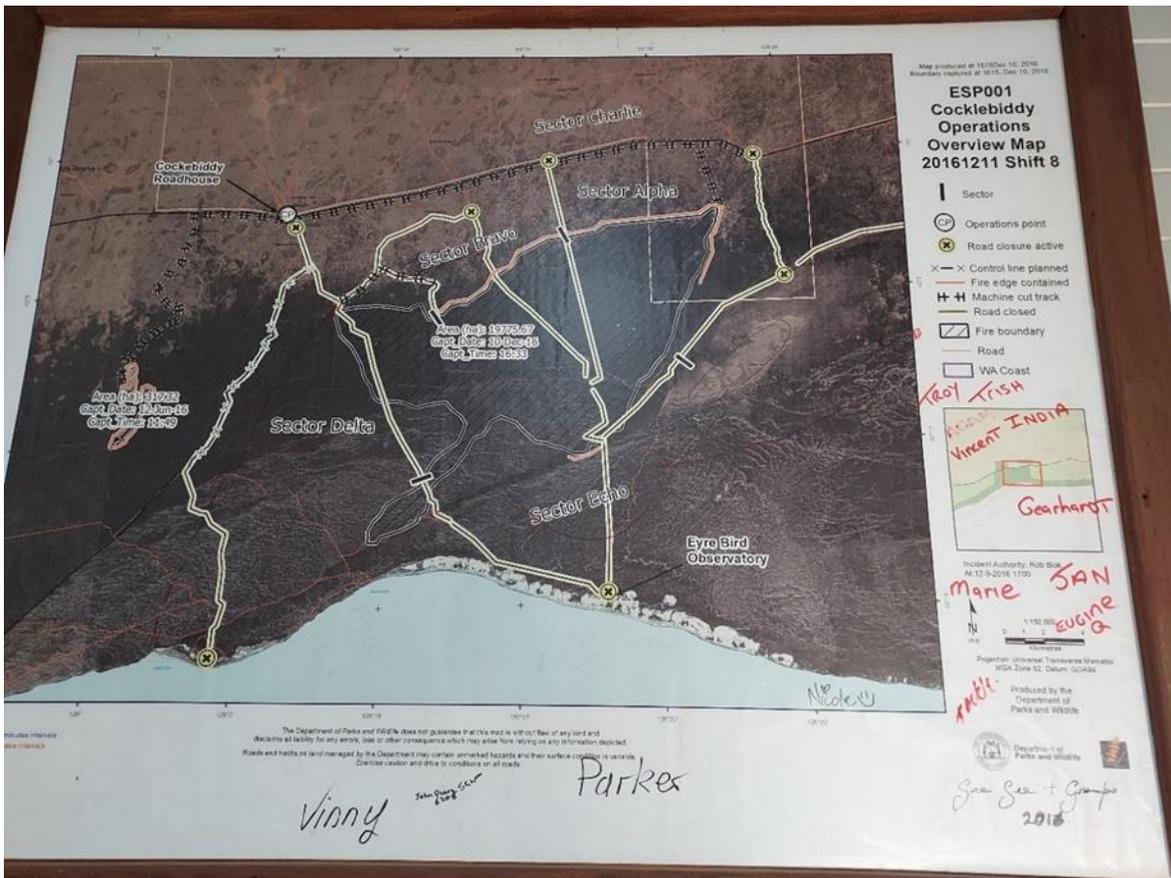
Seven fires were between 10, 000 and 100, 000 hectares including the 2017 Hyden Norseman Rd Fire at 98,000 Hectares and the 2016 Cocklebiddy fire at 48,000 hectares Figure 43. Nine fires were between 1,000 and 10, 000 hectares and nine between 100 and 1000 hectares.

7.5. Controls and Capability

Prevention and preparedness programs

Several programs are in place to reduce the risk of bushfire. The extent and quality of each program is not necessarily aligned to the risks identified, nor coordinated in an efficient manner. These programs are described in more detail in the controls section.

Figure 43 Cocklebiddy fire operations overview map on the wall of the Cocklebiddy Tavern



Some programs are specifically competitive State funding initiatives, particularly the Mitigation Activity Fund that partially resources

- DFES fuel management on UCL and Unmanaged reserves within town boundaries
- Parks and Wildlife Southern Rangelands Bushfire Risk Management program on UCL/UMR. One off \$5 million dollar has been allocated to this program over four years.

Whilst access for local Government to MAFs funding is reliant on the approval of this plan the funds are limited to Council managed State land, which is very limited in the Shire of Dundas.

Local Government Grant Scheme provides direct funding for Bushfire Brigade resources such as personal protection and communications equipment and dedicated vehicles.

Utilities have a range of fuel management controls in place. These are very inconsistent in quality. Details on these are limited based on the commercial in confidence conditions.

Local Government manages a range of Bushfire Act 1954 Regulations, including permits to burn, private property fire break and vegetation management

Parks and Wildlife have extensive bushfire response resources for Parks and Reserves.

Response capacity.

Mitigation controls are only as strong as the response capacity to support them. The State Hazard Plan outlines bushfire response responsibilities.

The owner or occupier of the land

“Have a responsibility to take all possible measures to extinguish a fire burning on their land, unless that fire is part of burning operations.”⁹⁰

Parks and Wildlife Service are the lead responders for bushfire on the parks, reserves and forest, and contractual for plantation forests. The closest service is at Esperance or Kalgoorlie.

Local Government are the lead responders for Private property and Unallocated Crown Land outside of Gazetted townsites. One volunteer brigade at Norseman is managed through the Ngadju Rangers, and a pastoral Brigade services the Nullarbor stations.

DFES are the lead responders for fires in Gazetted townsites through their Volunteer Fire and Emergency Service brigades and for any level 3 fires. DFES maintain contractual arrangements with suppliers of plant and equipment for use in bushfire response. Contractor heavy machinery for bushfire is available from Fraser Range Station and Mundrabilla Station. A VFES Brigade is based in Norseman and DFES resources are at Kalgoorlie.

Mine sites at Nova IGO, Fraser Range maintain an Emergency Response Team (ERT) and tankers, whilst Pantoro at Norseman are developing an ERT.

⁹⁰ State Hazard Plan Fire V1.01 SEMC 2020

Given the low level of local resources any response requires support from all parties. The financial ability of the Shire of Dundas to manage level 1 and 2 fires on 8.5 million hectares of State land is clearly not the intent of the State Hazard Plan, Fire but is currently managed in this way, placing significant financial burden on Local Government to the detriment of the community.

8. Risk Identification

8.1. Bushfire scenario

The Risk Management Local Government Handbook and the BRMS system both rely on a scenario of an extreme bushfire incident and its potential consequences, to make assumptions and stimulate analysis. The Southern Goldfields has the lived experienced of a sequence of catastrophic level bushfire events in the last 15 years that that it can draw on for the scenario.

- The Boorabbin Fire of 2007, that led to 3 fatalities
- The Scadden Esperance fire of 2016 that led to 4 fatalities
- The 500 000 hectares of the Norseman complex of fires in 2019/20 that damaged extensive woodland, isolated communities, and cut or disrupted national supply chains for 12 days.

The high level of incidence for these events in the region, a catastrophic event every 5 years, means the return period for the incident in the Risk Register was set at 1:10 years.

8.2. Asset identification

Asset identification and a BAL based assessment has been conducted using the methodology and tools described in the BRM planning guidelines. These assets were categories as per. Figure 44, with detail description in the Asset Register at Appendix 9 and the in the BRMS system. A list of some 223 assets or asset groups have been identified. Table 8.

Total human settlement assets were 87. This number reflects the segmentation of community footprints at Norseman, Eucla, and Red Rock, and includes the service centres of the Eyre Highway, mine sites, some station homestead, camp and day visitor locations of the Parks and Reserves and touring trails and the Main Roads parking bay /campsites. 16 of these were co-categorized with environment to acknowledge the significant number of asbestos buildings that if burnt will create contamination and expensive rehabilitation.

Table 8 Asset types and number identified in the Bushfire Risk Management System July 2022⁹¹

Asset Category	Count of Asset Category
Cultural	36
Cultural, Environmental	3
Cultural, Environmental, Human Settlement	1
Economic	72
Economic, Environmental	6
Economic, Human Settlement	9
Environmental	19
Environmental, Human Settlement	16
Human Settlement	61
Total	223

Total economic assets were 87. These included the segmentation of linear, supply chain infrastructure such as highways, railway, water pipeline, power supply and the trans-national fibre optic network. Pastoral lease stations were assessed and segmented based on the dominant fuel categories. Communication towers, accommodation, services, and business areas are included. Some service centers were identified for their dual economic and human settlement value. Six of these were co-categorized with environment to acknowledge the significant number of asbestos structures or other contaminants, that if burnt will create further life risk and expensive rehabilitation

The Aboriginal lands include many listed cultural heritage sites. These sites protect burials, gathering places, artifacts, and places of mythological creation. Some are restricted by gender and purpose. A number of these sites have been assessed together as they reflect historic patterns or purpose in the landscape. Whilst the sites have been listed here, they are not exclusive and important cultural connections are maintained within the broader landscape. A small number of European cultural buildings are also identified.

The Great Western Woodlands dominate the landscape and include many valuable rare and threatened fauna and flora species. The size and extent of the Woodlands though allows for large scale ecological function, minimizing the threat from fire to these values. The greater threat in this landscape is an inappropriate repeated use of fire and machinery damage in

⁹¹ Department of Fire and Emergency Services. July 2022. Bushfire Risk Management System

operational response. The environmental assets listed here are the extent of the parks and reserves system. Areas of specialized Mallee Fowl habitat and vulnerable woodlands regrowth.

Figure 44 Asset categories and sub-categories in BRMS

Asset Category	Asset Subcategories
Human Settlement	Residential areas Places of temporary occupation Special risk and critical facilities
Economic	Agricultural Commercial and industrial Critical infrastructure Tourist and recreational Commercial forests and plantations Drinking water catchments
Environmental	Protected Flora, fauna and ecological communities Priority Flora, fauna and ecological communities Locally important
Cultural	Aboriginal heritage European heritage Local heritage Other

The Eyre bird observatory has been noted for its cultural, human settlement and environmental values.

8.3. Asset exposure and vulnerability

Assessments have been undertaken for each asset or group of assets identified using the methodology described in the BRMP Guidelines. The BRMS classifies likelihood and consequence in the following way, similar to the Bushfire Attack Level Assessment.

Broadly the “likelihood” of the fire reaching the asset is determined by the

- Fuel age x separation distance

and the consequence by the

- Fire intensity (fuel type, age, density, proximity and slope) x asset vulnerability class

Table 9 Number of assets and their priority by asset category

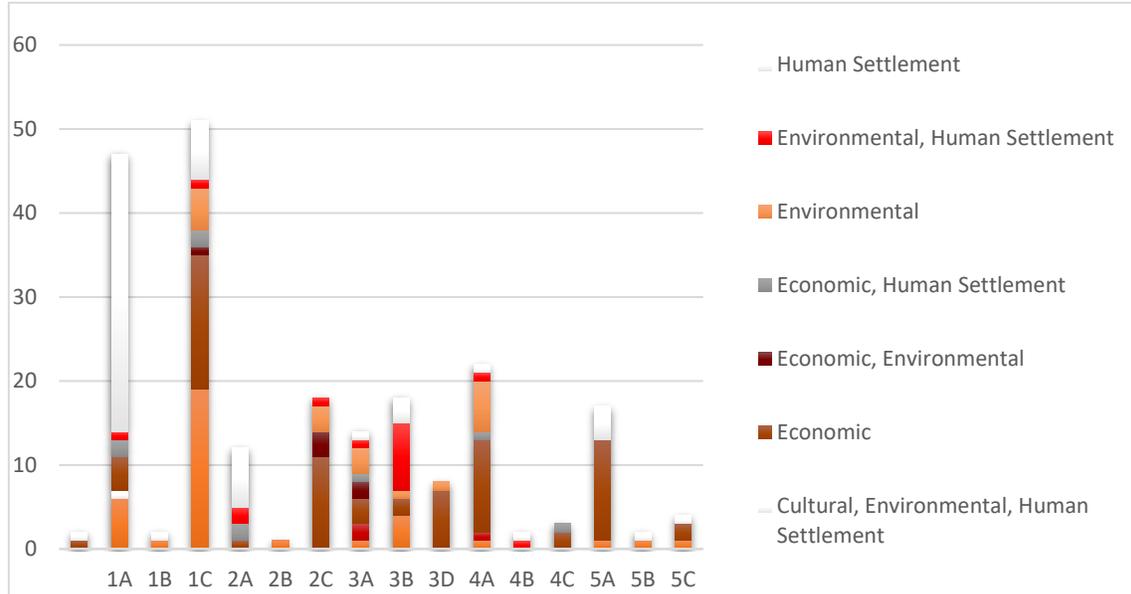
Priority s levels	Count of Asset ID
	2
Economic	1
Human Settlement	1
1A	47
Cultural	6
Cultural, Environmental, Human Settlement	1
Economic	4
Economic, Human Settlement	2
Environmental, Human Settlement	1
Human Settlement	33
1B	2
Cultural	1
Human Settlement	1
1C	51
Cultural	19
Economic	16
Economic, Environmental	1
Economic, Human Settlement	2
Environmental	5
Environmental, Human Settlement	1
Human Settlement	7
2A	12
Economic	1
Economic, Human Settlement	2
Environmental, Human Settlement	2
Human Settlement	7
2B	1
Cultural	1
2C	18
Economic	11
Economic, Environmental	3
Environmental	3
Environmental, Human Settlement	1
3A	14
Cultural	1
Cultural, Environmental	2
Economic	3
Economic, Environmental	2
Economic, Human Settlement	1
Environmental	3
Environmental, Human Settlement	1

Human Settlement	1
3B	18
Cultural	4
Economic	2
Environmental	1
Environmental, Human Settlement	8
Human Settlement	3
3D	8
Economic	7
Environmental	1
4A	22
Cultural	1
Cultural, Environmental	1
Economic	11
Economic, Human Settlement	1
Environmental	6
Environmental, Human Settlement	1
Human Settlement	1
4B	2
Environmental, Human Settlement	1
Human Settlement	1
4C	3
Economic	2
Economic, Human Settlement	1
5A	17
Cultural	1
Economic	12
Human Settlement	4
5B	2
Cultural	1
Human Settlement	1
5C	4
Cultural	1
Economic	2
Human Settlement	1
Grand Total	223

These may be better considered as hazard and exposure measures. The number of assets by their priority ranking and asset category at the time of BRM Plan endorsement is shown in Table 9. Of the 223 assets assessed, the most, 100, assets were identified as Priority One, , and 32 as

Priority Two.. 40 Priority Three assets were identified. Proportionately, human settlement and the economy dominate the higher priority ratings Figure 45 .

Figure 45 Ratio of priority assets by type



8.4. Risk Statements

Based on context and these identified assets and values, potential exposure, and vulnerability, 81 Risk Statements were developed and placed in the Risk Register, Part 3. These broadly can be described as;

PEOPLE: Protect lives and wellbeing of persons

- A bushfire will impact the health of people and cause death(s), injury and/or serious illness to.
 - Residents of Norseman and Eucla townships, and occupations at Red Rock and Wanteen
 - Visitors to the Shire
 - Transport workers
 - Mining sector workers
 - Agriculture sector workers
 - First Responders/ Fire fighters

- People through secondary impacts caused by disruption to essential services or release of smoke or toxins

ECONOMY: Maintain and grow the State's productive capacity, employment and government revenue

- A bushfire will impact economic activity resulting in a reduction of production, recovery costs and/or financial losses for
 - The mining sector
 - The pastoral lease holders
 - The transport sector
 - The tourism sector
 - Services and supply sector
 - Local government
 - Homeowners

SOCIAL SETTING: Ensure that there is public order, that people are housed and fed in a safe and sanitary manner and have access to social amenities including education and health services, and that things of cultural importance are preserved.

- A bushfire will result in impacts to the community wellbeing through
 - social disruption and separation due to housing loss
 - social disruption and separation due to loss of critical services or employment
 - deaths and injury of community members, volunteer fire fighters or employees
 - damage to culturally important places from bushfire, and response or mitigation activities

GOVERNANCE: Ensure that there is, at all times, an effective and functioning system of government and societal respect for rule of law

- A bushfire will cause an increased demand (surge) at the local level, impacting their ability to maintain core services of
 - The emergency services
 - Local Government
 - Government services
- A bushfire will impact communications and other infrastructure, resulting in major disruption to communications and the ability to maintain core services
 - The emergency services
 - Local Government
 - Government services

INFRASTRUCTURE: Maintain the functionality of infrastructure, particularly key transport infrastructure and utilities required for community health, economic production, and effective management of emergencies

- A bushfire will impact infrastructure resulting in repair costs and/or financial losses and disrupt national/state supply chain of
 - The national / state road transport system / supply chain
 - The state rail transport system / supply chain
 - The national long haul fibre backbone
 - Mobile phone communication towers/infrastructure
 - Regional water supply
 - Local power supply

ENVIRONMENT: Protect ecosystem and biodiversity

- A bushfire will impact on vulnerable environmental ecosystems and/or identified critically endangered species.
 - Listed ecological communities at Fraser Range and Lake Johnstone
 - Old growth woodlands
 - Woodlands in recovery from previous fires

- Mallee Fowl habitat
- Create contamination of the land, water or air through releasing toxins or contaminants.

9. Risk Analysis

Now that the risk statements have been established and the return period for the incident set at 10 years, we are able to use the risk register to analysis the risk statements.

Using the risk register we

- Identified existing controls their strength and efficacy
- Identified maximum consequence (from Dundas Consequence Table) (Part 3)
- Using BRMS establish likelihood of risk statement
- Used BRMS assessment to inform confidence level

9.1. Existing controls their strength and efficacy

Controls are all those activities and standards put in place to reduce the risk of fires igniting, spreading and the consequence of impact on assets and values that underpin the functionality of the community.

Determining the level of existing controls is achieved using a multi-criteria analysis. Figure 46, provides generic qualitative descriptors of levels of control. Control strength refers to the ability of the control, or group of controls, to achieve its objective if it operates as intended. Control expediency Figure 47, refers to the ability of the control to be used/deployed readily and the control's acceptability to stakeholders.⁹²

Primary controls of stakeholders had been identified in Appendix 6. These controls have been further assessed for their efficacy in the Shire area by considering their strength and expediency.

The relevant controls in Appendix 6 are considered for each risk statement. Based on the descriptions in figure 42 and 43, and included in the Risk Register in Part C.

⁹² Government of Western Australia. SEMC 2015. WESTERN AUSTRALIAN EMERGENCY RISK MANAGEMENT GUIDE 2015 V1.0

Figure 46 Control strength and expediency descriptions

Level	Control strength	Control expediency
High	Control is highly effective in reducing the level of risk	The control is frequently applied.
Medium	Control is effective in reducing the level of risk	The control is infrequently applied and is outside of the operators' everyday experience. The use of the control has been foreseen and plans for its application have been prepared and tested. Some extraordinary cost may be required to apply the control.
Low	Control has some effect in reducing the level of risk	The control is applied rarely and operators may not have experienced using it. The use of the control may have been foreseen and plans for its application may have been considered, but it is not part of normal operational protocols and has been tested. Extraordinary cost is required to apply the control, which may be difficult to obtain.
Very low	Control has almost no effect in reducing the level of risk	Application of the control is outside of the experience and planning of operators, with no effective procedures or plans for its operation. It has not been foreseen that the control will ever need to be used. The application of the control requires significant cost over and above existing resources, and the cost will most likely be objected to by a number of stakeholders.

Figure 47 Control effectiveness

	Control expediency ^b			
Control strength ^a	Very low	Low	Medium	High
High	Low	Medium	Medium	High
Medium	Low	Medium	Medium	Medium
Low	Very low	Low	Medium	Medium
Very low	Very low	Very low	Low	Low

Notes: a How well does the control reduce risk?

b How easily can the control be activated and used?

9.2. Identify maximum consequence (from Dundas Consequence Table)

A consistent, locally relevant Consequence Table for the Shire of Dundas is used for all hazards. The consequence Table is at Part 3. The maximum consequence is based on the scenario anticipated and the exposure and vulnerability of the asset to bushfire. Given the low population of the Dundas Shire, single life losses rate as Catastrophic. The integrated nature of the Goldfields economy means economic losses are based on the gross area product of over 244 million dollars (2015/16). The maximum potential consequence of the risk statement is recorded in the risk register.

9.3. Using BRMS establish likelihood of risk statement

The priority levels identified for each asset provides a correlation with the likelihood of the risk statement occurring in the Risk Register. In this assessment the translations are shown in Figure 48

Figure 48 BRMS priority ranking to risk statement likelihood

BRMS conversion to likelihood of risk statement occurring			
			%
Extreme	1	a	100
		b	95
		c	90
Very high	2	a	80
		b	75
		c	70
High	3	a	60
		b	55
		c	50
Medium	4	a	40
		b	35
		c	30
Low	5	a	20
		b	15
		c	10

It should be noted to achieve a single order reduction in risk in the auto generated risk level likelihood of risk statement occurring must be 10% or lower. The likelihood based on the BRMS conversion is entered into the Risk Register.

9.4. BRMS assessment informs confidence level

The application of the BRMS information significantly improve the confidence level in the risk assessment. Strong BRMS information leads to “highest” rated confidence level, which influence the priority level for action. Where important information is absent as to the location of assets, the fuel conditions abutting them or the assurance of controls that are in place this raises the priority of risk treatment. This is particularly evident regarding,.

- The emergency services communication infrastructure
- Telstra communication infrastructure
- Water Corporation power supply to essential infrastructure

10. Risk Evaluation

When undertaking the risk evaluation, we use the Risk Register which auto generates the

- Likelihood of risk statement
- Risk level of risk statement
- Auto priority set
- Auto treatment action set

10.1. Evaluating Bushfire Risk

The risk register auto generates the risk evaluation steps

- “Auto generated **likelihood** level” is based on the relationship between the return period of the hazard event and the “likelihood of the risk statement occurring”
- “Auto generated **risk** level” is based on the relationship between the “Maximum consequence” and the “Auto generated Likelihood level”.⁹³ Table 10.
- The “Auto generated priority level” is based on the relationship between the “Maximum consequence”, the “Confidence level” and the “Auto generated Likelihood level”
- The Auto “treatment action” is set by the relationship between the “Confidence level”, the “Auto generated Likelihood level” and the “Auto generated risk level”

⁹³ SEMC 2020. Western Australian Risk Management Manual 2020 v2.01

Table 10 Likelihood and consequence table identifies the level of risk

Likelihood	Consequence level				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Medium	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	Extreme	Extreme
Unlikely	Low	Low	Medium	High	Extreme
Rare	Very low	Low	Medium	High	High
Very Rare	Very low	Very low	Low	Medium	High
Extremely rare	Very low	Very low	Low	Medium	High

10.2. Risk Acceptability

It is not possible or practical to treat all bushfire risk. Some risk may be acceptable without the need for a specific treatment. Assets with a Low to Medium risk rating are likely to be adequately managed through routine controls, so committing resources to further reduce the risk may not be justifiable. Table 11.

Table 11 Number of risk statements by domain and risk level

Domain	Extreme	High	Medium	Low	Grand Total
Economy	9	10	7		26
People	18	3			21
Public Administration	2	7	9		18
Social Setting		4	4	3	11
Environment		1	4		5
Grand Total	29	25	24	3	81

The auto treatment action in the risk register suggests that

- Extreme and high risks are to be treated,
- Medium risk should have treatments considered and
- Low risk is to be monitored and regularly reviewed for any change in circumstances.

Risks below a certain level were not considered to require specific treatment during the life of this BRM Plan. They will be managed by routine local controls and monitored for any significant change in risk.

In most circumstances risk acceptability and treatment will be determined by the landowner or occupier, in collaboration with local government and fire agencies. However, as a rule, and subject to funding, the following courses of action have been adopted for each risk rating. Table 12.

Table 12 Risk rating courses of action

Risk Rating	Criteria for Acceptance of Risk	SUBJECT TO FUNDING
Extreme	Urgent treatment action is required.	Current controls are not enough to adequately manage the risk. Action plan is required in first 12 months of BRM Plan. These assets and treatments are to be reviewed bi-annually.
High	Treatment action is required	Current controls are not enough to adequately manage the risk. Action plan is required in 18 months of BRM Plan. These assets and treatments are to be reviewed every 1 year/prior to the start of each bushfire season for any significant changes.
Medium	Treatment action may be required	Current controls are not enough to adequately manage the risk. Specific action is required in the life of the BRM Plan. These assets and treatments are to be reviewed every 2 year/prior to the start of each bushfire season for any significant changes.
Low	Treatment action is not required but risk must be monitored regularly	Specific actions are not be required. Risk may be managed with existing controls and monitored periodically throughout the life of the BRM Plan.
Very Low	Treatment action is not required but risk must be monitored	Specific actions are not required. Risk will be managed with current controls and monitored as required.

10.3. Treatment Priorities

The auto generated priority level in the Dundas Risk Register is determined by the combination of.

- The risk level (higher risk level leads to higher priority)
- The level of confidence (lower confidence leads to higher priority).

The response to a level of priority is to:

- Improve the confidence level of the risk (if possible) through research, further expert judgement or further investigations
- Treat the risk by taking action to reduce the likelihood or consequence of the risk
- Monitor and review the risk as part of the ongoing risk management process

Priority	General descriptor: action pathway
1	Highest priority for further investigation and/or treatment, and the highest authority relevant to context of risk assessment must be formally informed of risks. Each risk must be examined, and any actions of further investigation and/or risk treatment are to be documented, reported to and approved by that highest authority.
2	High priority for further investigation and/or treatment, and the highest authority relevant to context of risk assessment should be formally informed of risks. Further investigations and treatment plans should be developed.
3	Medium priority for further investigation and/or treatment. Actions regarding investigation and risk treatment should be delegated to appropriate level of organisation, and further investigations and treatment plans may be developed.
4	Low priority for further investigation and/or treatment. Actions regarding investigation and risk treatment should be delegated to appropriate level of organisation, and further investigations and treatment plans may be developed.
5	Broadly acceptable risk. No action required beyond monitoring of risk level and priority during monitoring and review phase.

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⁹⁴ SEMC 2020. Western Australian Risk Management Manual 2020 v2.01

11. Risk Treatment

The purpose of risk treatment is to reduce the likelihood of a bushfire occurring and/or the potential impact of a bushfire on people, the community, economy, environment and services. This is achieved by implementing treatments that modify the characteristics of the hazard, the exposure or the vulnerability. There are many strategies available to treat bushfire risk. The treatment strategy (or combination of treatment strategies) selected will depend on the level of risk and the type of asset being treated. Not all treatment strategies will be suitable in every circumstance.

Strategies and actions for this plan contained in Part A, Chapter 4.

11.1. Treatment Strategies

Local government wide controls are activities that are non-asset specific, rather they reduce the overall bushfire risk within the local government area. Asset specific treatments are implemented to protect an individual asset or group of assets, identified, and assessed in the BRM Plan as being at risk from bushfire. There are a suite of interconnected treatment strategies to reduce risk:

Planning

Treatments focus on developing plans and arrangements to improve the ability of Government departments, business and industry, firefighters and the community to prepare for, respond to and recover from bushfire;

Prevention

Ignition management

- Treatment aims to reduce potential human and infrastructure sources of ignition in the landscape;

Fuel management

- Treatments aimed to slow the movement of large-scale fires in the landscape by reducing or modifies the bushfire fuel through planned burning methods.

- Treatments aimed to protect assets by reducing or modifies the bushfire fuel through manual, chemical and planned burning methods.
- Treatments aimed to protect cultural sites and values by reducing or modifying the bushfire fuel through manual and traditional burning methods by appropriate people.

Preparedness

Access

- Treatments that provide safe access for responders
- Treatments aim to improve access and water supply arrangements to assist firefighting operations.

Resilience

- Treatments aimed to build the resilience of assets, artifacts, homes, and infrastructure to bushfire impacts
- Treatments aimed to build the resilience of people to bushfire impacts

Capability

- Treatments aimed at increasing capability of response resources across volunteer, landholder, and industry sectors
- Treatments seek to build relationships, raise awareness, and change the behavior of people exposed to bushfire risk.

11.2. Development of the Treatment Plans and Schedule

Many of the risk identified in this plan are complex and require significant coordination, collaboration, resources and in some cases new or adapted policy. These are to be bought together as separate action plans or projects. The on-ground actions will be included in a treatment schedule in the BRMS.

The treatment schedule is a list of bushfire risk treatments recorded within BRMS. Shire of Dundas LEMC will work with members and the DEMC on developing a program of works. The treatment schedule will evolve and develop throughout the life of the BRM Plan.

The treatment schedule will be developed in broad consultation with landowners, occupiers and other stakeholders including DFES and DBCA.

Landowners and occupiers are ultimately responsible for treatments implemented on their own land. This includes any costs associated with the treatment and obtaining the relevant approvals, permits or licenses to undertake an activity. This plan may provide the basis of accessing internal resources or seeking grants and funding from external resources when required. Where agreed, another agency may manage a treatment on behalf of a landowner. However, the onus is still on the landowner to ensure treatments detailed in this BRM Plan's *Treatment Schedule* are completed.

12. Monitoring and Review

Monitoring and review processes are in place to ensure that the BRM Plan remains current and valid. These processes are detailed below to ensure outcomes are achieved.

12.1. Review

A comprehensive review of this BRM Plan will be undertaken at least once every five years, from the date of council approval. Significant circumstances that may warrant an earlier review of the BRM Plan include:

- Changes to organisational responsibilities or legislation.
- Changes to the bushfire risk profile of the local government; or
- Following a major fire event.

12.2. Monitoring

BRMS will be used to monitor each asset identified in the BRM Plan and record the treatments implemented. Risk ratings are reviewed on a regular basis as described in Table 13. New assets will be added to the Asset Risk Register when they are identified.

12.3. Reporting

Services, landowners, and occupiers will report annually progress of the treatment plan to the Local Emergency Management Committee (LEMC).

LEMC will report annually on the progress of the treatment plan to the LEMC members, District Emergency Management Committee, and the Shire of Dundas Council.

Landowners and occupiers will be requested to contribute information relating to their fuel management activities to assist in the annual OBRM *Fuel Management Activity Report*.

13. Glossary

Asset		A term used to describe anything of value that may be adversely impacted by bushfire. This may include residential houses, infrastructure, commercial, agriculture, industry, environmental, cultural and heritage sites.
Asset Category		There are four categories that classify the type of asset – Human Settlement, Economic, Environmental and Cultural.
Asset Owner		The owner, occupier, or custodian of the asset itself. Note: this may differ from the owner of the land the asset is located on, for example a communication tower located on leased land or private property.
Asset Register		A component within the Bushfire Risk Management System (BRMS) used to record the details of assets identified in the Bushfire Risk Management Plan (BRM Plan).
Asset Risk Register		A report produced within the BRMS that details the consequence, likelihood, risk rating and treatment priority for each asset identified in the BRM Plan.
Bushfire		Unplanned vegetation fire. A generic term which includes grass fires, forest fires and scrub fires both with and without a suppression objective.
Bushfire Hazard		The hazard posed by the classified vegetation, based on the vegetation category, slope and separation distance.
Bushfire Management Plan	Risk	A development related document that sets out short, medium and long term bushfire risk management strategies for the life of a development.
Bushfire Risk		The chance of a bushfire igniting, spreading and causing damage to the community or the assets they value.
Bushfire Management	Risk	A systematic process to coordinate, direct and control activities relating to bushfire risk with the aim of limiting the adverse effects of bushfire on the community.
Bushfire Risk		The chance of a bushfire igniting, spreading and causing damage to the community or the assets they value.
Consequence		The outcome or impact of a bushfire event.

Draft Bushfire Risk Management Plan	The finalised draft BRM Plan is submitted to the Office of Bushfire Risk Manager (OBRM) for review. Once the OBRM review is complete, the BRM Plan is called th ‘Final BRM Plan’ and can be progressed to local government council for approval.
Geographic Information System (GIS)	A data base technology, linking any aspect of land-related information to its precise geographic location.
Land Owner	The owner of the land, as listed on the Certificate of Title; or leaser under a registered lease agreement; or other entity that has a vested responsibility to manage the land.
Likelihood	The chance of something occurring. In this instance, it is the potential of a bushfire igniting, spreading and impacting on an asset.
Locality	The officially recognised boundaries of suburbs (in cities and larger towns) and localities (outside cities and larger towns).
Map	The mapping component of the BRMS. Assets, treatments, and other associated information is spatially identified, displayed and recorded within the Map.
Planning Area	A geographic area determined by the local government which is used to provide a suitable scale for risk assessment and stakeholder engagement.
Priority	See Treatment Priority.
Risk Acceptance	The informed decision to accept a risk, based on the knowledge gained during the risk assessment process.
Risk Analysis	The application of consequence and likelihood to an event in order to determine the level of risk.
Risk Assessment	The systematic process of identifying, analysing and evaluating risk.
Risk Evaluation	The process of comparing the outcomes of risk analysis to the risk criteria in order to determine whether a risk is acceptable or tolerable.
Risk Identification	The process of recognising, identifying, and describing risks.
Risk Register	A component within the BRMS used to record, review, and monitor risk assessme and treatments associated with assets recorded in the BRM Plan.
Risk treatment	A process to select and implement appropriate measures undertaken to modify risk.

Rural	Any area where in residences and other developments are scattered and intermingled with forest, range, or farm land and native vegetation or cultivated crops.
Rural Urban Interface	The line or area where structures and other human development adjoin or overlap with undeveloped bushland.
Slope	The angle of the ground's surface measured from the horizontal.
Tenure Blind	An approach where multiple land parcels are consider as a whole, regardless of individual ownership or management arrangements.
Treatment	An activity undertaken to modify risk, for example a planned burn.
Treatment Objective	The specific aim to be achieved or action to be undertaken, in order to complete the treatment. Treatment objectives should be specific and measurable.
Treatment Manager	The organisation, or individual, responsible for all aspects of a treatment listed in the <i>Treatment Schedule</i> of the BRM Plan, including coordinating or undertaking work, monitoring, reviewing and reporting.
Treatment Planning Stage	The status or stage of a treatment as it progresses from proposal to implementation.
Treatment Priority	The order, importance or urgency for allocation of funding, resources and opportunity to treatments associated with a particular asset. The treatment priority is based on an asset's risk rating.
Treatment Schedule	A report produced within the BRMS that details the treatment priority of each asset identified in the BRM Plan and the treatments scheduled.
Treatment Strategy	The broad approach that will be used to modify risk, for example fuel management.
Treatment Type	The specific treatment activity that will be implemented to modify risk, for example a planned burn.
Vulnerability	The susceptibility of an asset to the impacts of bushfire.

14. Common Abbreviations

AFAC	Australasian Fire and Emergency Services Authorities Council
BFAC	Bush Fire Advisory Committee
BRM	Bushfire Risk Management
BRM Branch	Bushfire Risk Management Branch (DFES)
BRM Plan	Bushfire Risk Management Plan
BRMS	Bushfire Risk Management System
DBCA	Department of Biodiversity, Conservation and Attractions
DFES	Department of Fire and Emergency Services
DPLH	Department of Planning, Lands and Heritage
EPBC Act	Environmental Protection and Biodiversity Conservation Act
FPC	Forest Products Commission
GIS	Geographical Information System
LEMC	Local Emergency Management Committee
OBRM	Office of Bushfire Risk Management (DFES)
PEC	Priority Ecological Community
SEMC	State Emergency Management Committee
TEC	Threatened Ecological Community
UCL	Unallocated Crown Land
UMR	Unmanaged Reserve
WA	Western Australia
WAPC	Western Australian Planning Commission

Appendices

Appendix 1 – Legislation, Policy, Guidelines and Standards

Legislation, Policy, Standards and Guidelines
Aboriginal Heritage Act 1972
Biodiversity Conservation Act 2016
Building Act 2011
Bush Fires Act 1954
Conservation and Land Management Act 1984
Country Areas Water Supply Act 1947
Emergency Management Act 2005
Environmental Protection Act 1986
Environmental Protection and Biodiversity Conservation Act 1999 (Cth)
Fire Brigades Act 1942
Fire and Emergency Service Act 1998
Metropolitan Water Supply, Sewerage and Drainage Act 1909
Bush Fires Regulations 1954
Emergency Management Regulations 2006
Planning and Development (Local Planning Scheme) Regulations 2015
SEM Plan (State Emergency Management Committee (SEMC) 2019)
SEM Policy (SEMC 2019)
SEM Prevention and Mitigation Procedure 1 (SEMC 2019)
State Hazard Plan Fire (SEMC 2019)
State Planning Policy 3.4: Natural Hazards and Disasters (Western Australian Planning Commission (WAPC) 2006)
State Planning Policy 3.7: Planning in Bushfire Prone Areas (WAPC 2015, as amended)
A Capability Roadmap: Enhancing Emergency Management in Australia 2016 (Australasian Fire and Emergency Services Authorities Council 2016)
A Guide to Constructing and Maintaining Fire-Breaks (DFES 2018)
AS 3959:2009 Construction of Buildings in Bushfire-Prone Areas (Standards Australia 2009)
AS/NZ ISO 31000:2009 Risk Management – Principles and Guidelines (Standards Australia 2009)
Australian Disaster Resilience Handbook 10: National Emergency Risk Assessment Guidelines (Australian Institute for Disaster Resilience 2015)
Guidelines for Preparing a Bushfire Risk Management Plan 2020 (DFES 2020)
Bushfire Risk Management Planning Handbook (DFES 2018)
Code of Practice for Timber Plantations in Western Australia (Forest Products Commission (FPC) 2006)
Guidelines for Planning in Bushfire Prone Areas (WAPC 2017)
Guidelines for Plantation Fire Protection (DFES 2011)
National Disaster Risk Reduction Framework (Department of Home Affairs 2018)
National Strategy for Disaster Resilience (Attorney-General's Department 2011)
Public Service Circular No. 88 Use of Herbicides in Water Catchment Areas (Department of Health 2007)
Western Australian Emergency Risk Management Guide (SEMC 2015)

Appendix 2 – Policies, Plans and programs

DOCUMENT	Author
2020-21 FIREBREAK NOTICE BUSH FIRES ACT 1954 SHIRE OF DUNDAS	Shire of Dundas
A Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands	CaLM
A guide to the exemptions and regulations for clearing native vegetation under part V of the Environmental Protection Act 1986	Department of Water and Environmental Regulation
ADRI Disaster Resilience Data report. Coolgardie Norseman Kambalda April 2022	Bushfire Natural Hazards CRC
ADRI Disaster Resilience Factors Report Coolgardie Norseman Kambalda April 2022	Bushfire Natural Hazards CRC
ARTC Fire management fact sheet	ARTC
AS 3959:2018 Construction of buildings in bushfire-prone areas	
Birds of the Great Western Woodlands.	The Nature Conservancy, BirdLife Australia
Bushfire Resiliency Report. Optus and CSIRO collaboration. Steve Crowley Optus. September 2021.	OPTus
Bushfire Threat Analysis of the Great Western Woodlands 2010	CaLM
Bushfire travelers checklist	DFES
C9. Community Consultation and Engagement Policy	Shire of Dundas
Critical Infrastructure Resilience strategy: PLAN	Australian Government
Draft Goldfields Regional fuel management plan (in development)	Parks and Wildlife Kalgoorlie
Driving in Western Australia A guide to safe stopping places	Main Roads
Dundas Woodlands Discovery Trail map	Shire of Dundas
EMERGENCY MANAGEMENT CAPABILITY SUMMARY Dundas 2018, 2019, 2021	DFES State Capability Team
Findings And Actions from Inquiries Conducted by The Department of Environment and Conservation into the Boorabbin Fire 28 December 2007 - 8 January 2008	The Department of Environment and Conservation
Freight rail in Western Australia information sheet	Freight and Logistics Council
Goldfields Voluntary Regional Organisation of Councils. An infrastructure strategy for industry growth. Opportunities identification study	Australia Venture Consultants
GOLDFIELDS-ESPERANCE EMERGENCY MANAGEMENT DISTRICT Risk assessment report	Goldfields Esperance. DEMC
IMPACT STATEMENT Norseman West Complex Shire of Dundas 16 December 2019 - 20 January 2020	Peter Stewart Deputy Incident Commander
Inquest into the deaths of Kym CURNOW, Thomas BUTCHER, Julia KOHRS-LICHTE and Anna WINTHER (8059/15, 8060/15, 8062/15, 8063/15) (Scadden-Esperance Bushfire 2016)	Coroner's Court of Western Australia
LGIS Renewal report Dundas	LGIS

Markyt Community Resilience scorecard	Markyt
National Disaster Royal Commission 2020 RCNDA Hearing Block 2, Week 2 - Notice to Give Information and identification of witnesses Submission No: NND001.01225	Shire of Dundas
National Freight and Supply Chain Strategy	Commonwealth of Australia; Infrastructure
National Freight and Supply Chain Strategy - WA Implementation Plan	Approved by Minister April 2020
Ngadju kala; Ngadju fire knowledge and contemporary fire management in the Great Western Woodlands	CSIRO
Ngadju Protected area map	Australian Government
Ngadju. Indigenous Protected Area. Plan of Management 2020-2030	Ngadju Conservation Aboriginal Corporation
Radio Frequency National Site Archive(database)	Australian Mobile Telecommunications Association (AMTA)
Regional Telecommunications Review 2021. Issues paper	Commonwealth of Australia; Infrastructure
Review of the Norseman West Complex of Bushfires. SEMC November 2020	Nous Consulting
Review SHP Fire - Bushfire responsibilities and LGIS (unofficial)	Shire of Dundas
Risk Register Dundas WARR tool 1st risk workshop 4 October 2018	DFES - Shire of Dundas LEMC
Risk Register Dundas WARR tool 1st risk workshop 4 October 2018 – Bushfire update 2022	Shire of Dundas
Shire of Dundas. Annual Report. 2019-2020	Shire of Dundas
Shire of Dundas (Emergency Risk) Consequence Table 2018	Shire of Dundas
Shire of Dundas 2021-22 Renewal Report	LGIS
Shire of Dundas Bushfire Policy	Shire of Dundas
Shire of Dundas Local Emergency Management Plan	Shire of Dundas
SHIRE OF DUNDAS VISITOR SITE DEVELOPMENT PLAN	Shire of Dundas
Southern Rangelands Bushfire Risk Management Zone – UCL/UMR Bushfire Mitigation Plan WORKING COPY as 29/03/21	Parks and Wildlife
Standard Administrative Procedure 3.17.D Operational Pre-Plans	DFES
State Hazard plan Fire	SEMC
Strategic Community plan 2012 22	Shire of Dundas
T1 – Bushfire control policy	Shire of Dundas
The First National Action Plan: To implement the National Disaster Risk Reduction Framework	Australian Government minister for agriculture, drought and EM
WA Implementation Plan 2020 For the National Disaster Risk Reduction Framework	SEMC
Westplan – Brookfield Rail Crash Emergencies Western Australia State Hazard Plan for Brookfield Rail Crash Emergencies	SEMC
Woodland recovery after fire - Landscape	CaLM

Appendix 3 - Data Layers

DATA Layers	Owner
Contaminated sites (DWER 059)	DWER
Fuel_Categories3 (supports the Bushfire Threat Analysis of the Great Western Woodlands)	CaLM
GWDT Visitor Nodes (Granites and Woodlands Discovery Trail)	Shire of Dundas
Heavy, major, and minor rest areas	Main Roads
Horizon – substations, poles and high voltage wires	Horizon Power
Mining Tenements (DMIRs 003)	DMIRS
NBN – relay sites	NBN
Optus - Fibre optic and tower relay sites	Optus
Pastoral Stations (DPLH 083)	DPLH
RATIS (Parks and Wildlife day visitor and camping areas)	Parks and Wildlife
Residential Property attributes and other Building layer information	Landgate
Ex pastoral areas managed by Parks and Wildlife	Parks and Wildlife
GWV woodlands forests in recovery	Shire of Dundas
Active mining operations	DMIRS
Abandoned mines	DMIRS

Appendix 4 - Roles and responsibilities

The roles and responsibilities of the key stakeholders involved in the development of the BRM Plan are outlined below. These are not necessarily supported by all parties.

Stakeholder Name*	Roles and Responsibilities
Shire of Dundas	<ul style="list-style-type: none"> • Through LEMC be custodian of the Bushfire Risk Management Plan (BRM Plan) • Coordinate the development and ongoing review of the integrated BRM Plan. • Advocate with landowners and occupiers to treat risks identified in the BRM Plan. • Undertake treatments on lands owned or managed by Council. • Submit the draft BRM Plan to DFES's Office of Bushfire Risk Management (OBRM) for review. • Submission of the BRM Plan to council for their consideration.
Communities of Dundas	<ul style="list-style-type: none"> • Provide expert local knowledge of fire experience and consequence • Provide review of plan in line with Community consultation policy
Ngadju Native Title Aboriginal Corporation (NNTAC)	<ul style="list-style-type: none"> • The traditional owners of the land, the Ngadju people, have a responsibility to care for their country and to preserve their significant heritage and culture under the Native Title Act • The Ngadju Native Title Aboriginal Corporation (NNTAC) is the Prescribed Body Corporate (PBC) that is responsible for upholding and managing these objectives, and acts as the legal entity which conducts the affairs of the Ngadju Native Title Holders. • Enable and support Ngadju Conservation to undertake fire management activities
Department of Fire and Emergency Services	<ul style="list-style-type: none"> • Participate in and contribute to the development and implementation of BRM Plans. • Support to local government through expert knowledge and advice in relation to the identification, prevention and treatment of bushfire risk. • Undertake treatments on Unmanaged Reserves and Unallocated Crown Land within gazetted town site boundaries. (Subject to funding) • In accordance with Memorandums of Understanding and other agreements, implement treatment strategies for other land owners. • Review BRM Plans for consistency with the Guidelines Administer and coordinate the Mitigation Activity Fund Grants Program.
Department of Biodiversity, Conservation and Attractions	<ul style="list-style-type: none"> • Participate in and contribute to the development and implementation of BRM Plans. • Provide advice for the identification of environmental assets that are vulnerable to fire and planning appropriate treatment strategies for

	<p>their protection.</p> <ul style="list-style-type: none"> • Undertake treatments on department managed land, and Unmanaged Reserves and Unallocated Crown Land outside gazetted town site boundaries and land in which they have an agreement for.
Department of Planning, Lands and Heritage	<ul style="list-style-type: none"> • Provide advice for the identification of their assets and infrastructure, specifically Aboriginal and European heritage. • Provide funding for works on lands they administer
Other State and Federal Government Agencies and Public Utilities	<ul style="list-style-type: none"> • Provide information about their assets and current risk treatment programs. • Participate in and contribute to the development and implementation of BRM Plans. • Undertake treatments on lands they manage.
Corporations and Private Land Owners	<ul style="list-style-type: none"> • Provide information about their assets and current risk treatment programs. • Participate in and contribute to the development and implementation of BRM Plans. • Undertake treatments on lands they manage.
Main Roads	<ul style="list-style-type: none"> • Provide information about their assets and current risk treatment programs. • Participate in and contribute to the development and implementation of BRM Plans. • Undertake treatments on lands they manage

Appendix 5 - Controls and their effectiveness

Level	Control strength	Control expediency
High	Control is highly effective in reducing the level of risk	The control is frequently applied.
Medium	Control is effective in reducing the level of risk	<p>The control is infrequently applied and is outside of the operators' everyday experience.</p> <p>The use of the control has been foreseen and plans for its application have been prepared and tested.</p> <p>Some extraordinary cost may be required to apply the control.</p>
Low	Control has some effect in reducing the level of risk	<p>The control is applied rarely and operators may not have experienced using it.</p> <p>The use of the control may have been foreseen and plans for its application may have been considered, but it is not part of normal operational protocols and has been tested.</p> <p>Extraordinary cost is required to apply the control, which may be difficult to obtain.</p>
Very low	Control has almost no effect in reducing the level of risk	<p>Application of the control is outside of the experience and planning of operators, with no effective procedures or plans for its operation.</p> <p>It has not been foreseen that the control will ever need to be used.</p> <p>The application of the control requires significant cost over and above existing resources, and the cost will most likely be objected to by a number of stakeholders.</p>

	Control expediency ^b			
Control strength ^a	Very low	Low	Medium	High
High	Low	Medium	Medium	High
Medium	Low	Medium	Medium	Medium
Low	Very low	Low	Medium	Medium
Very low	Very low	Very low	Low	Low

Notes: *a* How well does the control reduce risk?

b How easily can the control be activated and used?

Appendix 6 - Bushfire Risk Management Planning – Controls strength and expediency

Phase	Action or activity description	Regulator lead	Control owners	Control suite			
What is the control in place?	What is the name of the specific action or activity?		Who is the party responsible for implementation of the control		Control strength	Control expediency	Control effectiveness
Planning	BRMPlan	DFES	Shire of Dundas	Development of the Bushfire risk management plan	High	Low	Medium
			Shire of Dundas LEMC				
Planning	BRMP plan implementation	LEMC	LEMC members	Facilitate the implementation of the plan	High	Low	Medium
Prevention	Prevention - Bushfire regulation	Local Government	Chief Bushfire Control officer	Regulate the bushfire notices	High	High	High
				Regulate/permit the lighting of fires	Medium	Medium	Medium
Prevention	Prevention regulation -TFB	DFES	Chief Bushfire Control officer	Regulate /implement TFB declarations	High	High	High
			Department of Mines Industry Regulation and Safety				
Preparedness	Property management - Mine leases	Department of Mines Industry Regulation and Safety	Department of Mines Industry Regulation and Safety	Project Management Plan, (Safety Management plan) and site management	Medium	High	Medium
			Mining licensees				
				Access and fire breaks	Low	low	Low
				Asset protection – industrial	Medium	Medium	Medium
				Asset protection – accommodation	High	Low	Medium
				Evacuation plan	High	Low	Medium

Preparedness	Property management Pastoral Leases –	Department of Planning, Lands and Heritage	Pastoral holders lease	Lease agreements	Very low	Very low	Very Low
				Access and fire breaks	Medium	Medium	Medium
				Evacuation plan	Low	Very low	Very Low
				Animal welfare plan	Medium	Very low	Low
Preparedness	Property management – Aboriginal unallocated crown land	Department of Planning, Lands and Heritage	DBCA, Parks and Wildlife	Safe access and fire breaks	Medium	Low	Medium
			Ngadju Conservation	Strategic burning, slashing	High	Very low	Low
				Evacuation plan	High	Very low	Low
				Protect cultural assets values	High	High	High
Preparedness	Property management – Unallocated crown land/unmanaged reserves within townships	Department of Planning, Lands and Heritage	DFES	Undertake risk assessment	High	High	High
			Local Government	Maintain breaks	Medium	Low	Medium
				Vegetation clearance/slashing	High	High	High
Preparedness	Property management – Conservation parks and reserves	DBCA,	Parks and Wildlife	Safe access and fire breaks	High	High	High
				Strategic protection burning	High	Low	Medium
				Evacuation plan	Medium	Very low	Low
				Protect values	High	Low	Medium

Preparedness	Property management freehold land	–	Local Government	Domestic property owners	Maintaining resilient property	High	Very Low	Low
				Business property owners	Safe property developments	High	High	High
				Department of Planning, Lands and Heritage	Access and fire breaks	Medium	Low	Medium
				Volunteer brigades (local, FES)	Evacuation plan	Medium	Low	Medium
Preparedness	Property management – road authorities		Main Roads	Road users	Maintain verges low fuel	Medium	Medium	Medium
			Local Government	• Domestic	Maintain parking bays low fuel	Medium	Very low	Low
				• Industrial	Limit egress off road easement	Medium	Very Low	Low
					Vehicle standards	High	High	High
Preparedness	Property management – rail authorities		Public Transport Authority	ARC Infrastructure	Maintain easement low fuel	High	Medium	Medium
				Australian Rail Track Corp	Heat/speed/ fire policy?	High	High?	High
					Emergency response plan (bushfire?)	High	Low	Medium
					Limit access to rail easement	High	High	High
					Equipment standards	High	High?	High
Preparedness	Property management utilities	–	Department of Mines Industry Regulation and Safety	Western Power	Maintain (regulated?) vegetation clearance	High	Low	Medium
				Horizon Power	Access tracks			
				Western Water				

Preparedness	Property management – Telcos	Australian Communications and Media Authority	NBN	Maintain (regulated?) vegetation clearance	High	Low	Medium
			Telstra				
			Optus	Maintain resilient structures	High	Low	Medium
Preparedness	Property management – Local Government and Reserves	Local Government	Community groups, users	Maintain (regulated) vegetation clearance	High	Medium	Medium
				Maintain resilient structures	High	Very low	Low
				Access and fire breaks	High	Medium	Medium
				Evacuation plan	High	Very low	Low
Prevention	Prevention – powerline ignition	Department of Mines Industry Regulation and Safety	Western Power	Use management protocol's	High	Medium	Medium
			Horizon Power				
			Private line owners domestic	Maintain power lines	High	Medium	Medium
			Private line owners' industry	Maintain power poles	High	Medium	Medium
Prevention	Prevention – Campfires	DFES	DBCA, Parks and Wildlife	Camping regulation and visitor education	Medium	Medium	Medium
			Local Government				
			Main Roads				
Preparedness	Volunteer Bushfire fire brigade	Local Government	DFES	Maintain training and accreditation (Council and Brigade)	Medium	Medium	Medium
			Ngadju Conservation	Vehicles and appliances	Medium	Medium	Medium
			Chief Bush Fire Control Officer	Administration and insurances	High	Low	Medium

				Response plans, contacts, and arrangements	High	Low	Medium
Preparedness	Pastoral Bushfire fire brigade	Local Government	Nullarbor stations	Maintain training and accreditation	High	Very low	Low
			DFES	Vehicles and appliances	High	Very low	Medium
				Administration and insurances	High	Very low	Low
				Response plans, contacts, and arrangements	High	Very low	Low
Preparedness	Mine emergency response team	Department of Mines Industry Regulation and Safety	IGO Nova	Maintain training and accreditation	High	Low?	Medium
			Pantora	Vehicles and appliances	High	High	High
			Exploration teams	Administration and insurances	High	Low?	Medium
			DFES (MOU's)	Response plans, contacts, and arrangements	High	Low	Medium
Preparedness	Bushfire equipment contractors	DFES	Ben Holland (Fraser Range)	Maintain training and accreditation	High	Very Low	Low
			Campbell (Mundrabilla)	Vehicles and appliances	High	Medium	Medium
				Administration and insurances	High	Medium	Medium
				Approved contracts	High	Medium?	Medium
Preparedness	Volunteer Fire and Emergency	DFES	Norseman Brigade	Maintain training and accreditation	High	High	High
			Eucla Brigade				
				Vehicles and appliances	High	High	High
				Administration and insurances	High	High	High
Preparedness	Utilities/Telcos	DFES	Western Power	Maintain training and accreditation	High	Medium	Medium
			Horizon Power				
			Western Water				

			Telstra				
			NBN	Vehicles and appliances	High	High	High
			Optus	Administration and insurances	High	High	High
			Main Roads	Response plans, contacts, and arrangements	High	Medium	Medium
Preparedness	Government services	DFES	Education	Maintain training and accreditation	High	Very low	Low
			Health	Administration and insurances	High	Low	Medium
			Community services	Response plans, including evacuation	High	Low	Medium
				contacts and arrangements	High	Low	Medium
Preparedness	Community based services	Local Government	LG Community Housing	Response plans, including evacuation	High	Low	Medium
			NDIS				
Preparedness	Community capability	DFES	Prospectors	Maintain awareness	High	Low	Medium
			Visitors and tourists	Response including self-evacuation plan	High	Low	Medium
				Insurances	High	Medium	Medium
Preparedness	Community capability	DFES	Norseman and Eucla towns	Maintain awareness	High	High	High
			Station communities				
			Nullarbor services				
			Red Rocks leases	Response including self-evacuation plan	High	Low	Medium
				Insurances	High	Very low	Low

Appendix 7 - BRMS asset categorization

Asset Category	Asset Subcategories
<p>Human Settlement</p>	<p>Residential areas Residential areas, including dwellings in rural areas and the rural-urban interface.</p> <p>Places of temporary occupation Commercial and industrial areas, mining sites or camps and other locations where people may work or gather, camp grounds, motels and caravan parks</p> <p>Special risk and critical facilities Locations and facilities where occupants may be especially vulnerable to bushfire for one or more of the following reasons:</p> <ul style="list-style-type: none"> • Occupants may have limited knowledge about the impact of bushfires; • Occupants may have a reduced capacity to evaluate risk and respond adequately to bushfire event; • Occupants may be more vulnerable to stress and anxiety arising from a bushfire event or the effects of smoke; • There may be significant communication barriers with occupants; • Relocation and/or management of occupants may present unique challenges or difficulties, such as transportation, or providing alternative accommodation, healthcare or food supplies; or • Facilities that are critical to the community during a bushfire emergency.
<p>Economic</p>	<p>Agricultural Areas under production, such as pasture, livestock, crops, viticulture, horticulture and associated infrastructure.</p> <p>Commercial and industrial Major industry, waste treatment plants, mines (economic interest), mills, processing and manufacturing facilities and cottage industry.</p> <p>Critical infrastructure Power lines and substations, water pumping stations, tanks/bores and pipelines, gas pipelines, telecommunications infrastructure(including fibre optic) , railways, bridges, port facilities and waste water treatments plants, roads,</p> <p>Tourist and recreational Tourist attractions, day-use areas and recreational sites that generate significant tourism and/or employment within the local area. These assets are different to tourist accommodation described as a Human Settlement Asset (see above).</p> <p>Commercial forests and plantations Plantations and production native forests.</p> <p>Drinking water catchments Land and infrastructure associated with drinking water catchments.</p>
<p>Environmental</p>	<p>Protected Flora, fauna and ecological communities that are listed as a:</p> <ul style="list-style-type: none"> • Critically Endangered, Endangered or Vulnerable species under the Environmental Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act 1999) (including associated critical habitat);

	<ul style="list-style-type: none"> • Critically Endangered, Endangered or Vulnerable species under the Biodiversity Conservation Act 2016; • Critically Endangered, Endangered or Vulnerable ecological community under the EPBC Act 1999 (Cth); • Critically Endangered, Endangered or Vulnerable Threatened Ecological Community (TEC) endorsed by the Minister for Environment (WA); • Fauna protected under international conventions; and • Ramsar wetlands of international importance. <p>Priority Flora, fauna and ecological communities that are a:</p> <ul style="list-style-type: none"> • Priority species listed on the Priority Flora or Priority Fauna Lists held by DBCA (Priority 1-5). • Priority Ecological Community (PEC) (Priority 1-5); and • Wetlands of national or state importance. <p>Locally important Species, populations, ecological communities or habitats that the local community or independent scientific experts consider important for the area and for which there is some scientific evidence that protection would be beneficial. Wetlands of local importance. Sites being used for scientific research.</p>
Cultural	<p>Aboriginal heritage Places of indigenous significance identified by the DPLH or the local community.</p> <p>European heritage Non-Indigenous heritage assets afforded legislative protection through identification by the National Trust, State Heritage List or Local Planning Scheme Heritage List.</p> <p>Local heritage Assets identified in a Municipal Heritage Inventory or by the local community as being significant to local heritage.</p> <p>Other Other assets of cultural value to the local community, for example community halls, churches, clubs and recreation facilities.</p>

Appendix 8 - Communication Strategy

Introduction

A Bushfire Risk Management (BRM) Plan is a strategic document that outlines the approach to the identification, assessment and treatment of values and assets exposed to bushfire risk within the Shire of Dundas. In developing the plan, engagement with risk owners and stakeholders is fundamental to the adoption and future implementation of the plan.

It documents the:

- engagement objectives;
- roles and responsibilities for communication;
- key stakeholders;
- stakeholders engaged in the development of the BRM Plan and Treatment Schedule

Engagement Overview

Engagement Objectives

The engagement objectives for the development of the BRM Plan for the Shire of Dundas are as follows:

1. Key stakeholders understand the purpose of the BRM Plan and their role in the BRM planning process.
2. Stakeholders who are essential to the BRM planning process, or can supply required information, are identified and engaged in a timely and effective manner.

3. Relevant stakeholders are involved in decisions regarding risk acceptability and treatment.
4. Key stakeholders engage in the review of the BRM Plan
5. The community and other stakeholders engage with the BRM planning process
6. Engagement is culturally appropriate and addresses community needs and expectations
7. Engagement is 2-way, sensible, relevant and achievable

Communication Roles and Responsibilities

Key stakeholders support local government by participating in the development and implementation of the Communications Strategy as appropriate. An overview of communication roles and responsibilities follows:

- Shire of Dundas, Manager of Corporate & Community Services is responsible for endorsement of the BRM Plan Engagement Strategy.
- Shire of Dundas Bushfire Risk Management Planning Coordinator, responsible for
 - external communication with the local government area
 - operational-level communication between the Shire and the Department of Fire and Emergency Services.

Key Stakeholders engagement approach

The following table identifies key stakeholders in BRM planning process. These are stakeholders that are identified as having a significant role or interest in the planning process or are likely to be significantly impacted by the outcomes.

Who is the stakeholder? Consider government agencies, interest groups and service providers.	What is their role or interest that makes them a stakeholder? Consider if they are an asset owner, land owner or manager, treatment manager or interested party.	Consider how the implementation of the BRM Plan will impact each stakeholder and then assign them a rating of High, Medium or Low.	What level of engagement is necessary for the stakeholder? Inform, consult, involve, collaborate or empower?
Land owners / managers	They may be responsible to fund and undertake mitigation actions on their land	High	Inform, consult, involve, collaborate
Fire responders	They will rely on the combination of controls in place to support their tactics Their capability will directly influence the type of mitigation actions undertaken	High	Inform, consult, involve, collaborate
Community	As rate payers they have an interest in how community funds are expended As community members they have a high interest in the management of the GWW Community members wellbeing was adversely impacted by recent fires and the impact on environment and cultural values	Medium	Inform, consult, involve
Fire planning groups	DEMC and LEMC have planning responsibilities and are champions for emergency planning. LEMC will be the future assurance body P and W and DFES have initiated planning arrangements to manage specific bushfire issues and \$5 million funding	High	Inform, consult, involve, collaborate
Industry	Owners of critical international assets in the Shire Reliant on safe transport routes Add significant value to state Have isolated vulnerable assets including people Potential champions	Medium	Inform, consult, involve, collaborate,
Community services	Champions Strong connections into diverse parts of community	Low	Inform, consult
Media	Champion Provide warnings to community	Media	Inform and involve

Engagement tactics actions for the effective participation from stakeholders in the development of the Dundas BRMP

Inform	Consult	Involve	Collaborate
Individual out-reach	Values and assets workshop and surveys	Setting bushfire risk management objectives	LEMC - Strategies and actions
Presentation at LEMC meetings	Draft BRMP plan community consultation	LEMC bushfire risk assessment workshop	BRMP document review with BRMB and OBRM
Article in newsletter			Council adoption of plan
Participation in bushfire public meets and promotion			LEMC plan delivery
Presentation at Council members workshop			

Engagement actions in development of the BRM Plan

When did this communication occur?	Who was the stakeholder or target audience?	What was the purpose of the communication?	What topics were discussed?	What communication method did you use?	Were there any issues or lessons identified?	Was there any follow up required?
First quarter	All	Inform introduce project	Purpose, process and timing	Project Fact sheet		
First Quarter	Shire of Dundas Councilors	Involve Engage leadership	Purpose, process and timing	SoD Council project presentation		
Monthly	Shire of Dundas Councilors	Inform Project progress, issues	Progress, issues arising	SoD Council Information bulletin reporting - monthly		
2nd quarter	Shire of Dundas Councilors	Consult - Engage commitment and capture local knowledge	Assets and values of the Shire	Councilors and executive assets and values workshop		Incorporate into asset id in plan
Quarterly	Ngadju Conservation CEO	Involve Engage and capture local knowledge	Ngadju perspectives on land management , values and fire	Ngadju Conservation liaison		

4th Quarter	Ngadju leader	Involve Engage and capture local knowledge	Ngadju perspectives on land management, opportunity , values and fire	Ngadju Conservation field visit	Opportunities for rangers	
3rd quarter	Mining sector	Involve leadership and introduce project	Purpose, process and timing, mining EM planning	Kalgoorlie Chamber of Mines presentation	Mining act exemption	Survey
3rd Quarter	Mining sector	Involve Sample sector views on risk, preparedness and planning	Sample sector views on risk, preparedness and planning	Survey monkey through chamber	Varying degree of knowledge and preparedness	
3rd Quarter	Pastoral sector	Involve - Sample sector views on risk, preparedness and planning	Sample sector views on risk, preparedness and planning	Survey monkey	Response timing, planning and coordination	
Quarterly	LEMC	Consult- update, opportunity for q's		Meeting face to face		
2nd quarter	Market Street stall	Involve community	Preparedness, planning process, funds	Meeting face to face	Fear of repeat of recent fires	
Opportunistic	stakeholders	Engagement,				
Annually	Caiguna meet - Pastoral lease holders	Inform	Process outlined, draft community plan provided for comment	Meeting face to face		
Oct 22	Stakeholders, land occupiers and owners	comment	Provide draft community plan for comment	Email, SoD web site	Dates, climate, Ranger input, Main Roads	Review comments to include in plan.
Oct 22	Market street stall	comment	Provide draft community plan for comment	Community plan version	Risk associated with asbestos release in fires.	

Appendix 9 - Asset Register August 2022

Asset ID	Asset Pin	Asset Name	Asset Owner	Asset Category	Priority
46581	DUNDDS0125	Communication Tower 6443004 Cocklebiddy Eyre Highway	Telstra	Economic	
46753	DUNDDS0134	Fraser Range Exploration camp	Private	Human Settlement	
42779	DUNDDS0005	Norseman cemetery	Local Government	Cultural	1A
46020	DUNDDS0053	Modified tree ID 23262, Lake Johnson FS05 / 02	Native Title	Cultural	1A
46074	DUNDDS0065	Norseman north burial complex	Native Title	Cultural	1A
46146	DUNDDS0074	Southern Hills heritage sites cluster	Native Title	Cultural	1A
46151	DUNDDS0075	Fraser Range massacre and burial sites	Native Title	Cultural	1A
46376	DUNDDS0082	Norseman burial site south Site 2144	Native Title	Cultural	1A
46444	DUNDDS0087	Dundas Coach Road Heritage Trail	Local Government	Human Settlement	1A
46445	DUNDDS0088	Bromus Dam Visitor node	Local Government	Human Settlement	1A
46468	DUNDDS0092	Highway 1 Eyre Highway, Norseman to Balladonia	Main Roads WA	Economic	1A
46477	DUNDDS0096	Jimberlina Hill minor rest area 5km mark	Main Roads WA	Human Settlement	1A
46478	DUNDDS0097	Unnamed minor rest area 1. Eyre Hway 15km mark	Main Roads WA	Human Settlement	1A
46479	DUNDDS0098	Unnamed minor rest area 2. Eyre H'way 45kms mark	Main Roads WA	Human Settlement	1A
46484	DUNDDS0099	Unnamed minor rest area 3 . Eyre H'way 53km mark	Main Roads WA	Human Settlement	1A
46486	DUNDDS0100	Unnamed minor rest area 4 . Eyre H'way 65km mark	Main Roads WA	Human Settlement	1A
46488	DUNDDS0101	Fraser Range major rest area 1 extended	Main Roads WA	Human Settlement	1A
46489	DUNDDS0102	Southern Hill major rest area extended (Frazer Range rest area 2)	Main Roads WA	Human Settlement	1A
46490	DUNDDS0103	Unnamed minor rest area 5 . Eyre H'way 93km mark	Main Roads WA	Human Settlement	1A
46491	DUNDDS0104	Unnamed minor rest area 6 . Eyre H'way 108 km mark	Main Roads WA	Human Settlement	1A

46492	DUNDDS0105	Unnamed minor rest area 7. Eyre H'way 125km mark	Main Roads WA	Human Settlement	1A
46493	DUNDDS0106	Unnamed minor rest area 8. Eyre H'way 131km mark	Main Roads WA	Human Settlement	1A
46495	DUNDDS0107	Unnamed minor rest area 9. Eyre H'way 140km mark	Main Roads WA	Human Settlement	1A
46502	DUNDDS0108	Unnamed minor rest area 10. Eyre H'way 152km mark	Main Roads WA	Human Settlement	1A
46503	DUNDDS0109	Unnamed minor rest area 11. Eyre H'way 163km mark	Main Roads WA	Human Settlement	1A
46508	DUNDDS0112	Unnamed minor rest area 14. Eyre H'way 205km mark	Main Roads WA	Human Settlement	1A
46517	DUNDDS0114	Unnamed minor rest area 16. Coolgardie Esperance hwy 180km mark	Main Roads WA	Human Settlement	1A
46518	DUNDDS0115	Unnamed minor rest area 17. Coolgardie Esperance hwy 149km mark	Main Roads WA	Human Settlement	1A
46744	DUNDDS0129	Granites and woodlands discovery trail. McDermiad Rocks campsite	Local Government	Human Settlement	1A
46788	DUNDDS0142	Yalunya Puljanya visitor site	Native Title	Human Settlement	1A
47104	DUNDDS0152	Eyre Bird Observatory	Dept of Biodiversity, Conservation and Attractions	Cultural, Environmental, Human Settlement	1A
47112	DUNDDS0154	Madura Services Centre	Private	Economic, Human Settlement	1A
47116	DUNDDS0158	Eucla Caravan Park	Private	Human Settlement	1A
47140	DUNDDS0166	Moodini Bluff rest area	Main Roads WA	Human Settlement	1A
47141	DUNDDS0167	Telstra optic fibre facility 3 Eyre Highway (unconfirmed)	Telstra	Economic	1A
47143	DUNDDS0168	Maggie Hays Mine accommodation village	Private	Economic, Human Settlement	1A
48059	DUNDDS0171	Shack 1 Red Rock Beach, Madura Coast	Private	Human Settlement	1A
48290	DUNDDS0172	Shack 2 Red Rock Beach, Madura Coast	Private	Human Settlement	1A
48293	DUNDDS0175	Shack 5 Red Rock Beach, Madura Coast	Private	Human Settlement	1A
48294	DUNDDS0176	Shack 6 and 6A Red Rock Beach, Madura Coast	Private	Human Settlement	1A
48295	DUNDDS0177	Shack 7 Berrybush, Madura Coast	Private	Human Settlement	1A
48297	DUNDDS0179	Shack 8 Mundrabilla beach Lot 316	Private	Human Settlement	1A

48298	DUNDDS0180	Shack 9 Eucla beach Eucla Coast lot317	Private	Human Settlement	1A
48299	DUNDDS0181	Shack 11 Eucla beach track, Eucla Coast	Private	Human Settlement	1A
48702	DUNDDS0185	Point Culver visitor node, Nuytsland	Dept of Biodiversity, Conservation and Attractions	Human Settlement	1A
48705	DUNDDS0188	Red Rocks Point, visitor node Nuytsland Nature Reserve	Dept of Biodiversity, Conservation and Attractions	Human Settlement	1A
54514	DUNDDS0216	Norseman south Crampton, Goodliffe, Hicks St	Private	Environmental, Human Settlement	1A
54548	DUNDDS0217	Highway 1 Eyre Highway, Norseman to Balladonia, Fraser range scrublands	Main Roads WA	Economic	1A
54558	DUNDDS0218	Highway 1 and State highway 94, Coolgardie Esperance Highway, South (Shrubland section)	Main Roads WA	Economic	1A
46378	DUNDDS0083	Norseman burial site 2143	Native Title	Cultural	1B
46747	DUNDDS0131	Granites and woodlands discovery trail. Disappointment Rocks campsite	Local Government	Human Settlement	1B
22753	DUNDDS0001	Frazer Range rest area 1, Eyre Hwy, Dundas	Main Roads WA	Human Settlement	1C
22755	DUNDDS0003	Balladonia rest area, Eyre Hwy, Dundas	Main Roads WA	Human Settlement	1C
45723	DUNDDS0019	Shire of Dundas tip site	Local Government	Economic, Environmental	1C
45914	DUNDDS0049	Norseman South West , Simon, Brockman, Alsopp, Goodliffe, Angove and Hicks	Private	Environmental, Human Settlement	1C
46019	DUNDDS0052	Breakaways archaeological scatter site 17708	Native Title	Cultural	1C
46021	DUNDDS0054	Maggie Hays cluster, aboriginal archaeological sites	Native Title	Cultural	1C
46023	DUNDDS0055	West Lake Johnstone occupation cluster	Native Title	Cultural	1C
46035	DUNDDS0057	Lake Johnstone mythological site complex	Native Title	Cultural	1C
46036	DUNDDS0058	Mandal mythological ceremonial site 38499	Native Title	Cultural	1C
46070	DUNDDS0063	Munguni mythological site Site 2920	Native Title	Cultural	1C
46076	DUNDDS0066	Bundburra camp Site 38326	Native Title	Cultural	1C

46078	DUNDDS0067	NOGANYER SOAK Site 2924	Native Title	Cultural	1C
46079	DUNDDS0068	HORSE ROCKS Site 2923	Native Title	Cultural	1C
46081	DUNDDS0069	Jimberlana and Eclipse Well camps and scatter cluster	Native Title	Cultural	1C
46082	DUNDDS0070	Lake Cowan_Ngadju hunting site Site 37190	Native Title	Cultural	1C
46085	DUNDDS0071	Buldania, Bedonia and Jacob Dimer Rocks complex	Native Title	Cultural	1C
46112	DUNDDS0072	Ten mile rocks sites cluster (Fraser Range)	Native Title	Cultural	1C
46145	DUNDDS0073	JANYORNA / DANJUNA, Gnama Hill Site 17230	Native Title	Cultural	1C
46152	DUNDDS0076	Fraser Range complex of archaeological sites	Native Title	Cultural	1C
46212	DUNDDS0077	Newman Rocks Site 2877	Native Title	Cultural	1C
46278	DUNDDS0078	KARBABADJANINGA Site 1089	Native Title	Cultural	1C
46312	DUNDDS0081	Balladonia south complex of cultural sites	Native Title	Cultural	1C
46409	DUNDDS0084	Dundas Nature Reserve (Shire of Dundas portion)	Dept of Biodiversity, Conservation and Attractions	Environmental	1C
46442	DUNDDS0085	Brockway Timber Reserve General	Dept of Biodiversity, Conservation and Attractions	Environmental	1C
46475	DUNDDS0094	Highway 1 and State highway 94, Coolgardie Esperance Highway, South	Main Roads WA	Economic	1C
46743	DUNDDS0128	Granites and woodlands discovery trail. Breakaways campsite	Local Government	Human Settlement	1C
46754	DUNDDS0135	Southern Hills Station Homestead	Private	Human Settlement	1C
46879	DUNDDS0143	Dundas West CEV site 26DY	Optus	Economic	1C
46880	DUNDDS0144	Fraser Range CEV site 66FR	Optus	Economic	1C
47037	DUNDDS0147	IGO Nova Mine site	Private	Economic, Human Settlement	1C
47084	DUNDDS0149	Telstra optic fibre facility peg 1 Eyre Highway	Telstra	Economic	1C
47115	DUNDDS0157	Eucla Motel service centre	Private	Economic, Human Settlement	1C
47117	DUNDDS0159	Eucla power and water	Private	Economic	1C
47121	DUNDDS0163	Eucla township	Private	Human Settlement	1C
47733	DUNDDS0170	NBN , Telstra optic fibre facility 4 Coolgardie Esperance Highway	National Broadband Network (NBN)	Economic	1C

48257	CGDCLG0017	State H'way 94 Coolgardie Esperance Highway , Dundas Shire boundary to Kambalda turn off	Main Roads WA	Economic	1C
48292	DUNDDS0174	Shack 4 Red Rock Beach, Madura Coast	Private	Human Settlement	1C
48706	DUNDDS0189	Red Rocks Point weather station	Dept of Planning, Lands and Heritage	Economic	1C
48707	DUNDDS0190	Air navigation facility Caiguna	Other Federal Govt	Economic	1C
48708	DUNDDS0191	Fraser Range station	Private	Economic	1C
48709	DUNDDS0192	Southern Hills Station	Private	Economic	1C
48710	DUNDDS0193	Balladonia station	Private	Economic	1C
48719	DUNDDS0194	Noondoonia Station	Private	Economic	1C
48720	DUNDDS0195	Woorlba Station	Private	Economic	1C
50075	DUNDDS0204	Jimberlana Hill Conservation reserve	Dept of Biodiversity, Conservation and Attractions	Environmental	1C
50107	DUNDDS0205	Boy Scouts camping reserve	Dept of Planning, Lands and Heritage	Human Settlement	1C
50251	DUNDDS0207	Madoonia Downs Station 1 (Dundas)	Private	Economic	1C
50662	DUNDDS0208	Winjarni Warnarl Modified tree. Site 38617	Native Title	Cultural	1C
53424	DUNDDS0210	Norseman north contaminated site 12889	Aboriginal Lands Trust	Environmental	1C
53425	DUNDDS0211	Norseman explosives magazine reserve	Other State Govt	Environmental	1C
54562	DUNDDS0219	State H'way 94 Coolgardie Esperance Highway , north (unburnt)	Main Roads WA	Economic	1C
22754	DUNDDS0002	Frazer Range rest area 2, Eyre Hwy, Dundas	Main Roads WA	Human Settlement	2A
28327	DUNDDS0004	Norseman District High School	Dept of Education	Human Settlement	2A
45325	DUNDDS0011	Gateway Caravan Park	Private	Environmental, Human Settlement	2A
45916	DUNDDS0051	Norseman North Angove, McIvor, Prinsep and Roberts	Private	Environmental, Human Settlement	2A
46504	DUNDDS0110	Unnamed minor rest area 12. Eyre H'way 180km mark	Main Roads WA	Human Settlement	2A
46541	DUNDDS0117	Communication tower 6443002 Norseman	Optus	Economic	2A
46745	DUNDDS0130	Granites and woodlands discovery trail. Lake Johnston campsite	Local Government	Human Settlement	2A

46757	DUNDDS0138	Balladonia service centre	Private	Economic, Human Settlement	2A
47138	DUNDDS0165	Border station	Dept of Primary Industries and Regional Development	Human Settlement	2A
48296	DUNDDS0178	Wanteen shacklement, lot 314, Mundrabilla coast	Private	Human Settlement	2A
48300	DUNDDS0182	Shack 12 Eucla beach track, Eucla coast	Private	Human Settlement	2A
55306	DUNDDS0225	Pantora OK mine, adit, explosives magazine, fuel storage and ventilation shaft	Private	Economic, Human Settlement	2A
46068	DUNDDS0061	Ngarta wampurru (tree message stick), Site ID 38648	Native Title	Cultural	2B
45322	DUNDDS0008	Norseman hospital staff quarters 14 Douglas St	Dept of Health	Environmental, Human Settlement	2C
45326	DUNDDS0012	Caltex Norseman Service Station	Private	Economic	2C
45725	DUNDDS0021	Pantoro mine assay facility	Private	Environmental	2C
45727	DUNDDS0023	Pantoro Mine administration facility	Private	Economic, Environmental	2C
45728	DUNDDS0024	Pantoro Mine Camp and accommodation	Private	Environmental	2C
45783	DUNDDS0039	Norseman Industrial Area Hatto Way west	Private	Economic, Environmental	2C
46443	DUNDDS0086	Nuytsland Nature Reserve	Dept of Biodiversity, Conservation and Attractions	Environmental	2C
46455	DUNDDS0089	West Kalgoorlie Esperance Railway, Norseman north (Object ID 250)	Arc Infrastructure	Economic	2C
46458	DUNDDS0090	West Kalgoorlie Esperance Railway, Norseman south (Object ID 1249)	Arc Infrastructure	Economic	2C
46574	DUNDDS0118	Communication tower 6443021 Fraser Range Eyre Highway	Telstra	Economic	2C
47069	DUNDDS0148	IGO Nova haul / access rd	Private	Economic	2C
47087	DUNDDS0151	Telstra optic fibre facility 2 Eyre Highway (unconfirmed)	Telstra	Economic	2C
47118	DUNDDS0160	Eucla Police station	Dept of Justice	Economic	2C
47119	DUNDDS0161	Eucla Fire and emergency station	Dept of Fire and Emergency Services	Economic	2C
47120	DUNDDS0162	Eucla communityhall	Local Government	Economic	2C
48587	DUNDDS0183	Norseman Mission site	Dept of Planning, Lands and Heritage	Economic, Environmental	2C

48726	DUNDDS0201	Madura Station	Private	Economic	2C
48727	DUNDDS0202	Mundrabilla Station	Private	Economic	2C
45324	DUNDDS0010	Great Western Travel Village Motel	Private	Environmental, Human Settlement	3A
45328	DUNDDS0014	BP Norseman	Private	Economic	3A
45329	DUNDDS0015	Norseman State Battery	Dept of Primary Industries and Regional Development	Cultural, Environmental	3A
45330	DUNDDS0016	Norseman race course and turf club	Local Government	Economic, Environmental	3A
45722	DUNDDS0018	Shire of Dundas works depot	Local Government	Economic	3A
45730	DUNDDS0026	Norseman fire and emergency volunteer fire station	Dept of Fire and Emergency Services	Economic	3A
45782	DUNDDS0038	Norseman Industrial area Hatto Way East	Private	Economic, Environmental	3A
45815	DUNDDS0040	Norseman Historical Collection and Museum	Dept of Planning, Lands and Heritage	Cultural, Environmental	3A
46760	DUNDDS0141	Caiguna Services centre	Private	Economic, Human Settlement	3A
48291	DUNDDS0173	Shack 3 Red Rock Beach, Madura Coast	Private	Human Settlement	3A
50665	DUNDDS0209	Coolgardie Esperance Highway Water Trees, Site 38790	Native Title	Cultural	3A
54755	DUNDDS0220	2019 Woodlands regeneration Norseman Hyden Rd south C	Dept of Planning, Lands and Heritage	Environmental	3A
54757	DUNDDS0222	2017 Woodlands regeneration Norseman Hyden Rd north, Lake Johnston	Dept of Planning, Lands and Heritage	Environmental	3A
54759	DUNDDS0223	2017 Woodlands regeneration Norseman Hyden Rd south, Lake Johnston	Dept of Planning, Lands and Heritage	Environmental	3A
45320	DUNDDS0006	Norseman Hospital	Dept of Health	Environmental, Human Settlement	3B
45321	DUNDDS0007	Norseman hospital staff quarters	Dept of Health	Environmental, Human Settlement	3B
45327	DUNDDS0013	Norseman Eyre Motel	Private	Environmental, Human Settlement	3B
45745	DUNDDS0036	Norseman Hotel	Private	Human Settlement	3B
45816	DUNDDS0041	Norseman south east - Downing , Crabbe Staples Sts block	Private	Environmental, Human Settlement	3B
45817	DUNDDS0042	Norseman East Block, Dodd, Rumble, Staples, Downing St's	Private	Environmental, Human Settlement	3B
45818	DUNDDS0043	Norseman North East Battery Rd, Dodd, Nulsen Sts, Mines Rd	Private	Environmental, Human Settlement	3B

45848	DUNDDS0045	Norseman Roberts St to Railway parade	Private	Environmental, Human Settlement	3B
45849	DUNDDS0046	Norseman Roberts St to Neville parade (sth)	Private	Environmental, Human Settlement	3B
46067	DUNDDS0060	Theatre Rocks including Site 1544	Native Title	Cultural	3B
46072	DUNDDS0064	Minjal Kutja (Little Rockhole) Site 38310	Native Title	Cultural	3B
46310	DUNDDS0079	BINIYAGURINYA Site 1091	Native Title	Cultural	3B
46311	DUNDDS0080	KARALYA SOAK site 1090	Native Title	Cultural	3B
46471	DUNDDS0093	Highway 1 Eyre Highway Balladonia to Eucla/State border	Main Roads WA	Economic	3B
46476	DUNDDS0095	State H'way 94 Coolgardie Esperance Highway , north	Main Roads WA	Economic	3B
46507	DUNDDS0111	Unnamed minor rest area 13. Eyre H'way 195km mark	Main Roads WA	Human Settlement	3B
46749	DUNDDS0132	Granites and woodlands discovery trail. Woodlands Camp	Local Government	Human Settlement	3B
50108	DUNDDS0206	Conservation reserve 8029	Dept of Biodiversity, Conservation and Attractions	Environmental	3B
46464	DUNDDS0091	Norseman Hyden Rd west to Shire boundary with Kondinin	Local Government	Economic	3D
46576	DUNDDS0120	Communication tower 6443027 Sirius Resources Village off Eyre Highway	Telstra	Economic	3D
46582	DUNDDS0126	Communication Tower 6443003 Cocklebiddy Eyre Bird Observatory	Telstra	Economic	3D
46755	DUNDDS0136	Southern Hills quarry	Private	Economic	3D
46756	DUNDDS0137	Balladonia airstrip	Private	Economic	3D
47036	DUNDDS0146	Power supply communication tower 6443002 Norseman	Horizon Power	Economic	3D
47136	DUNDDS0164	Eucla National Park	Dept of Biodiversity, Conservation and Attractions	Environmental	3D
47144	DUNDDS0169	Maggie Hays Mine assay, administration and processing facility	Private	Economic	3D
45323	DUNDDS0009	Norseman Golf club	Dept of Planning, Lands and Heritage	Cultural, Environmental	4A
45743	DUNDDS0034	Norseman CBD west	Private	Economic	4A
45744	DUNDDS0035	Norseman CBD east	Private	Economic	4A
45915	DUNDDS0050	Norseman west	Private	Environmental, Human Settlement	4A

46066	DUNDDS0059	Normans water tree site 38813	Native Title	Cultural	4A
46510	DUNDDS0113	Eyre Highway emergency airstrip Balladonia	Main Roads WA	Economic	4A
46577	DUNDDS0121	Communication tower 6443006 Balladonia Eyre Highway	Telstra	Economic	4A
46706	DUNDDS0127	Communication Tower 6443001 Eucla Eyre highway	Telstra	Economic	4A
46881	DUNDDS0145	Dundas East CEV site 26DU	Optus	Economic	4A
47114	DUNDDS0156	Mundrabilla Service Centre	Private	Economic, Human Settlement	4A
48704	DUNDDS0187	Twilight Cove visitor node, Nuytsland Nature Reserve	Dept of Biodiversity, Conservation and Attractions	Human Settlement	4A
48721	DUNDDS0196	Koonjarra Station	Private	Economic	4A
48722	DUNDDS0197	Virginia Station	Private	Economic	4A
48723	DUNDDS0198	Vanesk Station	Private	Economic	4A
48724	DUNDDS0199	Arubiddy Station	Private	Economic	4A
48725	DUNDDS0200	Moonera Station	Private	Economic	4A
54448	DUNDDS0212	2019 Woodlands regeneration old Hyden Rd north	Dept of Planning, Lands and Heritage	Environmental	4A
54451	DUNDDS0213	2019 Woodlands regeneration between Norseman Hyden Rd and old Hyden Rd north	Dept of Planning, Lands and Heritage	Environmental	4A
54457	DUNDDS0214	2019 Woodlands regeneration Norseman Hyden Rd south A	Dept of Planning, Lands and Heritage	Environmental	4A
54460	DUNDDS0215	2019 Woodlands regeneration Norseman Hyden Rd south B	Dept of Planning, Lands and Heritage	Environmental	4A
54756	DUNDDS0221	2019 Woodlands regeneration old Norseman Hyden Rd north and Victoria Rock Rd east	Dept of Planning, Lands and Heritage	Environmental	4A
54760	DUNDDS0224	2019 Woodlands regeneration Norseman Hyden Rd south of Lake Johnston	Dept of Planning, Lands and Heritage	Environmental	4A
45850	DUNDDS0047	Norseman south Crampton, Hicks, Angove to Roberts	Private	Environmental, Human Settlement	4B
46519	DUNDDS0116	Lake Cowan minor rest area. Coolgardie Esperance hwy 142km mark	Main Roads WA	Human Settlement	4B
45729	DUNDDS0025	Norseman swimming pool	Local Government	Economic	4C
46759	DUNDDS0140	Caiguna Airstrip	Private	Economic	4C
47111	DUNDDS0153	Cocklebidy Service Centre	Private	Economic, Human Settlement	4C
45721	DUNDDS0017	Norseman oval and sport precinct, RV stop over	Local Government	Human Settlement	5A

45724	DUNDDS0020	Norseman police precinct	Dept of Justice	Economic	5A
45726	DUNDDS0022	Pantoro Mine production facility	Private	Economic	5A
45736	DUNDDS0027	Norseman Town Hall (evacuation centre)	Local Government	Economic	5A
45737	DUNDDS0028	Norseman Community health centre	Dept of Health	Economic	5A
45738	DUNDDS0029	Shire of Dundas Council administration facility	Local Government	Economic	5A
45739	DUNDDS0030	Telstra exchange and communications tower Norseman	Telstra	Economic	5A
45740	DUNDDS0031	Norseman Pensioner Units	Local Government	Human Settlement	5A
45741	DUNDDS0032	Norseman Mens Shed	Local Government	Economic	5A
45742	DUNDDS0033	Shared services emergency facility, (Ambulance)	Local Government	Economic	5A
45819	DUNDDS0044	Roman Catholic Church	Roman Catholic Archbishop of Perth	Cultural	5A
46578	DUNDDS0122	Communication tower 6443012 Balladonia Eyre Highway	Telstra	Economic	5A
46579	DUNDDS0123	Communication Tower 6443017 Caiguna Eyre Highway	Telstra	Economic	5A
46580	DUNDDS0124	Communication Tower 6443020 Caiguna Eyre Highway	Telstra	Economic	5A
46751	DUNDDS0133	Fraser Range Station, Homestead and farm stay accommodation	Private	Human Settlement	5A
46758	DUNDDS0139	Balladonia Station Homestead	Private	Human Settlement	5A
47113	DUNDDS0155	Madura airstrip	Private	Economic	5A
46024	DUNDDS0056	Lake Johnson aerodrome artefact scatter cluster	Native Title	Cultural	5B
48703	DUNDDS0186	Toolinna Cove Visitor node, Nuytsland Nature reserve	Dept of Biodiversity, Conservation and Attractions	Human Settlement	5B
45746	DUNDDS0037	Railway Hotel Motel	Private	Human Settlement	5C
45881	DUNDDS0048	Ngadju Conservation Ranger Station	Aboriginal Lands Trust	Economic	5C
46069	DUNDDS0062	WALGAMIRI, Site 2921	Native Title	Cultural	5C
46575	DUNDDS0119	Communication tower 6443005 Fraser Range Eyre Highway	Telstra	Economic	5C

PART C

RISK REGISTER AND CONSEQUENCE TABLE

