

City of Mandurah

Bushfire Risk Management Plan

2019 – 2023



Document Control

Document Endorsements

The City of Mandurah Council endorses that the Bushfire Risk Management Plan (BRMP) has been reviewed and assessed by the Office of Bushfire Risk Management as compliant with the standard for bushfire risk management planning in Western Australia, the *Guidelines for Preparing a Bushfire Risk Management Plan*. The City of Mandurah is the owner of this document and has responsibility, as far as is reasonable, to manage the implementation of the Bushfire Risk Management Plan and facilitate the implementation of bushfire risk management treatments by risk owners. The endorsement of the Bushfire Risk Management Plan by the City of Mandurah council satisfies their endorsement obligations under section 2.3.1 of the *State Hazard Plan for Fire* (Interim).

Local Government	Representative	Signature	Date

Amendment List

Version	Date	Author	Section
1.0	May 2019	Myra Giardini	Emergency Management
2.0	July 2019	Myra Giardini	Emergency Management

Publication Information

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1. Introduction

1.1 Background

The State Emergency Management Plan for Fire, *State Hazard Plan – Fire*, requires an integrated Bushfire Risk Management Plan (BRM Plan) to be developed for each local government outlining a strategy to treat bushfire related risk across all land tenures. This BRM Plan has been prepared for the City of Mandurah in accordance with the requirements of *State Hazard Plan - Fire* and the Bushfire Risk Management Planning Guidelines for preparing a Bushfire Risk Management Plan (BRM Plan Guidelines). The risk management processes used to develop this plan are generally consistent with the key principles of AS/NZA ISO 31000:2009 Risk Management – Principle and guidelines (ISO 31000:2009), as described in the Second Edition of the National Emergency Risk Assessment Guidelines (NERAG 2014). Such an approach is consistent with the policies of the State Emergency Management Committee, specifically State Emergency Management Policy 3.2– Emergency Risk Management Planning.

The Bushfire Risk Management Plan is a strategic document that identifies assets at risk from bushfire and their priority for treatment. The *Treatment Schedule* sets out a broad program of coordinated multi-agency treatments to address risks identified in the Bushfire Risk Management Plan. Government agencies and other land managers with responsibility for implementing treatments will participate in the Bushfire Risk Management Plan process to ensure treatment strategies are collaborative and efficient, regardless of land tenure.

1.2 Aim and Objectives

The aim of the Bushfire Risk Management Plan is to document a coordinated and efficient approach towards the identification, assessment and treatment of assets exposed to bushfire related risk within the City of Mandurah.

The objective of the Bushfire Risk Management Plan is to effectively manage bushfire related risk within the City of Mandurah in order to protect people, assets and spaces of local value. Specifically, the objectives of this plan are to:

- Guide and coordinate a tenure blind, multi-agency bushfire risk management program over a five year period;
- Document the process used to identify, analyse and evaluate risk, determine priorities and develop a plan to systematically treat risk;
- Facilitate the effective use of financial and physical resources available for bushfire risk management activities or to maximise treatment;
- Integrate bushfire risk management into the business processes of local government, land owners and other agencies;
- Ensure there is integration between land owners and bushfire risk management programs and activities;
- Implement a process of continuous review and improvement to ensure treatment plans are adaptable and risk is managed at an acceptable level;
- Monitor and review the implementation of treatments to ensure treatment plans are adaptable and risk is managed at an acceptable level.

1.3 Legislation, Policy and Standards

The following legislation, policy and standards were considered to be applicable in development and implementation of the BMRP.

1.3.1 Legislation

- *Bush Fires Act 1954*
- *Emergency Management Act 2005*
- *Fire Brigades Act 1942*
- *Fire and Emergency Service Act 1998*
- *Conservation and Land Management Act 1984*
- *Contaminated Sites Act 2003*
- *Environmental Protection Act 1986*
- *Environmental Protection and Biodiversity Conservation Act 1999*
- *Biodiversity Conservation Act 2016*
- *Aboriginal Heritage Act 1972*
- *Metropolitan Water Supply, Sewerage and Drainage Act 1909*
- *Country Areas Water Supply Act 1947*
- *Bush Fires Regulations 1954*
- *Emergency Management Regulations 2006*
- *Planning and Development (Local Planning Scheme) Regulations 2015*
- *City of Mandurah Bushfire Brigades Local Law*

1.3.2 Policies, Guidelines and Standards

- National Emergency Risk Assessment Guidelines (NERAG) (Second Edition 2015)
- State Emergency Management Policy 2.5 - Local Arrangements
- State Emergency Management Policy 3.2 – Emergency Risk Management Planning
- State Emergency Management Preparedness Procedure 8 – Local Emergency Management Arrangements
- State Planning Policy 3.7: Planning in Bushfire Prone Areas
- State Planning Policy 3.4: Natural Hazards and Disasters
- Guidelines for Planning in Bushfire Prone Areas (2015)
- Western Australian Emergency Risk Management Guidelines (2005)
- A Guide to the Use of Pesticides in Western Australia (Dept. of Health 2010)
- Guidelines for Plantation Fire Protection (DFES 2011)
- Firebreak Location, Construction and Maintenance Guidelines (DFES)
- Bushfire Risk Management Planning Guideline (2015)
- AS/NZS ISO 31000:2009 - Risk management – Principles and Guidelines
- AS 3959-2009 Construction of buildings in bushfire-prone areas (2009)
- PFBFP Guidelines (WAPC et al. 2010)
- DFES Bushfire Prone Areas (as mapped by OBRM)

1.3.3 Other Related Documents

- National Strategy for Disaster Resilience
- National Statement of Capability for Fire and Emergency Services (AFAC 2015)
- Public Service Circular No. 88 Use of Herbicides in Water Catchment Areas (DoH 2007)
- Code of Practice for Timber Plantations in WA (Forest Products Commission 2006)
- Bushfire Risk Management Planning Handbook
- Bushfire Risk Management System User Guide
- City of Mandurah Firebreak and Fuel Hazard Reduction Notice
- Local reserve management plans
- Visual Fuel Load Guide – for Mandurah (DFES Environmental Protection Branch April 2014)
- City of Mandurah Bushfire Risk Management Plan 2015 (Strategen)
- City of Mandurah Biodiversity Strategy November 2013
- City of Mandurah 20 Year Strategic Community Plan 2017 – 2037
- City of Mandurah Annual Report 2017-18
- City of Mandurah Bushland Conservation Policy
- City of Mandurah Coastal Management Policy
- City of Mandurah Parks and Reserves Policy
- City of Mandurah Risk Management Policy
- City of Mandurah OHS Policy
- City of Mandurah Bushfire Prevention and Control Policy
- City of Mandurah Emergency Management Policy
- City of Mandurah Unauthorised Clearing of Vegetation Policy
- City of Mandurah Land Assets Policy

2. The Risk Management Process

The risk management processes used to identify and address risk in the Bushfire Risk Management Plan are aligned with the international standard for risk management, ISO 31000:2009, as described in NERAG (2015). This process is outlined in Figure 1 below.

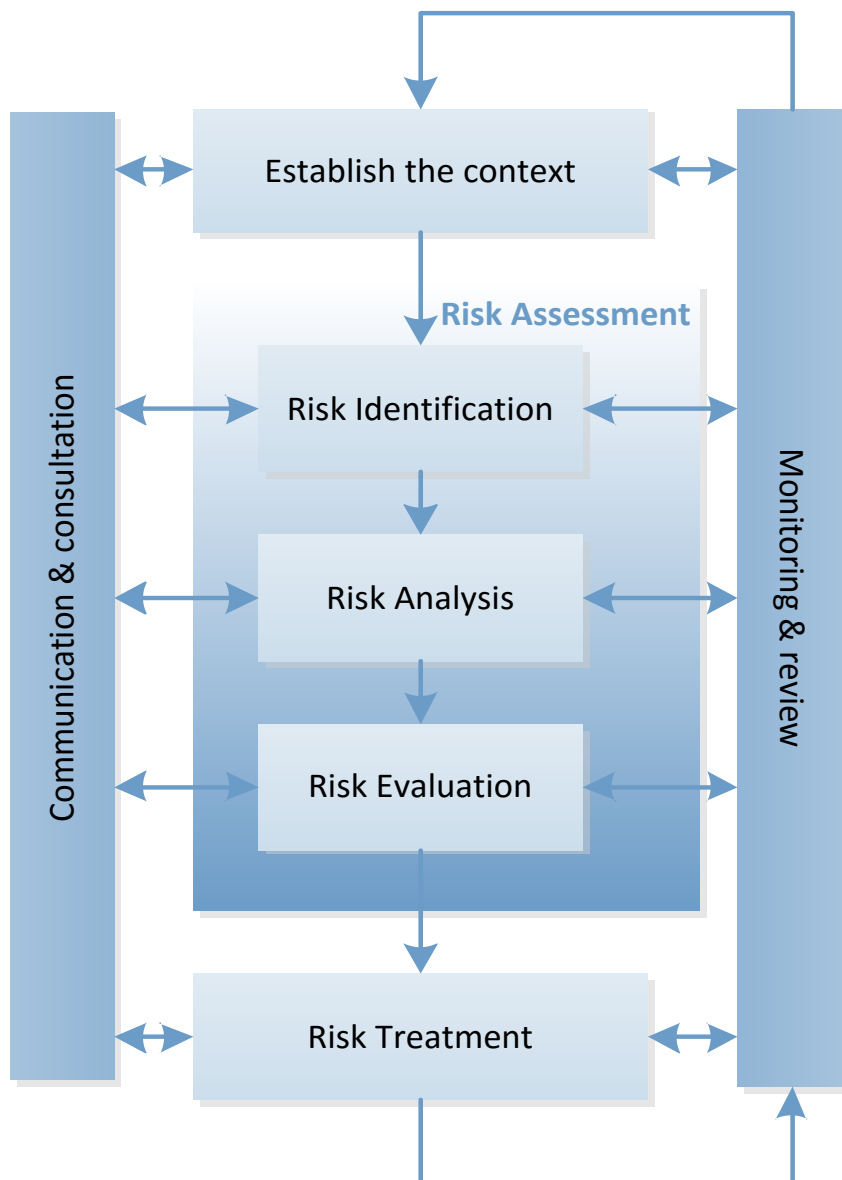


Figure 2: Risk Management Cycle

2.1 Roles and Responsibilities

Table 1: Roles and Responsibilities

Stakeholder Name*	Roles and Responsibilities
Local Government	- As custodian of the BRM Plan, coordination of the development and ongoing review of the integrated BRM Plan. - Negotiation of commitment from land owners to treat risks identified in the BRM Plan. - As a treatment manager, implementation of treatment strategies. - As part of the approval process, submission of the draft BRM Plan to the Office of Bushfire Risk Management (OBRM) to review it for consistency with the Guidelines. - As part of the approval process, submission of the final BRM Plan to council for their endorsement and adoption.
Department of Fire and Emergency Services (DFES)	- Participation in and contribution to the development and implementation of BRM Plans, as per their agency responsibilities as the <i>State Hazard Plan - Fire Hazard Management Agency</i>. - Provide support to local government through expert knowledge and advice in relation to the identification, prevention and treatment of bushfire risk. - Facilitation of local government engagement with state and federal government agencies in the local planning process. - Undertake treatment strategies, including prescribed burning on behalf of Department of Lands for Unmanaged Reserves and Unallocated Crown Land within gazetted town site boundaries. - In accordance with Memorandums of Understanding and other agreements, implementation of treatment strategies for other landholders.
Office of Bushfire Risk Management (OBRM)	- Under the OBRM Charter, to ensure bushfire risk is managed in accordance with AS/NZS ISO 31000 and reporting on the state of bushfire risk across Western Australia. - Review BRM Plans for consistency with the Guidelines prior to final endorsement by council.
Department of Biodiversity Conservation and Attractions (DBCA)	- Participation in and contribution to the development and implementation of BRM Plans. - Providing advice for the identification of environmental assets that are vulnerable to fire and planning appropriate treatment strategies for their protection. - As treatment manager, implementation of treatment strategies on department managed land and for Unmanaged Reserves and Unallocated Crown Land outside gazetted town site boundaries. - In accordance with Memorandums of Understanding and other agreements, implementation of treatment strategies for other landholders.

¹ Source: AS/NZS ISO 31000:2009, Figure 3, reproduced under SAI Global copyright Licence 1411-c083.

Stakeholder Name*	Roles and Responsibilities
Other State and Federal Government Agencies	- Assist the local government by providing information about their assets and current risk treatment programs. - Participation in and contribution to the development and implementation of BRM Plans. - As treatment manager, implementation of treatment strategies.
Public Utilities	- Assist the local government by providing information about their assets and current risk treatment programs. - Participation in and contribution to the development and implementation of BRM Plans. - As treatment manager, implementation of treatment strategies.
Corporations and Private Land Owners	As treatment manager, implementation of treatment strategies.

2.2 Communication and Consultation

Communication and consultation throughout the risk management process is fundamental to the preparation of an effective Bushfire Risk Management Plan. Table 2 outlines the key stakeholders in bushfire risk management planning in Mandurah; identified as having a significant role or interest in the planning process or are likely to be significantly impacted by the outcomes.

To ensure appropriate and effective communication occurs with relevant stakeholders in the development, implementation and monitoring of the BRM Plan, a *Communication Strategy* was prepared (provided in Appendix 1). The level of engagement of each stakeholder group is related to, but not dependant on the level of impact of outcomes respectively.

Internally the City has established an internal Bush Fire Mitigation Group, consisting of:

- Executive Manager, Development and Compliance
- Manager Environment and Arts
- Manager Operations
- Coordinator Ranger Service
- Coordinator Emergency Management
- Coordinator and Supervisor Natural Areas
- Coordinator Landscape Services
- Senior Development Officer (Also the Chief Bush Fire Control Officer and VRS Captain)
- Senior Environmental Management Officer

Meeting bimonthly, this working group collaborate on all aspects of bushfire mitigation, informing the schedule treatments in BRMS. This network also contribute to new landscape designs, ensuring they are taking bushfire risk into consideration, minimising longer term mitigation and maintenance.

Table 2: Key stakeholders in bushfire risk management planning in Mandurah

Stakeholder	Role or interest	Level of impact of	Level of engagement
Community, Community Groups and Community Interest Groups			
General Community Private Land Owners (residential, rural and commercial)	Landholder, Human Settlement	High	Inform, Educate, Collaborate
Coastcare / Bushcare Groups Community	Landholder, Human Settlement	High	Inform, Educate, Collaborate
'Embrace a Space' participants	Human Settlement	High	Inform, Educate, Collaborate
Mandurah Environmental Advisory Group	Interested Party	Med	Inform, Collaborate
Traditional Owners	Interested Party	High	Inform, Collaborate
Local Emergency Management Committee	Interested Party	Low	Inform
Mandurah Bush Fire Advisory Committee	Interested Party	Med	Inform, Collaborate
Local Governments			
City of Rockingham	Neighboring LGA	Low	Inform
Shire of Murray	Neighboring LGA	Low	Inform
Shire of Waroona	Neighboring LGA	Low	Inform
Bushfire Brigades, Bushfire Ready Groups and JAFFA program leaders			
Southern District Volunteer Bush Fire Brigade	Interested Party	Med	Inform, Collaborate, Empower
Mandurah Volunteer Fire and Rescue Service	Interested Party	Med	Inform, Collaborate
Falcon Volunteer Fire and Rescue Service	Interested Party	Med	Inform, Collaborate

3. Establishing the Context

3.1 Description of the Local Government and Community Context

The City of Mandurah is Western Australia's largest regional city and covers an area of 173.5km. It is home to more than 85,000 people with an average increase of 1500 new residents each year over the past five years. Between 2016 and 2036, the population for the City of Mandurah is forecast to increase by 36,778 persons (44.26% growth), at an average annual change of 1.85%.

Mandurah boasts a typical Mediterranean climate and relaxed coastal lifestyle which provides a unique work/life balance opportunity. Between the Indian Ocean, the expansive waterways of the Peel-Harvey Estuary and the lower reaches of the Serpentine River, this unique location boasts some of the best water based activity facilities in Western Australia.

Mandurah is a superb place to live and raise a family. It offers an exciting mix of residential developments, from family homes and modern apartments within new estates to luxurious homes nestled among canal waterways. Mandurah forms part of the Peel Region, located just one hour's drive from Perth and lying between the metropolitan area and the South West Region. It is bordered by the Indian Ocean to the west, with Jarrah forests and farmlands of the Darling Range leading east to the bordering wheat belt.

3.1.1 Strategic and Corporate Framework

This BRM Plan aligns with the *City of Mandurah Strategic Community Plan 2017 – 2037* across all five focus areas: Environment, Social, Economic, Identity and Organisational Excellence (Table 3).

Table 3: Strategic objectives met by the BRM Plan

Corporate Objectives		Bushfire Risk Management Plan
Environment	<i>Protect and ensure the health of our natural environment and waterways</i>	Proactive and collaborative bushfire planning and prevention ensures that mitigation works are undertaken in a manner that supports biodiversity and environmental protection.
	<i>Encourage and enable our community to take ownership of our natural assets, and to adopt behaviours that assist in achieving our environmental targets.</i>	The <i>Embrace a Space</i> program and established volunteer programs support community participation in bushfire prevention and control.
	<i>Factor climate change predictions into land-use planning, building design and future council decisions.</i>	Decisions are based on both legislative requirements and an organisation wide focus to future proof our community for climate changes ahead.
Social	<i>Help build our community's confidence in Mandurah as a safe and secure city.</i>	Significant resources are dedicated to carrying out annual inspections, ensuring properties are compliant with fire control requirements. Every property is assessed and works undertaken if required.
Economic	<i>Develop a strong and sustainable tourism industry.</i>	Tourism is a key industry to Mandurah, with transient communities presenting a range of challenges in respect to emergencies. The <i>Prepare the Peel Tourism Project</i> undertaken in 2018 aimed

		to enhance emergency preparedness within the Peel tourism industry by raising awareness in the short-term accommodation sector, better preparing the service provider and traveller for emergency events. A range of resources were developed and shared, including a <i>Crisis Essentials Guide for Tourism Businesses</i> .
Identity	<i>Encourage active community participation and engagement.</i>	Officers use a range of forums and existing networks to encourage a shared responsibility in emergency planning, prevention, response and recovery. For example, vulnerable communities are represented at the Local Emergency Management Committee has two aged care organisations within its membership.
Organisational Excellence	<i>Ensure the City has the capacity and capability to deliver appropriate services and facilities.</i>	Mandurah is one of the few local governments in WA to have a position dedicated solely to emergency management, enabling increased focus to planning, preparedness and prevention. In 2019 / 20 the City will appoint a bushfire mitigation officer provide specific focus to bushfire mitigation and maintenance of the Bushfire Risk Management System.

The implementation of processes used in achieving the relevant key focus area criteria is outlined in the 4 year Corporate Business Plan and further detailed in annual operational plans and annual budget allocations. The City of Mandurah is committed to a proactive and collaborative approach to bushfire risk management as demonstrated by:

- The Bushfire Mitigation Group review Bushfire Risk Management Plan and treatment schedules.
- Shared opportunities in bushfire related training e.g. Fuel Hazard Assessment training.

3.1.2 Location, Boundaries and Tenure

The City of Mandurah is located some 50km south of the Perth CBD, bounded by the City of Rockingham to the north, the Shire of Murray, the Serpentine River and Harvey Estuary to the east, the Shire of Waroona to the south, and the Indian Ocean to the west.

Mandurah is the largest of five Local Government Areas (LGAs) that comprise Western Australia's Peel Region, on the southern fringe of the Perth Metropolitan Region. The other LGAs include: Serpentine-Jarrahdale; Murray; Waroona; and Boddington. The City of Mandurah extends from Madora Bay and Lakelands in the north to Herron and Lake Clifton in the south. The Mandurah local government area is approximately 50km long, yet only 8km wide at its widest point.

Mandurah is a rapidly developing residential area, the City encompasses a total land area of about 173.5 square kilometres, including substantial waterways, coastline and bushland. A breakdown of the tenure with the City of Mandurah municipality is shown below in Table 4.

Table 4: Overview of Land Tenure and Management within the Local Government Area2

Land Manager/Agency*	% of Local Government Area
Local Government (Reserves/Crown Land)	51.85%
Private/Freehold	48.15%
Department of Biodiversity Conservation and Attractions	33.33%
Department of Lands	8.47%
Water Corporation	0.14%
Electrical Networks Corporation	0.00% (only 3 parcels)
Department of Water	0.05%
Department of Training & Workforce Development	0.15%
Department of Education	0.25%
Police Service	0.01%
Public Transport Authority of WA	0.08%
Department of Transport	0.67%
Health Departments of WA	0.12%
Department of Fire and Emergency Services	0.00% (only 1 parcel)
Other Vacant/Crown Land	3.01%

3.1.3 Population and Demographics

European settlement dates from the 1830s when Thomas Peel and a number of pioneers set up in what is now Mandurah. Population was minimal until 1850 when a road was built to the region and a ferry across the estuary opened. Early industries included fishing, fruit growing and canning. Some growth took place from the late 1800s. From early 1900s, the area became renowned as a holiday destination, and tourism became an important contributor to the local economy. Significant residential development occurred during the immediate post-war years, particularly in holiday dwellings. More substantial growth took place from the 1970s, especially in permanent dwellings. Rapid growth continued from the early 1990s, with the population of the City increasing from under 27,000 in 1991 to 85,302 in 2018.

As per the 2018 Australian Bureau of Statistics Census data, the City of Mandurah had a total population of 85,302. The population is forecast to continue growing steadily, to reach approximately 119, 872 by 2036. This means that Mandurah will become home to almost 50,000 new residents over the next two decades. Figures 2 and 3 highlight these trends, as well as the age group distribution across the population in 2011 as compared with those on both state and national levels. Table 5 provides a population breakdown by suburb.

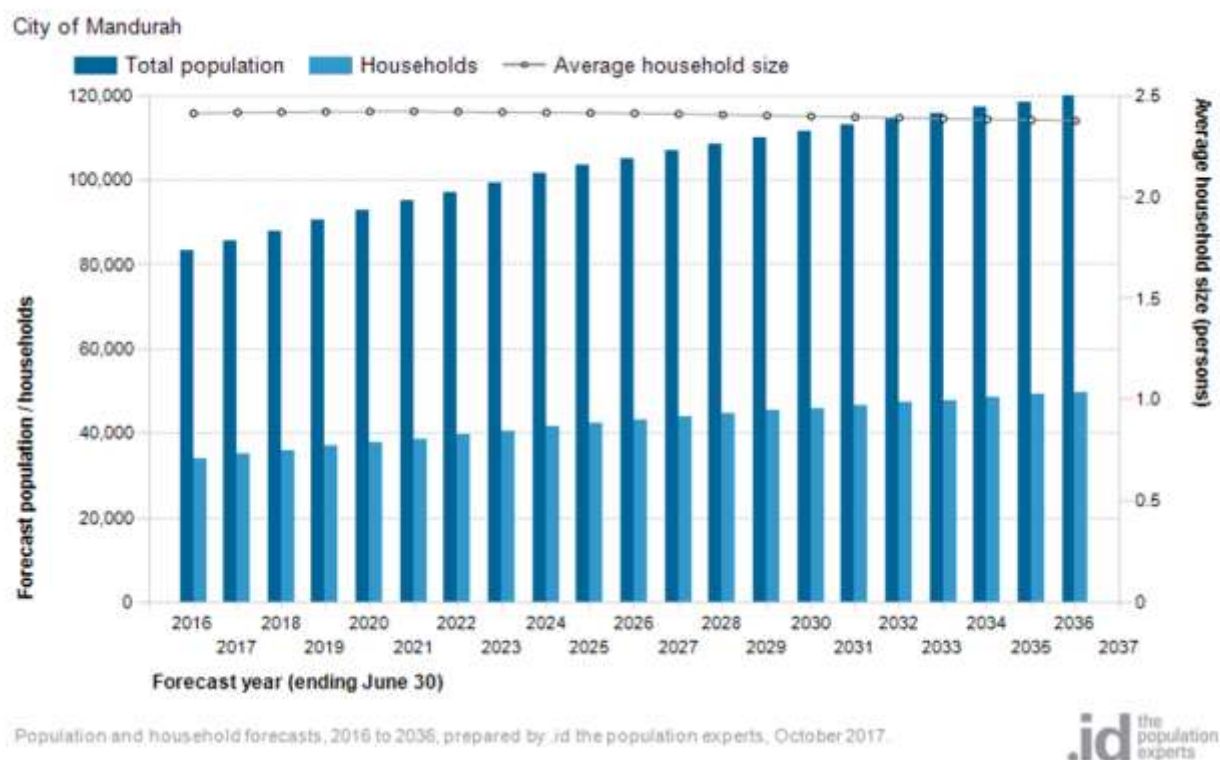


Figure 3: Mandurah forecast population, households and average household size

Mandurah is rapidly growing as a sea-change and retirement destination. The 2016 Census indicated that 22.7 percent of the Mandurah population is aged 65 or over, compared to the state average of 13.8 percent.

As a result of the link between disability and age, and the large increase expected in the number of older Western Australians, the total number of people with disabilities is projected to increase substantially by approximately 38 per cent to an expected 632,600 by 2023.

With such a large and growing aged care population, vulnerable communities cannot rely solely on the already stretched emergency services and are encouraged to undertake their own emergency evacuation planning, as captured in the City of Mandurah Vulnerable Communities Plan.

Cultural diversity is also increasing in Mandurah with the 2016 ABS census data showing Mandurah has having between 20 – 40% of the population as migrants, with an increasing number of those from non-English speaking backgrounds.

Understanding the complexities of the Mandurah community is essential for emergency planning, specifically knowing those with who may have limited ability to receive, understand or act on information, prior to or during an emergency.



Figure 4: Age and gender demographics of Mandurah (2016)

Table 5: Population by suburb from 2011 Census data

Suburb	Total Population	% of total population
Bouvard	821	1.2%
Clifton	4	0.0%
Coodanup	3,526	5.0%
Dawesville	4,299	6.1%
Dudley Park	5,751	8.2%
Erskine	4,100	5.9%
Falcon	4,666	6.7%
Greenfields	9,939	14.2%
Halls Head	13,044	18.7%
Herron	429	0.6%
Lakelands	2,923	4.2%
Madora Bay	1,721	2.5%
Mandurah	7,327	10.5%
Meadow Springs	5,920	8.5%
Parklands	539	0.8%
San Remo	884	1.3%
Silver Sands	1,241	1.8%
Wannanup	2,769	4.0%

3.1.4 Economic Activities and Industry

Mining and Construction are the Peel Region's main industries, with manufacturing, retail, tourism, agriculture, fishing and forestry also being major contributors to the region's economy.

Mandurah's main employment industries are construction, retail and manufacturing. These sectors are the largest employers, and are in decline. Meanwhile industries such as mining, education and training, health care and social assistance, accommodation and food services, public administration and safety each demonstrated strong growth in Mandurah between 2006 and 2011. There were more technicians and trades workers in in 2011 than in any other occupation, this still reflected in 2017 (see Table 6).

Tourism is a key industry in Mandurah and the Peel Region, attracting around 1.4 million overnight visitors per year, generating approximately \$271 million in revenue for the local economy (2014/15 National Institute of Economic Research). The impressive landscape brings with it a number of risks, with around 70% of the region being designated as bushfire prone, and a 1:100 year flood event having the potential of doubling waterway surface areas and significantly impacting local and transient communities.

The predominant use of land in the vicinity of the subject reserves is residential or rural development. High density urban residential development is prevalent throughout the suburbs of Halls Head, Falcon, Dawesville (east), San Remo, Dudley Park, Riverside Gardens, Wannanup and Melros. These areas are generally associated with a high level of vegetation clearance with smaller pockets of vegetation retained amongst individual residences, adjacent to the coast or adjacent to large surface watercourses such as the Peel inlet.

Lower density rural residential development is prevalent throughout the suburbs of Parklands, Dawesville (west), Bouvard and Herron. These areas are generally associated with a higher level of vegetation retention both on privately owned lots and throughout surrounding reserve and conservation land.

Table 6: Employment (total) by industry in Mandurah

City of Mandurah	2017/18			2011/12		Change	
Industry	Number	%	WA %	Number	%	WA %	2011/12 to 2017/18
Agriculture, Forestry and Fishing	158	0.6	2.7	105	0.5	2.5	+53
Mining	86	0.3	7.2	71	0.3	7.4	+15
Manufacturing	736	2.8	5.7	936	4.4	7.9	-199
Electricity, Gas, Water & Waste Services	157	0.6	1.3	143	0.7	1.4	+14
Construction	2,216	8.3	10.4	1,690	8.0	10.5	+525
Wholesale Trade	252	0.9	2.6	306	1.4	3.5	-54
Retail Trade	5,483	20.5	9.7	4,139	19.5	9.8	+1,344
Accommodation and Food Services	2,868	10.7	6.8	2,238	10.6	5.8	+630
Transport, Postal and Warehousing	691	2.6	4.6	682	3.2	4.8	+9
Information Media and Telecoms.	291	1.1	1.1	303	1.4	1.3	-12
Financial and Insurance Services	651	2.4	2.4	344	1.6	2.6	+307
Rental, Hiring & Real Estate Services	563	2.1	1.7	575	2.7	1.8	-13
Professional, Scientific & Tech. Services	1,003	3.7	6.6	737	3.5	7.2	+266
Administrative and Support Services	1,047	3.9	3.3	855	4.0	3.3	+192
Public Administration and Safety	1,251	4.7	6.3	1,076	5.1	6.1	+175
Education and Training	2,984	11.1	9.6	2,238	10.5	8.1	+747
Health Care and Social Assistance	4,415	16.5	12.3	3,362	15.8	10.3	+1,052
Arts and Recreation Services	584	2.2	1.8	404	1.9	1.6	+180
Other Services	1,337	5.0	4.1	1,009	4.8	4.1	+329
Total Industries	26,775	100.0	100.0	21,214	100.0	100.0	+5,561

Source: National Institute of Economic and Industry Research (NIEIR) ©2018. Compiled and presented in economy.id by .id.

3.2 Description of the Environment and Bushfire Context

3.2.1 Topography and Landscape Features

Mandurah lies within the Swan Coastal Plain Bioregion and possesses an array of vegetation communities, from coastal dunes and sand plains to Banksia and eucalypt woodlands. Dune systems dominate the coastline, with limestone outcrops found to the north of the City. Coastal dune vegetation is characterised by scrub-heath communities associated with low woodlands dominated by Banksia while inland is dominated by eucalypt woodlands. Given the tendency for some of these vegetation communities to accumulate fuel loads, the potential for fire to spread and produce fires of greater intensity increases thus reducing the likelihood of rapid suppression. Treatment options in many of these areas are limited by the presence of peat soils, Threatened Ecological Communities such as the Ramsar listed Peel-Harvey Estuary and areas of Commonwealth (EPBC Act) listed Banksia Woodlands TEC.

Topography throughout the Swan Coastal Plain is predominantly flat to gently undulating with slopes averaging around 0-5 degrees; however, steep topography does exist throughout coastal dune areas and limestone outcrops with slopes up to 15 degrees. These areas are problematic as steep, sandy hills are difficult to negotiate with heavy machinery and fire appliances.

The steepest topography with the City of Mandurah occurs along the coastal strip in association with dune systems, as well as throughout limestone ridges that occur predominantly along the southern section of Old Coast Road. Elevation throughout the municipality ranges from 0-60m AHD (Australian Height Datum) (Strategen Environmental Consultants 2015).

3.2.2 Climate and Bushfire Season

City of Mandurah experiences a Mediterranean climate characterised by mild, wet winters and warm to hot, dry summers. The Bureau of Meteorology (BoM) weather station that records the full suite of mean monthly climate statistics for coastal areas in the vicinity of Mandurah is located in the suburb, Halls Head. Figure 4 demonstrates the annual temperatures and rainfall for Mandurah.

The City undertakes annual reviews of the *Bush Fire Prevention and Control Policy EMS01* (Appendix 6) to ensure that it aligns with best practice and seasonal changes. Restricted burning is permitted from 1 April and 30 November each year, with the prohibited burning period extending from 1 December and 31 March each year. To reduce the risk of escape, land owners are not permitted to undertake running or mosaic burns at any time of year without the assistance of the local bush fire brigade.

Predominant and worst case fire weather conditions are based on long term climate statistics recorded by Bureau of Meteorology (BoM). These statistics provide insight into potential bushfire scenarios and fire behaviour during the designated bushfire season, as well as conditions appropriate for prescribed burning during the cooler months of late autumn, winter and early spring, taking into consideration wind speed and direction, relative humidity, temperature and moisture content.



Figure 5: Annual temperatures and rainfall for Mandurah 2001 – 2019 (BOM)

Southwest Western Australia generally experiences a cool to mild growing season in the months of August through to November of each year, followed by four months of summer drought conditions. During this period, the potential for bushfire is considered to be at its peak.

The worst fire weather conditions occur during this dry period when a low pressure trough forms off the west coast and strong winds develop from the north and northeast. These conditions are sometimes associated with 'Extreme' or 'Catastrophic' fire dangers, which are consistent with very high temperatures, low relative humidity and very strong winds. Based on the predominant summer climatic conditions of the local area, 'Extreme' or 'Catastrophic' fire dangers occur less than 5% of the time during the designated bushfire season, which equates to around six days between December and March. Table 7 summarises the statistics rainfall and temperature for Mandurah.

Table 7: Mandurah Long-Term Averages for Temperature and Rainfall 2001 – 2019 (BOM)

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean maximum temperature (°C)	29.4	29.7	27.8	24.1	21.2	18.7	17.5	18.0	19.0	21.9	24.8	27.0	23.3
Mean minimum temperature (°C)	18.9	19.3	18.1	15.8	13.5	11.5	10.7	11.0	11.7	13.5	15.6	17.1	14.7
Mean rainfall (mm)	18.4	12.1	16.5	39.1	90.6	115.7	117.2	97.7	64.2	30.7	22.7	16.7	666.7
Decile 5 (median) rainfall (mm)	3.1	2.9	13.1	33.5	76.3	113.4	126.4	96.5	57.7	27.8	19.2	5.4	654.7
Mean rainy days ≥ 1 mm	1.6	1.3	2.6	5.4	8.4	11.6	15.2	12.4	10.2	5.4	4.1	2.2	80.4

Predominant fire weather conditions are those that occur 95% of the time during the designated bushfire season. For the City of Mandurah municipality, these generally correlate with average January climatic conditions (Strategen Environmental Consultants 2015).

DFES Weekly Intelligence Briefings, which are now shared with Local Governments provide a State Wide Intelligence Overview including the likelihood of bushfires for the Metropolitan Region.

3.2.3 Vegetation

The Mandurah environment is particularly unique as it has a high diversity of ecosystems inclusive of riverine, estuarine and coastal foreshores, wetlands and bushlands, coastal heathland, and Tuart-Jarra-Marri-Banksia woodlands as reflected in Table 8 (or refer to maps provided in Appendix 2).

Of the 16 725 ha of vegetated land that existed within the local government area prior to European settlement only 8600 hectares of natural areas remain, approximately 50 per cent of the original extent. Of these remaining areas approximately 3840 ha is within land managed for conservation by the State Government and 650 ha is managed for conservation and passive recreation by the City of Mandurah.

Within the modified landscape of Mandurah just over 2000 ha is managed by the City as sporting ovals, parkland cleared open spaces, playgrounds and developed reserves with the balance being urban development and rural residential development.

Given the patterns of development within the City, there are several areas where urban development intersects with undeveloped bushland, this includes the interface between houses and coastal reserves along most of the 50km of coast within the City and development in Dawesville adjacent the Tim's Thicket reserve.

Table 8: Vegetation complexes occurring in Mandurah

Vegetation Complex & Description		Pre-European Extent (ha)	Current Extent (ha)	% Remaining	Extent of BRM Plan area (%)
Bassendean Complex	Central & South - ranges from woodland of Jarrah - Sheoak - Banksia species to low woodland of Melaleuca species, & sedge lands on the moister sites.	73.08	23.64	32.35	0.46
Cottesloe Complex	Central & South - Mosaic of woodland of Tuart and open forest of Tuart - Jarrah - Marri; closed heath on the Limestone outcrops.	4,696.10	1,805.94	38.46	29.9
Herdsmen Complex	Sedgeland (closed tussock grassland) and fringing woodland of Flooded Gum - Melaleuca species.	245.35	53.16	21.67	1.56
Karrakatta Complex	Central & South - Predominantly open forest of Tuart - Jarrah - Marri & woodland of Jarrah - Banksia species	1,760.00	1,174.80	66.75	11.22
Quindalup Complex	Coastal dune complex consisting mainly of two alliances - the strand & fore-dune alliance and the mobile & stable dune alliance. Varies between closed scrub of Acacia rostellifera (Summer-scented Wattle) & closed or open heath	1,897.63	1,267.75	66.81	12.1
Vasse Complex	Mixture of the closed scrub of Melaleuca species fringing woodland of Flooded Gum - Melaleuca species & open forest of Tuart - Jarrah - Marri. Will include areas dominated by Tecticornia & Sarcocornia (Samphire) near Mandurah	506.80	188.82	37.26	3.22
Yoongarillup Complex	Woodland to tall woodland of Tuart with Peppermint in the second storey. Less consistently an open forest of Tuart - Jarrah - Marri.	6,501.01	3,060.84	47.08	41.46

3.2.4 Bushfire Frequency and Causes of Ignition

A report provided by DFES Operational Information System Branch summarises landscape fire ignitions from June 2015 to March 2019. The number of ignitions has trended downward since 2016/17, this may be attributed to a changing weather conditions, increased community education and awareness, targeted arson programs and improved reporting.

Mandurah's gazetted fire district is from the northern boundary to the northern prolongation of Williams Street Melros, this is serviced by one career fire brigade and two volunteer fire and rescue units. The Mandurah Southern Districts bush fire brigade are first response to bushfires south of William Street, Melros to the southern border at Herron. The size and nature of fires attended may be influenced early reporting, rapid response times and largely developed areas.

There were 353 bushfires attended to across Mandurah between mid-2015 and 2019, as listed in Table 9. Of these, 56.9% of ignitions (recorded in Table 10) were reported as suspicious/deliberate behaviour (201), 18.5% cigarette butts (65); and 13% re-ignition from a previous fire (27). Mitigation works undertaken in connection with the BRM Plan aim to minimize the impact of bushfires when they occur.

Table 9: City of Mandurah Landscape Ignition Data Summary 2015 - 2019

	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	Total
Total Number of Bushfires:	71	118	81	83	353
Burn off fires	2	9	1	2	14
Campfires/bonfires/outdoor cooking	3	0	2	2	7
Cigarette	17	7	26	15	65
Construction, installation, design deficiency	0	1	0	0	1
Equipment - Mechanical or electrical fault	0	1	0	0	1
Fireworks/flares	0	0	1	1	2
Hot works (grinding, cutting, drilling etc.)	1	0	1	0	2
Human Error (Left on, knock over, unattended etc.)	0	1	0	2	3
Improper Fueling / Cleaning/Storage/Use of material ignited	0	0	0	1	1
Other open flames or fire	1	6	1	4	12
Power lines	1	0	0	1	2
Reigniting of previous fire	5	11	4	7	27
Suspicious/Deliberate	38	72	43	48	201
Undetermined	1	4	0	0	5
Unreported	1	1	0	0	2
Vehicles (incl. Farming Equipment/Activities)	0	2	0	0	2
Weather Conditions - Lightning	1	0	1	0	2
Weather Conditions (High winds, natural combustion etc. Excludes Lightning)	0	3	1	0	4

Table 10: Mandurah Bushfires Summary of Size 2015 – 2019

Only available where reported. The size of a fire is an estimation from the attending Officer in Charge.

	2015/2016	2016/2017	2017/2018	2018/2019	Total
Total Number of Bushfires: Size Reported (hectares)	71	118	81	83	353
1 or less	58	98	45	62	263
2 - 5	1	6	2	0	9
6 to 10	1	0	0	0	1
10+	1	1	0	0	2
Not Known	10	13	34	21	78

4. Asset Identification and Risk Assessment

4.1 Planning Areas

The City of Mandurah Bushfire Risk Management Plan has been divided into two planning areas, Mandurah North and South. The Planning areas are divided by the Dawesville Cut. Appendix 2 includes maps of bushfire prone areas occurring within each planning area.

4.1.1 Priorities for Asset Identification and Assessment

Assets were identified and assessed across Mandurah, based on the order of priority outline in Table 11, informed by Asset Category and Subcategory.

Table 11 Priorities for Asset Identification and Assessment

Priority	Asset Category	Asset Subcategory	Planning Area
First Priority	Human Settlement	Special Risk and Critical Facilities	All
Second Priority	Human Settlement	All other subcategories	All
Third Priority	Economic	Critical Infrastructure	All
Fourth Priority	Economic	All other subcategories	All
Fifth Priority	Environmental	All subcategories	All
Sixth Priority	Cultural	All subcategories	All

4.2 Asset Identification

Asset identification and risk assessment has been conducted at the local level, using the risk assessment methodology described in the *Bushfire Risk Management Plan Guidelines*. Identified assets have been mapped recorded and assessed in the Bushfire Risk Management System (BRMS). Identified assets are categorised into the subcategories (Table 12).

Table 12: Asset Categories and Subcategories

Asset Category	Asset Subcategories
Human Settlement	• Residential areas Rural properties and urban interface areas. • Places of temporary occupation Commercial, mining and industrial areas located away from towns and population centres (i.e. not adjoining residential areas). • Special risk and critical facilities Hospitals, nursing homes, schools and childcare facilities, tourist accommodation and facilities, prison and detention centres, local government administration centres and depots, incident control centres, designated evacuation centres, emergency services.
Economic	• Agricultural Pasture, grazing, livestock, crops, wineries and other farming, silos and sales yards. • Commercial and industrial

	Major industry, waste treatment plants, mines, mills and processing/manufacturing facilities, cottage industry. • Critical infrastructure Power lines and substations, water and gas pipelines, telecommunications infrastructure, railway lines, bridges, port facilities and waste water treatments plants. • Tourist and recreational Tourist attractions and recreational sites that generate significant tourism and/or employment within the local area. • Commercial forests and plantations • Drinking water catchments
Environmental	• Protected Rare and threatened flora and fauna, ecological communities and protected wetlands. • Priority Fire sensitive species and ecological communities. • Locally important Nature conservation and research sites, habitats, species and communities considered to be of local importance.
Cultural	• Aboriginal heritage Places of indigenous significance. • Recognised heritage Assets afforded legislative protection through identification by the National Trust, State Heritage List or Local Planning Scheme Heritage List. • Local heritage Assets identified in a Municipal Heritage Inventory or identified by the local community. • Other assets of cultural value e.g. Halls, community centres, clubs, places of worship and recreation facilities.

4.3 Assessment of Bushfire Risk

Risk assessments have been undertaken for each asset or group of assets identified using the methodology described in the Bushfire Risk Management Plan Guidelines. Where an asset falls into more than one asset category, a risk assessment is completed under each category selected. The risk assessment that results in the highest risk rating will be used as the overall risk rating and treatment priority for the asset. While not assets in Mandurah have been identified and mapped, some 68% of those currently recorded are Human Settlement.

Asset Category	Percentage of identified assets
Human Settlement	68%
Economic	6%
Environmental	24%
Cultural	2%

4.3.1 Likelihood Assessment

Likelihood is described as the chance of a bushfire igniting, spreading and reaching an asset. The approach used to determine the likelihood rating is the same for each asset category; Human Settlement, Economic, Environmental and Cultural. There are four possible likelihood ratings: unlikely, possible, likely and almost certain (see Table 13).

Table 13: Likelihood Ratings

Likelihood Rating	Description
Almost Certain (Sure to Happen)	- Is expected to occur in most circumstances; - High level of recorded incidents and/or strong anecdotal evidence; and/or - Strong likelihood the event will recur; and/or - Great opportunity, reason or means to occur; - May occur more than once per year.
Likely (Probable)	- Will probably occur in most circumstances; and/or - Regular recorded incidents and strong anecdotal evidence; and /or - Considerable opportunity, reason or means to occur; - May occur at least once per year.
Possible (feasible but < probable)	- Should occur at some stage; and/or - Few, infrequent, random recorded incidents or little anecdotal evidence; and/or - Some opportunity, reason or means to occur; - May occur once every 2 to 4 years.
Unlikely (Improbable, not likely)	- Could occur only on exceptional circumstances; - May occur once in 5 years or more.

4.3.2 Consequence Assessment

Consequence is described as the outcome or impact of a bushfire event. The approach used to determine the consequence rating is different for each asset category; Human Settlement, Economic, Environmental and Cultural. There are four possible consequence ratings: minor, moderate, major and catastrophic (Table 14).

Table 14: Consequence Ratings

Consequence Rating	Descriptions
Minor	- No fatalities. - Near misses or minor injuries with first aid treatment possibly required. - No persons are displaced. - Little or no personal support (physical, mental, emotional) required. - Inconsequential or no damage to an asset, with little or no specific recovery efforts required beyond the immediate clean-up. - Inconsequential or no disruption to community. - Inconsequential short-term failure of infrastructure or service delivery. (Repairs occur within 1 week, service outages last less than 24 hours.) - Inconsequential or no financial loss. Government sector losses managed within standard financial provisions. Inconsequential disruptions to businesses.
Moderate	- Isolated cases of serious injuries, but no fatalities. Some hospitalisation required, managed within normal operating capacity of health services. - Isolated cases of displaced persons who return within 24 hours. - Personal support satisfied through local arrangements.

	• Localised damage to assets that is rectified by routine arrangements. • Community functioning as normal with some inconvenience. • Isolated cases of short to mid-term failure of infrastructure and disruption to service delivery. (Repairs occur within 1 week to 2 months, service outages last less than 1 week.) • Local economy impacted with additional financial support required to recover. Government sector losses require activation of reserves to cover loss. Disruptions to businesses lead to isolated cases of loss of employment or business failure. • Isolated cases of damage to environmental/cultural assets, one-off recovery efforts required, but with no long term effects to asset.
Major	• Isolated cases of fatalities. • Multiple cases of serious injuries. Significant hospitalisation required, leading to health services being overstressed. • Large number of persons displaced (more than 24 hours duration). • Significant resources required for personal support. • Significant damage to assets, with ongoing recovery efforts and external resources required. • Community only partially functioning. Widespread inconvenience, with some services unavailable. • Mid to long-term failure of significant infrastructure and service delivery affecting large parts of the community. Initial external support required. (Repairs occur within 2 to 6 months, service outages last less than a month.) • Local or regional economy impacted for a significant period of time with significant financial assistance required. Significant disruptions across industry sectors leading to multiple business failures or loss of employment. • Significant damage to environmental/cultural assets that require major rehabilitation or recovery efforts. • Localised extinction of native species. <i>This may range from loss of a single population to loss of all of the species within the Local Government area (for a species which occupies a greater range than just the Local Government area).</i>
Catastrophic	• Multiple cases of fatalities. • Extensive number of severe injuries. • Extended and large number requiring hospitalisation, leading to health services being unable to cope. • Extensive displacement of persons for extended duration. • Extensive resources required for personal support. • Extensive damage to assets that will require significant ongoing recovery efforts and extensive external resources. • Community unable to function without significant support. • Long-term failure of significant infrastructure and service delivery affecting all parts of the community. Ongoing external support required. (Repairs will take longer than 6 months, service outages last more than 1 month.) • Regional or State economy impacted for an extended period of time with significant financial assistance required. Significant disruptions across industry sectors leading to widespread business failures or loss of employment. • Permanent damage to environmental/cultural assets. • Extinction of a native species in nature. <i>This category is most relevant to species that are restricted to the Local Government area, or also occur in adjoining Local Government areas</i>

and are likely to be impacted upon by the same fire event. In nature means wild specimens and does not include flora or fauna bred or kept in captivity.

4.3.3 Assessment of environmental assets

Using available biological information and fire history data, environmental assets with a known minimum fire threshold were assessed to determine if they were at risk from bushfire, within the five year life of the Bushfire Risk Management Plan. Environmental assets that would not be adversely impacted by bushfire within the five year period have not been determined and assessed in the Bushfire Risk Management Plan. The negative impact of a fire on these assets (within the period of this plan) was determined to be minimal and may even be of benefit to the asset and surrounding habitat.

4.3.4 Local Government Asset Risk Summary

A risk profile for the local government is provided in the summary table below (Table 15). This table shows the proportion of assets at risk from bushfire in each risk category at the time the BRM Plan was endorsed.

Table 15: Mandurah Asset Risk Summary

Risk Rating Asset Category	Low	Medium	High	Very High	Extreme
Human Settlement	7.41% (8)	9.26% (10)	20.37% (22)	25% (27)	5.56% (6)
Economic	0.93% (1)	2.78% (3)	0.93% (1)	0.93% (1)	0.93% (1)
Environmental	6.48% (7)	13.89% (15)	3.7% (4)	0%	0%
Cultural	0%	1.85% (2)	0%	0%	0%

5. Risk Evaluation

5.1 Evaluating Bushfire Risk

The risk rating for each asset has been assessed against the likelihood and consequence descriptions to ensure:

- The rating for each asset reflects the relative seriousness of the bushfire risk to the asset;
- Likelihood and consequence ratings assigned to each asset are appropriate; and
- Local issues have been considered.

5.2 Treatment Priorities

The treatment priority for each asset has been automatically assigned by Bushfire Risk Management System (BRMS), based on the asset's risk rating. Table 12 shows how likelihood and consequence combine to give the risk rating and subsequent treatment priority for an asset.

No organisation has limitless resources to deal with adverse risk. It is therefore necessary to define priorities. Risks below a certain level were assessed as not requiring specific treatment within the life of this plan and will be managed through routine local government controls. Where risk ratings above very high exist, these will be addressed within the first twelve months of the plan. Risk ratings of extreme will be given priority to be addressed within six months. The treatment priority for each asset identified is recorded in the *Treatment Schedule* at Appendix 4.

Table 16: Treatment priorities

Consequence Likelihood	Minor	Moderate	Major	Catastrophic
Almost certain	3D (High)	2C (Very High)	1C (Extreme)	1A (Extreme)
Likely	4C (Medium)	3A (High)	2A (Very High)	1B (Extreme)
Possible	5A (Low)	4A (Medium)	3B (High)	2B (Very High)
Unlikely	5C (Low)	5B (Low)	4B (Medium)	3C (High)

5.3 Risk Acceptability

In most circumstances risk acceptability and treatment will be determined by the land owner, in collaboration with local government and fire agencies. The guidelines around risk acceptance and existing control effectiveness are applied. The consequence levels (Table 17) are detailed in relation to risk categories: reputation; environment; financial; operational; health; and, legal and regulatory consequences.

The criteria for acceptance of risk determines the appropriate course of action. The City of Mandurah considers a bushfire risk to an asset rated as Extreme or Very High to be unacceptable and requiring asset specific treatments, to be scheduled as a priority. Many assets with a higher risk rating are located within close proximity to remnant vegetation, such as bush reserves. Annual reserve management plans include fuel management as a routine control.

Table 17: Risk Acceptance Criteria (Risk Tolerance Table)

Risk Rating	Criteria for Acceptance of Risk	Course of Action
Extreme (Priorities 1A, 1B, 1C)	Only acceptable with excellent controls. Urgent treatment action is required.	Routine controls are not enough to adequately manage the risk. Immediate attention required as a priority. Specific action is required in first year of plan.
Very High (Priorities 2A, 2B, 2C)	Only acceptable with excellent controls. Treatment action is required.	Routine controls are not enough to adequately manage the risk. Specific action will be required during the period covered by the plan.
High (Priorities 3A, 3B, 3C, 3D)	Only acceptable with adequate controls. Treatment action may be required.	Specific action may be required. Risk may be managed with routine controls and monitored annually.
Medium (Priorities 4A, 4B, 4C)	Acceptable with adequate controls. Treatment action is not required, but risk must be monitored regularly.	Specific action may not be required. Risk may be managed with routine controls and monitored periodically throughout the life of the Bushfire Risk Management Plan.
Low (Priorities 5A, 5B, 5C)	Acceptable with adequate controls. Treatment action is not required, but risk must be monitored.	Need for specific action is unlikely. Risk will be managed with routine controls and monitored as required.

6. Risk Treatment

The purpose of risk treatment is to reduce the likelihood of a bushfire occurring and/or the potential consequences of a bushfire on the community, economy and environment. This is achieved by implementing treatments that modify the characteristics of the hazard, the community or the environment.

There are many strategies available to treat bushfire risk, Local Government wide and asset-specific. The treatment strategy (or combination of treatment strategies) selected depend on the level of risk and the type of asset being treated. Not all treatment strategies are suitable in all circumstances.

The City of Mandurah has also entered a three-year Australian Research Council Linkage Project partnership with the Murdoch University aimed at addressing the important issue of managing fire risk in urban bushland in a way that has minimal impact on ecosystem function and wildlife. In addition, the project aims to involve the community in the mitigation of bushfire risk in urban bushland, therefore providing valuable educational and capacity building opportunities that can be utilised by landholders on private land.

The proposed research project will provide valuable insight into the impacts of fire on urban bushland and wildlife biodiversity, community perceptions around fire and fuel loads, and the effectiveness of manual fuel load reduction for reducing fire risk and changing fire behaviour.

6.1 Local Government Wide Controls

The following controls are currently in place across the City of Mandurah to assist in the strategic management of bushfire related risk:

- *Bush Fires Act 1954* Section 33 notices, including applicable fuel management requirements, firebreak standards and annual enforcement program/s;
- Declaration of Prohibited Burn Times, Restricted Burn Times and Total Fire Bans for the local government;
- Public education campaigns and the use of DPAW and DFES state-wide programs, tailored to suit local needs;
- State-wide arson prevention programs developed in conjunction with WA Police and DFES;
- State planning framework and local planning schemes, implementation of appropriate land subdivision and building standards in line with DFES, Planning Commission (WAPC) and Building Commission policies and standards; and
- Bushfire Risk Management Plan performance monitoring and reporting annually to the local government council and Office of Bushfire Risk Management (OBRM).
- Other practices and programs undertaken by local government or state agencies that contribute to bushfire risk management within the local government, including controls in place under state government policies, agreements or memorandums of understanding.

A *LG Wide Controls Works Plan* has been developed and is attached at Appendix 5. The plan details work to be undertaken to improve current controls, or implement new controls to better manage bushfire-related risk across the local government.

6.2 Asset Specific Treatment Strategies

Asset specific treatments are implemented to protect an individual asset or group of assets, identified and assessed in the Bushfire Risk Management Plan as being at risk from bushfire. In particular, Local Government and landholders are encouraged to assign at least one asset specific treatment strategy to all assets with a

risk rating of extreme or very high, where routine controls are not sufficient. There are six asset specific treatment strategies:

- **Fuel management** - Treatment reduces or modifies the bushfire fuel through manual, chemical and prescribed burning methods;
- **Ignition management** - Treatment aims to reduce potential human and infrastructure sources of ignition in the landscape;
- **Preparedness** - Treatments aim to improve access and water supply arrangements to assist firefighting operations;
- **Planning** - Treatments focus on developing plans to improve the ability of firefighters and the community to respond to bushfire; and
- **Community Engagement** - Treatments seek to build relationships, raise awareness and change the behaviour of people exposed to bushfire risk.
- **Other** - Local Government Wide Controls will be used to manage the risk. Asset specific treatment is not required or not possible in these circumstances.

6.3 Determining the Treatment Schedule

Efforts will be made to finalise the Treatment Schedule within 6 months of this plan being approved by Council. The Treatment Schedule will be developed in broad consultation with land owners and other stakeholders. The Treatment Schedule will be informed by treatment prioritisation and resource availability.

Land owners 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 licences to undertake an activity. Where agreed, another agency may manage a treatment on behalf of a land owner. However, the onus remains on the land owner to ensure treatments detailed in this plan are implemented.

Treatments assigned to assets rated as being at an Extreme risk will be prioritised for scheduling, to be completed by the end of the calendar year, wherever possible. Thereafter, the remaining treatments will be scheduled based on asset risk rating (working back from 'Very High'), as well as funding and contractor availability.

Table 18 summarises the treatments assigned to assets identified as being at Extreme risk currently, and being a priority for treatment. Treatments include fuel management and preparedness. In most cases, the resulting risk rating to the assets while reduced, is still 'Very High'. Where this occurs, the subject assets will be prioritised for further investigation for appropriate treatment options.

Table 18: Priority treatments identified

Asset ID	Asset Name	Planning Area	Post Treatment Risk	Treatment Strategy	Treatment Type
MDHMDS080	Austin Rise Bryde Ct Residences Dawesville	Mandurah South	Very High	• Fuel Management	• Prescribed burning
MDHMDS069	Bouvard Estuary Edge lots	Mandurah South	Very High	• Fuel Management	• Mechanical works
MDHMDS068	Bouvard Herron Estuary edge lots	Mandurah South	Very High	• Fuel Management	• Mechanical works
MDHMDS149	Carnarvon Way residences Erskine	Mandurah South	Very High	• Preparedness	• Fire access

MDHMDS032	Estuary Rd Sth Warrangup Springs	Mandurah South	Very High	Fuel Management	Prescribed burning
MDHMDS020	Falcon Playgroup Centre	Mandurah South	Very High	Fuel Management	Mechanical works
MDHMDS021	Linville St/Tansey Way Falcon	Mandurah South	Very High	Fuel Management	Mechanical works
MDHMDS119	Moorberg Enchantress residences Dawesville	Mandurah South	Very High	Fuel Management	Prescribed burning
MDHMDS067	Mount John Rd lots	Mandurah South	Very High	Fuel Management	Mechanical works
MDHMDS044	Ocean Road Primary School	Mandurah South	Very High	Fuel Management	Mechanical works
MDHMDS255	Roden Hill - Surrounding Residential Area South	Mandurah North	Very High	Preparedness	Fire access
MDHMDS026	Allendale St/Warrangup	Mandurah South	High	- Fuel Management - Preparedness	- Prescribed burning - Mechanical works - Firebreaks
MDHMDS037	Caddadup Reserve Tanjinn Street Residents	Mandurah South	High	Preparedness	Firebreaks
MDHMDS109	Hazelmere residences Dawesville	Mandurah South	High	Fuel Management	Mechanical works
MDHMDS040	Longboard Cove	Mandurah South	High	- Fuel Management - Preparedness	- Mechanical works - Fire access
MDHMDS025	St Ives Retirement Village	Mandurah North	High	Fuel Management	Mechanical works
MDHMDS039	Warrangup North	Mandurah South	High	- Fuel Management - Preparedness	- Prescribed burning - Mechanical works - Community engagement
MDHMDS124	Agonis Way Linville St residences Wannanup	Mandurah South	Medium	Fuel Management	Mechanical works
MDHMDS035	Coodanup Community Centre 26 Broun Rd Coodanup	Mandurah North	Medium	- Fuel Management - Ignition Management - Preparedness	- Mechanical works - Prescribed burning - Access – gate - Asset fire protection - Fire access
MDHMDS084	Gumnut north residences	Mandurah South	Medium	Fuel Management	Prescribed burning
MDHMDS033	Tim's Thicket South East Residents	Mandurah South	Medium	- Fuel Management - Preparedness	- Prescribed burning - Firebreaks

7. Monitoring and Review

Monitoring and review processes are in place to ensure that the Bushfire Risk Management Plan remains current and valid. These processes are detailed below to ensure outcomes are achieved in accordance with the *Communication Strategy* and *Treatment Schedule*.

7.1 Review

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

- Changes to the Local Government area, organisational responsibilities or legislation;
- Changes to the bushfire risk profile in the area; or
- Following a major fire event or exercise review.

7.2 Monitoring

The Bushfire Risk Management System (BRMS) will be used to monitor the risk ratings for each asset identified in the Bushfire Risk Management Plan and record the treatments implemented. Risk ratings are reviewed on a regular basis. New assets will be added to the *Asset Risk Register*, as and when they are identified.

7.3 Reporting

The City of Mandurah will submit an annual report to the Office of Bushfire Risk Management (OBRM) each year, summarising progress made towards implementation of the Bushfire Risk Management Plan. Internal reporting on bushfire mitigation works will occur via;

- Weekly Updates to executive (as required)
- Emergency Management / Natural Areas bimonthly reports
- Quarterly budget reviews
- Annual report to Council

The City has been awarded *2019-20 All West Australians Reducing Emergency (AWARE)* funding for the I.G.N.I.T.E project, the appointed bushfire mitigation officer will provide quarterly progress reports and final report on acquittal in July 2020.

8. 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 (4) 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: <i>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.</i>)
Asset Register	A component within the Bushfire Risk Management System used to record the details of assets identified in the Bushfire Risk Management Plan.
Asset Risk Register	A report produced within the Bushfire Risk Management System that details the consequence, likelihood, risk rating and treatment priority for each asset identified in the Bushfire Risk Management Plan.
Bushfire	Unplanned vegetation fire. A generic term which includes grass fires, forest fires and scrub fires both with and without a suppression objective. ¹
Bushfire hazard	The potential or expected behaviour of a bushfire burning under a particular set of conditions, i.e. the type, arrangement and quantity of fuel, the fuel moisture content, wind speed, topography, relative humidity, temperature and atmospheric stability.
Bushfire Risk	The chance of a bushfire igniting, spreading and causing damage to the community or the asset/s they value.
Bushfire risk management	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 Management Plan (Bushfire Risk Management Plan) Area	The whole area that the Bushfire Risk Management Plan applies. In most cases this will be the local government area. However, in some cases it may include land ² adjacent to the local government's boundaries or multiple local governments.
Bushfire Threat	The threat posed by the hazard vegetation. Based on the vegetation category, slope and separation distance.
Consequence	The outcome or impact of a bushfire event.
Emergency Risk Management Plan	A document (developed under <i>State Emergency Management Policy 2.9</i>) that describes how an organisation(s) intends to undertake the activities of emergency risk management based on minimising risk. These plans help

¹ Australasian Fire and Emergency Service Authorities Council 2012, *AFAC Bushfire Glossary*, AFAC Limited, East Melbourne, Australia.

² Land that is outside of local government jurisdiction, such as land owned and managed by the Botanical Gardens and Parks Authority or Rottnest Island Authority may be included in a local government plan, where agreed.

inform the ongoing development of Local Emergency Management Arrangements (LEMA) and State Hazard Plans.

Fire Management Plan	A plan developed for a specific area that details all activities associated with the management of fire prone land, including the use of fire to meet land management goals and objectives.
Geographic Information System (GIS)	A data base technology, linking any aspect of land-related information to its precise geographic location. ³
Geographic Information System (GIS) Map	The mapping component of the Bushfire Risk Management System. Assets, treatments and other associated information is spatially identified, displayed and recorded within the GIS Map.
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, the chance of a bushfire igniting, spreading and reaching the asset.
Locality	The officially recognised boundaries of suburbs (in cities and larger towns) and localities (outside cities and larger towns).
Planning Area	A geographic area determine by the local government which is used to provide a suitable scale for risk assessment and stakeholder engagement.
Priority	See Treatment Priority.
Recovery Cost	The capacity of an asset to recover from the impacts of a bushfire.
Responsible Person	The person responsible for planning, coordinating, implementing, evaluating and reporting on a risk treatment.
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 Manager	The organisation or individual responsible for managing a risk identified in the Bushfire Risk Management Plan; including review, monitoring and reporting.
Risk Register	A component within the Bushfire Risk Management System used to record, review and monitor risk assessments and treatments associated with assets recorded in the Bushfire Risk Management Plan.

³ Landgate Glossary, www.landgate.wa.gov.au/corporate.nsf/web/glossary

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. ⁴
Rural Urban Interface (RUI)	The line or area where structures and other human development adjoin or overlap with undeveloped bushland. ⁵
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 in order to modify risk. E.g. a prescribed 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 Treatment Schedule of the Bushfire Risk Management Plan; including coordinating or undertaking work, monitoring, reviewing and reporting.
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 Bushfire Risk Management System that details the treatment priority of each asset identified in the Bushfire Risk Management Plan, and the treatments scheduled.
Treatment Strategy	The broad approach that will be used to modify risk. E.g. fuel management.
Treatment Type	The specific treatment activity that will be implemented to modify risk. E.g. a prescribed burn.
Vulnerability	The susceptibility of an asset to the impacts of bushfire.

⁴ Australasian Fire and Emergency Service Authorities Council 2012, *AFAC Bushfire Glossary*, AFAC Limited, East Melbourne, Australia.

⁵ Australasian Fire and Emergency Service Authorities Council 2012, *AFAC Bushfire Glossary*, AFAC Limited, East Melbourne, Australia.

9. Common Abbreviations

APZ	Asset Protection Zone
BFAC	Bush Fire Advisory Committee
BRMP	Bushfire Risk Management Planning (or Plan)
BRMS	Bushfire Risk Management System
CALD	Culturally and Linguistically Diverse
DEMC	District Emergency Management Committee
DFES	Department of Fire and Emergency Services
DPaW	Department of Parks and Wildlife
ERMP	Emergency Risk Management Plan
FFDI	Forest Fire Danger Index
FMP	Fire Management Plan
GFDI	Grassland Fire Danger Index
GIS	Geographical Information System
HSZ	Hazard Separation Zone
JAFFA	Juvenile and Family Fire Awareness
LEMA	Local Emergency Management Arrangements
LEMC	Local Emergency Management Committee
LG	Local Government
LMZ	Land Management Zone
OBRM	Office of Bushfire Risk Management
SEMC	State Emergency Management Committee
SLIP	Shared Land Information Platform
WAPC	Western Australian Planning Commission

Table of Appendices

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Appendix 4: Treatment Schedule

Appendix 5. Local Government Wide Controls, Multi-Agency Treatment Work Plan

Appendix 6: City of Mandurah Bush Fire Prevention and Control Policy

Bushfire Risk Management Plan Communications Strategy



Document Control

Document Name	Bushfire Risk Management Plan Communications Strategy	Current Version	
Document Owner	City of Mandurah Mandurah CEO	Issue Date	
Document Location		Next Review	

Related Documents

Title	Version	Date
City of Mandurah Bushfire Risk Management Plan	1.0	May 2019

Amendment List

1 INTRODUCTION

The Bushfire Risk Management Plan (BRM Plan) is a strategic document that outlines the approach to the identification, assessment and treatment of assets exposed to bushfire risk within the City of Mandurah. This Communication Strategy accompanies the BRM Plan for the City of Mandurah. It documents the communication objectives for the BRM Plan, roles and responsibilities for communication, key stakeholders, target audiences and key messages at each project stage, communication risks and strategies for their management, and communication monitoring and evaluation procedures.

2 COMMUNICATIONS OVERVIEW

Communication Objectives

The communication objectives for the development, implementation and review of the BRM Plan are as follows:

1. Key stakeholders understand the purpose of the BRM Plan and their role in the bushfire risk management planning process.
2. Stakeholders who are essential to the bushfire risk management 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 as per the schedule in place for the local government area.
5. The community and other stakeholders engage with the bushfire risk management planning process and as a result are better informed about bushfire risk and understand their responsibilities to address bushfire risk on their own land.

Communication Roles and Responsibilities

The City of Mandurah is responsible for the development, implementation and review of the Communication Strategy. 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:

Position	Roles and Responsibilities
CEO	▪ Endorsement of the BRM Plan Communication Strategy
Manager Statutory Services	▪ Monitoring and reporting on the BRM Plan and Communication Strategy ▪ Scheduling of internal Bushfire Mitigation Group Meetings
Coordinator Emergency Management	▪ Operational-level communication between the City and stakeholders ▪ Communicating BRM Plan to volunteer fire brigades
Coordinator Natural Areas	▪ Responsible for communication between the City departments and external stakeholders (contractors)

Key Stakeholders for Communication

The following table identifies key stakeholders in bushfire risk management planning. 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. Stakeholders can be added to the table over time.

Stakeholder	Role or interest	Level of impact of	Level of engagement
Community, Community Groups and Community Interest Groups			
General Community Private Land Owners (residential, rural and commercial)	Landholder, Human Settlement	High	Inform, Educate, Collaborate
Coast Care / Bush Care Groups Community	Landholder, Human Settlement	High	Inform, Educate, Collaborate
'Embrace a Space' participants	Human Settlement	High	Inform, Educate, Collaborate
Mandurah Environmental Advisory Group	Interested Party	Med	Inform, Collaborate
Traditional Owners	Interested Party	High	Inform, Collaborate
Local Emergency Management Committee	Interested Party	Low	Inform
Mandurah Bush Fire Advisory Committee	Interested Party	Med	Inform, Collaborate
Local Governments			
City of Rockingham	Neighboring LGA	Low	Inform
Shire of Murray	Neighboring LGA	Low	Inform
Shire of Waroona	Neighboring LGA	Low	Inform
Bushfire Brigades, Bushfire Ready Groups and JAFFA program leaders			
Southern District Volunteer Bush Fire Brigade	Interested Party	Med	Inform, Collaborate, Empower
Mandurah Volunteer Fire and Rescue Service	Interested Party	Med	Inform, Collaborate
Falcon Volunteer Fire and Rescue Service	Interested Party	Med	Inform, Collaborate

Communications Plan

Timing of Communication	Stakeholder (s)	Communication Objective(s)	Communication Method	Key Message or Purpose	Responsibility	Identified Risks to Communication	Strategy to Manage Risks	Monitoring and Evaluation Method
Development of the Bushfire Risk Management Plan								
<i>What is the timeframe or date for this communication?</i>	<i>Who is the stakeholder(s) or target audience?</i>	<i>Which communication objective(s) does this activity support or achieve?</i>	<i>How are you communicating (e.g. email, meetings) and how often? What resources are required?</i>	<i>What is the key message or purpose that needs to be understood?</i>	<i>Who is responsible for planning and undertaking the communication activity?</i>	<i>What could reduce the effectiveness of the communication?</i>	<i>What will be done to reduce the likelihood of this happening?</i>	<i>How will you know if your communication was successful?</i>
Life of Plan	City of Mandurah CEO, Senior Leadership Team and Staff (incl. internal Bushfire Mitigation Group)	All (1-5)	Emails Meetings City Website and Intranet	Informed, consulted, or responsible. Review and input into Plan.	Manager Development & Compliance	Time constraints No clear message Incorrect audience	Careful planning and time management	Feedback, questions and level of support received
Life of Plan	Mandurah Environmental Advisory Group (MEAC)	All (1-5)	Meetings (Biennially)	Review and input into Plan.	Manager Environment & Arts	Treatments not negotiated	Prepare presentation for MEAG, provide updates as required	Feedback, treatments negotiated and supported by committee.

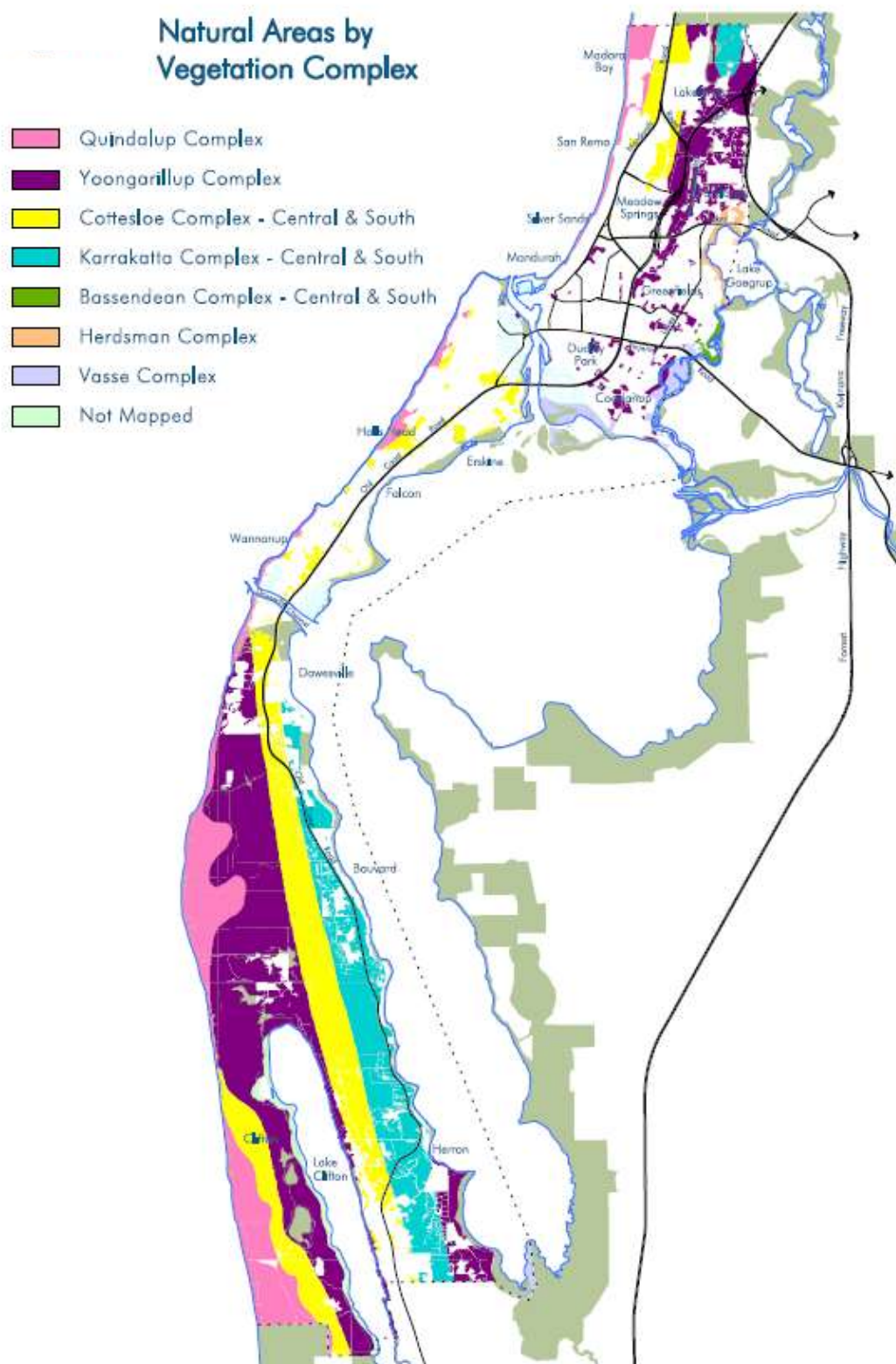
Life of Plan	Bush Fire Advisory Committee (BFAC)	All (1-5)	Meetings (Quarterly)	Engaged in process of BRM Plan, Treatment Schedule and Risk Analysis	Emergency Management Coordinator	Plan not complete Treatments not negotiated Time constraints	Prepare presentation for BFAC, provide updates as required	Feedback, treatments negotiated and supported by committee.
Life of Plan	Local Emergency Management Committee (LEMC)	All (1-5)	Meetings (Quarterly)	Engaged in process of BRM Plan, Treatment Schedule and Risk Analysis	Emergency Management Coordinator	Time constraints	Prepare presentation for LEMC, provide updates as required	Feedback, treatments negotiated and supported by committee.
Life of Plan	BFB Captains	All (1-5)	Meeting to be organized as required	Engaged in BRM planning process Identify Risk, and share information	Emergency Management Coordinator	Time constraints No plan Availability of volunteers	Availability of volunteers	Feedback, support for BRM planning process
Life of Plan	General Community Traditional Owners MEAC Bush Care, Coast Care and Embrace a Space Groups (as required)	1 & 2	Media (Newspaper) City Website Face to face meetings Mail/letter box drops Signage	Inform of the BRM Plan process Identify valued assets Identify existing controls	Emergency Management Coordinator	Media not reaching majority Workshops and forums could get abstracted by other agendas	Newspaper and website details Chair meetings with strict agenda and purpose	Engaged throughout process Feedback received Success of outcomes

Life of Plan	State Agencies, Service providers and other Stakeholders (WP, WC, etc.)	All (1-5)	Emails Face to Face Meetings Telephone	Inform of BRM Plan process Identify assets at risk Identify existing controls/programs	Emergency Management Coordinator	Time constraints and travel Level of interest and engagements in process	Select appropriate channel of communication Prepare materials and good planning	Select appropriate channel of communication Prepare materials and good planning
Implementation of the Bushfire Risk Management Plan								
Life of Plan	City of Mandurah CEO, Senior Leadership Team and Staff (incl. internal Bushfire Mitigation Group)	All (1-5)	Emails Meetings (Quarterly) City Website and Intranet	Informed, consulted, or responsible. Review and input into Plan.	Emergency Management Coordinator / Manager Statutory Services	Time constraints Availability Lack of understanding Budget (for LG mitigation)	Careful planning and time management Clear purpose Clear communication and regular updates	Feedback, questions and level of support received
Life of Plan	Bushfire Advisory Committee (BFAC)	All (1-5)	Meetings (Quarterly) Face to Face	Report on progress to plan Report issues/constraints	Emergency Management Coordinator	Poor communication from stakeholders and LG on completion of works	Collate data and report on success to plan Compliance to plan	Feedback, treatments negotiated and supported by committee.
Life of Plan	General Community Traditional Owners MEAC Bush Care, Coast Care and Embrace a Space Groups (as required)	1 & 2	Mail out Door knock Emails Meetings Website Telephone	Informed, consulted, accountable or responsible. Progress to plan	Emergency Management Coordinator	Time constraints Lack of understanding	Well planned and executed sharing of information Negotiations conducted	Good feedback or minimal complaints received regarding works undertaken

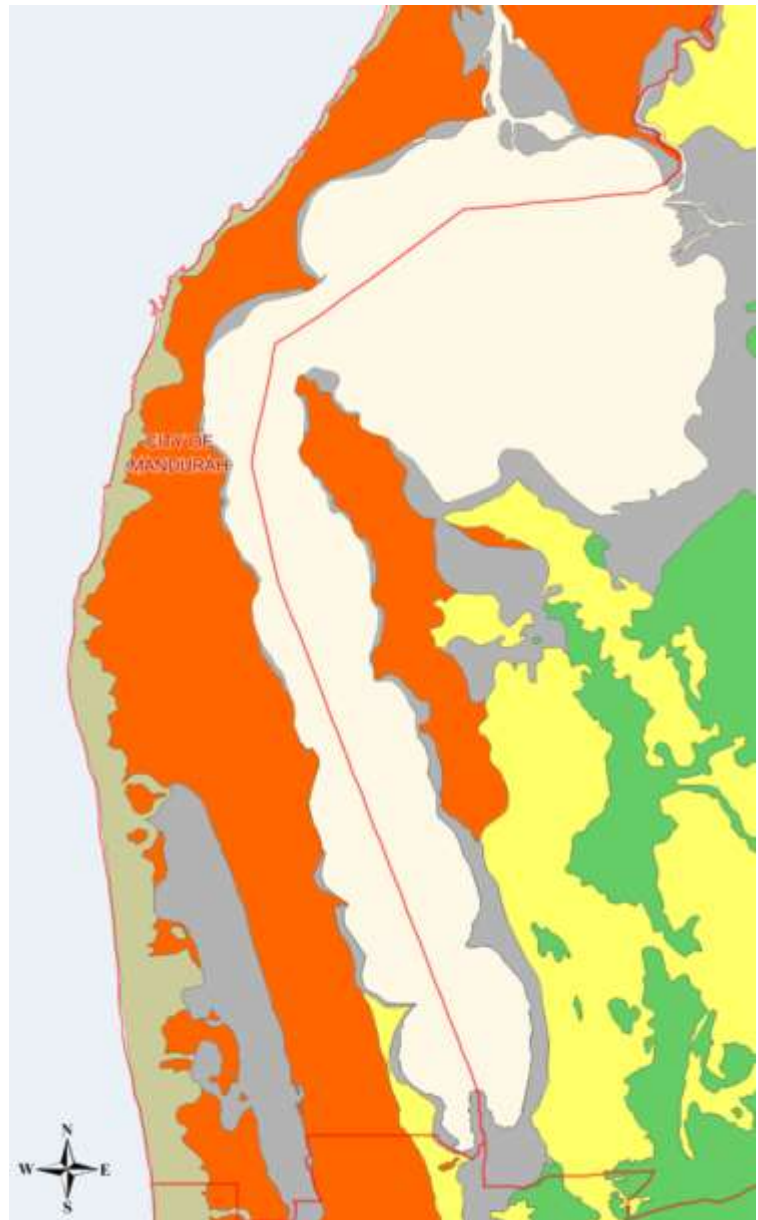
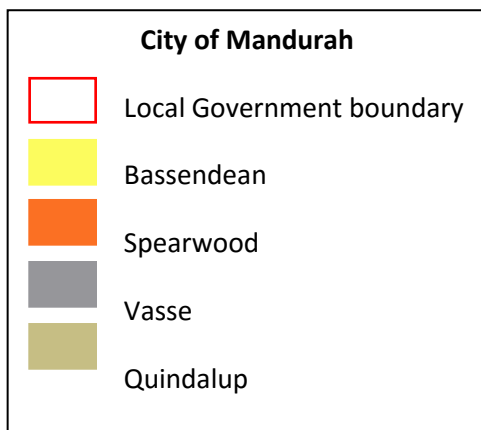
Review of the Bushfire Risk Management Plan								
Yearly (City) 5 Yearly (City, DFES and OBRM)	City of Mandurah CEO, and Staff OBRM, SBRO & LG Council	All (1-5)	Meetings Emails	Review, Monitor and Reporting Endorse plan Compliance to plan and acceptance of risk	Emergency Management Coordinator / Manager Statutory Services	Poor reporting and recording of information Review not completed by BRMB and OBRM	Senior Bushfire Risk Officer to record data and information appropriately Approved by OBRM for LG	Feedback from Council received Work completed as a result of plan Good reporting
Quarterly	City of Mandurah	All (1-5)	Bulletin	Report on actions and key performance indicators for BRM Plan	Emergency Management Coordinator	Objectives not clearly set out Key actions not identified	Discuss with CEO and Director Clear objectives set	Good reporting and feedback from CEO and Director on work completed

Appendix 2: Planning Area Maps

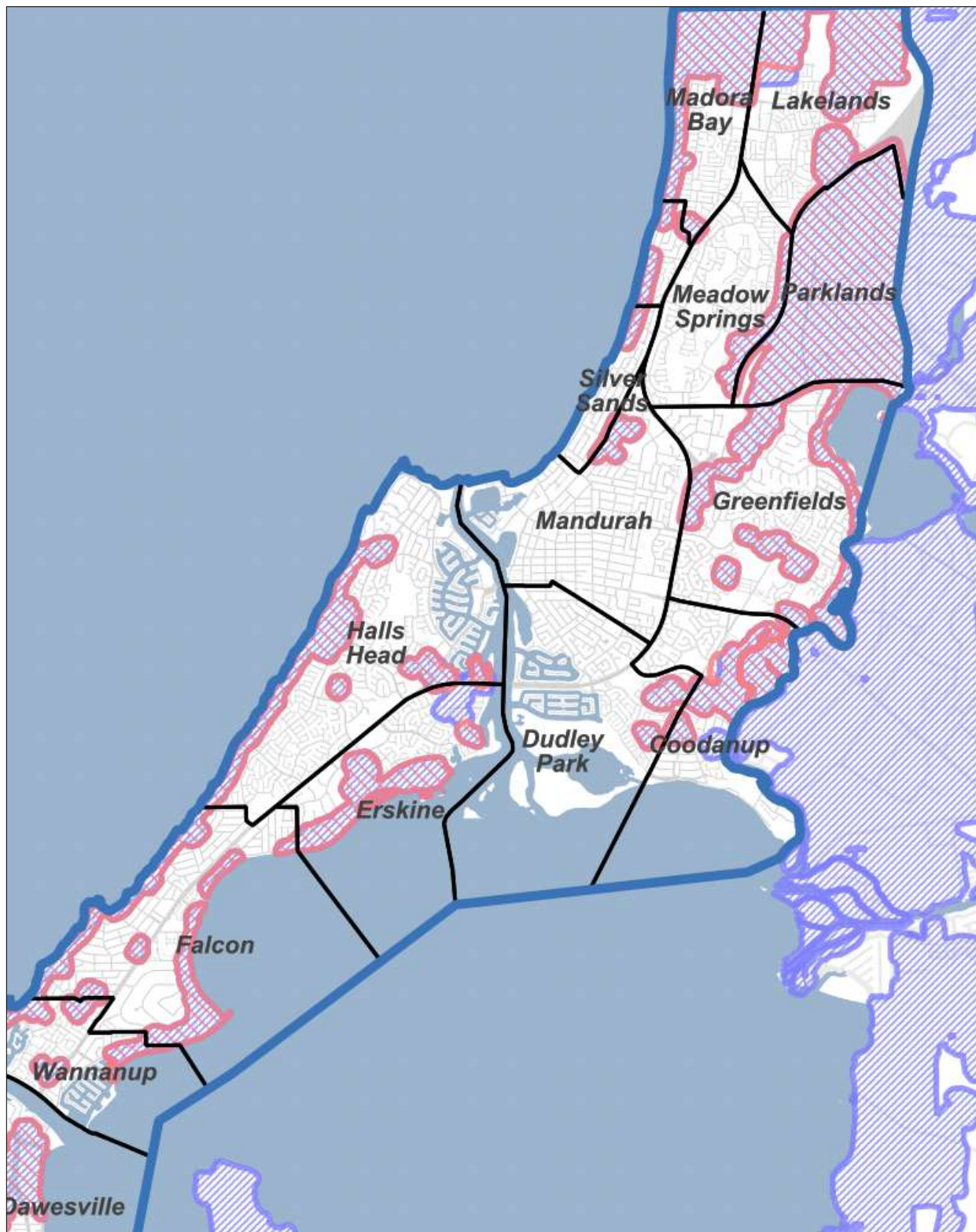
Vegetation Complexes of Mandurah



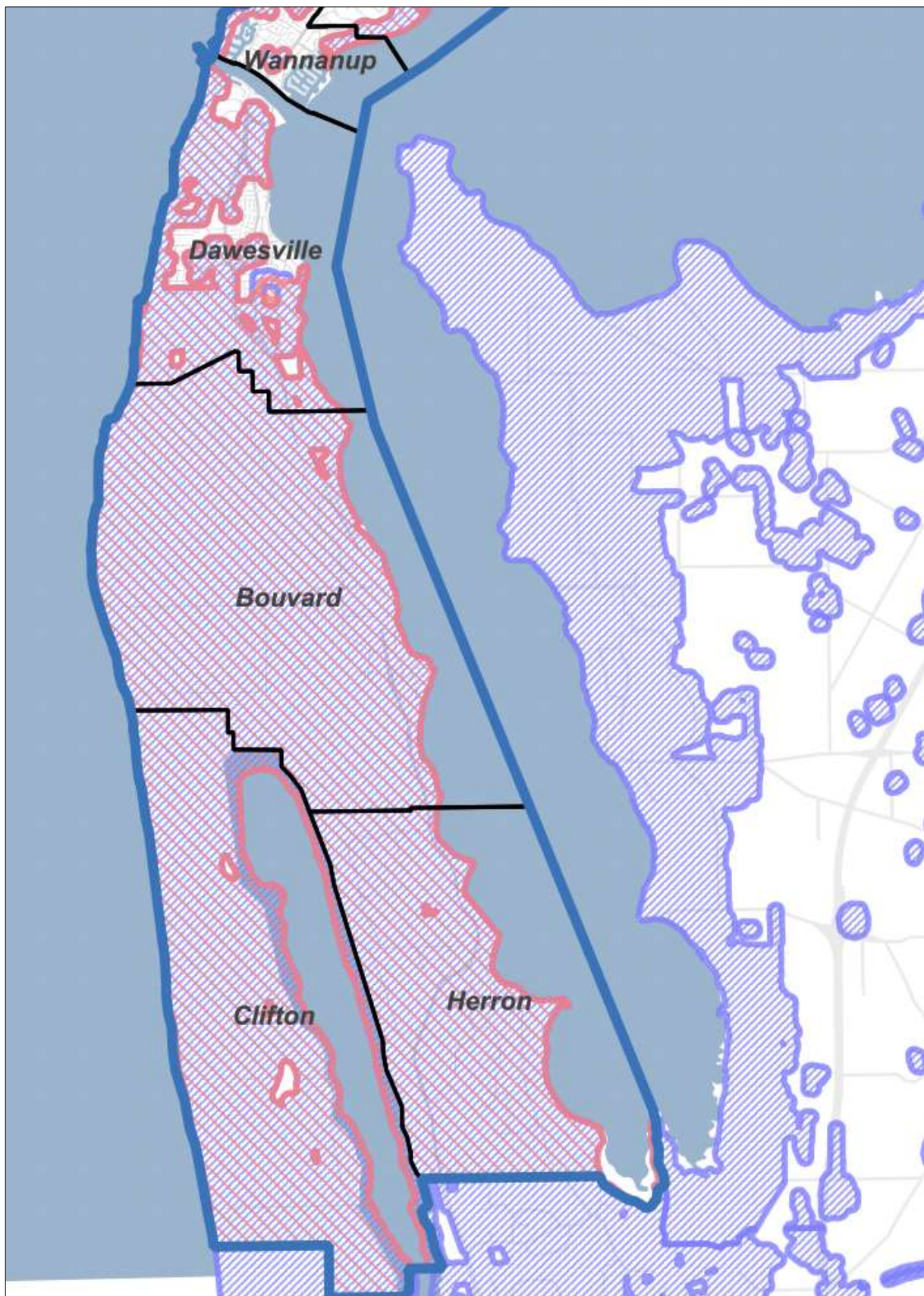
Soil Type Areas



Bushfire Prone Areas – Mandurah North to Dawesville Cut



Bushfire Prone Areas – Mandurah South to Dawesville Cut



Appendix 3 Asset Risk Register

Asset ID	Asset Category	Asset Sub Category	Asset Name	Location Description	Planning Area	Likelihood	Consequence	Risk Rating	Priority
MDHMDN095	Human Settlement	Special Risk and Critical Facilities	Goodstart Early Learning Centre	Child care centre in Greenfields	MDN	Likely	Moderate	High	3A
MDHMDN168	Economic	Commercial and Industrial	Commercial buildings Reserve Dr	Commercial buildings off Reserve Dr and Kulin Way in	MDN	Likely	Moderate	High	3A
MDHMDN176	Human Settlement	Residential	Gordon Rd residences Parklands	Residents along Gordon Rd and Mulga Dr	MDN	Possible	Major	High	3B
MDHMDN251	Human Settlement	Special Risk and Critical Facilities	Emergency Services Complex - Education Drive, Mandurah (21)	EDUCATION DRIVE MANDURAH 6210	MDN	Almost Certain	Catastrophic	Extreme	1A
MDHMDN252	Human Settlement	Special Risk and Critical Facilities	John Tonkin College MET Campus	John Tonkin College MET Campus	MDN	Likely	Major	Very High	2A
MDHMDN254	Environmental	Priority	Beacham Reserve, Coodanup	26 Broun Road, Coodanup	MDN	Almost Certain	Minor	High	3D
MDHMDS053	Human Settlement	Residential	Private Quail Rd	94 Quail Rd	MDS	Likely	Catastrophic	Extreme	1B
MDHMDS056	Human Settlement	Temporary Occupation	Old Coast Rd Bouvard Lots	Rural lots Old Coast Rd Bouvard	MDS	Likely	Catastrophic	Extreme	1B
MDHMDS058	Human Settlement	Residential	Clifton Downs Old Coast Rd	Clifton Downs Rd and Old Coast Rd lots	MDS	Likely	Minor	Medium	4C
MDHMDS060	Environmental	Locally Important	Lot 2657 Old Coast Rd Bouvard	Lot 2657 Old Coast Rd	MDS	Unlikely	Minor	Low	5C
MDHMDS061	Human Settlement	Residential	Southern Estuary Rd lots Herron	Southern Estuary Rd lots in Herron	MDS	Likely	Catastrophic	Extreme	1B

Asset ID	Asset Category	Asset Sub Category	Asset Name	Location Description	Planning Area	Likelihood	Consequence	Risk Rating	Priority
MDHMDS062	Human Settlement	Temporary Occupation	16 and 44 Hexham Close	16 and 44 Hexham Close in Herron	MDS	Unlikely	Major	Medium	4B
MDHMDS064	Environmental	Locally Important	Wetland Buffer Herron	Wetland Buffer in Herron	MDS	Unlikely	Minor	Low	5C
MDHMDS065	Human Settlement	Residential	2755-2835 Old Coast Rd Herron	Large lots along Old Coast Rd in Herron	MDS	Likely	Moderate	High	3A
MDHMDS066	Human Settlement	Residential	Lakeside Pwy lots Herron	Rural blocks on Lakeside Pathway in Herron	MDS	Likely	Major	Very High	2A
MDHMDS067	Human Settlement	Residential	Mount John Rd lots	Mt John Rd rural blocks in Herron	MDS	Likely	Catastrophic	Extreme	1B
MDHMDS068	Human Settlement	Residential	Bouvard Herron Estuary edge lots	Estuary Edge in Herron and Bouvard	MDS	Likely	Major	Very High	2A
MDHMDS069	Human Settlement	Residential	Bouvard Estuary Edge lots	Bouvard Estuary edge rural lots	MDS	Likely	Catastrophic	Extreme	1B
MDHMDS070	Human Settlement	Residential	Point Morfitt lots	Point Morfitt rural lots	MDS	Likely	Major	Very High	2A
MDHMDS071	Human Settlement	Residential	Ridgewood Dr Dawesville	Ridgewood Dr Dawesville rural lots	MDS	Likely	Major	Very High	2A
MDHMDS072	Human Settlement	Residential	Lot 7 Dunkeld Dr Herron	Lot 7 Dunkeld Dr	MDS	Unlikely	Major	Medium	4B
MDHMDS073	Human Settlement	Residential	Pinkett Close Dawesville	Pinkett Close residential blocks in Dawesville	MDS	Likely	Minor	Medium	4C
MDHMDS074	Human Settlement	Residential	Bonne Doone Grove residences	Off Wilderness Drive adjacent road reserve	MDS	Likely	Minor	Medium	4C
MDHMDS076	Human Settlement	Residential	Shoshone View Residences Dawesville	Shoshone View Dawesville	MDS	Likely	Major	Very High	2A

Asset ID	Asset Category	Asset Sub Category	Asset Name	Location Description	Planning Area	Likelihood	Consequence	Risk Rating	Priority
MDHMDS077	Human Settlement	Residential	Garden Rd Residences Dawesville	Garden Rd in Dawesville	MDS	Unlikely	Moderate	Low	5B
MDHMDS078	Human Settlement	Residential	Rainbow Way Yalgor Heights Dawesville	Residences along Rainbow Way and Yalgor Heights Dawesville	MDS	Almost Certain	Moderate	Very High	2C
MDHMDS079	Human Settlement	Residential	Jinatong Loop Warrangup West residences	Jinatong Loop along Western boundary of Warrangup Sedgely Reserve	MDS	Almost Certain	Moderate	Very High	2C
MDHMDS080	Human Settlement	Residential	Austin Rise Bryde Ct Residences Dawesville	Austin Rise and Bryde St residences in Dawesville	MDS	Almost Certain	Moderate	Very High	2C
MDHMDS085	Human Settlement	Residential	Dawesville east residences	Residences east of Dawesville east bushland reserves	MDS	Likely	Moderate	High	3A
MDHMDS086	Human Settlement	Residential	Dawesville west residences	Residences east of Dawesville east bushland reserves	MDS	Likely	Minor	Medium	4C
MDHMDS087	Human Settlement	Residential	Dawesville West northern residences	Residences north of Dawesville West Reserve	MDS	Likely	Moderate	High	3A
MDHMDS090	Economic	Commercial and Industrial	Lot Old Coast Rd	2711 Old Coast Rd Herron	MDS	Likely	Minor	Medium	4C
MDHMDS091	Human Settlement	Special Risk and Critical Facilities	Great Beginnings Child Care	Child care centre	MDS	Likely	Moderate	High	3A
MDHMDS092	Human Settlement	Special Risk and Critical Facilities	Dandyllion Day Care	1 Melros Rd	MDS	Likely	Moderate	High	3A
MDHMDS093	Human Settlement	Special Risk and Critical Facilities	YMCA Early Learning Centre	Child care centre in Falcon near Linville Reserve	MDS	Almost Certain	Moderate	Very High	2C
MDHMDS094	Human Settlement	Special Risk and Critical Facilities	Butterflies Play Centre	Child care centre near northern Cox Bay	MDS	Likely	Moderate	High	3A
MDHMDS096	Economic	Commercial and Industrial	721 Old Coast Rd	Quarry on Old Coast Rd	MDS	Likely	Minor	Medium	4C

Asset ID	Asset Category	Asset Sub Category	Asset Name	Location Description	Planning Area	Likelihood	Consequence	Risk Rating	Priority
MDHMDS098	Human Settlement	Residential	Small Estuary Rd lots Dawesville	Estuary Rd small lots in Dawesville	MDS	Likely	Moderate	High	3A
MDHMDS109	Human Settlement	Residential	Hazelmere residences Dawesville	Hazelmere residences surrounding Tambellup	MDS	Likely	Catastrophic	Extreme	1B
MDHMDS119	Human Settlement	Residential	Moorberg Enchantress residences	Enchantress Lane residences Dawesville	MDS	Almost Certain	Catastrophic	Extreme	1A
MDHMDS124	Human Settlement	Residential	Agonis Way Linville St residences	Agonis Way and Linville St residences around Agonis	MDS	Almost Certain	Major	Extreme	1C
MDHMDS149	Human Settlement	Residential	Carnarvon Way residences Erskine	Residences surrounding Carnarvon Way Reserve	MDS	Almost Certain	Catastrophic	Extreme	1A
MDHMDS198	Environmental	Locally Important	Gumnut Reserve Dawesville	Gumnut Reserve in Dawesville	MDS	Almost Certain	Minor	High	3D
MDHMDS218	Environmental	Locally Important	Enchantress Lane Bushland Dawesville	Part of Caddadup Reserve adjacent sporting complex in	MDS	Almost Certain	Moderate	Very High	2C
MDHMDS224	Environmental	Locally Important	Linville St Reserve Falcon	Linville St reserve in Falcon	MDS	Almost Certain	Minor	High	3D
MDHMDS248	Environmental	Locally Important	Carnarvon Way Reserve Erskine	Carnarvon Way Reserve in Erskine	MDS	Almost Certain	Minor	High	3D
MDHMDS253	Economic	Critical Infrastructure	Caddadup Water Treatment	1000L Old Coast Road, Dawesville	MDS	Almost Certain	Major	Extreme	1C

Appendix 4 Interim Treatment Schedule

Priority	Asset ID	Asset Name	Asset Category	Treatment Strategy	Treatment Type	Treatment Objective	Treatment Manager	Date Scheduled	Season	Year of Works
2A	MDHMDN252	John Tonkin College MET Campus	Human Settlement	Fuel Management	Mechanical Works	Lower the overall bushfire risk to the College and ESC	Department of Education	31/12/2019	Summer	19/20
1B	MDHMDS069	Bouvard Estuary Edge lots	Human Settlement	Fuel Management	Mechanical Works	Reduce ignition risk and fuel loads. Slashing, removed dead wood, reduce ladder fuels to 2m within 10m of verge Treatment ID 3756 Asset ID MDHMDS069	Local Government	31/01/2020	Summer	19/20
						Reduce ignition risk and fuel loads. Slashing, removed dead wood, reduce ladder fuels to 2m within 10m of verge Treatment ID 3758 Asset ID	Local Government	31/12/2019	Summer	19/20
1B	MDHMDS067	Mount John Rd lots	Human Settlement	Fuel Management	Mechanical Works	Slashing, mulching and pruning dead dying vegetation on verges of Mount John Road Treatment ID 3760 Asset ID	Local Government	31/12/2019	Summer	19/20
1A	MDHMDS119	Moorberg Enchantress residences Dawesville	Human Settlement	Fuel Management	Prescribed Burning	Burn 1 Grass tree burn to reduce fuel load and flame height for future burning Burn 2 Running burn to reduce ground to 8-12 t/Ha Ref ID Treatment ID 3727	Local Government	31/12/2019	Summer	19/20
2C	MDHMDS080	Austin Rise Bryde Ct Residences Dawesville	Human Settlement	Fuel Management	Prescribed Burning	Undertake grass tree burn in Cell 1, reduce skirt and ground fuel (up to 5m), autumn/spring	Local Government	31/12/2019	Summer	19/20

Priority	Asset ID	Asset Name	Asset Category	Treatment Strategy	Treatment Type	Treatment Objective	Treatment Manager	Date Scheduled	Season	Year of Works
						burn. Treatment ID 3761 Asset ID				
1C	MDHMDS253	Caddadup Water Treatment	Economic	Fuel Management	Mechanical Works	Increase separation distance between vegetation and the boundary fencing of the Water Treatment facilities by mulching 10m vegetation to a depth of 10mm. This will result in more than 30m clearance between vegetation and infrastructure and create additional access. Mulching vegetation up to 10m from the fence line along the northern side onl due to slope and access. Note: Existing vegetation is quite thick.	Local Government	30/06/2020	Winter	20/21
3B	MDHMDN176	Gordon Rd residences Parklands	Human Settlement	Preparedness	Fire Access Road / Track(s)	Stabilize existing 4m firebreak to support heavy duty fire appliances Treatment ID 3750 Asset ID MDHMDN176	Local Government	30/06/2020	Winter	19/20
2C	MDHMDS078	Rainbow Way Yalgor Heights Dawesville	Human Settlement	Fuel Management	Mechanical Works	Increase separating distance and fuel load, 10m to the southern boundaries. Trim ladder fuels to 2m, prune overhanging branches, slash and mulch. Asset ID MDHMDS078 Treatment ID 3729	Local Government	31/12/2019	Summer	19/20
1C	MDHMDS124	Agonis Way Linville St	Human Settlement	Fuel Management	Mechanical Works	Increase separation distance. Reduce ground fuel loads within the reserve and verge to 8-10t/Ha. Slash/mulch, trim	Local Government	31/12/2019	Summer	19/20

Priority	Asset ID	Asset Name	Asset Category	Treatment Strategy	Treatment Type	Treatment Objective	Treatment Manager	Date Scheduled	Season	Year of Works
		residences Wannanup				dead/dying ladder fuels to 2m from ground. Treatment ID 3745 Asset ID				
2C	MDHMDS218	Enchantress Lane Bushland Dawesville	Environmental	Fuel Management	Prescribed Burning	Reduce fuel load in 70% of grass tree skirts (Xanthorrhoea) Reduce surrounding ground fuel <5m to 8t/Ha Treatment ID 3727	Local Government	31/05/2020	Autumn	19/20
						Reduce ground fuels to 8 t/Ha Burn 2 - Running burn Treatment ID 3779	Local Government	30/06/2020	Winter	19/20
			Human Settlement	Preparedness	Fire Access Road / Track(s)	Install limestone fire access track to improve accessibility Treatment ID 3617 Ref ID	Local Government	31/12/2019	Summer	19/20
3D	MDHMDS198	Gumnut Reserve Dawesville	Environmental	Fuel Management	Mechanical Works	Manual reduction of ground fuel loads in the western portion of the public open space. Cost is indicative based on previous works.	Local Government	30/06/2020	Winter	19/20
3A	MDHMDN168	Commercial buildings Reserve Dr Mandurah	Economic	Fuel Management	Mechanical Works	Slash/mulch 10m buffer inside fence line, reducing ladder and ground fuels. Treatment ID 3555 Asset ID MDHMDN168	Local Government	30/06/2020	Winter	19/20
3D	MDHMDS248	Carnarvon Way Reserve Erskine	Human Settlement	Preparedness	Fire Access Road / Track(s)	Install gate at Cervantes Drive and improve access from Cul De Sac	Local Government	31/01/2020	Summer	19/20
						Reinstate 4m x 4.2m fire access track. Treatment ID Asset ID	Local Government	31/12/2019	Summer	19/20

Appendix 5 Local Government-Wide Controls, Multi-Agency Treatment Work Plan

Control		Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
1	City of Mandurah Bushfire Risk Management Plan 2018 - 2022	Bushfire Risk Management Plan extreme and very high risks	DFES & Local Government	DFES and landowners/managers	Implementation of risk mitigation treatments
		Maintain and refine BRM Plan	Local Government	DFES and landowners/managers	Maintenance of Bushfire Risk Management Plan and BRMS. Bushfire Risk Management Plan performance monitoring and reporting progress to local government
2		Issue separate treatment plans to property owners to reduce risk and increase awareness	Local Government		Implementation of treatments, ensuring compliance, monitoring risk, reporting on progress
3	Bush Fire Act 1954	Annual Firebreak Notice published	Local Government		Ensuring compliance with Annual Fire Control Notice, Fire Management Plans and other required works (i.e. issuing of infringement notices, work orders, abatement notices and education letters)
		Review of Annual Firebreak Notice		BFAC members	Review the effectiveness of the Annual Fire Control Notice
		Annual inspection target			Implementation of any changes to increase effectiveness and volume of inspections
		Burning on Crown Lands		DFES	Continued liaison with land managers to ensure mitigation treatments are applied where required
		Total fire bans, prohibited and restricted burning times		DFES	Enforcing restrictions where required or deemed necessary
4	Bushfire Brigades Amendment Local Law 2018	Mechanism to perform works related to bushfire mitigation treatments	Land owners/managers		Similar contribution to bushfire risk mitigation as the Bush Fire Act 1954
5	Bushfire Prevention and Control Policy 2002	Reviewed annually in line with Annual Fire Notice			See Appendix 6

	City of Mandurah Town Planning Scheme No.2 (TPS2)	Mechanism to perform works related to bushfire mitigation treatments	Local Government and Land Managers	-	In accordance with scheme text, property owners can implement strictly defined types of bushfire mitigation on their property based on zoning.
Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments	
State Planning Policy 3.7: Planning in Bushfire Prone Areas Planning and Development (Local Planning Scheme) Regulations 2015 Australian Standard 3959 – <i>Construction of Buildings in Bushfire-Prone Areas</i>	Implementation and compliance with SPP3.7 and the Bushfire Protection Criteria of the <i>Guidelines for Planning in Bushfire Prone Areas</i> where required	Local Government	WAPC	State planning framework and local planning schemes, implementation of appropriate subdivision and building standards in line with DFES, WAPC and Building Commission policies, guidelines and standards	
CoR Engineering and Parks Services and Compliance and Emergency Liaison annual works	Management of road reserves, public open space and other local government owned lands.	Local Government	-	Include the reduction of fuels through various annual works programs such as slashing, clearing, burning or chemical application. The installation of firebreaks.	
DFES UCL/UMR land management	Preparedness, mitigation work conducted and lands owned by DoL and managed by DFES	DFES	LG, Local Brigades		
Department of Biodiversity, Conservation and Attractions Annual Prescribed Burn Program	DBCA have an indicative burn program that is published on their website. Yearly plans are available.	DBCA	DFES, LG	Plans can be accessed via the DBCA website.	
Department of Biodiversity, Conservation and Attractions mitigation works	DBCA conduct mulching and other mechanical treatments to reduce fuel load or provide fire access.	DBCA	DFES, LG	No formal plan exists however; works are completed as required, upon request or when identified.	

Control		Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
11	Water Corporation Bushfire Risk Management Program	Water Corporation is the custodian of a Bushfire Risk Management Plan that identifies areas for risk reduction treatment.	Water Corporation	DFES, LG	High to Extreme risk areas are identified and treatments planned. Treatments and risk assessments are available through Water Corp Bushfire Risk Management department. Some risks have been identified in the City of Mandurah for treatment.
12	Western Power annual asset inspection and vegetation management program	Western Power is the custodian of a Bushfire Risk Management Plan that identifies and prioritizes areas for bushfire risk reduction treatments to be implemented.	Western Power, Private Landowners	DFES, LG	Areas of the City of Mandurah have been identified as high bushfire risk by WP resulting in a prioritized mitigation program that aims to complete asset inspection and vegetation management works within a time period annually to reduce risk.
		Tree and powerline Safety Information			
13	Public Transport Authority Bushfire Management Strategy	Strategy outlines the PTA's intended future approach to bushfire risk reduction across PTA owned, managed or leased land to reduce the risk of bushfire to assets.	Public Transport Authority	DFES, LG	Vegetation within rail corridors is managed to reduce bushfire hazards. Fuel reduction measures include vegetation clearing, weed control, vegetation slashing and other actions as identified in Bushfire Management Plans submitted to LG (access etc).
14	Main Roads	Main Roads have road 'Design Objectives', 'Design Requirements' and 'Design Considerations' that incorporate management objectives for landscaping and revegetation zones.	Main Roads	DFES, LG	The management objectives for Main Roads landscaping and revegetation zones includes removal of hazards, maintaining clearances to utilities, weed control and fire control. All of which may be acknowledged and utilised when implementing bushfire risk reduction strategies.
15	State-wide arson prevention programs	Police infringement and reward schemes to prevent arson. Also various awareness campaigns and available information packages	DFES, WAPOL	Local Government	Application of the <i>Bush Fire Act 1954</i> , Criminal Code 444 & 554. Programs developed by DFES and WAPOL such as Bushfire season 'Are You Ready?' Campaign and Bushfire Action Month. Prepare Act Survive information package.
16	Bushfire Ready Groups and Community Education	Community workshops and targeted education programs	Local Government	-	City of Mandurah Officers participate as require; disseminating information and educating residence.



POLICY

BUSH FIRE PREVENTION AND CONTROL

(Bush Fires Act 1954)

Policy Objective:

To provide advice on all aspects of preparedness, prevention and the management of bush fires on properties within the City of Mandurah.

Policy:

The City of Mandurah (the 'City') is committed to formulating and imposing appropriate fire prevention measures necessary to provide a safe environment for the community on properties including rural, urban, occupied and unoccupied land. In achieving this, the City has implemented the following measures:

1. FIRE HAZARD REDUCTION AND FIRE BREAK INSTALLATION:

- 1.1 Council may, in accordance with section 33 of the *Bush Fires Act 1954* (the Act) issue and publicise annually to all landowners requisitions necessary for the reduction of fire hazards within the City.
- 1.2 Delegated Authority has been granted to the Chief Executive Officer by Council to approve the first and final Fire Break and Fuel Hazard Reduction Notice (The Notice) annually, unless substantial changes are recommended by Council's Bush Fire Advisory Committee. Recommendations for substantial alterations to The Notice shall be submitted to Council for consideration of adoption.
- 1.3 The following requisitions have been adopted by Council as a minimum requirement for landowners for the reduction of fire hazards on their property. The below mentioned fire hazard reduction must be complied with by or on the 17 November annually and maintained until 31 May:

➤ **Occupied or Unoccupied Land Less than 4000m²**

Where the area of land is less than **4000m²** remove all flammable material on the land except living standing trees, from the whole of the land to a height of no longer than 4 centimetres by either mowing, slashing, ploughing, cultivating, scarifying, chemical spraying (followed by slashing down to 4 centimetres) or other approved method by an officer of Council authorised for this purpose. **A four (4) metre fire break is not acceptable.** (Note: Properties with dense vegetation will also need to

be thinned out to reduce any significant fire risk to the satisfaction of the City's authorised bush fire control officer).

➤ **Occupied or Unoccupied Land 4000m² and Over**

When the area of land is **4000m²** and over, provide a trafficable mineral earth firebreak at least four (4) metres wide, with a vertical height clearance of 4.2 metres;

- Immediately inside all external boundaries on the land;
- Immediately surrounding all outbuildings erected on land;
- Immediately surrounding haystacks, fuel storage or other flammable substances or material.

Where land is subject to an approved Fire Management Plan the management plan must be fully complied with for the site.

1.4 **ASSET PROTECTION ZONES**

In all areas noted as being within 100m of Bush Fire Prone Vegetation as designated by the Fire and Emergency Services Commissioner, the installation and maintenance of Asset Protection Zone (APZ) are recommended.

Asset Protections Zones in these areas are recommended to include:

- A 20 metre asset protection zone (reduced fuel load) from the walls of any building or infrastructure unless otherwise approved in a Fire Management Plan.
- Reticulated gardens shall be maintained to a height no greater than .5 metre (50 cm).
- Loose flammable material within the APZ should be removed to reduce the fuel load to less than 2 tonnes per hectare and this is to be maintained to this level.
- Wood piles to be stored at least 10 metres from the building.
- Maintenance of a minimum 2 metre gap between trees and shrubs any building or infrastructure.
- Ensuring that no trees overhang any building or infrastructure.
- Prune lower branches of trees within the APZ (up to 2 metres off the ground) to stop a surface fire spreading to the canopy of the trees.
- Trees or shrubs in the APZ are to be cleared of any dead material.

On all land 4000m² and greater Asset Protection Zones in these areas are required to:

- Maintain a minimum 2 metre gap between trees and shrubs and dwelling; and
- Ensure that no trees overhang any dwelling.

The City's Authorised Bush Fire Control Officers may issue a request for works to be completed for the failure to undertake required Asset Protection Zone works and where works are not completed an infringement notice may be issued.

Contractors will not be requested to undertake works on the owner's behalf in relation to Asset Protection Zone non-compliance. Any change in enforcement approach in this regard is to be endorsed by Council.

Authorised Bush Fire Control Officers may issue a variation from Asset Protection Zone requirements where it is considered that adequate risk mitigation measures have

been implemented, such as the reduction of fuel loads and appropriate management of understorey vegetation.

Applications can be made to the City to remove trees or vegetation in order to create an Asset Protection Zone within a tree preservation area as designated in the City's Town Planning Scheme No 3.

These requirements are the minimum standard. Additional requests may be made in accordance with the relevant section of the Bush Fires Act 1954 by the City's authorised Bush Fire Control Officer.

- 1.5 Annual property fire break and fuel hazard reduction inspections of all urban, rural occupied and unoccupied land by authorised Bush Fire Control Officers will officially commence on the 18 November each year.
- 1.6 Variation to the City's requirements: If a landowner considers for any legitimate reason it impractical to clear firebreaks as required by The Notice, or if natural features are considered to render firebreaks unnecessary, application may be made in writing to the City or its authorised Bush Fire Control Officers, not later than 1 November of each year for alternative locations, or other method of fire prevention on the land.

The City's authorised Bush Fire Control Officers may apply an approval to the variation for a period of up to 3 years where appropriate. Properties must be maintained each year in accordance with the approved variation.

If permission is not granted, the requirements of The Notice must be complied with. Any major fire hazard reduction request which can not be resolved between the applicant and an authorised Bush Fire Control Officer may be referred to the Chief Bush Fire Control Officer for determination.

- 1.7 The City or its authorised Bush Fire Control Officers may, in accordance with section 33 of the Act, arrange for a contractor, workers, machinery or other equipment or workforce necessary to clear land found in contravention of subsection 1.3. The City's contractors may be requested to undertake remedial compliance works to properties found to be in contravention of subsection 1.3.
- 1.8 Landowners may be served with notice of the contravention and an infringement notice may be issued in accordance with the Act.
- 1.9 Landowners shall be liable for the costs associated with the hazard reduction clearing on their land as stipulated in subsection 1.7 of this policy and those costs shall remain as a debt against the property until paid in full.

2 BURNING PERIODS

2.1 Restricted Burning Period:

The restricted burning period, pursuant to section 18 of the Act shall be between 1 April and 30 November inclusive each year.

2.2 Prohibited Burning Period:

The prohibited burning period, pursuant to section 18 of the Act shall be between 1 December and 31 March inclusive each year.

2.3 Limited Burning Times:

Has the same meaning as 'Restricted Burning Period' where a Permit to Burn is required.

3 COPEN AIR FIRES

Council has resolved to prohibit open air fires lit for the purpose of camping or cooking within the district unless specifically approved by the Chief Bush Fire Control Officer in writing.

4 BURNING OF GARDEN REFUSE

Council has resolved to prohibit the burning of garden refuse or rubbish within the district of Mandurah that would otherwise be permitted under Section 24F of the *Bush Fires Act 1954*. This prohibition applies to all land zones urban residential under the City of Mandurah Town Planning Scheme No. 3, during the "Restricted Burning Period". The effect is that the burning of garden refuse either in an incinerator or on the ground in urban zoned areas is prohibited at all times of the year. The following exemptions apply:

Land zoned rural residential under the City of Mandurah Town Planning Scheme No. 3, and on all land 4000m² and greater. Any other exemption is based on an assessment of the hazard by a City authorised Bush Fire Control Officer.

These exemptions are restricted to the declared "Restricted Burning Times" as mentioned above and a "Permit to Burn" will be required during these dates. No burning is permitted during the 'Prohibited Burning period' as mentioned above.

Burning Permits may be issued for the entirety of the "Restricted Burning Period" season with appropriate conditions imposed.

These conditions include the following:

- Properties of area less than 2 hectares to burn 1m³ of refuse at one time.
- Properties of area 2 hectares or greater are permitted to burn no more than 3m³ of refuse at one time.

Originating Section:

Ranger Services

Relevant Legislation:

Bush Fires Act 1954

Reviewer:

Coordinator Ranger Services

Manager Statutory Services

Delegated Authority:

DA-EMS 01 Prohibited Burning Times

DA-EMS 02 Bush Fires Act 1954

DA-DBC 02 Planning/Building Application Fees

Approved:

Minute G.28/06/02, 18 June 2002

Reviewed:

Minute G.43/12/09, 15 December 2009

Minute G.31/6/12, 26 June 2012

Minute G.25/2/14, 25 February 2014

Minute G.25/3/15, 24 March 2015

Minute G.22/6/17, 13 June 2017

Minute G.19/4/19, 30 April 2019

Other References:

Previous reference – CS-RA 01

References

- Glasser, R. (2019) Australian Strategic Policy Institute, *Preparing for the Era of Disasters*
- Australian Standards 2009, Construction of buildings in bushfire-prone areas, AS 3959.2009.
- Strategen Environmental Consultants (2015), *Bushfire Risk Management Plan – City of Mandurah Reserves*
- The Department of Fire and Emergency Services (2014). *Visual Fuel Load Guide for Mandurah*
- The Department of Fire and Emergency Services 2015, *Bushfire Risk Management Planning – Guidelines for preparing a Bushfire Risk Management Plan*, November 2015.
- State Government of Victoria, *Overall Fuel Hazard Assessment Guide – Fire and Adaptive Management*, 4th Edition July 2010
- Australian Government Bureau of Meteorology, *Climate Statistics for Australian Locations* available at: <http://www.BOM.gov.au>. Accessed May 2019.
- Beard JS. (1990). *Plant life of Western Australia*. Kangaroo Press. Kenthurst, NSW.
- Churchward, H.M. and McArthur, W.M. (1980). *Landforms and Soils of the Darling System*. In: Atlas of Natural Resources, Darling System, Western Australia. Perth, Pinjarra and Collie Sheets. Department of Conservation and Environment, Western Australia.
- Community Profile - *City of Mandurah*. Available at: profile.id.com.au. Accessed April 2019.
- DPaW (2013). *Carnaby's Cockatoo (Calyptorhynchus latirostris) Recovery Plan*.
- Hedde, E.M., Loneragan, O.W., and Havel, J.J. (1980). *Vegetation of the Darling System in Atlas of Natural Resources, Darling System, Western Australia*. Department of Conservation and Environment, Perth, Western Australia.
- Department of Aboriginal Affairs. (2015). Aboriginal Heritage Inquiry System. Available at: <http://maps.dia.wa.gov.au/AHIS2>. Accessed January 2015.
- Department of Environment and Conservation (2010). *Definitions, categories and criteria for threatened and priority ecological communities*. Department of Environment and Conservation, Perth.
- Department of the Environment (2015). *Protected Matters Search Tool*. Available at <http://www.environment.gov.au/epbc/pmst>. Accessed January 2015.
- Department of Environment and Conservation (2006). *Acid Sulphate Soils Risk Mapping – Swan Coastal Plain*. Department of Environment and Conservation, Perth