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INTEGRATED URBAN PLANNING FOR NATURAL HAZARD MITIGATION

Including Risk Scenario Assessments for Bushfire Risk in Urban Edge Expansion Processes in Victoria

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EXECUTIVE SUMMARY

Urban edge development is one of the most rapidly changing risk-scapes in Australian settlements, and the domain in which the most effective treatments could apply. However, risk modelling in these settings remains relatively limited. Many challenges exist to appropriate risk management in the form of logical sequencing of inputs and decision points, allowing for testing of risks that are likely to exist in the future remain. Risk-sensitive decision-making deliberately considers and avoids, treats or accepts risk with a reasonable knowledge of likely future scenarios. Currently, formal planning processes do not adequately assess risks comprehensively. It is common for future growth area identification processes to progress significantly, well before adequate risk assessment. This sequencing places excessive pressure on later stages of land rezoning, scheme amendments and permit processes.

The inclusion of critical decision criteria, requirements for scenario testing, allocation of roles and establishment of suitable forums can significantly improve future growth risk assessments. Various parties need to be provided with appropriate legal standing, responsibilities and powers to facilitate these processes. Next are the key findings of this report:

1. Future Growth should be considered and assessed as a range of possible scenarios;
2. Advisory Committees considering Logical Inclusions and other changes to the Urban Growth Boundary should include mandatory requirements to assess risks;
3. The Victorian Parliament should be required to consider future risks in assessing future Edge Development;
4. A broad range of organisations, including local councils, CFA, EMV and the VPA should be part of meaningful scenario assessment as part of designing Metropolitan Strategies;
5. Developers should be required to take on reasonable responsibility for the consequences associated with their projects;
6. Statutory requirements should stipulate scenario testing and risk assessment as part of Metropolitan Strategy formulation
7. Parliament of Victoria, Ministers, VPA, EMV, CFA and Local Councils should be required/allowed to contribute to regional fire management and growth plans; and, in turn, required to consider risk scenarios in urban planning processes, including scheme amendment and permits.
8. Planning Panels assessing Planning Scheme Amendment Proposals should be required to consider risk scenarios in urban planning processes.
9. A range of procedural, practice guidance, training and statutory modifications are required across a range of administrative and professional facilitators to achieve the above.

INTRODUCTION

This report is the third in a series produced for the BNH-CRC-funded project Integrating Urban Planning and Natural Hazard Mitigation. The first report constituted a theoretical exploration of integration between urban planning and emergency management supported by an overarching understanding of national and state contexts for these two fields of inquiry and practice, with a focus on the states of Victoria and South Australia. This report generated a preliminary framework used to subsequently interrogate a series of urban-planning-related recommendations from royal commissions of inquiry and reviews targeting natural-hazard-related events in the past ten years, summarised in the second report.

Building on the preliminary framework of integration previously developed, this current report presents the development of an analytical framework for assessing integration between urban planning and emergency management arrangements and practice and its application in a real case in the state of Victoria. Findings presented in this report serves as the basis for the analysis of the South Australian case of integration in a moment when its planning system is under considerate reforms. A separate report containing findings from this subsequent analysis is to be submitted next.

RESEARCH APPROACH

This report is an output of the BNH-CRC Integrated Urban Planning for Natural Hazard Mitigation project. While it contributes to addressing the broader project objectives, it does focus on the following project question, sub-questions and milestone.

PRIMARY QUESTION

What are the limits and potentials of integrated urban planning for Bushfire hazard mitigation in Australia in Melbourne's urban edge change processes?

METHODOLOGICAL SCOPE

This report builds on the work developed in previous stages of this project[1], particularly the development of an analytical framework for assessing the integration of urban planning and natural hazard mitigation.

Conversion of this framework into a diagram facilitated the undertaking of the research by mapping connections between ***urban planning treatments of risk***; ***urban planning tools***; and ***elements of an approach to integration***. Synthesis and reframing of these elements allowed contextualisation. This process of reframing, synthesising and contextualising the analytical framework was guided by a complex-adaptive-systems approach.

As a result, the analytical framework was expanded to include four categories of urban development processes that can help determine natural hazard disaster risk, namely: edge development, infill development, redevelopment (for adaptation) and existing (or legacy) development (see Figure 1).

FIGURE 1. PROPOSED CATEGORIES OF URBAN DEVELOPMENT PROCESSES AFFECTING NATURAL HAZARD DISASTER RISK

Edge development is understood here as development occurring at the urban/rural interface, while infill development refers to development occurring within established urban areas through rebuilding for higher density or building in vacant lots. Redevelopment implies retrofitting existing development to attend to contemporary needs while existing development refers to legacy built-form that continue to be utilised for their original purposes, have been vacated or are now being utilised for new purposes. These are legacy because they may or may not have been adapted to current building standards and may or may not be undergoing maintenance of their original structures. Heritage listing and specific planning controls may be limiting their redevelopment or demolition for infill development that could result in higher density.

This project recognises these development processes as four significant domains in which urban planning can operate and influence. The specific characteristics

[1] *Practical and Theoretical Issues: Integrating Urban Planning and Emergency Management* and *Australian Inquiries into Natural Hazard Events: Recommendations relating to urban planning for natural hazard mitigation* (2009-2017).

of any of these four domains (development processes) of urban planning influence imply ***that urban planning treatments of risk*** need to be tailored to these processes to be effective.

The framework was further expanded by reframing and synthesising the list of ***elements of an approach to integration***, allowing the identification of five types of implementation processes (see Figure 2). These implementation processes are understood here as being the mechanisms through which urban planning treatments can apply to specific development processes.

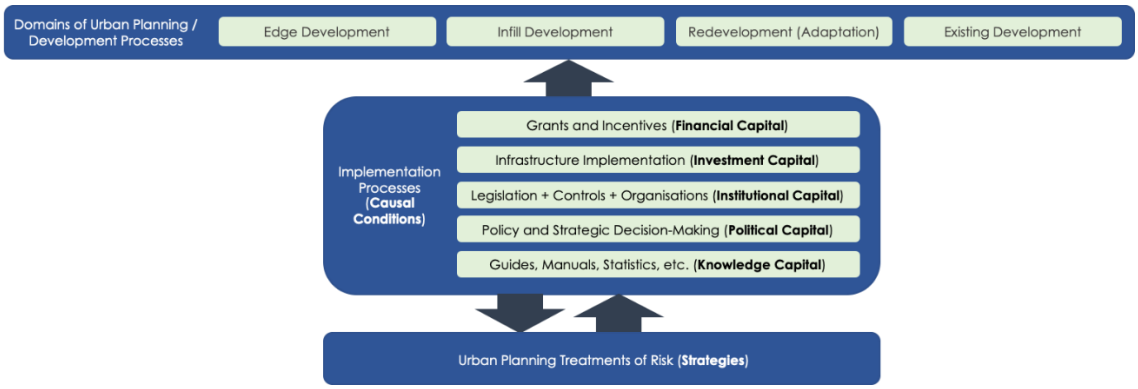

FIGURE 2. IMPLEMENTATION PROCESSES LINKING URBAN PLANNING TREATMENT OF RISKS AND ASSOCIATED DEVELOPMENT PROCESSES

The diagram above illustrates five key implementation processes:

- Grants and incentives (or the application of financial capital)
- Infrastructure Implementation (or the application of investment capital)
- Legislation, Controls and Organisations (or the application of institutional capital)
- Policy and Strategic Decision-Making (or the application of political capital)
- Guides, Manuals, Statistics, News (or the application of knowledge capital)

These implementation processes are understood here as the bridge between urban planning's complex set of diverse priorities and their influence on development processes in human settlements. They are also acknowledged here as taking place in arenas where complex networks of organisations can act and where the lack of integration in pursuing individual, organisational goals could lead to overlapping action, gaps and potentially conflicting agendas. These organisations can have mandates in urban planning or emergency management or other fields such as healthcare, transport, environment, education, police and state emergency services (see Figure 3).

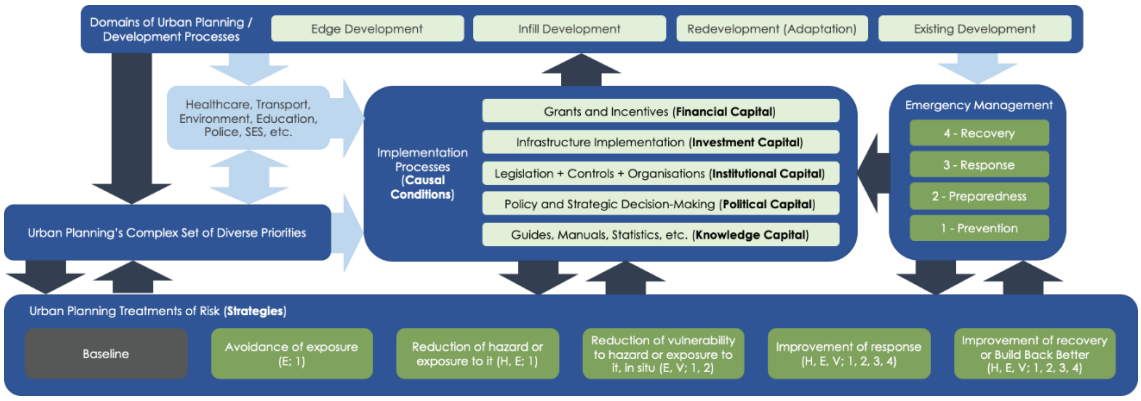

FIGURE 3. THE COMPLEX ORGANIZATIONAL CONTEXT INFLUENCING THE TRANSLATION OF URBAN PLANNING TREATMENTS OF RISK

This report focuses on developing understandings of these processes, their actors and roles, of when integration is already taking place or it could/should occur.

The analytical framework (see Figure 4) also recognises that different development planning processes result in evolving human settlements portraying different combinations of natural and built environments. It understands these settlements as comprising spatially arranged social-ecological interactions driven by local self-organisation and state regulation. The way these interactions manifest can help shape specific hazards, a certain level of exposure and a degree of vulnerability/resilience that, together, inform a particular risk profile. These settlements can also be understood to portray a specific social and natural capital that could be increased to build local resilience to hazards. The use of nature-based solutions is an example of the increase of focus on natural capital while supporting community engagement and cohesion for natural hazard mitigation could be seen as the use of social capital for disaster risk reduction.

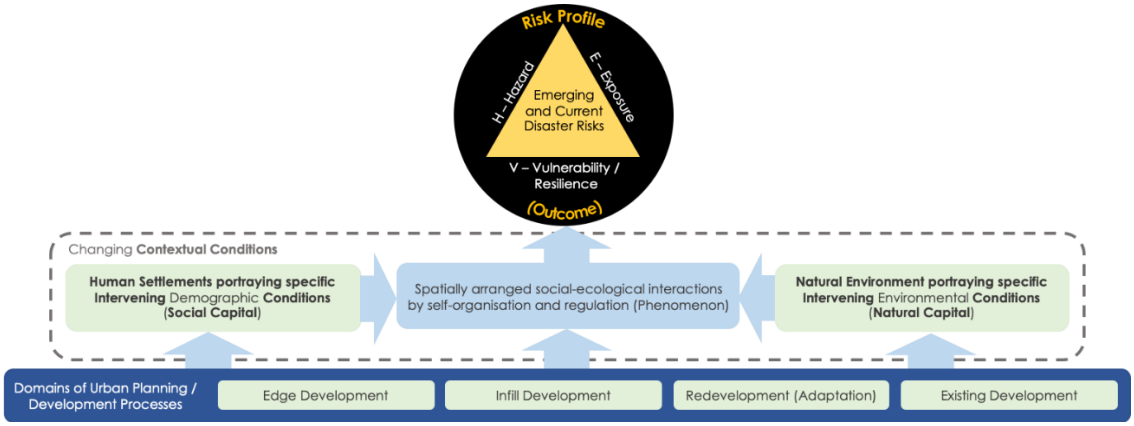

FIGURE 4. SOCIAL-ECOLOGICAL INTERACTIONS EMERGING FROM DEVELOPMENT PROCESSES LEADING TO SPECIFIC RISK PROFILES

Risk profiles can be perceived and translated into disaster risk reduction strategies by different fields and agencies in different ways. In the case of Urban Planning, the complex set of diverse priorities (see Figure 5) including house affordability and economic growth, can dilute the effective translation of risk assessment into strategies and action.

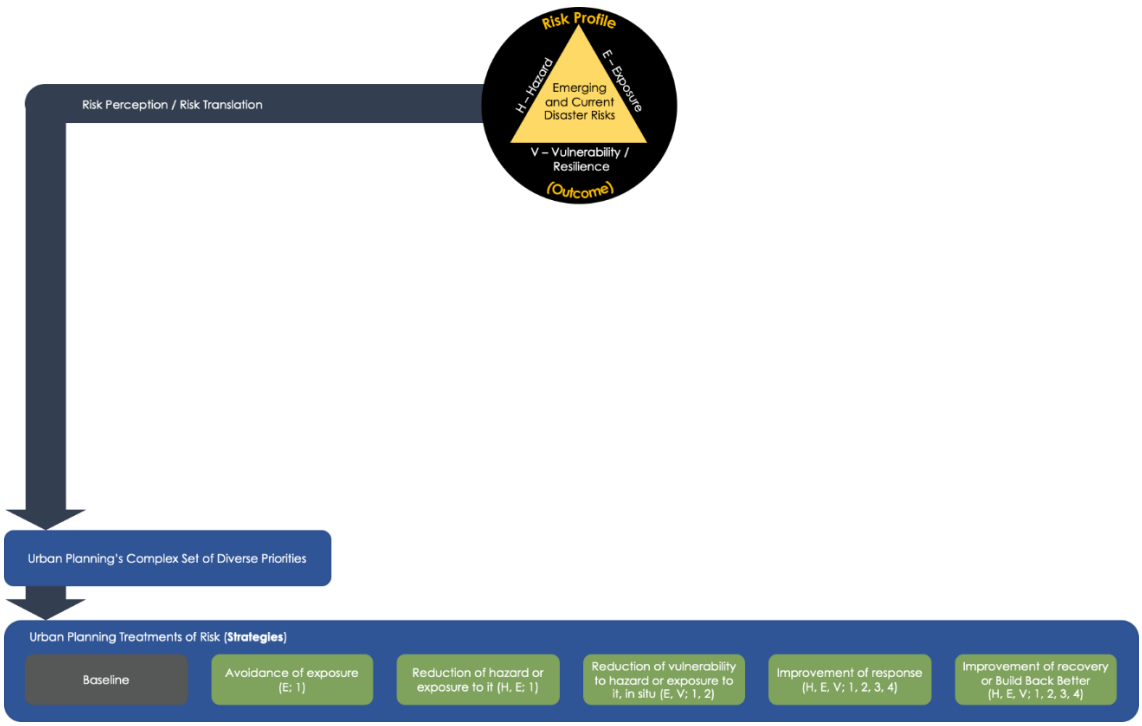

FIGURE 5. RISK PERCEPTION AND TRANSLATION FILTERED DOWN BY URBAN PLANNING'S COMPLEX SET OF DIVERSE PRIORITIES

The diagram also illustrates that five categories of urban planning treatments of risk can implement urban planning strategies for disaster risk reduction.

Avoidance of exposure is often considered the most effective approach to risk reduction because it addresses the spatial overlapping of potential hazards and vulnerable elements such as people or assets. Through this treatment, houses and infrastructure would not be built in bushfire-prone areas in the first place, eliminating risks from the start.

Reduction of hazard or exposure in situ refers to localised actions that reduce exposure in the immediate surrounds of the elements at risk, such as building firebreaks or conducting fuel reduction burns around houses.

Reduction of vulnerability can be understood as reducing the impacts a hazard is likely to have on any element at risk by modifying or improving them. For example, houses can be built of noncombustible and non-heat impacted materials so that exposure to heat, flame ember and fire weather conditions will not adversely impact it or those sheltering within.

Improvement of response refers to facilitating better mechanisms that aid firefighting, sheltering or evacuation as appropriate. Examples include the provision of adequate water on-site for fire fighting, roads allowing fire truck access, space around buildings for firefighting and signage showing the location of water and access. *Improvement of recovery* includes establishing a range of recovery mechanisms in advance of events to aid recovery, as well as ensuring risk reduction in recovery and rebuilding processes.

Finally, the diagram suggests five processes to implement these treatments of risk. It also points out the influence of these processes in the shaping of these same treatments.

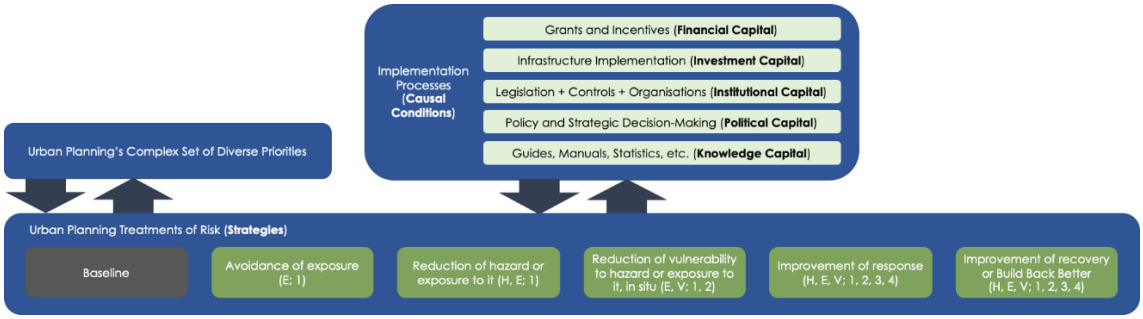

FIGURE 6. MAJOR CATEGORIES OF URBAN PLANNING TREATMENTS OF RISK AND THEIR RELATION TO IMPLEMENTATION PROCESSES

Figure 7 presents the complete diagram representing the generic analytical framework:

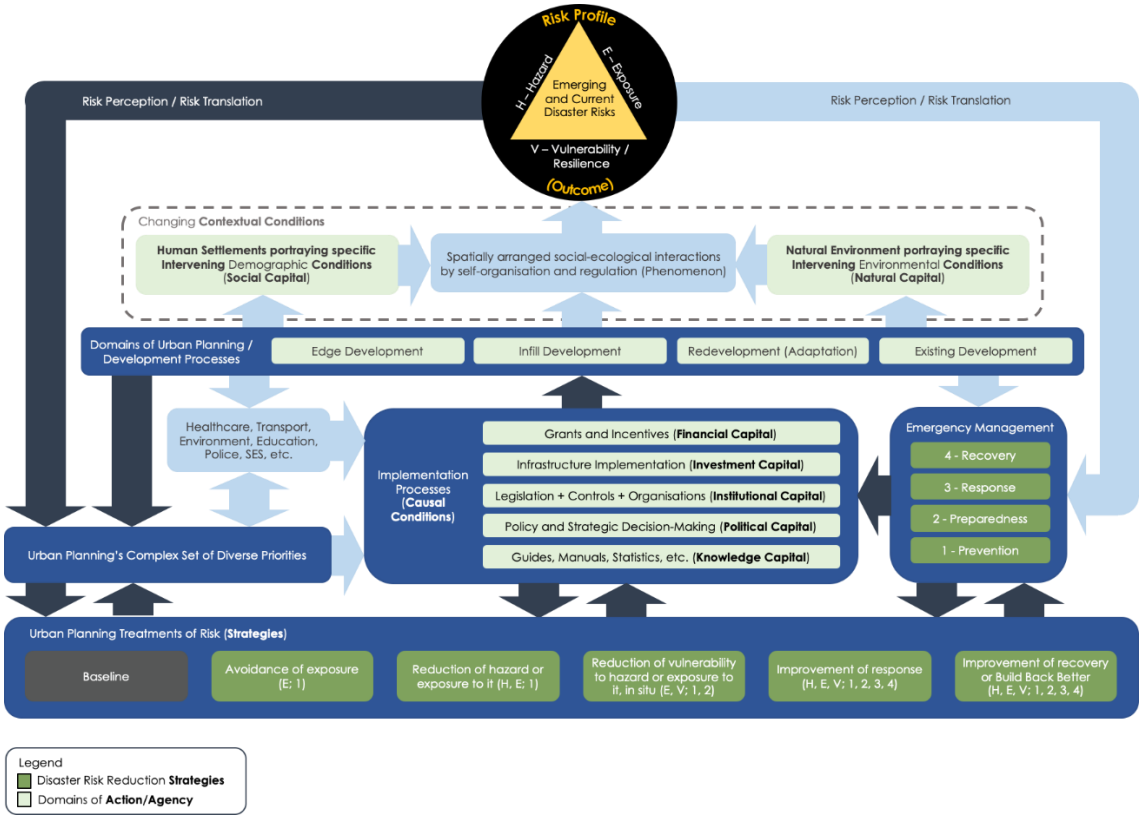

FIGURE 7. INTEGRATED URBAN PLANNING PLANNING FOR NATURAL HAZARD MITIGATION PROPOSED ANALYTICAL FRAMEWORK

To better communicate examples of urban planning treatments of risk, infographics were developed with the support of the BNH-CRC, resulting in the diagram targeting bushfire risk presented in Figure 8:

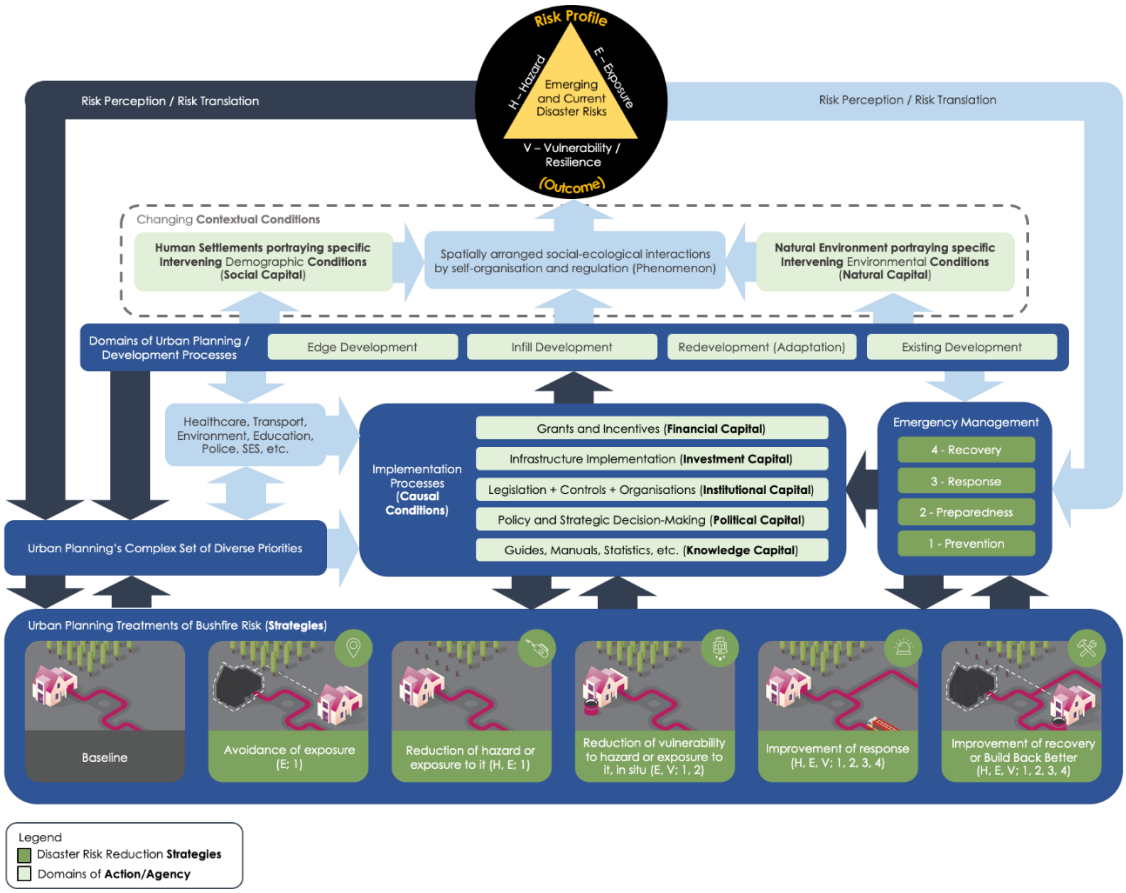

FIGURE 8. INTEGRATED URBAN PLANNING PLANNING FOR NATURAL HAZARD MITIGATION PROPOSED ANALYTICAL FRAMEWORK

As an analytical tool, the diagram was used to inform the development of a data collection protocol for the mapping and assessment of processes implementing urban planning risk treatments in conjunction with emergency management in different domains (development processes) of influence of urban planning.

The following elements and their connections were the focus of data collection:

- Responsible Organisations and Roles
- The sequence of events in a given process
- Points of intersection between urban planning and emergency management agencies in these processes

Data Collection Protocol

The following matrices guided data collection and subsequent analysis:

HAZARD-BASED PLANNING INTEGRATION ASSESSMENT – Bushfire					
"Site" for Assessment					
Fundamental Processes	Based on the combination of oxygen, heat and fuel, *bushfire* generally describes a fire moving through an Australian landscape. The behaviour of bushfires is influenced significantly by the nature of fuels, consisting mainly of vegetation, and which can vary considerably across landscapes. Fire characteristics are also significantly impacted by topography and weather.				
Mechanisms of Interaction – Structures	Heat, direct flame, and embers can ignite structures. Fire driven wind and tree strike can damage structures and facilitate ignition or other damage.				
Mechanisms of Interaction – Human and Other Values	Heat, direct flame, ember, fire-driven wind, tree strike, smoke and gases. Can impact on unprotected humans and livestock or pets, and damage property, infrastructure and other valued assets or systems.				
Impacts/ Consequences	Death and injury, property damage, economic and social impacts.				
Planning Processes & Controls					
	Description	**Risk Aspect**			**Assessment (Summary)**
		Exposure	**Resistance/ Vulnerability**	**Hazard**	
Change Management Processes					
Systems of Regulation and their Application					
Emphasis on Plan, Prepare, Respond Recover?					
Interactions with other systems					

Process & Stakeholder Map

	Stakeholder Roles: Risk Assessment and Treatment									
Role: Codification:	Proponent, referral recommending, referral deciding, technical information, decision-maker, coordination, stakeholder, other Formalised, informal, optional, varies									
Highlighted areas for further investigation	1	2	3	4	5	6	7	8	9	10
Process Steps	**Land Holders**	**CFA**	**DELWP**	**Local Council**	**VPA**	**Panel**	**VCAT**	**Parks Victoria**	**Melb. Water**	**Minister**
Ongoing Policy + Plan Production										
Identify potential future land										
Undertake prior studies & broad plan										
Scenario testing										
Determination of Acceptable risk										
Precinct Structure Plan										
Scenario testing										
Prepare Rezoning Documents										
Prepare Subdivision Documents										
Exhibition										
Critique and Analysis (hearing or similar)										
The decision to rezone (and overlays such as BMO)										
The decision to Subdivide (and its Design)										
Individual Permits to Build for Bushfire										

Urban edge broad land-use-planning steps	Hazard	Exposure	Vulnerability	Risk	Treatment
Ongoing Policy + Plan Production					
Identify potential future land					
Undertake prior studies & broad plan					
Scenario testing					
Determination of acceptable risk					
Precinct Structure Plan (PSP)					
Scenario testing					
Prepare rezoning + overlay documents					
Prepare subdivision documents					
Exhibition of documents					
Critique and analysis (hearings or similar)					
The decision to rezone (and overlays - BMO)					
The decision to subdivide (and its design)					
Individual permits to build for bushfire					

Choice of Case

Desktop research and end-user consultation informed the selection of the case study presented in this report.

The analytical framework presented in Figure 7 was used to define the basic set of criteria utilised for the case study selection process. It involved choosing a site that could illustrate a process of edge development in a location subject to natural hazard risk considerations, especially concerning bushfire and flood.

The site was also chosen for its capacity to illustrate the following stages of edge development:

- urban growth boundary change through the rezoning of land from Green Wedge to Urban Growth Area by amendments to the Local Planning Scheme;
- development of a Precinct Structure Plan - PSP and its incorporation into the Local Planning Scheme through an amendment; and
- the approval of associated planning permit applications that would allow edge development.

SOURCES AND ANALYTICAL METHODS

Data was sourced through workshops with end-users, through desktop research and direct observation of the local case study site. Relevant state and commonwealth legislation, associated regulations, national and state policies, local planning schemes, commissioned reports, recordings of parliamentary

debates, news bulletins, webpages and existing research were interrogated using the analytical framework presented in Figure 7. Results of this interrogation are presented in the ***Results and discussion*** section, firstly as a summary of the instances in which relevant sources address risk management in the state of Victoria, followed by a description and analysis of the Brompton Lodge case study in the Municipality of Casey.

LIMITATIONS

The findings presented in this report are limited to the application of the analytical framework in a particular case that illustrates the process of edge development in a specific time and contextual circumstances.

Following the 2009 Victorian Bushfires, the State of Victoria started a complex reform of its emergency management arrangements, that is still in course. As a result, the analysis of this particular case study had to take into account the specific arrangements in place when critical decisions were carried out as part of the process of edge development. Hence, the case described in this report is time-specific to the period of 2011 to 2016, when significant transformations in the Victorian Emergency Management arrangements were happening.

Therefore, the conclusions presented here can serve only as a reference to other studies, that should also reflect on the current state of emergency management and planning arrangements applicable to specific times and jurisdictions. Nevertheless, the case study presented in this report is a relevant illustration of the application of the analytical framework presented in the previous section, demonstrating how its fundamentals can be used to interrogate different cases under future examination.

RESULTS AND DISCUSSION

This section presents findings from an examination of current processes of edge development in the State of Victoria.

As described in the project's previous report titled "Practical and Theoretical Issues: Integrating Urban Planning and Emergency Management", integration can be assessed from different perspectives, including:

- Organisational;
- Multi-hazards;
- Treatment Options;
- Procedural;
- Across Prevention, Preparedness, Response and Recovery;
- Contextual; and
- Temporal (legacy and emerging risks).

For this report, we focus on organisational, procedural, contextual and temporal integration by looking at policy; legislation and regulation; parties; and procedures & processes involved in consideration of legacy and emerging bushfire and flood risks in edge development in Metropolitan Melbourne.

To research the process of edge development, different levels and scales of activity are relevant, including:

- broad state policy formulation focusing on metropolitan and regional planning addressing urban growth (e.g. Plan Melbourne, Growth Corridor Plans and Regional Growth Plans);
- applicable legislation, regulation and responsible agencies;
- the actual re-zoning of greenfield edge areas adjoining the metropolitan Urban Growth Boundary from Green Wedge / Rural Zones to Urban Growth Zones, bringing them inside the Urban Growth Boundary (changes to the UGB);
- precinct structure planning and amendments to planning schemes to apply schedules to Urban Growth Zones - UGZs to allow development;
- land use permit applications for specific sites within UGZs for which Precinct Structure Plans - PSPs have been prepared, approved and incorporated to Planning Schemes;
- building permit applications for construction within specific lots.

This report will focus on understanding the first four categories above, namely: policy; legislation, regulation and responsible agencies; processes of Urban Growth Boundary changes; and Precinct Structure Planning and associated Planning Scheme Amendments.

STATE POLICY

From a policy perspective, there are currently ten critical sets of documents relevant to natural hazard mitigation in processes of edge development in Victoria:

- Plan Melbourne 2017-2050 (and companion documents) and Regional Growth Plans;
- The Planning Policy Framework VPPs[2] (Victorian Planning Provisions) 10 to 19;
- Corridor Growth Plans;
- Precinct Structure Plans;
- the Victorian Emergency Management Strategic Action Plan (2015-2018 and subsequent updates #1, 2 and 3);
- the Victorian Emergency Management Manual (2018);
- the State Bushfire Plan;
- the Victorian Flood Management Plan;
- Regional Strategic Fire Management Plans; and
- Municipal Fire Management Plans.

Plan Melbourne

Plan Melbourne 2017-2050 (DELWP, 2017b) is the current Metropolitan Planning Strategy and the overarching policy document guiding edge development in the state. It acknowledges the need to reduce disaster risk[3] by stating that "planning for green wedge and peri-urban areas should **avoid development in locations where there is risk to life, property, the natural environment and infrastructure from natural hazards such as bushfire and flooding**" (DELWP, 2017b, p. 87). When describing desired planned outcomes for green wedges and peri-urban areas, Plan Melbourne highlights the need to "**avoid development in areas that are subject to high risk from bushfire or flooding and inundation so as to minimise potential risk to life, property and the environment** [and to] recognise, understand and prepare for the projected impacts of climate change and rising sea levels" (DELWP, 2017b, p. 90).

Natural hazard risk is also targeted explicitly in *Plan Melbourne's* ***Direction 6.2 Reduce the likelihood and consequences of natural hazard events and adapt to climate change*** within its ***Policy 6.2.1 Mitigate exposure to natural hazards and adapt to the impacts of climate change***. This policy lists considerations underpinning growth, including the application of "risk assessment decision-making frameworks […] to inform appropriate risk-mitigation measures" and the increase of "strategic effort in planning for a disaster – thereby maximising risk avoidance and reduction" (DELWP, 2017b).

[2] As the Planning Policy Framework VPPs are subsidiary legislation to the Planning and Environment Act 1987, they are described and analysed in the section dealing with legislation, regulations and key agencies.
[3] In its Direction 4.5 - Plan for Melbourne's green wedges and peri-urban areas.

Using "climate modelling [to] show[…] that Victoria is […] facing […] increased risk of extreme weather events such as flood and bushfire", ***Plan Melbourne*** acknowledges the need to address both climate change mitigation and adaptation in conjunction with natural hazard mitigation. The Plan also presents a map of natural hazards likely to affect metropolitan green wedge areas including bushfire risk areas identified as ***Bushfire Management Overlays*** or ***Wildfire Management Overlays*** in ***Planning Schemes***, as well as one-in-one-hundred-years riverine flood extent, projected flooding from 20cm of sea-level rising at 2040 and landform susceptible to significant shoreline recession (DELWP, 2017b, p. 112).

Plan Melbourne also acknowledges that "land-use planning and building provisions play a key role in reducing a community's level of exposure to a natural hazard by influencing where and how development occurs". In that regard, it states that "new development should be located away from extreme risks [and] where risk is unavoidable, such as in existing settlements, land-use planning should reduce risk and ensure planning controls do not prevent risk-mitigation or risk-adaptation strategies from being implemented" (DELWP, 2017b, p. 113).

In its implementation companion document, ***Plan Melbourne*** outlines[4] the need to "influence growth and settlement patterns to avoid and reduce long-term risk" and to "improve the approach to settlement resilience in areas exposed to high natural hazard and climate change risk" (DELWP, 2017a, p. 29). In this line, Plan Melbourne seeks to amend local planning schemes[5] to include "strategies to improve community resilience […] while providing "guidance for responsible authorities on taking risk-mitigation principles into consideration in the preparation and assessment of development applications" (DELWP, 2017a, p. 29). In other words, it proposes the application of a combination of institutional and knowledge capital.

Corridor Growth Plans

Growth Areas Framework Plans[6] were released in June 2012 by the Growth Areas Authority[7] as a response to the document ***Delivering Melbourne's Newest Sustainable Communities*** (DPCD, 2010), published two years earlier, in July 2010. These plans "define the urban structure for the expanded growth areas for housing, employment, community facilities, public transport, road and rail infrastructure, drainage and open space[, while also] provid[ing] direction on the sequencing of development" (DPCD, 2010, p. 8).

Corridor Growth Plans are supported by "the development of ***Precinct Structure Plans*** [which] provide a detailed framework for land use and development at the community level and identify the development and investment [to] occur in the growth areas over many years"(DPCD, 2010, p. 8). At the precinct level, ***Nature Vegetation Precinct Plans*** "set out the requirements for the protection

[4] In its Action 85 – Improvement of natural hazard, climate change and environmental adaptation and risk mitigation strategies in planning schemes.
[5] In its Action 86 – Whole-of-settlement adaptation and risk-mitigation strategies.
[6] Now called Corridor Growth Plans.
[7] Currently the Victorian Planning Authority – VPA.

and removal of native vegetation for a defined area or precinct in the growth areas. Both the ***Precinct Structure Plans*** and ***Native Vegetation Precinct Plans*** need to be incorporated into the ***Planning Scheme***, through an amendment, to become effective (DPCD, 2010, p. 8).

Regional Bushfire Planning Assessments

To address *Recommendation 38* of the *2009* ***Victorian Bushfires Royal Commission Final Report*** (2009 VBRC, 2010d, p. 228), the Victorian State Government committed to "conduct eight regional bushfire land use risk assessment studies and produce regional policy responses by the end of September 2011" (BRCIM, 2011, p. 104). A series of *Regional Bushfire Planning Assessments* were carried out by the Department of Planning and Community Development to address that recommendation, resulting in 6 ***Regional Bushfire Planning Assessments*** (BRCIM, 2011, p. 104).

RBPAs "map where a significant bushfire hazard may affect land use planning, and identify features such as settlements, urban interfaces and single access roads" (DELWP, 2019a). They help inform the preparation of *Regional Growth Plans* and ***Corridor Growth Plans*** and "provide a basis to initiate further detailed analysis as part of other planning processes such as settlement planning and preparing planning scheme amendments" (DPCD, 2012, p. 3). While RBPAs are not translated as VPPs, they "complement planning scheme provisions such as the *Bushfire Management Overlay* (BMO) by providing spatial and qualitative information from a variety of sources which together can inform considerations about **where bushfire should be assessed early in the strategic planning process**" (DPCD, 2012, p. 3).

Victorian Emergency Management Strategic Action Plan

The ***Emergency Management Act 2013*** (State Parliament of Victoria, 2016) requires the ***State Crisis and Resilience Council*** – SCRC to "develop a rolling three-year *Strategic Action Plan*" (SAP) to support the ongoing reform of emergency management arrangements in the State of Victoria (State Parliament of Victoria, 2016, p. 12).

The 2015 edition of the ***Strategic Action Plan*** acknowledges the need to integrate land use planning and disaster risk reduction through its ***Priority F***: "Define a process for understanding and mitigating the consequence for communities that are at high risk of experiencing an emergency, such as those in peri-urban areas, and make sure the process is understood by all involved" (EMV, 2015, p. 22). As part of this priority, the document defines as a critical action that "state and local governments review land use planning provisions on the peri-urban interface to ensure that mechanisms are available to adequately mitigate the consequence of emergencies for these metropolitan-rural areas" (EMV, 2015, p. 22).

By 2017, a peri-urban risk mitigation framework had been developed and piloted in three growth corridors (EMV, 2017, p. 17) and by 2018, all three actions for ***Priority F*** had been completed, including the "review of all ***Municipal Emergency Management Plans***" for peri-urban areas (EMV, 2018b, p. 17).

Victorian Emergency Management Manual

The ***Victorian Emergency Management Manual 2018 – Part 2*** (EMV, 2018a) describes Emergency Risk Management and Mitigation in Victoria, referring to the definition of mitigation by COAG's report on ***Natural Disasters in Australia: Reforming Mitigation, relief and recovery arrangements***:

"Disaster mitigation means measures taken in advance of, or after, a disaster aimed at decreasing or eliminating its impact on society and the environment" (DoTaRS, 2004, p. 24).

In doing so, it highlights mitigation as "an area of active work and effort with the United Nations focusing on an ***International Strategy for Disaster Risk Reduction***" (EMV, 2018a, p. 2.1) that is also closely linked with the prevention of emergencies (EMV, 2018a, p. 2.2).

When it describes mitigation at the state level, the manual emphasises the role of the State's land use planning system through the Victorian Planning Provisions that apply to ***Municipal Planning Schemes***, as well as ***Building Controls*** and ***Standards*** that apply to new constructions (EMV, 2018a, p. 2.6).

It also lists the natural hazard mitigation roles of different agencies in Victoria. In that respect, ***Catchment Management Authorities*** have a role in:

- "manag[ing] and prioritis[ing] regional flooding issues in cooperation with local government and communities […]
- Advis[ing] and assist[ing] local governments in the incorporation of flood-related planning controls in planning schemes
- Advis[ing] local government and other authorities on planning permit referrals, building issues and infrastructure management within floodplains
- Provid[ing] flood advice to local government and the community in general […]" (EMV, 2018a, p. 7.35).

As for the ***Country Fire Authority***, it has a role in bushfire mitigation that includes "developing/enforcing of relevant legislation and regulations" (EMV, 2018a, p. 7.40).

The Manual also lists **DELWP** as having a mitigation role in the:

- "formulation of policy and regulation for bushfire management in state forest, national parks and protected public lands;
- planning and delivery of programs to reduce the risk of bushfire in state forest, national parks and protected public lands; […]
- formulation of policy and regulation for floodplain management[; and
- planning and delivery of floodplain management programs to reduce the risk of major flood" (EMV, 2018a, p. 7.48).

Integrated Fire Management Planning Framework

Following the *2003 Victorian Bushfire Inquiry* recommendation of "improved integration of bushfire management across all tenures" (CFA & DSE, 2008, p. 27), in 2008, the Victorian Government published an ***Integrated Fire Management***

Planning – IFMP ***Framework*** (State Fire Management Planning Support Team, 2008), providing the basis for the development of integrated State, Regional and Municipal ***Fire Plans***. State, Regional and Municipal ***Bushfire Planning Committees*** were established and charged with developing and reviewing these plans, using the ***Integrated Fire Management Planning Guide***[8] (State Fire Management Planning Committee, 2012) as a reference. The structure set forth by the framework supported the Victorian Government to address Recommendation 3 of the ***2009 Victorian Bushfires Royal Commission Final Report***[9] (2009 VBRC, 2010a).

State Bushfire Plan – Victoria

The latest ***State Bushfire Plan*** published in 2014 acknowledges that "Victoria's high bushfire risk is the consequence of a combination of factors including […] an increasing population density in bushfire-prone areas, such as in the rural-urban fringe" (EMV, 2014, p. 2). Building on the concept of shared responsibility put forward by the ***2009 Victorian Bushfires Royal Commission Final Report***, the State Bushfire Plan's strategy calls for an application of "risk-based land management and planning" (EMV, 2014, p. 9), while also acknowledges that the existing ***Bushfire Safety Policy Framework*** does not currently address "land use planning […], which [is] also vital in managing the bushfire risk" (EMV, 2014, p. 22).

Regional Strategic Fire Management Plans – Southern Metropolitan Region

One of eight regional committees, the ***Southern Metropolitan Regional Strategic Fire Management Planning Committee*** is responsible for developing and implementing a regional plan in line with State policy. In carrying its duties, the Committee is required to consider state and municipal level fire management planning. It provides for communication and collaboration with the municipal committees and the state level. The legislative arrangements for the operation of IFMP are detailed in the ***Emergency Management Manual Victoria*** – EMMV (EMV, 2018a, p. 5.6). Regional committees prepare 10-year regional strategic fire management plans.

The following are key objectives set out in the Southern Metropolitan Regional Plan (RSFMPC, 2011, pp. 15-16):

Objectives	**Description**
1. *Planning together*	*Develop regional, municipal and local fire management plans and planning with a clear purpose and a consistent assessment of risk*
2. *Collaborative implementation*	*Develop and implement fire management programs and activities in a collaborative manner.*

[8] Published in September 2010, this guide proposes that bushfire plans should be prepared through a risk assessment process in alignment with AS/NZS ISO 31000:2009 Risk management – principles and guidelines (Australian Standards & New Zealand Standards, 2009).

[9] "Recommendation 3: Review current guidance to councils (including relationships between TPPs, MEMPs and MFPPs)". Prior to the framework, the existing arrangements included only Municipal Fire Prevention Plans (MFPPs) (2009 VBRC, 2010a, p. 24).

3. *Building knowledge*	*Build and share knowledge in the fire management sector and across the community.*
4. *Building capability*	*Improve the capability of communities, the fire management sector and the government to deal with fires*
5. *Using fire*	*Using fire to manage fuels and support the health of environmental, social and economic environments. In this context, this objective relates solely to bushfire management.*

Objective 2 includes the following Strategic Direction: *Fire management issues are represented in relevant regional planning forums, for example, Green Wedge planning, biolink planning, urban planning* (RSFMPC, 2011, p. 15).

The Regional Plan also presents broad mapping to identify risks based on fire hazard categories, exposure of assets, and fire history. It then sets out a wide range of actions to manage risks across the diverse actors with roles to play in managing risk. These include CFA, SES, VicPolice, DHS, DELWP, MFB, Local Governments, Parks Victoria, VicRoads, Electricity providers, Melbourne Water, Regional Emergency Response Committee, NGOs, and indigenous groups. These parties undertake the actual implementation.

Figure 9 presents the extent and location of the Southern Metropolitan Region area.

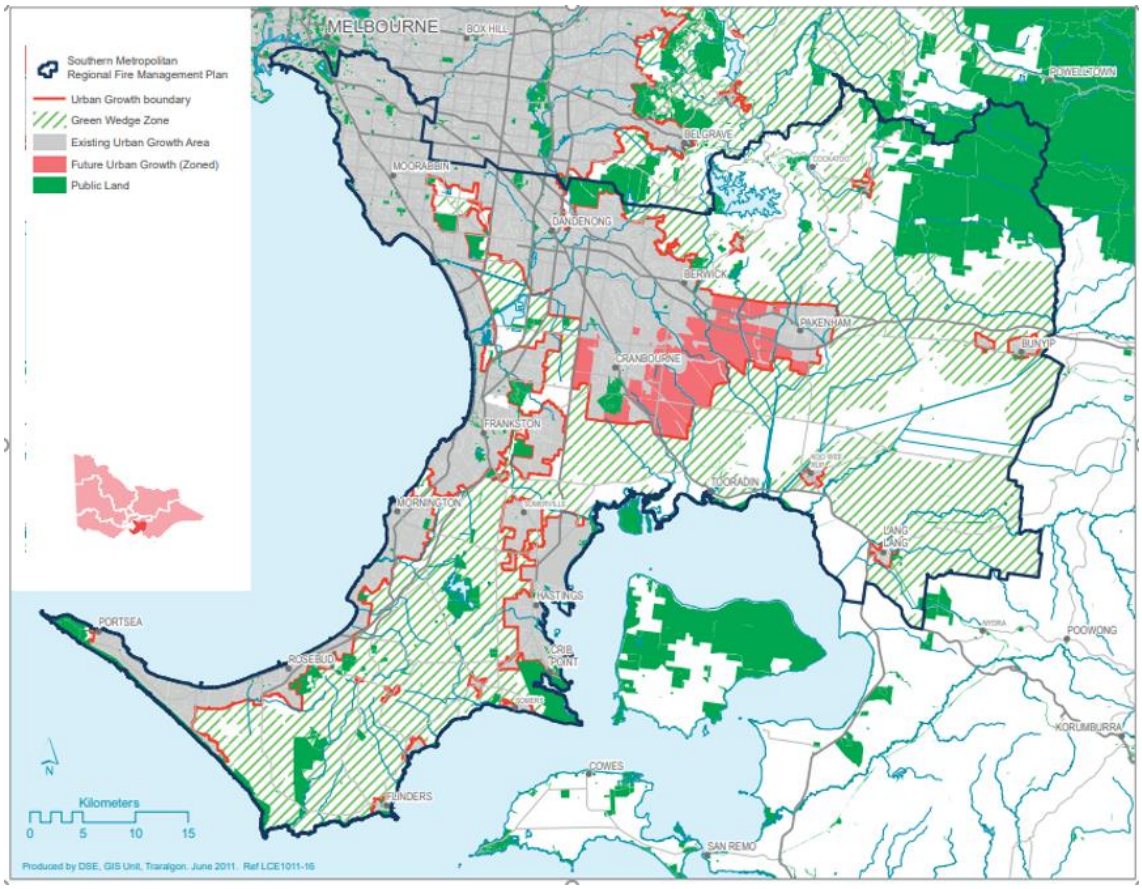

FIGURE 9. SOUTHERN METROPOLITAN REGIONAL FIRE MANAGEMENT PLAN AREA (RSFMPC, 2011, P. 12)

Municipal Fire Management Plans – City of Casey

Under the broader guidance of the ***Southern Metropolitan Regional Strategic Fire Management Plan*** (RSFMPC, 2011), the Casey Fire Management Planning Committee developed the ***Casey Municipal Fire Management Plan*** – CMFMP (FMPC, 2018). The plan's purpose is to better understand the community and environment with consideration for bushfire impacts; improved resilience and community self-reliance; coordination across agencies including mitigation activities; and improved partnerships between community safety stakeholders.

The CMFMP has been produced pursuant to Section 20 of the ***Emergency Management Act 1986*** – the EM Act (State Parliament of Victoria, 2014). It is deemed to fulfil Section 55A of the ***Country Fire Authority Act 1958*** (State Parliament of Victoria, 1958). It forms part of the ***City of Casey Municipal Emergency Management Plan*** – MEMP (City of Casey MEMPC, 2017).

The methodological steps used in the plan comply generally with ***ISO31000*** (Australian Standards & New Zealand Standards, 2009) and parties included are essentially the same as those identified in the Regional Plan (RSFMPC, 2011)as relevant to the Municipality.

Mapping includes: Victoria Police Evacuation Resource Mapping, VFRR Treatment Areas, Neighbourhood safer places, Fire Danger Sign locations, Fire Breaks, Burn Permit Zones, Static Water Tank locations, Fire Access Track locations, CFA Fire Stations, Contours, Suburb Boundaries, Bushland Reserve Fuel Management Areas, Inspection Risk Areas, Bushfire Management Overlay Areas (triggers planning permits), Latest (and historic) Gazetted BPAs, Aerial Imagery, Near Maps Imagery, Key assets, Fire Protection Plans, Fire Plug and Hydrants, Emergency Water Supply, Emergency Management Plan, Fire Access Roads and Tracks, Traffic Diversion Plans, Fire Operations Plan Community Activities.

Its main treatments are vegetation management, hazard reduction burning, community education, fire-trail maintenance and community fireguard groups.

Other treatments include:

- Municipal Permits to Burn Off (LGA)
- Permits to Burn (CFA)
- Permits to Work (Private)
- Total Fire Ban (CFA)
- Daily Readiness (Emergency Agencies)
- Incident Control Centres (ICC)
- Local Mutual Aid Program (DEPI/CFA)
- Municipal Emergency Management Plan (LGA)
- Fire Management Plan (LGA)
- (Emergency Agencies)

In association with the actions, Section 43 of the ***Country Fire Authority Act 1958*** states "it is the duty of every municipal council and public authority to take all practical steps (including burning) to prevent the occurrence of fires on, and minimise the danger of the spread of fires on and from any land vested in it or under its control or management: and any road under its care and management" (State Parliament of Victoria, 1958, p. 95).

The Municipality appoints a ***Municipal Fire Prevention Officer*** – MFPO to act as the executive officer of the ***Municipal Fire Prevention Committee*** – MFPC (State Parliament of Victoria, 1958, section 95). The MFPO is responsible for issuing permits to burn during the fire danger period and issuing fire prevention notices for hazard removal to private landowners in their Municipality. In addition, municipalities have prosecution powers under the CFA Act, relating specifically to failure to comply with Fire Prevention Notices and breaching conditions of Permits to Burn issued during the Fire Danger Period (State Parliament of Victoria, 1958, section 96A). Councils may enter private lands to remove fire hazards if fire prevention notices are not complied with. Victoria Police prosecute other offences relating to fire pursuant to the CFA Act, the Crimes Act and the Summary Offences Act. The police are also responsible for undertaking prosecutions for illegal burning without a permit during the Fire Danger Period (State Parliament of Victoria, 1958, section 31).

LEGISLATION, REGULATIONS AND KEY AGENCIES

While providing direction and a vision for the metropolis, Plan Melbourne (DELWP, 2017b) is a policy document and not a piece of legislation. Nevertheless, the ***Planning and Environment Act 1987*** institutionalises ***Planning Schemes*** as key components of statutory planning in the state of Victoria, and ***Victorian Planning Provisions*** – VPPs as key pieces of planning schemes (State Parliament of Victoria, 1987).

According to Rowley (2017, p. 22), ***Planning Schemes*** are "subordinate legislation" or "a form of legal control that is created under a deferred authority created by the original legislation", in this case, the Planning and Environment Act 1987 (State Parliament of Victoria, 1987). Despite being legally binding, they "are not directly endorsed by Parliament: they are law that is created in accordance with a secondary process spelt out under the Act" (Rowley, 2017, p. 22). The jurisdiction of Planning Schemes is usually aligned with that of the City Council that administers its daily application and, in general terms, it contains all the planning controls and references to the policy applicable to areas within that jurisdiction. Planning schemes follow a pre-set structure composed of pieces that can be state-wide or applicable as relevant.

Next is a list of ***Victorian Planning Provisions*** - VPPs (DELWP, 2019b) that are part of the Planning Policy Framework – PPF and relevant extracts to bushfire and flood risk mitigation in edge development:

VPP 11.01-1S Settlement sets the objective "[t]o promote the sustainable growth and development of Victoria and deliver choice and opportunity for all Victorian through a **network of settlements"**. Among the settlement strategies, the VPP proposes to "[c]reate and reinforce settlement boundaries[,] deliver networks of high-quality integrated settlements that have a strong identity and sense of place, [being] prosperous and […] sustainable by[, among other ways,] [d]developing settlements that will support **resilient communities** and **their ability to adapt and change**,[…] and [l]imit **urban sprawl** and direct growth into existing settlements".

VPP 11.02-2S Structure Planning sets the objective "[t]o facilitate the orderly development of urban areas [through] the preparation of a hierarchy of

structure plans or **precinct structure plans** [that] provide the **broad planning framework** for an area as well as the more detailed planning requirements for neighbourhoods and precincts, where appropriate".

VPP 11.03-2S Growth Areas highlights the role of:

- **Growth Area Framework Plans** that will "[i]dentify the location of open space to be retained for recreation, and/or biodiversity protection and/or **flood risk reduction** purposes guided and directed by regional biodiversity conservation strategies[; and] show significant waterways as opportunities for creating linear trails, along with areas required to be retained for biodiversity protection and/or **flood risk reduction** purposes.
- **Precinct Structure Plans** that will "[r]espond to climate change and increase environmental sustainability".

VPP 13 Environmental Risks and Amenities is the VPP that is most focused on risk mitigation as an important function of planning. It emphasises that planning should: "strengthen the **resilience and safety of communities** by adopting a best practice environmental management and **risk management approach**[;] aim to **avoid or minimise natural** […] **hazards**[;] ensure development and **risk mitigation** [do] not detrimentally interfere with important natural processes[; and] **prepare** for and **respond** to the **impacts of climate change**".

More specifically, **VPP 13.01-1S Natural Hazards and Climate Change** sets the objective to "minimise the impacts of natural hazards and adapt to climate change through **risk-based planning**" and lists strategies that target different levels of the planning system, and include both legacy and emerging risks, so these are considered in planning decision-making processes. Among these strategies we can highlight the identification of areas at risk, adaptation response strategies for existing settlements in risk areas, **the direction of population growth and development to low-risk areas**, and, most importantly, the "**integrat[ion of] strategic land use planning with emergency management decision making** [and the assurance that] planning controls allow for risk mitigation or risk adaptation strategies to be implemented".

Within the broad scope of natural hazards, this report focuses on bushfire and flood risks as these two types of natural hazards have been subject to significant scrutiny through the 2009 Victorian Bushfires Royal Commission reports (2009 VBRC, 2010a, 2010b, 2010c, 2010d, 2010e) and the Victorian Floods Review – VFR (Comrie, 2011). As a result, the following VPPS are particularly relevant to this report:

Clause 13.02-1S Bushfire Planning sets out key principles for urban planning regarding bushfire risks, including the prioritisation of human life as an overarching strategy that trumps other policy considerations. This prioritisation is to be undertaken via:

- Directing population growth and development to low-risk locations and ensuring the availability of, and safe access to, areas where human life can be better protected from the effects of bushfire.

- Reducing the vulnerability of communities to bushfire through the consideration of bushfire risk in decision making at all stages of the planning process.

Complementary elements of Clause 13.02-1S include using comprehensive hazard mapping, consultation with emergency and fire services, using strategic and evidenced-based assessment approaches, and application of the Bushfire Management Overlay in conjunction with AS3959-2018 Building in Bushfire Prone Areas (Standards Australia, 2009).

The following are zones determined by the Victorian Planning Provisions that are relevant to bushfire and flood risk mitigation in edge development:

- Rural Zones, notably the **Green Wedge Zone** and the **Green Wedge A Zone**, the latter being more restrictive. Among their purposes, the Green Wedge Zone is meant to "**recognise, protect and conserve green wedge land for its agricultural, environmental, historical, landscape, recreational and tourism opportunities**, and mineral and stone resources" (VPP 35.04 VCC148, 31/07/2018), "a permit [being] required to subdivide land" (VPP 35.04-3, VC 148, 31/07/2018). More restrictive than its counterpart, the Green Wedge Zone A is also meant to "recognise and **protect the amenity of existing rural living areas**" (VPP 35.05 VC148, 31/07/2018) while also requiring a permit for subdivision. In the case of metropolitan Melbourne, areas zoned as GWZ or GWZA are located outside the Urban Growth Boundary, their rezoning and subdivision through planning scheme amendments requiring ratification by the Victorian Parliament.
- Special Use Zones, especially the Urban Floodway Zone and the **Urban Growth Zone**, the later having the purpose "to manage the **transition of non-urban land into urban land** in accordance with a **precinct structure plan**" (VPP 37.07 VC148, 31/07/2018). As for the Urban Floodway Zone, one of its purposes is "to identify waterways, major floodpaths, drainage depressions and high hazard areas within urban areas which have the greatest risk and frequency of being affected by flooding [and] to **ensure that any development maintains the free passage and temporary storage of floodwater**, **minimises flood damage** and is **compatible with flood hazard**, local drainage conditions and the minimisation of soil erosion, sedimentation and silting" (VPP 37.03 VC148, 31/07/2018).

The following are **relevant overlays** to bushfire and flood risk mitigation in edge development:

- Environmental and Landscape Overlays, especially the **Vegetation Protection Overlay**, which has, among others, the purpose "to protect areas of significant vegetation [and] to maintain and enhance habitat corridors for indigenous fauna". This overlay allows emergency works, fire protection and planned burned to be carried out by responsible agencies without the requirement to obtain a permit. However, when considering development requiring a permit application, the responsible authority must consider as part of its decision guidelines, "the need to retain vegetation where ground slopes exceed 20 percent" or when it is "within 30 meters of a waterway or wetland", and "the effect of the proposed

use, building, works or subdivision on the nature and type of vegetation to be protected" (VPP 42.02 VC148, 31/07/2018).

- Land Management Overlays, especially the Floodway Overlay, the Land Subject to Inundation Overlay and the **Bushfire Management Overlay – BMO**.
    - The BMO "identif[ies] areas where the bushfire hazard warrants bushfire protection measures to be implemented[,] to ensure development is only permitted where the risk to life and property from bushfire can be reduced to an acceptable level". It also aims "to ensure that the development of land prioritises the protection of human life and strengthens community resilience to bushfire". This overlay requires a permit to subdivide land unless a schedule exempts this requirement. Overall, this overlay sets permit requirements for building and works to be carried out in association with a range of uses, including accommodation, leisure and recreation, places of assembly, hospitals and education centres. Application requirements include a bushfire hazard site assessment in accordance with AS3959:2009 (Standards Australia, 2009), a bushfire hazard landscape assessment and a bushfire management statement. Most importantly, with some exceptions, this overlay triggers the referral of applications to the relevant fire authority as a recommending (subdivision, or building/works in habitable buildings) or determining (all other applications) referral authority (VPP 44.06 VC148, 31/07/2018).
- Other Overlays, especially the ***Development Contribution Plan Overlay***, the Infrastructure Contributions Plan Overlay, the Infrastructure Contributions Overlay and the Specific Controls Overlay – these allow opportunities for Council to require specific financial contributions or actions of developers to fund or provide for community needs.

Processes of edge development involve the rezoning of land, thus requiring Planning Scheme Amendments.

Amendments to the planning scheme generally require the following process summarised in Chapter 2 of ***Using Victoria's Planning System*** (State Government of Victoria, 2015).

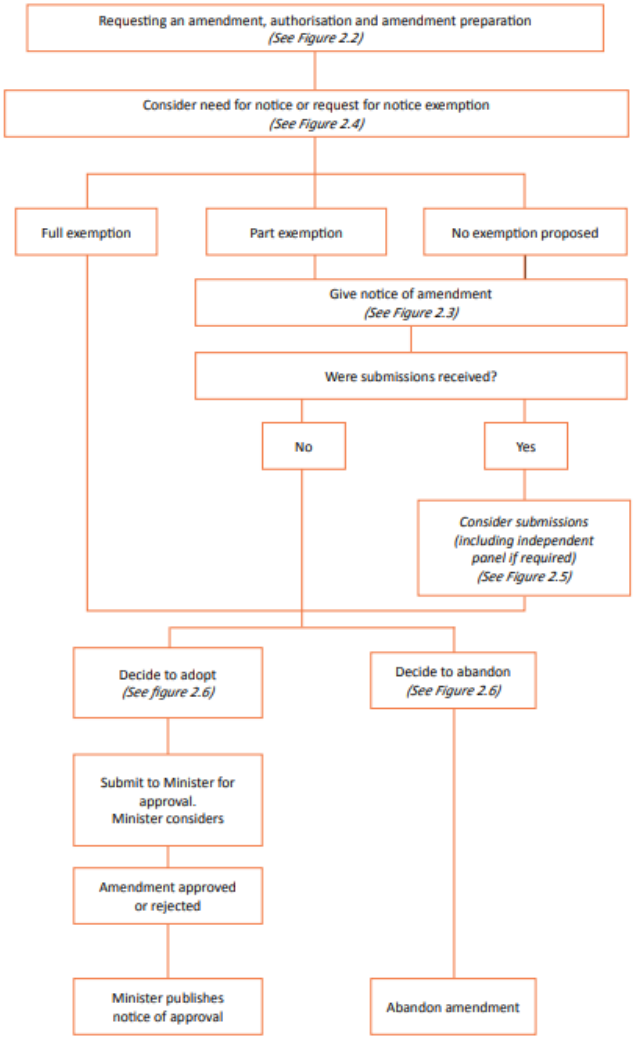

FIGURE 10. SCHEME AMENDMENT PROCESS AS ILLUSTRATED IN "USING VICTORIA'S PLANNING SYSTEM" (STATE GOVERNMENT OF VICTORIA, 2015, P. 2.5).

Responsibility for changes to the planning scheme largely rests with local governments in the role of Planning Authority under section 12 of the Planning and Environment Act 1987 (State Parliament of Victoria, 1987) – however, the processes to be followed are set out in detail in Part 3 of the Act and changes proposed must conform with the wider Victoria Planning Provisions (DELWP, 2019b). Consultation with other parties, such as emergency services, can occur at any time but is statutorily required during exhibition and Panel hearing processes.

As prescribed in the statutory planning system, specific circumstances may trigger the need for permit applications to be approved for development to occur on land that has been zoned for specific purposes. The permit application process generally involves the following steps summarised below.

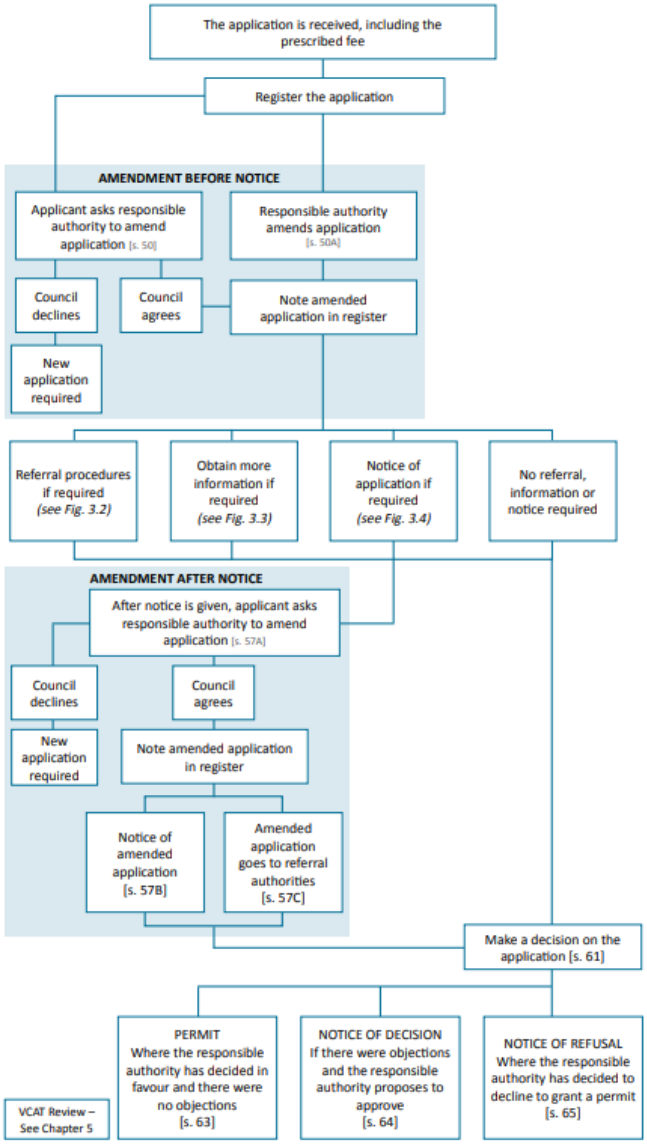

FIGURE 11. PLANNING PERMIT APPLICATION PROCESS AS ILLUSTRATED IN "USING VICTORIA'S PLANNING SYSTEM" (STATE GOVERNMENT OF VICTORIA, 2015, P. 3.5)

As with scheme amendments, it is primarily local government's role to process permit applications, using the processes set out in part 4 of the Act (State Parliament of Victoria, 1987) and according to the tests and provisions set out in its planning Scheme. Other parties may object to the proposal during the notification stage (under section 52) and also have a subsequent right of appeal (Division 2 of the Act) in many cases.

According to clauses 96A to 96N, there are cases in which combined Planning Scheme Amendments and Permit Applications can be lodged. These apply to cases of edge development in which considerable time passes during the preparation of amendments. Additionally, the permit application includes detail of the proposed subdivision so that decisions can be fully informed in terms of the intended layout, design and use of the land.

The ***Planning and Environment Act 1987*** also states that "a planning scheme may […] regulate or prohibit any use or development in hazardous areas or in areas which are likely to become hazardous areas" (State Parliament of Victoria, 1987, section 6(2)(a)). The Act also establishes that a ***Metropolitan Fringe Planning***

Scheme applies to the municipal districts of specific municipal councils as part of Metropolitan green wedge land protection or "land that is described in a metropolitan fringe planning scheme as being outside an urban growth boundary (section 46AC).

By **Urban Growth Boundary**–UGB the Act "means a boundary that is specified as an urban growth boundary in a planning scheme" (section 3(1)) and states that "an amendment to a metropolitan fringe planning scheme that has been approved by the Minister [after the commencement of the ***Planning and Environment (Metropolitan Wedge Protection) Act 2003***] that amends or inserts an urban growth boundary; or that has the effect of altering or removing any controls over the subdivision of any green wedge land to allow the land to be subdivided into more lots or into smaller lots than allowed for in the planning scheme" **must be ratified by Parliament** (Part 3AA, Division 3). However, as pointed out by Rowley (2017), "while this does add an extra level of protection, it is not a fundamental barrier, assuming that the government of the day has control of the parliament and, the Urban Growth Boundary has in fact been moved several times since its introduction" (p. 231).

A key player in the process of edge development, the ***Victorian Planning Authority*** was established in 2017 by the Victorian Planning Authority Act 2017[10] (State Parliament of Victoria, 2018, section 7 (1)) to "provide advice and assistance that is in accordance with the objectives of planning in Victoria". These objectives are defined in Part 1, section 4 of the ***Planning and Environment Act 1987*** (State Parliament of Victoria, 1987) as:

> *(a) to provide for the fair, orderly, economic and sustainable use and* ***development of land****;*
> *(b) to provide for the* ***protection of natural and man-made resources*** *and the* ***maintenance of ecological processes*** *and* ***genetic diversity****;*
> *(c) To secure a pleasant, efficient and* ***safe working, living and recreational environment*** *for all* ***Victorians and visitors to Victoria****;*
> *(d)* ***to conserve*** *and enhance* ***those buildings, areas or other places*** *which are of scientific, aesthetic, architectural or historical interest, or otherwise of special cultural value;*
> *(e) to* ***protect public utilities and other assets*** *and enable the* ***orderly provision and co-ordination of public utilities and other facilities*** *for the benefit of the community;*
> *(f) to* ***facilitate development*** *in accordance to the objectives set out in paragraphs (a), (b), (c), (d) and (e);*
> *(fa)to* ***facilitate the provision of affordable housing*** *in Victoria;*
> *(g) to balance the present and future interests of all Victorians.*

According to its Act (State Parliament of Victoria, 2018), the ***Victorian Planning Authority***–**VPA**'s primary objective includes collaborating with government agencies (including public sector bodies) and Councils […] to promote the **alignment of decisions** made by government **about infrastructure with land use planning**; and […] to **encourage land development** that is sustainable and that **takes into account natural and other hazards** (section 7(2)).

According to the section 8 of the Act (State Parliament of Victoria, 2018), **VPA** is a central organisation for planning processes in Victoria as it has the functions to "**provide** the **Minister**[,] […] **Councils** and **public sector bodies** with **advice and**

[10] This act also abolished VPA's predecessor, the Growth Areas Authority.

assistance in relation to planning the use, development and protection of land in Victoria [and] to **undertake integrated land use and infrastructure planning** [and] **coordinate State Government action in relation to planning the use, development and protection of land**" in areas designated by the Minister. According to section 34 of the ***Victorian Planning Authority Act 2017*** (State Parliament of Victoria, 2018, Division 5), in carrying out its functions,

> *The Authority must–*
>
> *(a) if a matter is likely to affect a Council's functions as a planning authority or responsible authority, **consult with the Council**; and*
>
> *(b) if a matter is likely to significantly affect the functions of any other planning authority, responsible authority or public sector body, **consult with the authority or body** (section 34).*
>
> *[…]*
>
> *[And] by written notice, **may request** any of the following entities to provide the **information or assistance** specified in the notice—*
>
> *(a) a Council;*
>
> *(b) a planning authority;*
>
> *(c) a responsible authority;*
>
> *(d) a referral authority;*
>
> *(e) an advisory committee established under section 151 of the **Planning and Environment Act 1987**;*
>
> *(f) and interface body;*
>
> *(g) any other public statutory authority (section 33).*

Emergency Management Victoria – EMV and the ***Country Fire Authority*** – CFA are key organisations for consultation that the VPA may engage with when treating natural hazard risks in processes of land-use and infrastructure planning.

As stated in ***Plan Melbourne*** (DELWP, 2017b, p. 113), the ***Victorian Emergency Management Strategic Action Plan 2015-2018*** (and subsequent editions) sets a future vision for the State of Victoria as having "**Emergency Management** […] **reflected in land use and infrastructure planning**" (EMV, 2015, p. 7). As part of its ***Governance Strategic Theme***, this is encapsulated in *Priority F* that seeks to "[d]efine a process for understanding and mitigating the consequence for communities that are at high risk of experiencing an emergency, such as those in peri-urban areas, and make sure the process is understood by all involved […] [including the reviewing of] land use planning provisions on the peri-urban interface to ensure that mechanisms are available to adequately mitigate the consequence of emergencies for these metropolitan-rural areas" (EMV, 2015, p. 22). To achieve this, the ***State Crisis & Resilience Council*** – SCRC committed to actions that included to "drive legislative and regulatory reform with a focus on land use and infrastructure planning" (EMV, 2015, p. 19).

The **SCRC** is established by the ***Emergency Management Act 2013*** (State Parliament of Victoria, 2016, section 7):

> *(a) to act as the peak crisis and emergency management advisory board in Victoria responsible for producing advice to the Minister in relation to–*
>
> *(i) The whole of government policy and strategy for emergency management in Victoria; and*
>
> *(ii) The implementation of that policy and strategy; and*
>
> *(b) To consider any state emergency response plan or updated state emergency response plan submitted by the Emergency Management Commissioner to the State Crisis and Resilience Council for approval.*

PROCESSES OF CHANGING THE URBAN GROWTH BOUNDARY

This report now moves into analysing how edge development processes are formally driven, to allow understanding of how disaster risk assessment is being/could be potentially integrated with urban planning processes.

Edge Development Processes and the Urban Growth Boundary

Edge development involves the rezoning of metropolitan fringe greenfield areas (Green Wedge Zones) into Urban Growth Zones and subsequent subdivision for residential, commercial and industrial purposes. Population growth and the associated increase in demand for housing, coupled with ineffective urban consolidation can be drivers for edge development and associated urban sprawl. For example, the current South East Growth Corridor plan is included on the next page.

From 2002, Victorian metropolitan planning policy (Department of Infrastructure, 2002) has incorporated the concept of an Urban Growth Boundary to guide amendments to metropolitan fringe planning schemes in terms of rezoning edge greenfield land (or Green Wedge Zones - GWZs) into urban growth areas (Urban Growth Zones – UGZs).

Since 2002, at least five changes to the Urban Growth Boundary have been recorded. While some are treated as minor adjustments or fine-tuning of existing boundaries, other changes have been part of the overall recalibration of metropolitan planning as a strategy for guaranteeing specific levels of residential land and housing supply. While it is hard to determine a detailed single procedural protocol utilised to drive these changes, by analysing those occurred in 2003/2004, 2005, 2009/2010, 2012 and 2013, some similarities can be drawn.

Ad-hoc adjustments or fine-tuning:

Stage 1: Minister for Planning appoints an advisory committee to carry out a review of the existing Urban Growth Boundary and deliver a report (e.g. Logical Inclusions Advisory Committee or Urban Growth Boundary Anomalies Advisory Committee)

Stage 2: Government responds to Advisory Committee Recommendations Report

Stage 3: If appropriate, Minister for Planning triggers the process for Planning Scheme Amendments to rezone Green Wedge (A) Zone – GW(A)Z land into Urban Growth Zone – UGZ land as per the process prescribed in the Planning and Environment Act 1987.

Stage 4: Following his/her own consideration and approval of the planning scheme amendment proposal, the Minister tables any Urban Growth Boundary changes and Green Wedge (A) Zone land subdivisions comprised in the planning scheme amendment proposal to the Victorian Parliament for consideration and ratification.

Stage 5: If ratified, the amendment is published in the Government Gazette and becomes effective, making way for the preparation of a Precinct Structure Plan.

Recalibration of Metropolitan Planning that includes changes to the Urban Growth Boundary

Stage 1: (new) Minister for Planning appoints a committee to review existing policy;

Stage 2: Committee produces a report with recommendations;

Stage 3: Government (publicly) responds to the report;

Stage 4: New Metropolitan Strategy is formulated, alongside the proposal of planning scheme amendments that rezone specific Urban Growth Areas (typically zoned as Green Wedge Zones) as Urban Growth Zones and associated growth corridor planning;

Stage 5: Public Consultation on the Strategy is carried out and, when required by existing legislation, approval from responsible authorities is sought (e.g. approval from the Commonwealth Minister for Environment under the EPBC Act 1993).

Stage 6: Adjustments to the strategy and the proposed amendment are carried out in response to public consultation and submissions by referral and responsible agencies.

Stage 7: Following his/her own consideration and approval of the planning scheme amendment proposal, the minister tables any Urban Growth Boundary changes and subdivisions comprised in the planning scheme amendment proposal to the Victorian Parliament for consideration and ratification. To support the implementation of the proposed changes, Government may try to tie in changes in the Urban Growth Boundary to changes in existing legislation (e.g. introduction of the Growth Areas Infrastructure Contributions – GAIC in 2005).

Stage 8: If ratified, the amendment is published in the Government Gazette and becomes effective.

Following the rezoning of land and change in the urban growth boundary, planning permit applications for subdivisions may be submitted alongside planning scheme amendments that implement the Precinct Structure Plan for the rezoned land. If not, these permit applications are prepared and lodged once the planning scheme amendment approving the Planning Precinct structure is gazetted.

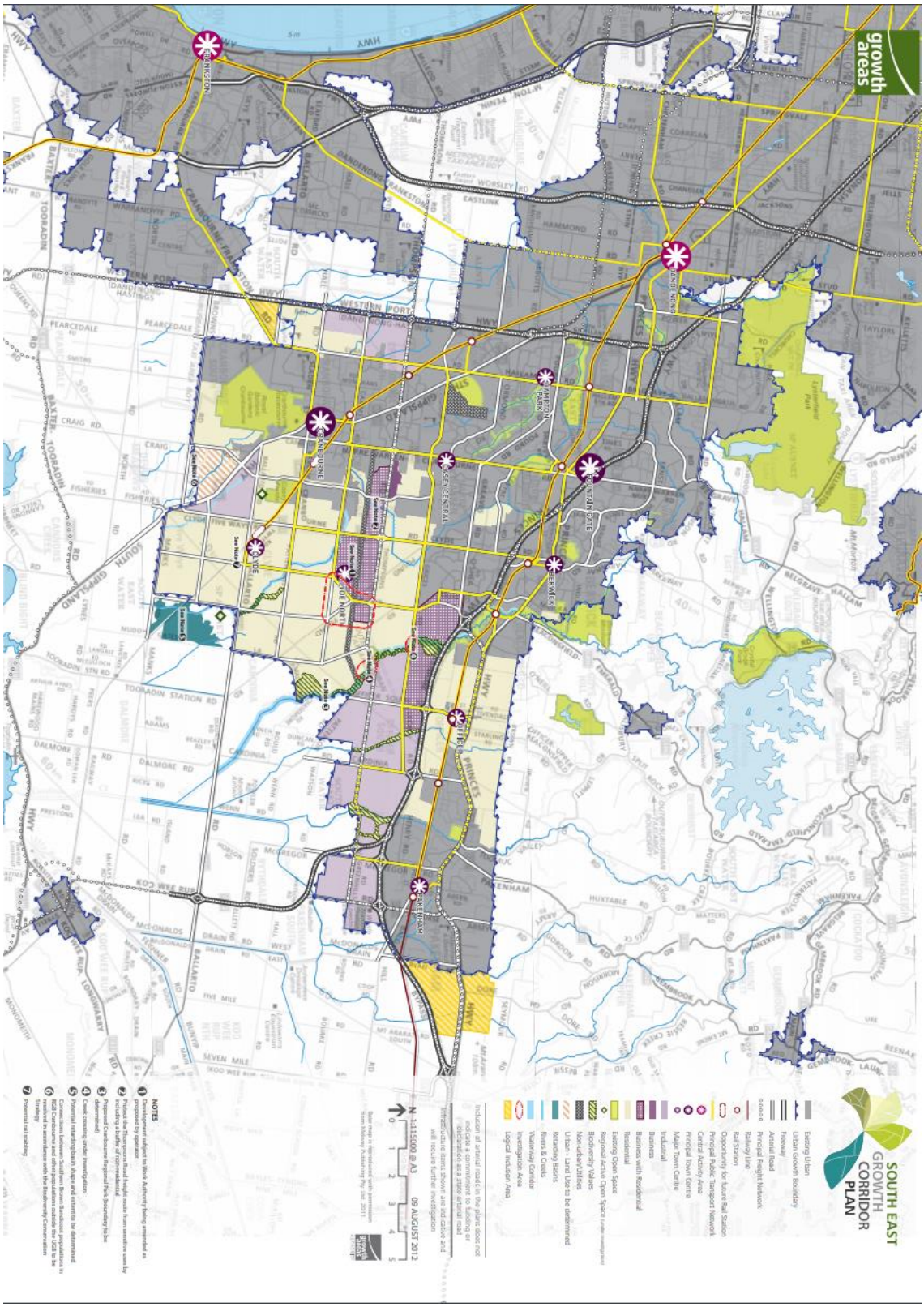

FIGURE 12. SOUTHEAST GROWTH CORRIDOR PLAN (GROWTH AREAS AUTHORITY, 2012)

PRECINCT STRUCTURE PLANNING PROCESSES

As part of edge development, Precinct Structure Planning are generally subsequent to the rezoning of land as Urban Growth Zones. As the process of preparing Precinct Structure Plans – PSPs is central to risk treatment, it is necessary

to describe how it is prescribed in the document titled *Precinct Structure Planning Guidelines – Part One – Overview of Planning New Communities* (Growth Areas Authority, 2013).

The document was first published in 2009 (Growth Areas Authority, 2009), revised in 2013 and currently undergoing a second revision by the Victorian Planning Authority.

The 2013 version outlines four stages for Precinct Structure Planning: Pre-Planning; PSP Preparation; PSP Approval and Planning Scheme Amendment; and Planning Permit Applications (Growth Areas Authority, 2013, p. 17).

The pre-planning stage is about getting the process started by providing advance notice of the process, carrying out budget management planning and a gap analysis of previous background technical studies as well as commencing the necessary background technical studies and initial vision setting workshops.

The PSP preparation stage involves the establishment of a vision for community and precinct, the completion of the necessary background technical reports, consultation and the preparation of the PSP document, the ***Native Vegetation Precinct Plan*** – NVPP and the ***Development Contributions Plan*** – DCP[11].

The PSP Approval and Planning Scheme Amendment Stage comprises: preparation and exhibition of a planning scheme amendment for the Urban Growth Zone and the Native Vegetation Precinct Plan; consultation and consideration of submissions by an independent panel, followed by PSP amendment; and PSP, NVPP and DCP approval by the Minister and their incorporation into the Local Planning Scheme.

Finally, the Planning Permit stage involves the lodging of planning permit applications with relevant authorities for approval, there being exemption from public notice, decision and review rights, followed by the issuing of planning permits with conditions related to specific development[12].

CASE STUDY: EDGE DEVELOPMENT IN THE CITY OF CASEY - BROMPTON LODGE[13]

On the 3rd of May 2011, the Victorian Minister for Planning appointed the Logical Inclusions Advisory Committee[14] to report on "Proposals for Logical Inclusions of Property within the Urban Growth Boundary". According to committee's terms of reference, "the planning process undertaken under the Delivering Melbourne's Newest Sustainable Communities (DMNSC) project in 2009 could have considered adjustments to the Urban Growth Boundary [and] proposals which

[11] The 2009 version also mentioned the preparation of the Cultural Heritage Management Plan (when applicable) and the Precinct Infrastructure Plan instead of the DCP, which was replaced by the Infrastructure Contributions Plan – ICP on the 27th October 2016.
[12] The PSP Guidelines document highlights that "The Planning and Environment Act 1987 allows permit applications to be prepared and approved concurrently with a precinct structure plan and planning scheme amendment".
[13] A detailed examination of the Brompton Lodge case study will be presented in an upcoming report for this project.
[14] Pursuant to Part 7, Section 151 of the Planning and Environment Act 1987.

ha[d] been made since 2009 and which [were] supported by growth area councils [might] merit closer examination" (Mitchell et al., 2011a, pp. 64-66).

The terms of reference also required the committee to have members with skills in strategic land use planning, metropolitan planning and land development, no mention made to skills in emergency management, disaster risk reduction or resilience to disasters.

The proposed method for the committee required inclusions to be "assessed against **Standards** and **Decision Criteria**, including a strategic review of the appropriateness of any proposed use in light of the relevant **State** and **Local Planning Policy Frameworks**" (Mitchell et al., 2011a, p. 64). However, no explicit mention of natural hazards or risk assessment appears in the *Terms of Reference*, which also list the parties that should have an opportunity to make a submission and be heard. In that respect, only land and property owners and respective Growth Area City Councils feature in that list, but not emergency management agencies of any kind (e.g. CFA, VIC-SES or MFB).

However, examination of the reports produced by the Logical Inclusions Advisory Committee[15] reveals that their set of **Decision Criteria** related to the identification of **Green Wedge Constraints** that included consideration of **Drainage Corridors** and **Wildfire** as constraints for urban development and employment, and the State Planning Policy Framework, that included clauses ***13 – Environment Risks*** and subclause ***13.5 Bushfire***.

At the time those reports were produced, recommendations from the 2009 Victorian Bushfires Royal Commission were still in the early stages of implementation, meaning that the ***Bushfire Management Overlay*** – BMO had not yet been introduced as an amendment to the State Planning and Policy Framework. Instead, the Committee utilised then-current ***Wildfire Management Overlay*** – WMO to assess wildfire risk.

EXISTING OPPORTUNITIES FOR IMPROVED INTEGRATION

A key challenge to appropriate risk management in urban development processes is the appropriate sequencing of inputs and decision points that allow for the testing of risks that are likely to exist in the future *if* development were to go ahead. If this occurs properly, then decision making deliberately considers and avoids, treats or accepts risk with a reasonable knowledge of likely future scenarios. However, formal planning processes do not currently comprehensively assess risks until the processes of land identification and release have progressed a significant amount – often beyond the point of no return. This sequencing issue subsequently places considerable pressure on later stages of land rezoning, scheme amendments and permit processes to adequately treat risks using planning instruments.

In summary, risk assessment and treatment could be improved by the inclusion of relevant parties in improved decision making during the process. It would also be improved by requiring the testing of scenarios and with the statutory requirement to assess risks in parallel. Further, various actors would have

[15] (Mitchell et al., 2011a, 2011b, 2011c, 2011d, 2011e)

appropriate legal standing, responsibilities and powers to facilitate these processes. These findings are explained next:

1. Future Growth would be considered as a range of possible scenarios, and generation and assessment of these in terms of risks would be required to be a statutory requirement.
2. Advisory Committees considering Logical Inclusions and other changes to the Urban Growth Boundary when they prepare their recommendations would include mandatory requirements in their ToR to do this;
3. The Victorian Parliament would be required to consider future risks when it is responding to the Advisory Committee reports on future Edge Development;
4. Victorians generally and a broad range of organisations, including local councils CFA, EMV and the VPA, when the draft Metropolitan Strategy would be included in meaningful scenario assessment during consultation processes;
5. Statutory requirements stipulate scenario testing and risk assessment as an aspect of Metropolitan Strategy production, including during and following consultation processes.
6. Developers are required to take on reasonable responsibility for the consequences associated with their projects.
7. Parliament of Victoria, Ministers, VPA, EMV, CFA and Local Councils are required/ allowed to contribute to regional fire management and growth plans; and, in turn, are required to consider risk scenarios in urban planning processes including scheme amendment and permits.
8. Planning Panels considering the Planning Scheme Amendment Proposal are required to consider risk scenarios in urban planning processes.
9. A range of procedural, practice guidance, training and statutory modifications are required across a range of administrative and professional facilitators to achieve the above.

TEAM MEMBERS

The Integrated Urban Planning for Natural Hazard Mitigation Project comprises an interdisciplinary team of researchers with expertise in the fields of urban planning, natural hazard mitigation, resilience, decision support systems, climate change, governance, disaster risk management and public policy.

PROF ALAN MARCH

Alan March is Professor in Urban Planning. He is also Director of the Bachelor of Design across the Faculties of Architecture, Building and Planning; Engineering; and, Faculty of Fine Arts and Music. Alan has twice won the Global Planning Education Network's prize for "Best Planning Paper" (2007, 2011). His teaching includes urban design, planning law and planning theory subjects, and he was awarded a Faculty teaching prize in 2007. Alan has successfully supervised over 60 students' theses encompassing a range of urban design and planning research topics. He won the Planning Institute of Australia's Victoria division "planner of the Year" prize in 2016 and won a National Commendation in the same category in 2017.

Alan has practised since 1991 in a broad range of private sector and government settings and has had roles in statutory and strategic planning, advocacy, and urban design. He has worked in Western Australia, the UK, New South Wales and Victoria. Alan's early career included projects as diverse as foreshore protection plans, rural to urban subdivision approval and design, the Mandurah Marina and Urban Design Guidelines for the Joondalup City Centre. In England, he has worked in brownfield and inner-city redevelopment, including land assembly and urban regeneration projects. Alan has extensive experience in inner-city redevelopment projects in Melbourne since 1996.

Alan's publications and research include the examination of the practical governance mechanisms of planning and urban design, in particular, the ways that planning systems can successfully manage change and transition as circumstances change. He is particularly interested in the ways that planning and design can modify disaster risks, and researches urban design principles for bushfire. His current work also considers the ways that urban planning is seeking to establish new ways to spatialise urban management.

DR LEONARDO NOGUEIRA DE MORAES

Leonardo Nogueira de Moraes is a postdoctoral research fellow in resilience and urban planning at the Faculty of Architecture, Building and Planning of the University of Melbourne. He is part of the research team for the Integrated Urban Planning for Natural Hazard Mitigation project, funded by the Bushfire and Natural Hazards Cooperative Research Centre.

His background includes a Bachelor of Tourism (Development and Planning) degree and a Specialisation in Tourism and Hospitality Marketing Management from the University of São Paulo, Brazil. His PhD in Architecture and Planning at The University of Melbourne focused on the effects of tourism development and

the implementation of protected areas on the resilience of small oceanic islands, from a social-ecological complex adaptive systems perspective.

His current research on resilience and urban planning also includes the effects of tourism development on the resilience of local communities to natural hazards. This research is being developed with the aid of grounded theory methods, coupled with social media analysis and data visualisation through interactive timelines.

DR GRAEME RIDDELL

Graeme is a researcher and consultant across the fields of urban planning, disaster risk and resilience. His work revolves around developing and applying innovative modelling and participatory approaches to tackle complex planning and policy issues. Graeme is currently a research fellow at the University of Adelaide (Australia) and associate consultant at RIKS, the Research Institute for Knowledge Systems (the Netherlands).

He is also a PhD Candidate at The University of Adelaide researching how to develop effective policies under conditions of complexity and uncertainty, considering both robust and adaptive approaches. He aims to develop decision support systems to assist in policy development. Graeme is also involved with the BNHCRC Project Decision support system for policy and planning investment options for optimal natural hazard mitigation led by Professor Holger Maier.

EMERITUS PROFESSOR STEPHEN DOVERS

Emeritus Professor Steve Dovers was originally trained as an ecologist and natural resource manager and worked in local government and heritage management. He later studied geography at graduate level and gained a PhD in environmental policy in 1996. He became an academic member of staff at the then Centre for Resource and Environmental Studies at the ANU in 1997. From 2009-2017 he was Director of the Fenner School of Environment and Society at the ANU and an inaugural ANU Public Policy Fellow. He is a Fellow of the Academy of Social Sciences in Australia, was inaugural Chair of the Management Committee of Future Earth Australia; a member of the Advisory Council of the Mulloon Institute, Associate Editor of the Australasian Journal of Environmental Management, and member of the Editorial Boards of the journals Local Environments, Environmental Science and Policy, and Resilience. Steve is a Senior Associate with the advisory firm Aither.

A/PROF JANET STANLEY

Janet Stanley is an Honorary Principal Fellow at the Faculty of Architecture, Building & Planning, visiting Professor at the University of Hiroshima, Japan, a Director of the National Centre for Research in Bushfire & Arson and a Director of Stanley & Co., consultants in sustainable policy. Prior to this, Janet was Chief Research Officer at Monash Sustainability Institute, Monash University.

Originally specialising in child protection and family violence, Janet now focuses on the interface between social, environmental and economic issues in climate

change and sustainability, across policy, system design, and at community levels. This work particularly focuses on sustainability issues for those people experiencing social exclusion and disadvantage. Most recent work has been on transport and land use in a 20-minute city, social policy and climate change and the prevention of bushfire arson. Janet has been an advisor to state and federal governments, is on the Board of the charitable trust, the George Hicks Foundation and is a member of the Future Melbourne Network.

A/PROF HEDWIG VAN DELDEN

Hedwig van Delden is Director of the Research Institute for Knowledge Systems (RIKS) in the Netherlands and Adjunct Associate Professor in the School of Civil, Environmental and Mining Engineering at the University of Adelaide.

Her work focuses on applying research into planning and policy practice, and in particular on understanding and modelling of land-use dynamics, integrating socio-economic and biophysical processes, bridging the science-policy gap and the development of strategic scenarios. In doing so, she focuses on the integration of disciplines as well as techniques (analysis, modelling, participation).

Hedwig has managed and contributed to a vast range of projects with multiple partners and objectives for various governmental organisations worldwide. Her work in Australia includes the development of integrated models to support long-term decision-making for disaster risk reduction policies as part of the Bushfire & Natural Hazard CRC project.

PROF RUTH BEILIN

Ruth Beilin is an internationally recognised expert in community-based resource management, in urban and non-urban resilience studies—especially in the area of social and environmental resilience and in complexity theory and the application of uncertainty to the everyday experiences of those on the ground—whether in fire, flood, sea rise, or drought. As examples: she has co-authored in excess of 90 peer-reviewed papers in high quality, international journals, including ecological and social journals. She co-designed and authored four chapters in the textbook Reshaping Environments, used by upwards of 6000 students to-date. In 2015 she co-edited two Special Issues of high impact international journals, Sustainability Science and J of Urban Studies, on Governance for Urban Resilience. She is an Associate Editor of Society and Natural Resources, among others. Since 2015, Professor Beilin has been a member of the New Zealand Science Advisory Panel for Land and Water. Her lab at the University of Melbourne is based on interdisciplinary research and her leadership in Australian Research Council Linkages and in the CRC Bushfires has involved applied and theoretical outcomes. For example, in the project The Social Construction of Fire and Fuel in the Landscape (CRC Bushfires) CFA and equivalent agency staff across the country can use the social-ecological/visual mapping techniques she co-developed.

PROF HOLGER MAIER

Holger Maier is Professor of Integrated Water Systems Engineering and Deputy Head of the School of Civil, Environmental and Mining Engineering at the University of Adelaide. Prior to joining the University in 1999, he worked as a consultant in the private and public sectors in South Australia, as a senior civil engineer with the Western Samoa Water Authority and as a postdoctoral research fellow at the University of British Columbia.

Holger's research is focussed on developing improved techniques for the sustainable management of water resources and infrastructure in an uncertain environment and includes elements of modelling, optimisation and multi criteria and uncertainty analysis. He has co-authored more than 10 book chapters and in excess of 100 refereed papers. He has received a number of national and international awards for his teaching and research.

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