Safer, Stronger Banyule

Methodology for Creating the 2026 Community Climate Resilience Plan

Banyule
City Council

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Banyule City Council is proud to acknowledge the Wurundjeri Woi-wurrung people as traditional custodians of the land and we pay respect to all Aboriginal and Torres Strait Elders, past, present and emerging, who have resided in the area and have been an integral part of the region's history. We have much to learn from First Nations peoples about adapting to a changing climate and living in balance with our local and global ecosystems.

Our community is made up of diverse cultures, beliefs, abilities, bodies, sexualities, ages and genders. We are committed to access, equity, participation and rights for everyone: principles which empower, foster harmony and increase the wellbeing of an inclusive community.

Banyule City Council is committed to building a climate-resilient community where all children and young people are safe, supported and able to thrive. We recognise that children are among the most affected by climate change, and we will ensure their safety, wellbeing and voices are central to our planning, decision-making and emergency responses. Our climate actions will uphold the Victorian Child Safe Standards, protect children's rights, and create environments where every child feels safe, valued and included today and into the future.

Banyule City Council would like to **thank the community members**, including members of the **Banyule Environment and Climate Action Advisory Committee**, who have participated in engagement and feedback workshops to share their ideas, around climate mitigation and adaptation.

We would like to thank **Dr. Kevin Hennessy**, author of our technical document, **Climate Hazard Scenarios for Banyule Council** for attending our community adaptation brainstorming session in his personal capacity to answer residents' questions. Creating a document that localises climate models to reflect our historic weather patterns and plausible future climate scenarios was a novel approach to creating this plan and will help us plan more effectively for the future. Dr. Hennessy has contributed to several Intergovernmental Panel on Climate Change (IPCC) reports and formerly worked at the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the head scientific research organisation for the Australian Government.

We acknowledge the contributions of many **Banyule City Council staff** who participated in the consultation process and helped shape the plan, particularly members of the adaptation working group who have met monthly since July 2025.

Cover photo by Michal Robak. This photo was chosen of mushrooms, the fruit of the highly resilient and collaborative mycelium networks which play a hidden, but key part of our world's ecosystems. These fragile-looking networks represent renewal and survival in the face of extraordinary changes and offer us something to reflect upon as we undertake our climate adaptation work.

No generative artificial intelligence (AI) was used in the analysis or writing of this document or related documents.

Introduction

This document, titled *Safer, Stronger Banyule*, provides the evidence-base around the 'what' and 'why' behind our approach to developing Council's ***Community Climate Resilience Plan 2026-2031 (CCRP)***.

This document was written with two audiences in mind. First, the Banyule community who told us they would like more transparency around our approaches and plan creation. For this audience, we dive deeper to include more information on populations deemed most at-risk of climate change and on the science which provides a look into our future climate pathways. Secondly, we wrote this for other local governments who are seeking to create their own climate adaptation plans. We've discussed some of the novel approaches used to create our plan, including citations and thinking that may help others on this same journey.

Initially we were going to create a separate climate adaptation plan and drafted an in-depth methodology in 2024 which set out our approach. In late 2025 we decided to merge our adaptation plan with Council's existing Community Climate Action Plan, which is more focussed on reducing Banyule-wide greenhouse gas emissions. The combined CCRP brings our climate adaptation and mitigation strategy and actions together into one easy to digest format.

Safer, Stronger Banyule specifically outlines:

- **The evidence informing our approach:** Why and how we focused on at-risk populations and the climate science behind the risks to Banyule.
- **How we identified our climate related risks and opportunities:** We describe our approach to defining climate risks, and the community and staff co-design approaches used to create our risks and opportunities that ultimately led to our action plan.
- **How we prioritised our climate-related risks:** We relied upon a variety of data points to help us prioritise our actions (that address identified climate risks) in ways that considered scientific evidence, historical occurrences, and local expertise, including that of our Banyule Environment and Climate Action Advisory Committee (BECAAC) and staff adaptation project working group.
- **How we'll implement the CCRP:** We define the 'adaptation lens'—an implementation mechanism to help us successfully complete our organisation's adaptation actions. We then detail what placing an adaptation lens across our work will look like.
- **How we'll monitor, evaluate, report, and improve (MERI) the CCRP:** Our MERI approach outlines how we intend to utilise continuous evaluation, a community of practice and Banyule community advisory committees, in addition to formal reporting timeframes.
- **The historical context for this work:** We outline how this climate change work has evolved at Banyule.

Focusing on Adaptation

Guided by the question, ***"What can Banyule City Council do to adapt to climate change impacts?",*** our work to bring climate adaptation to the forefront of the CCRP required us to reflect both internally as an organisation, and externally with community so we could better identify climate-related risks and increase preparedness within our community.

What do we mean by adaptation?

The Intergovernmental Panel on Climate Change (IPCC) defines climate change adaptation as:

> "Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation."

To make this definition clear, concise, and accessible for our community, we have restated this definition in the CCRP as:

Climate adaptation is the process of adjusting to the effects of climate change.

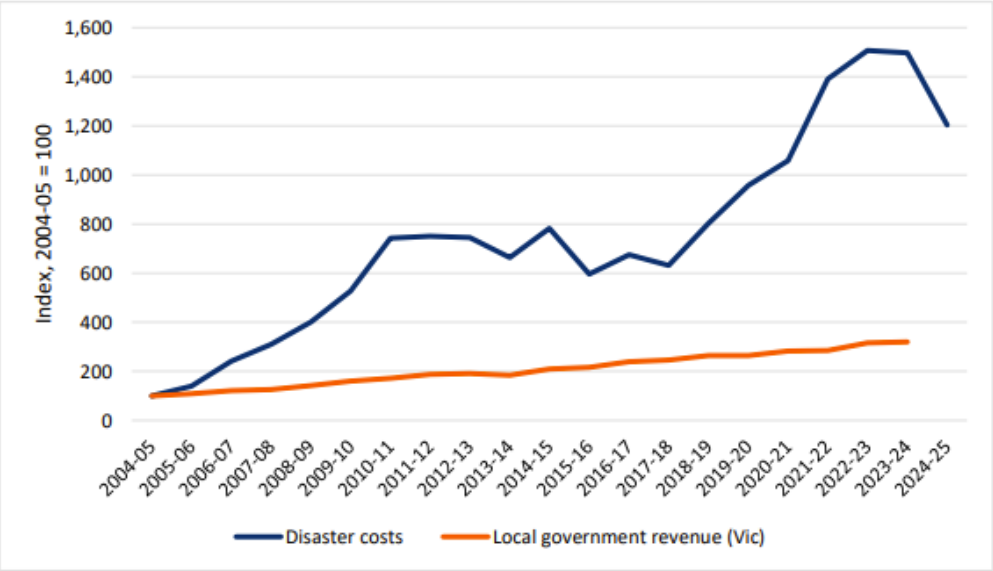
Climate adaptation planning challenges for local government

Climate change poses special challenges for local governments. Councils need to manage the rising costs of climate preparedness and disaster recovery within existing budgets and resources and with mixed understanding of climate models.

Local governments cannot pay for climate adaptations on their own

Municipalities across Australia are facing climate change related disasters like heatwaves, floods, and drought and their knock-on effects like power outages and impacts to the food supply. The costs for climate disasters are growing, however local governments across Australia do not have the budgets to keep up with those costs[1] (Figure 1). Rate caps limit the amount of funds that local governments can raise. There is much variability in budgets from Council to Council depending on the number of rate payers. Even if councils could afford these costs, a larger question remains around whether local government should be responsible for certain adaptation work. For example, cooling centres could arguably be supported by State or Federal Government, or through a cross-government collaborative model.

Figure 1 - Disaster cost vs local government revenue, 2004-05 to 2024-2025 VIC



(Source: Australia Institute, 2025)

The threat to infrastructure is large, and growing

A recent Infrastructure Victoria report examining State-held assets is instructive for local governments. It found that bushfire, flood, and extreme heat post the greatest risks to Victoria Government owned and regulated infrastructure. Currently, $23.4 billion of existing infrastructure is at risk from bushfires with the figure rising to $30.2 billion by 2070. In terms of flooding, $22.3 billion in infrastructure is currently at risk of flooding. These impacts will hit our roads, rail, energy and health sectors hard.[2]

[1] The Australia Institute. Costs of climate-driven disasters and local government revenue. September 2025.
[2] Infrastructure Victoria. Warning Signs: Climate change risks to Victoria's infrastructure. 2026.

Figure 2– Areas and infrastructure categories with a large value of infrastructure at risk to climate change hazards (Source: Infrastructure Victoria, 2026)

Value of infrastructure at risk of damage in a 2030 low emissions scenario (SSP1-2.6). Note: 'At risk' infrastructure means infrastructure assessed at level 3 or more on a 4-point risk scale. Areas with a large value at risk represent a 25 square kilometre grid with $100 million or more of infrastructure at risk to one or more of the 7 climate hazards in our analysis. Assets might be at risk to more than one climate hazard. Source: Infrastructure Victoria.

Locally, Banyule experienced flooding in December 2016 following one of the hottest nights on record and a violent storm. [3] Viewbank reached 33.8°C before recording 57.8 mm of rain between 4:00-4:30pm and 82 mm up to 11:00pm—the highest in Melbourne that day. SES received 1500 calls for help, including 41 people needing to be rescued from flooded cars or buildings. La Trobe University in Bundoora flooded and hundreds of homes were damaged. Transport was severely disrupted. The multi-lane Western Ring Road was closed in both directions in Bundoora due to the Darebin Creen flooding. Seven train lines were closed, including the Hurstbridge line between Greensborough and Hurstbridge. Strong winds knocked out the power to roughly 2500 homes and businesses across Victoria around 9:30pm and telecommunication services were disrupted.

[3] K Hennessy, Climate Hazard Scenarios for Banyule Council: A report by Climate Comms for Banyule Council, Victoria, 2025.

Rosanna Flooding 2016 (Source: Banyule City Council)

The built environment is only one area of concern for local governments. Social infrastructure, which includes things like community member agency, solidarity and security are also threatened by climate disasters. "Climate hazards are accelerating faster than our ability to rearrange exposure and build capacity."[4] Doing the work to help build community capacity, connection, and to create organisations that are resilient in times of emergency is key but is less visible than more obvious threats like flooded railways or buildings. Creating and supporting social infrastructure takes enormous amounts of time, behaviour change skills, and resourcing that builds capacity within communities.

Learning from Victorian Climate Resilient Councils

In October 2024, findings from a gap analysis[5] conducted by the Victorian Climate Resilient Councils group (VCRC) and the Western Alliance for Greenhouse Action (WAGA) were shared with councils across Victoria to build capacity amongst local government to prepare for, manage, and reduce risks related to climate change. This publication was commissioned due to a lack of locally specific resources available for the Victorian context.

The findings report gap analysis found that local governments across the board have many opportunities to strengthen their risk assessments to create robust climate change adaptation plans. Based upon this, VCRC created a toolkit and website that steps local governments through the process of creating a climate change risk assessment.

The timing of the gap analysis and toolkit provided Banyule City Council with an opportunity to create a climate change adaptation methodology that would address risks in a robust and fit-for-purpose way, while giving us a chance to create something truly transformative for our community.

[4] Standford Social Innovation Review. Climate Adaptation Means Building Social Infrastructure. 2026.
[5] Scoping a Climate Change Risk Assessment for Victorian Local Government: Findings Report, October 2024.

The following key findings from the VCRC gap analysis have informed the development of the CCRP:

Risk Frameworks – The likelihood and consequence approach is most typically used. The primary focus is on physical risks yet transitional risks are a gap. Standard risk frameworks can be used but must also cover multiple time horizons and emission scenarios to focus on climate change possibilities. Spatial analyses can support risk assessments by displaying hazards for various at-risk populations/locations. **Banyule has responded to this insight by creating the Adaptation Lens which will introduce climate scenarios and historic storylines into our current risk frameworks, along with cascading events rather than single events.**

Scenario Planning – Most councils utilise Representative Concentration Pathways (RCPs) but don't factor in things like demographic changes. One council used the Political, Economic, Social, Technological, Legal, Environmental (PESTLE) approach to think about risks holistically and with stakeholders to ensure richer scenarios. Councils need resources on possible scenario futures that can be tailored to their local context. **Banyule has responded to this insight by developing our *Climate Hazard Scenarios for Banyule Council* document to inform the CCRP and by working through PESTLE with our staff adaptation project working group to assess our risks and identify actions.**

Implementation – Analysis found that most local government plans stall at the implementation stage. To ensure actions are delivered, VCRC recommends actions be embedded and reported on through an organisation's Audit and Risk Committee. Analysis of Council climate risk assessments revealed that councils were approaching actions with a "light touch." While one council developed a cost-benefit analysis of inaction, none of the plans included a monitoring, evaluation, reporting and improvement (MERI) framework which often leads to inaction. Analysis found that work which is situated in an evidence-based behaviour change program is more likely to be actioned. The report warns of decision paralysis when actions have various degrees of long lead times and uncertainty, thus a Dynamic Adaptive Policy Pathways (DAPP) approach is recommended where hitting certain data points trigger a suite of actions. **Banyule has responded to this insight by creating a staff adaptation project working group to co-create this plan from the beginning to foster shared ownership and actions. We also created the Adaptation Lens which we will introduce into all staff workplans. We also created a MERI framework that is adaptive, iterative, and nimble.**

The toolkit and resources provided by VCRC included an Adaptive Capacity Checklist which helps councils gauge their current strengths, opportunities, and priorities as pre-work before creating an assessment. A service-level survey was provided as a tool to gather information across council departments and teams. A list of suggested actions and considerations was also provided to support the Adaptive Capacity Checklist and ensure actions are embedded in the organisation. VCRC also point councils to the existing legislative resource guides including those from The Department of Environment, Land, Water and Planning[6], The Northern Alliance for Green Action[7], and the Department of Health[8] and offers guidance on the use of climate scenarios and data sources.

[6] Department of Land, Water and Planning. Local government climate change adaptation roles and responsibilities under Victorian legislation: Guidance for local government decision-makers, 2020.
[7] Northern Alliance for Greenhouse Action. Embedding Action on Climate Change in your Council Plan.
[8] Victoria Department of Health. Tackling climate change and its impacts on health through municipal public health wellbeing planning: Guidance for Local Government, 2024.

Banyule's climate adaptation methodology

This methodology aims to help Banyule's community understand how we've developed our climate adaptation response. It was also written for other local government officers who are on this climate adaptation journey in the hope of providing guidance.

To guide the creation of our plan we stepped out a four-stage methodology / framework (Figure 3), incorporating all the best practice approaches outlined in VCRC's report. While the stages seem linear, the process was more iterative in practice, with us progressing from stages one to three, then going back to stage 1 again. Council's adaptation response through the CCRP will also need to be iterative, recognising that climate change is not business-as-usual and thus any plan needs to be a **living**, **evolving document** that can both prepare for and respond to climate changes as they happen.

Figure 3 – Four stages of creating Banyule's climate adaptation plan

Foundational guidance to our methodology included the VCRC assessment, in addition to the legal requirements under the Local Government Act 2020, the Australian Climate Reporting Standards 2024, the International Organization for Standardization's global guidance on risk assessments (ISO31000 and climate change adaptation assessments (IS)14090), a desktop review of best practices, and the insights drawn from the Northern Alliance for Greenhouse Action local government network.

An at-a-glance graphic depicting the full methodology used to create our climate adaptation plan can be found in Figure 4 below.

Figure 4 - Climate Change Adaptation Framework: At-A-Glance

Foundational guidance for adaptation focus of the Community Climate Action and Adaptation Plan

- Legal requirements under the Local Government Act 2020 and the Australian Climate Reporting Standards 2024
- International Organization for Standardization's global guidance for standard risk assessments (ISO31000) & climate change adaptation assessments (ISO14090)
- Victorian Climate Resilient Councils toolkit and assessment
- Desktop review of best practices and documents from Australian Greenhouse Alliance Network
- Community & staff engagement and co-design sessions during Stages 1-2
- Monthly staff adaptation project working group meetings

Stage 1- Identifying Risks & Opportunities

Methods for identification:
- Likelihood & Consequence
- Hazard, Exposure, and Vulnerability Analysis

Deliverables:
- Risk and opportunities register created
- Staff Adaptation Project Working Group created
- Creation of Banyule Climate Hazards Scenario document

Stage 2 - Analysing Risks & Opportunities

Methods for risk assessment:
- Likelihood & consequence
- Hazard, exposure, and vulnerability
- GIS risk mapping for variables
- Dynamic adaptive policy pathways

Climate scenarios & time horizons:
- Shared Socioeconomic Pathways (SSPs)
- Storylines from Climate Hazards Scenario document
- 2030, 2050, 2070, 2090

Analysis approaches:
- PESTLE
- ISO31000

Deliverables:
- Prioritisation workshops with Banyule Environment and Climate Action Advisory Committee & staff
- Prioritised action plan
- CRM/BOM events linkage project

Stage 3 - Embedding Adaptation Actions across Council & Community

Methods for embedding actions:
- Capability-Opportunity-Motivation model of behaviour change

Deliverable:
- Implementation plan
- Ongoing community of practice (evolving staff adaptation working group)

Stage 4 - Monitoring, Evaluation, Reporting and Improvement (MERI)

Methods for evaluation and improvement:
- Continuous evaluation through Community of Practice
- Annual evaluation of actions
- Scan of vulnerability and resilience metrics

Deliverables:
- Annual report
- Creation of online community impact portal to track actions and inspire others
- Creation of online Council impact dashboard to track actions
- Vulnerability indicators

Novel approaches

We used traditional approaches to create our climate adaptation plan, including literature reviews and a six-week community engagement process to guide the CCRP's creation. We also used some new approaches to better address the complexity of climate change and reflect the need for context and collaboration in our work, including:

Using climate data and GIS

We utilised available climate change data on Urban Heat Island Effect, Heat Vulnerability Index, and Bushfire Risk to create new GIS maps for internal use. These were used with SEIFA data on socioeconomic disadvantage and advantage to map areas of exposure and vulnerability across the municipality.

Staff co-design working group

We facilitated a cross-organisation staff adaptation working group who met monthly for the project's duration to co-design this plan with service delivery, infrastructure, and customer service needs in mind.

Localising our climate hazards

We created a local climate hazard risk scenarios document that uses both climate models and historical weather data to produce storylines. This is key to understanding our risks and feasible actions we can take to be prepared while utilising our resources strategically.

Community co-design

We workshopped our climate-related risks and opportunities with community members who attended four co-design workshops. We used community stories from our engagement methods to help us think through climate actions.

Prioritising risks with BECAAC and staff

We prioritised community-identified risks and opportunities related to climate adaptation with the Banyule Environment and Climate Action Advisory Committee (BECAAC), comprised of expert community volunteers, and the staff adaptation project working group.

Understanding our most at-risk populations

We sought to consult at-risk community members for in-depth interviews. Presentations to service-provider networks resulted in useful feedback and recommendations of best-practice literature that has guided the creation of our plan.

Using Customer Service data

We linked ten years of customer service requests to Bureau of Meteorology data on extreme heat and flooding events across our municipality over that time. This enables us to be proactive for future floods and heatwaves.

Who is most at-risk of climate change impacts?

We know that climate change disruptions and impacts are not evenly felt across our municipality. The most at-risk of climate change hazards[9] are impacted first and hardest. More people die in Australia from heatwaves than from all other extreme weather events combined.[10] People facing financial and social disadvantage are worst impacted by these events due to constraints like thermally inefficient housing, unaffordable energy bills, or a lack of resources to implement solutions or evacuate in times of crisis.[11]

Guided by the question, ***"What can Banyule City Council do to adjust to climate change impacts in both our organisation and in the community?",*** the Community Climate Resilience Plan defines actions we at Banyule can take, along with the community, to minimise harms from climate-related impacts such as extreme weather and its knock-on effects, like power outages. A core goal for this plan is to operate from a foundational understanding of climate change evidence, equity, and inclusion. This means not leaving anyone behind on the climate adaptation journey. Climate action must be accessible to all to be equitable, holistic, and effective.

The Intergovernmental Panel on Climate Change defines the following demographics as more at-risk[12] in terms of climate impacts:

Aboriginal and Torres Strait Islander Peoples	Women	Children aged 6 and under, and single parents
Drug and alcohol users and smokers	Populations aged 60+;	People with chronic health issues
People with disability	People who work outdoors	People from Culturally and Linguistically Diverse backgrounds
People experiencing economic disadvantage	People who are unhoused or experiencing housing insecurity	

The CCRP uses terms such as 'climate-vulnerable' and 'at-risk' to identify the people and communities most vulnerable to climate change that we aim to support, including people from diverse cultures, beliefs, abilities, bodies, sexualities, ages and genders.

Accessibility of this plan and needs arising from climate change for different genders

Gender is one of the many intersecting issues that can make someone more at-risk of climate impacts, along with things like socioeconomic status, disability, or age. We have focused on how extreme weather events and disasters are experienced through gender dynamics and norms and how this may increase personal risk. The performance of gender, for example, in terms of caretaking can mean different things from women than for men when it comes to disaster readiness, willingness to leave or evacuate, or willingness to take risks. Gender norms also shape how things like refuge or evacuation centres are de-signed with little consideration for people who are transgender and could pose dangers for this demographic. Men are overrepresented in emergency response and control agency leadership roles, while women are often represented more in relief and recovery

[9] International Panel on Climate Change (IPCC), Working Group 2 report on Impacts, Adaptation and Vulnerability, 2022.
[10] Australian Institute of Health and Welfare. Let's talk about the weather: Injuries related to extreme weather, 2023.
[11] Australian Council of Social Services (ACOSS). Heat in Homes Survey Report, 2025.
[12] International Panel on Climate Change (IPCC), Working Group 2 report on Impacts, Adaptation and Vulnerability, 2022.

roles seen as 'care' work. Particularly when it comes to emergency response organisations, a lack of diversity amongst leadership often results in practices that overlook the views of women and gender diverse people.[13]

When thinking through how different genders and demographic groups might access our climate adaptation plan, we realised we needed to consider two distinct issues—one, accessing the actual plan we drafted and two, the issue at heart which is climate change.

Gender influence on climate concern

While we have made every attempt to create our Community Climate Resilience Plan in a way that will be accessible, inclusive, and of interest to everyone, it is likely that women and gender diverse people will be more likely than men to engage with the plan. Research consistently shows that women in high income countries (with high per-capita emissions) express concern about issues like climate change more than men. A 2024 Yale University study[14] found that 65% of those 'alarmed' or 'concerned' about global warming were women, compared to 54% of men who were 'alarmed' or 'concerned.' This is reflected in our own engagement findings which showed that 63% of our adaptation survey respondents identified as female; and only 34% identified as male; while 3% identified as 'other identity.' Interestingly, the Yale study also found that in countries with low income and low per-capita emissions, this nearly evened out with 67% of women compared to 66% of men being 'alarmed' or 'concerned' about global warming.

A gender-responsive approach

We are still learning about the disparity of climate impacts upon genders. At the most recent UN Conference of Parties on Climate Change (COP30) in Brazil, the Belem Gender Action Plan 2026-2034 was proposed which called for stronger evidence on the differentiated impacts and opportunities of climate change upon women. The Belem Gender Action Plan recognised that gender equality and a just transition to renewables requires a gender-responsive implementation of climate policy and action. It acknowledges the differentiated impacts of climate change for women and girls across the world whether they are Indigenous, migrants, women with disabilities, women farmers, and other women most at-risk of climate change.

Action A.3 calls to,

> "Strengthen the evidence base for and understanding of the differentiated impacts and opportunities of climate change and climate action relevant milestones on women, especially Indigenous women and women from local communities, and their role as agents of change, as well as the role of men and boys as agents and beneficiaries of change and strategic allies in achieving gender equality".

Our research on the most at-risk demographics shows that:

- A hotter planet is a more violent one, particularly for women and children.[15]
- Climate change poses risks to Aboriginal and Torres Strait Islander people's self-determination, livelihoods, and cultures.[16]
- People with disability face higher rates of death during climate disasters as processes and refuge centres are not designed with them in mind.[17]
- Older people will require greater support, particularly for extreme heat.[18]

[13] Commission for Gender Equality in the Public Sector, Understanding gendered issues in emergency management, online, 2026.
[14] M Verner, et.al. International Public Opinion on Climate Change: Differences by Gender and Income/Emission Levels. Yale University. New Haven, CT: Yale Program on Climate Change Communication, 2024.
[15] R Mahendran, et. al. Interpersonal violence associated with hot weather. The Lancet Planetary Health, 5, e571-e572, 2021.
[16] Australian Climate Service. Aboriginal and Torres Strait Islander Peoples Technical Report, 2025, online.
[17] Collaborating4Inclusion. Disability Inclusive Disaster Risk Reduction (DIDRR) Framework and Toolkit, 2024.
[18] Collaborating4Inclusion. Disability Inclusive Disaster Risk Reduction (DIDRR) Framework and Toolkit, 2024.

Needs related to this plan from everyone who accesses it

Not everyone will have the same needs from the adaptation plan or benefit from it in the same way. At-risk community members will have more vested interest in the success of the plan. A summary of how vulnerable cohorts are differentially impacted by climate change is provided below.

The Community Climate Resilience Plan identifies opportunities for Council to better support these vulnerable cohorts, including through provisioning of advice, education, incentives, translated materials, and modifications to the public realm that support and build community resilience, for example urban cooling. The plan also provides guidance and direction to residents on how to improve their own climate resiliency.

The CCRP is informed by a detailed Gender Impact Assessment (GIA), which explored the gender impacts of climate change along with impacts on all at-risk communities in Banyule. Key findings of the GIA for each at-risk cohort are summarised below.

Aboriginal & Torres Strait Islander Peoples:

- The 2025 Wurundjeri Whole of Country Plan recognises climate change as a threat under section 6-Enhance biodiversity across Wurundjeri Woi-wurrung Country. The body is seeking collaboration with DEECA and local councils toward climate change adaptation, emergency planning and biodiversity planning and the creation of an overarching framework by 2030.[19] As of 2021, 0.7% of Banyule's population identifies as Aboriginal or Torres Strait Islander.[20]
- The Australia National Climate Risk Assessment identified eight key systems that support Australian society that are at risk from climate change. Aboriginal and Torres Strait Islander peoples are one of them. Deeply connected and interdependent with the natural world, Aboriginal and Torres Strait Islander peoples are disproportionately affected by climate change in a number of ways.[21]
    - Risk to self-determination
    - Risk to land, sea and Country
    - Risk to cultural knowledges, practices, values and sites
    - Risk to people's health, wellbeing and identity
    - Risk to economic participation and social and cultural economic development
    - Risk to water and food security
    - Risk to remote and rural communities
- Both acute and chronic climate events can change or restrict access to Country and cultural sites, which limits the ability of First Nations Peoples to practice and share cultural knowledge, and reduces self-determination. This can have flow on impacts to for health, wellbeing, and identity.
- It is also important to acknowledge the impacts from intersectionality, whereby Aboriginal & Torres Strait Island Peoples who are also women, LGBTQI+, and/or experiencing health conditions or economic disadvantages can receive compounding impacts.

Women, girls, and young children:

- Women and girls can be disproportionately impacted by climate stressors and extreme events due to additional care-giving burdens for family members, children, and the elderly.[22] This impact becomes more pronounced where the share of domestic labour and caregiving duties are already unequally

[19] Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation (2025). Whole of Country Plan. Online.
[20] City of Banyule Community Profile, ID Community, online.
[21] Australian Climate Service. Aboriginal and Torres Strait Islander Peoples Technical Report, 2025, online.
[22] R Mahendran, et. al. Interpersonal violence associated with hot weather. The Lancet Planetary Health, 5, e571-e572, 2021.

divided within families and across genders.[23] According to data from the Banyule 2025 Household Survey, 31% of the female population in Banyule do more than 14 hours of unpaid domestic work per week, compared to 12% of males.

- Women who undertake more home-based roles can be disproportionately impacted by extreme heat events, particularly where homes are not well insulated or do not have access to cooling. In Banyule, the labour force participation rate for women is 61%, compared to 68% for males[24].
- Instances of domestic violence and intimate partner violence increase alongside climate change impacts, such as heatwaves, or climate-driven cost-of-living pressures, with women experiencing the brunt of this negative impact.[25, 26]
- Perimenopausal and menopausal women often experience changes in thermoregulation caused by reduced estrogen levels.[27] This can result in vasomotor symptoms like hot flashes and increased sweating for 80% of women, which are exacerbated by heatwave conditions.[28]
- Young children are impacted differently than adults- their bodies and minds are especially vulnerable to pollution, climate-related diseases and extreme weather. Infants and young children can't regulate their body temperatures and suffer more than adults from air pollution and extreme heat.[29]

Older populations

- Climate-related heat and air pollution are two factors that most negatively impact morbidity for older adults.[30]
- Older populations have less adaptability due to physiological changes related to ageing and insufficient family or social networks[31] and may even face blame from younger generations for climate inaction, increasing feelings of isolation.[32]
- Older people are often not considered in mitigation and adaptation climate change policies.[33]
- Elders with various types of dementias are at a higher risk during extreme heat and suffer exacerbated cognitive decline and hospitalisations.[34]

People who smoke or are drug users

- This vulnerable cohort are more susceptible to respiratory health impacts from climate-driven air quality degradation, including windblown bushfire smoke, haze, and thunderstorm asthma.
- After disasters, people participating in drug rehabilitation programs often see disruptions to their programs and experience a loss of support networks, particularly after the "honeymoon period" of disaster recovery starts to fade and resources are strained.[35] Floods and fires lead to increased substance use.[36] This can increase the likelihood of relapse or even death.

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[23] A. Erman, et. al. Gender Dimensions of Disaster Risk and Resilience. World Bank. 2021.
[24] City of Banyule Community Profile, ID Community, online.
[25] R Mahendran, et. al. Interpersonal violence associated with hot weather. The Lancet Planetary Health, 5, e571-e572, 2021.
[26] United Nations (UN). Colliding Crises: How the climate crisis fuels gender-based violence, 2025, Online.
[27] M Gombert-Labedens, et. al. Effects of menopause on temperature regulation. Temperature (Austin). 2025 Apr 23;12(2):92-132.
[28] L Ironmonger. From hot flushes to night sweats: how to deal with menopause in a heatwave. Sydney Morning Herald, 2025.
[29] United Nations Children's Fund, The climate-changed child: A children's climate risk index supplement, UNICEF, New York, November 2023
[30] E M Montoro-Ramirez, et. Al. Climate change effects in older people's health: A scoping study, Journal of Advanced Nursing, 81. 8066-8079.
[31] E M Montoro-Ramirez, et. Al. Climate change effects in older people's health: A scoping study, Journal of Advanced Nursing, 81. 8066-8079.
[32] L Ayalon, Climate change and aging: From vulnerability to action, Innovation in Aging, 2023 Dec 21;7(Suppl 1):152.
[33] L Ayalon, Climate change and aging: From vulnerability to action, Innovation in Aging, 2023 Dec 21;7(Suppl 1):152.
[34] A Kriebel-Gasparro, Climate Change: Effects on the Older Adult, The Journal for Nurse Practitioners, Volume 18, Issue 4, 2022, 372-376.
[35] K Myers. Hurricane Helene shattered lives- and the systems that keep people sober, Grist, 2026.
[36] S MacLean, et.al. How does climate change impact people who use alcohol and other drugs? A scoping review of peer reviewed literature. International Journal of Drug Policy, Volume 134, 2024.

People who work outdoors

- Outdoor workers are one of the most vulnerable populations to climate change and heat related risks with studies showing heat-related symptoms in 64%-90% of outdoor workers, who are mostly men.[37]
- Extreme heat and humidity pose particular health risks for athletes who perform outdoors. Despite elite athletes collapsing during high-profile events like the Tokyo Olympics, games are rarely suspended but athletes are told to take more drink breaks.[38]
- By mid-century, outdoor workers could see a three-to-fourfold increase in days that "feel like" they are above 37°C.[39]
- A study of Mexican agriculture workers found that young workers, aged 15-24, are 10 times more likely to die from heat exposure than a peer in a professional or managerial role.[40] An Australian study found that farm worker productivity dropped by 2 to 3 percent for every degree above 20°C.[41]
- Firefighters, who are predominately male in Australia, experience environmental and occupational exposures during wildfire suppression which are linked to increases in PTSD and other psychological symptoms long after the events have passed. They are also less likely to be diagnosed for their conditions due to a stigma surrounding mental healthcare for men and lack of access to resources.[42]

People living with a disability or chronic health conditions:

- People living with a disability or who have accessibility needs are more likely to be adversely impacted by acute climate events, due to mobility challenges, reduced access to tailored information, visual or hearing impairments, and psychosocial factors.
- People with disability face increased climate exposure through housing discrimination, whereby they are more likely to live in areas with higher ambient temperatures, increased flood risk and lack of green space.[43]
- Emergency systems and procedures are often established without adequate consideration of diverse needs of people with disability or chronic health conditions.[44]
- In 2021, there were 7,426 people with a need for assistance living in the City of Banyule[45]. This cohort is susceptible to impacts where social services or caregiving services are disrupted due to climate change or extreme weather events, which can have cascading effects across mental and physical health domains.
- In addition, people with psychosocial disabilities are more likely to suffer heat stroke due to things like extreme heat interacting with some anxiety or depression medications. Other health challenges include reduced ability to thermoregulate for people with disability (such as reduced ability to sweat for people with spinal cord injuries).

People facing economic disadvantage:

- People may be unable to afford treatment and medication for mental and physical health conditions, where income is not sufficient to meet basic needs. This can increase vulnerability to impacts from climate impacts such as extreme heat.

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[37] M F Rossie, Heat-related risk in outdoor workers in the context of climate change: a systematic review, European Journal of Public Health, Vol. 34:3, November 2024, 906.
[38] K Sambrook, et. Al. Outdoor sport in extreme heat: Capturing the personal experiences of elite athletes, Weather, Climate and Society, July-September 2023, V. 15:3:619-631.
[39] K. Dahl and R Licker, Too hot to work: Assessing the threats climate change poses to outdoor workers, Union of Concerned Scientists, 2021.
[40] R Daniel Bressler, et.al. Working Under the Sun: The Role of Occupation in Temperature-Related Mortality in Mexico. Institute of Labor Economics, 2025.
[41] K Ricketts and S Whitnall, From heat stress to economic stress: Exploring the future of Australian agriculture and labour productivity, Australian Farm Institute, 2025.
[42] I Bonita, et.al. Exposure to wildfires exposures and mental health problems among firefighters: A systemic review. Atmosphere, 2024, 15, 78.
[43] S Kim. Leave no one behind: a call to include people with disabilities in climate change and health research. Lancet Planet Health, 2026,
[44] Collaborating4Inclusion. Disability Inclusive Disaster Risk Reduction (DIDRR) Framework and Toolkit, 2024.
[45] Disability in Banyule, Social Research Report (June 2024).

- 45% of women in Banyule compared to 33% of men reported being on low incomes (defined as less than $650 per week), highlighting the intersectionality of economic disadvantage with gender.[46]
- People facing economic disadvantage have less adaptive capacity in the face of climate or disaster events. Limited access to finances means less levers are available to mitigate, avoid, or lessen impacts. In addition, people facing financial insecurity often face the trade-off of taking time off work to care for self and others or continuing to attend work under potentially hazardous circumstances such as extreme heat, extreme storms, bushfires, or floods.

People who are unhoused or in precarious housing

- The personal safety of unhoused people is threatened by acute weather events such as storms, flooding, and heatwaves, whilst instances of morbidity and mortality are affected by heat and cold exposure. At the same time, access to essential homelessness services may be disrupted during extreme weather events, further exacerbating existing disadvantage.
- People who are unhoused are already more vulnerable to street aggression and crime, and increasing global temperatures have been found, at the population level, to increased violence.
- Increased displacement, damage to housing stock and/or insurability of homes can further displace lower income families and individuals.

People from Culturally and Linguistically Diverse backgrounds

- Culturally and Linguistically Diverse populations face disproportionate burden of climate change-related health impacts due to intersecting socio-cultural and economic factors, geographic vulnerabilities and health disparities.[47]
- Prioritising multilingual risk communication strategies and culturally appropriate education and access are key to addressing climate risks.[48]

Gender Diverse People:

- Gender diverse people's experiences are often added as a caveat to women's experiences in research data, which is not adequate in understanding the unique challenges faced by gender diverse people.[49]
- Gender diverse people are at risk of both physical and psychological harm from a cis-normative society in the context of climate and disaster events, for example: in disaster centres where gender neutral facilities may not be provided and 'corrective' (attempting to force one into normative binaries) harassment is widespread.[50]
- Loss of access to gender-affirming care such as hormone therapy and specialised psychological support as a result of climate events can be deeply harmful to transgender people and can result in negative impacts for physical and mental wellbeing.

In response to the GIA and literature review the CCRP includes a strong focus on supporting Banyule's most at-risk people, which is embedded within the CCRP's 'Adaptation Lens'.

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[46] City of Banyule Community Profile, ID Community, online.
[47] S Sharma and O Anikeeva, Impacts of climate change and related weather events on the health and wellbeing of culturally and linguistically diverse communities: A systematic review, Journal of Racial and Ethnic Health Disparities, 2025.
[48] N Laurie, et. al. Translation urgency in our climate-challenged times: co-producing geographical knowledge on El Niño in Peru. *Scottish Geographical Journal*, *140*(1–2), 248–261.
[49] KE Simmonds. Health impacts of climate change on gender diverse populations: A scoping review. Journal of Nursing Scholarship, 54, 81–91, 2022.
[50] KE Simmonds. Health impacts of climate change on gender diverse populations: A scoping review. Journal of Nursing Scholarship, 54, 81–91, 2022.

Climate risks to Banyule

This section provides a short summary of Banyule's historical and future climate[51] scenarios to outline what this means for our local area. To best prepare for things like extreme heatwaves or floods, we need to understand what we are experiencing now and how that is likely to change in our near future.

Climate risks are the potential harm to human or natural systems that result from extreme weather events made worse by human-caused climate change. Climate risks come from our exposure and vulnerability to things like extreme heatwaves, droughts, floods, and severe storms. Knowing more about the severity of climate hazards and the risks we face can help us increase our preparedness and decrease our vulnerability through planning and adaptation.

Climate risks fall into three types:

1. First Order- Exposure type risks
2. Second Order- Physical damage risks
3. Third Order- Systemic response risks

Exposure type risks result from the potential exposure of a place, community, ecosystem or population to a weather event made more likely by climate change. For example, a multiyear drought impacting millions of people across Melbourne.

Physical damage risks are the impacts of exposure to a weather event on the human body, nature, the built environment, or other systems. For example, a heatwave that causes hundreds of hospitalisations for heat stroke.

Systemic response risks result from large scale (systemic) responses to exposure to first and second order risks and can be political, economic, natural, or social in nature. For example, human migration from climate ravaged areas to more liveable areas.

For a more detailed analysis of climate scenarios and possible future impacts, please see our technical report, **Climate Hazard Scenarios for Banyule Council.**[52]

Changes to Victoria's climate

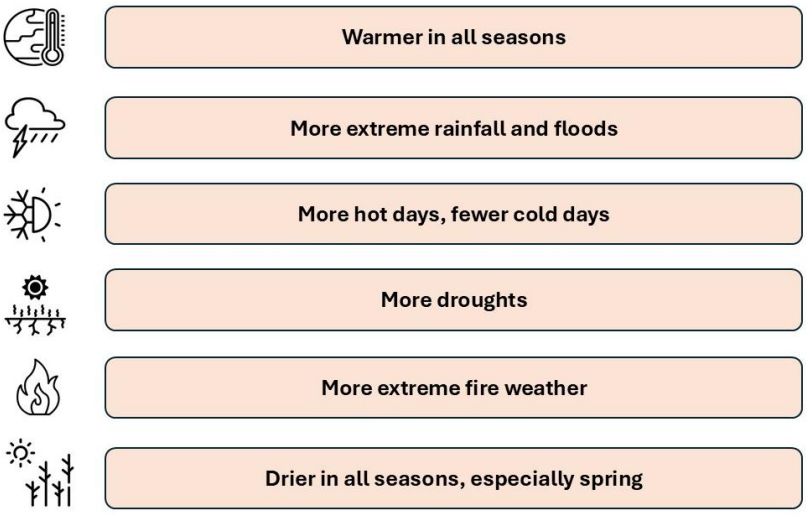
- Victoria has become about 1.2°C warmer since 1910 with more than half occurring in the past 30 years[53] . This has been attributed mostly to increases in greenhouse gases.
- Over recent decades Victoria has become drier. April to October rainfall declined by 10% over the past 30 years relative to the average for 1961–1990. This has been mostly attributed to increases in greenhouse gases[54].
- The Forest Fire Danger Index (FFDI) measures fire weather through temperature, rainfall, humidity, and wind speed observations. Since 1950, there has been an increase in the frequency of extreme fire weather days across most of Australia, including Victoria. Increases are largest in spring and summer and associated with an earlier start for the fire season.[55]

[51] Climate and weather are often confused. Weather refers to short-term conditions in the atmosphere that take place over hours to days- like cold, rainy, or windy. Climate refers to the long-term averages and patterns of weather over decades or longer.
[52] K Hennessy. Climate Hazard Scenarios for Banyule Council: A report by Climate Comms for Banyule Council, Victoria, 2025.
[53] Commonwealth Scientific and Industrial Research Organisation (CSIRO), Victoria's climate science report, 2024.
[54] Commonwealth Scientific and Industrial Research Organisation (CSIRO), Victoria's climate science report, 2024.
[55] Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Bureau of Meteorology (BoM), State of the Climate, 2024.

Future climate

According to climate projections made in 2024 for the Greater Melbourne region based on 34 CMIP6 climate models (5-8 of which were downscaled to improve local climate information)[56], Melbourne will become warmer in all seasons, and drier. In general, our climate is becoming more unstable and unpredictable.

Figure 5 - Melbourne's Future Climate Trends



What this means for Banyule

Figure 6 - Impacts of Low and High Emission Pathways on Projected Future Temperatures and Rainfall

	Low emissions scenario (ideal)	High emissions scenario (business-as-usual)		
	By 2050, 2070, and 2090:	2050:	2070:	2090:
Projected increase in average annual temperature	+1°C	+1°C	+2°C	+3°C
Projected decrease in annual average rainfall	-5%	-5%	-9%	-12%

Under a low global emissions scenario (which assumes significant global carbon emission reductions), the projected increase in annual average temperature is about 1°C for 2050, 2070 and 2090, relative to 1986-2005. For high emissions (assuming weak reductions in global emissions), the projected increase is about 1°C by 2050, 2°C by 2070 and 3°C by 2090. This means more hot days and fewer cold days and other considerations as illustrated below.

Drier conditions are likely, especially in spring. For low emissions, the projected decrease in annual-average rainfall is about 5% for 2050, 2070 and 2090, relative to 1986-2005. For high emissions, the projected decrease is 5% by 2050, 9% by 2070 and 12% by 2090. Greatest decreases are simulated in spring, which is the period we'd normally receive the most rain for our year.

[56] K Hennessy. Climate Hazard Scenarios for Banyule Council: A report by Climate Comms for Banyule Council, Victoria, 2025.

Utilising Climate Models and Scenarios in Adaptation Planning

A key difference between a traditional risk assessment and a climate change adaptation risk assessment is the use of climate models and scenarios to understand potential climate risks and how they may evolve over time. It is important to assess adaptation risks over different time horizons[57] (2030s, 2050s, 2070s, and 2090s) and across different greenhouse gas emissions scenarios to explore the possibilities our organisation and community faces as global temperatures increase and as certain actions might mitigate carbon emissions. Risk assessments can consider multiple scenarios to provide guidance for long-term planning and help us answer the questions "what will happen, what can happen, and how can a specific outcome be achieved?"[58] We have several tools in the form of climate models and scenarios at our disposal to better understand how our changing climate will behave in the future.

Climate models and scenarios are updated frequently and employ a range of conditions that require nuanced understanding. Climate scientists translate their models for the public to use but since different models account for different "forcings," or climate drivers (e.g. human-caused drivers like carbon emissions, or natural drivers such as sun-blocking volcanic eruptions), a technical understanding of these models is necessary. The VCRC found that local government staff typically rely upon summary data such as Climate Change in Australia and Victoria's Future Climate Tool which are useful but if used in isolation, might not account for variability between climate models.

Victoria's Future Climate Tool[59] is the primary recommended data source for Victorian councils. The tool was created by the Department of Energy, Environment and Climate Action (DEECA) and includes location specific data. It offers the ability to downscale data to 505km grids for a range of climate hazards across RCP4.5 and RCP8.5 over four time horizons (2030, 50s, 70s, and 90s). Data can be selected for local government areas.

Climate projections- Shared Socioeconomic Pathways (SSPs)

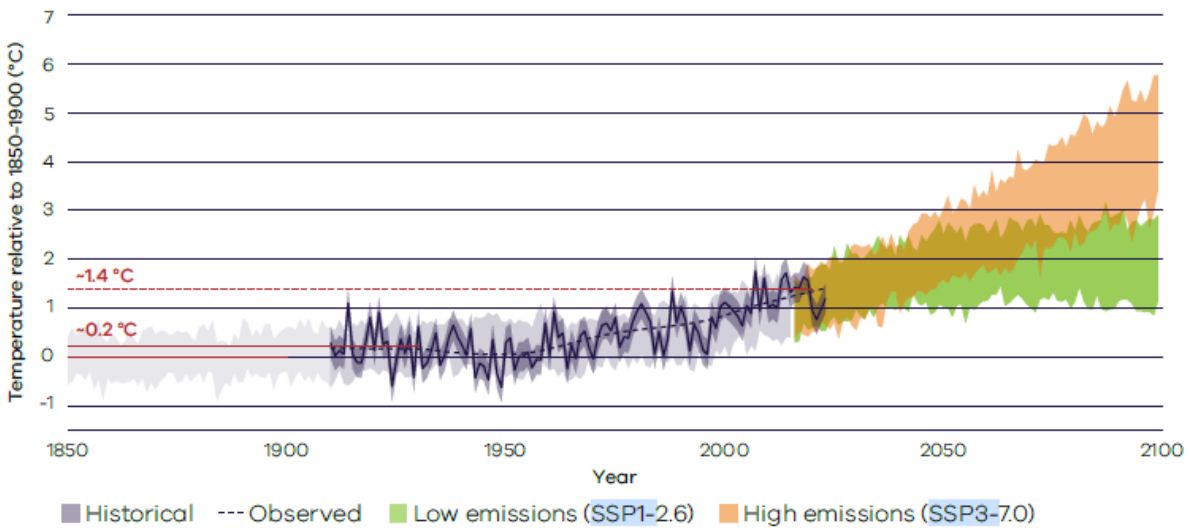
Shared Socio-economic Pathways (SSPs)[60] have been developed by international experts for use in future climate simulations. SSPs are potential paths that the planet's warming might take which are dependent upon the concentration of greenhouse gases in the atmosphere, mitigated by various human activities. The higher the SSP, the more costly it becomes to pay for the required adaptations needed for human survival.

Future emissions pathways are based on plausible assumptions about future socio-economic development, technological change, energy production, land use, and associated emissions of greenhouse gases and aerosols (fine particles in the air). They include data on national population, GDP, and urbanisation. There are four main SSPs.

- **SSP1-2.6 (Sustainability)** Would involve a rapid global shift to sustainability, with deep emission cuts, leading to a global warming of 1.3-2.4°C by 2081-2100, relative to 1850-1900.
- **SSP2-4.5 (Middle of the road)** Would involve a gradual global shift to sustainability, with moderate emission cuts, leading to a global warming of 2.1-3.5°C by 2081-2100, relative to 1850-1900.
- **SSP3-7.0 (Regional rivalry)** Would involve continued reliance on fossil fuels, with weak emission cuts, leading to a global warming of 2.8-4.6°C by 2081-2100, relative to 1850-1900.
- **SSP5-8.5 (Fossil-fueled development)** Would involve growing reliance on fossil fuels, with no emission cuts, leading to a global warming of 3.3-5.7°C by 2081-2100, relative to 1850-1900.

[57] Time horizons, or time frames or time slices, are the periods for which climate data will be collated and risks assessed.
[58] S Kelly, et. Al. The Use of Climate Scenarios in Australia. Climate-KIC & UTS Institute for Sustainable Futures, 2020.
[59] Victoria's Future Climate Tool https://vicfutureclimatetool.indraweb.io/project
[60] Climate Change in Australia: Climate information, projections, tools and data. Greenhouse gas scenarios, 2025.

Figure 7 - Observed and simulated historical temperature anomalies over Victoria from 1850-2020, relative to a baseline of 1850-1900*



**Simulated future temperature anomalies to 2100 are shown for low and high emissions pathways. Source: CSIRO (2024).*

SSPs and the use of storylines

Governments at all levels select one of the above SSP levels to guide their internal hazard planning. This can help them model certain conditions and conduct stress tests for issues like future flooding or fire risk. However, users of the scenarios have varying needs. Infrastructure planners, for example, may opt to design for the worst-case scenario to protect core assets whereas financial planners might use the middle of the road scenario to reflect current risks.

It can be difficult to determine which SSP a local government should utilise. There is variability in the models, with each range including averages and relying on likelihoods which might not be directly helpful in determining a local municipality's actual options. New climate-related disclosure legislation requires basing our risk assessments on at least 2 climate scenarios.[61] To help governments, businesses and decision-makers, the Australian Government is currently undergoing consultation on a draft climate scenario guidance document. In their document, the Australian Government recommends utilising a variety of SSPs to be determined by a localities' needs, focusing on SSP3-7.0 as a plausible high-emissions pathway for stress-testing scenarios.

It is important to note that climate scenarios can provide useful guidance[62], but are not strict predictions. There is a risk of overinvesting in adaptation actions that might never present themselves if we stick too closely to the various climate scenarios.

One approach that can better reflect local climate hazards is the use of storylines, as we outlined in our technical report, Climate Hazard Scenarios for Banyule Council.[63] Storylines are created with the use of climate models to imagine scenarios we'd see in a wetter, drier, or much drier future, but it also reflects the desired outcomes of an organisation. For example, local government's desired outcomes often include a focus on public safety, equity, and increased liveability.

To create a storyline, climate risk planners recommend identifying our desired outcomes, and then documenting and prioritising the known climate risks that challenge those outcomes. Feasibility of interventions must also be considered to keep things realistic.[64] Utilising a storylines approach uncovers the actual options an

[61] Australian Sustainability Reporting Standard AASB S2. 2024.
[62] Climate Systems, National Environmental Science Program, What are SSPs?
[63] K Hennessy. Climate Hazard Scenarios for Banyule Council: A report by Climate Comms for Banyule Council, Victoria, 2025.
[64] C Harris. Impactful climate adaptation goes beyond projections. Australian Water Association, 2025.

organisation has and reduces the tendency to invest in options to reduce risk that might never occur, or to overinvest in measures which were never practical to begin with.

In creating our storylines for Banyule, we relied upon past historical hazard events to anchor possible future events. The two historical hazards events we used were a 'hot and dry' event (January-February 2009) and a 'hot, wet and windy' event (December 2016). In illustrating these extreme weather events and their impacts upon Banyule, we get an indication of what to expect if these conditions present themselves again or unfold in more extreme ways.

We also created future scenarios based on climate models but relevant to the impacts we saw play out historically. Storylines for 2050 were developed for a 'hot and dry' event and a 'hot, wet and windy' event. The high emissions scenario (SSP3-7.0) was used in the storylines rather than the low emissions scenario (SSP1-2.6) because (a) SSP3-7.0 is more challenging and (b) SSP3-7.0 is more closely aligned with climate change estimates based on current global carbon emission reduction policies.

For each storyline, two scenarios were considered- one conservative and one stress test. The Conservative scenario is based on mid-range projected changes for 2050 SSP3-7.0. This includes 1.1ºC warming, 5% rainfall decrease, 40 dry months per 20 years, 37 annual heatwave days, 25 extreme fire weather days and no change in extreme rainfall intensity.

The Stress-test scenario is based on upper-limit projected changes for 2050 SSP3-7.0. This includes 1.4ºC warming, 15% rainfall decrease, 50 dry months per 20 years, 47 annual heatwave days, 30 extreme fire weather days and 15% increase in extreme rainfall intensity.

These storylines help us explore the potential impacts we could face from extreme weather events. Importantly, it helps us think through our response to things like loss of cooling during heatwaves, power grid failure, and impacts to telecommunications from disruptions. These more localised uses of climate scenarios can help Banyule City Council staff and community members determine who and what is most at risk across our municipality.

Banyule will utilise SSP3-7.0 to guide our future scenarios since it is more closely aligned with climate change estimates based on global carbon emission reduction policies. We will also incorporate our conservative and stress-test storylines into our future planning which factor in historical climate hazards that Banyule has experienced. In doing so we will have a better understanding of which climate hazards we should prioritise as our climate changes.

Council's management of climate risks

Council's Standard Risk Management Approach

Banyule's Risk Management Framework (the "Framework") is a standard approach to the identification, analysis, management, scrutiny, and reporting of risk to support the delivery of our strategic objectives. Under the Framework climate change is identified as a 'strategic risk' for the organisation to consider and manage.

Council's overall aim of the Framework is to embed a culture of risk management throughout the organisation, both at a corporate level and within operational and service delivery areas. It also aims to:

- Support effective decision making.
- Ensure a consistent and effective approach to risk management while allowing for innovation and development.
- Foster and encourage a risk-aware culture where risk management is seen as a tool to support decision-making rather than a corrective measure.
- Enable the provision of greater assurance to stakeholders that risks have been identified and that appropriate steps have been taken to manage risk to an appropriate level.

The Framework is integrated with Council's management systems and processes, planning, performance reporting, training, and key business decisions.

Council has aligned its risk management methodology to the **ISO31000 (2018)** risk management guidelines. ISO31000 is the international standard for risk management. It provides common language and methodologies for assessing and managing risks and differentiates risk management as a framework versus risk management as a process.

Categorisation of Risk

Council has risk registers which provide a snapshot of the risk management activities taking place across the organisation. They are a tool that assist in recording the risk appetite, defining risk management context, and providing the basis for management decisions through risk oversight and reporting.

Council considers risk in three distinct categories: 1.) Strategic, 2.) Enterprise, and 3.) Project.

Strategic Risks

Strategic Risks are those risks external to Council that, if they occurred, may require a change in strategic direction. Unlike Enterprise Risk (described below), Council has little to no control in relation to the risk materialising and therefore must keep abreast of any changes to the context in which it is operating.

While we at Council can undertake work to mitigate and adapt to climate change, Council cannot control climate change as a phenomenon.

Banyule City Council defines climate change as a strategic risk in the following way on the risk register:

> **"Increase in the number of/or severity of climate influenced major disaster events impact Council's ability to deliver services and infrastructure and increasing the burden on Council to support the community."**

Council identifies the potential risk causes for this eventuating as a:

- Lack of/or ineffective long-term environmental plans and strategies.
- Lack of/or ineffective organisational resilience planning and encompassing adaptive planning.
- Ineffective financial planning or strategy.

- Failure to future proof Council infrastructure and space.
- Organisational community contribution to overall climate change (e.g. reliance on fossil fuels).

Enterprise Risks

Enterprise risks are internal risks that arise from Council's operations. To effectively manage these, Council uses a centralised Enterprise Risk Management system, which allows us to maintain oversight of all risks and understand how well they are being addressed across Council.

Environmental safety is managed through our enterprise risk process which considers the risk management efforts to eliminate or reduce environmental harm that may result from Council operations. An example of this would be through reducing the likelihood and potential impact of a chemical spill at a Council-operated facility.

Likelihood and Consequence Approach (L&C)

The Likelihood/Consequence (L&C) approach to identifying risks is based upon the strength of an organisation's controls in addressing the identified risks. This means that while we cannot stop climate change, we can do our best to future-proof our organisation and the community. The L&C Approach works well because most organisations are familiar with it and outputs can be communicated readily across Council. Assessments can also be conducted quite rapidly. VCRC's gap analysis found, however, that ratings can be challenging over longer time horizons. They also found many instances where this approach failed to spur on adaptation action and additionally found that many do not include spatial definitions of risk. We can add more climate-focused controls into our L&C approach to make our enterprise risk management system more climate-resilient.

ISO14090 : 2019

In June 2019, the International Organization for Standardization published the first international climate change standard, *Adaptation to climate change - Principles, requirements, and guidelines* to help organisations assess climate change impacts and prepare for effective adaptation when designing and implementing policies, strategies, plans and activities. The standard uses a *systems thinking* approach which takes into account that organisations are complex, dynamic, and adaptive in their own right.

"Organisations can use systems thinking to identify, define and refine those activities that really matter and can be controlled by interventions. In this way, manageable boundaries can be set which make adaptation more achievable." (ISO14090:2019[65])

The standard covers:

- ten principles to guide the work
- pre-planning
- assessing risks and opportunities (likelihood and consequences; vulnerability; threshold analysis)
- adaptation planning
- implementation
- monitoring and evaluation
- reporting and communication

ISO14090 requires that a climate change adaptation plan is adopted by leadership and that its objectives and processes are integrated into the objectives and processes of the organisation.

[65] International Standards Organization. Adaptation to climate change: Principles, requirements and guidelines (ISO14090:2019), pp. 20.

What we've taken from this guidance:

- Applying a systems-thinking approach and following guidance on including vulnerabilities and thresholds in risk analysis.
- Guidance on embedding risk assessment and controls across the organisation and through leadership.
- Guidance on monitoring, evaluation, and improvement.

A Complementary Approach to Standard Risk Identification and Assessment

Relying on ISO31000 and ISO14090 is important since these are standardised approaches and best practice within risk management. However, as climate adaptation is a new frontier in risk assessment and differs from traditional risk assessment approaches, the Victorian Climate Resilient Councils recommends also establishing a climate change context. To establish this context means we needed a climate adaptation framework which:

- Included greenhouse gas emissions scenarios for contextualised risks.
- Included future time horizons (or time slices) for climate data to be collated and risks assessed (for example 2030s, 2070s, 2090s).
- Considered the climate variables of focus which are both acute (e.g. bushfires or floods) and chronic (e.g. reduced average rainfall).
- Used select climate data for each variable and including more technical understandings which can account for variability.

To this end, VCRC recommends supplementing the typical Likelihood/Consequence approach with a Hazard, Exposure, Vulnerability (HEV) approach to include a focus on vulnerable populations, environments, and/or infrastructure.

Hazard, Exposure and Vulnerability Approach (HEV)

The Hazard, Exposure, and Vulnerability (HEV) approach is useful to add to the existing Likelihood and Consequences approach suggested by the ISO. The Intergovernmental Panel on Climate Change (IPCC) articulated climate risk as resulting from a type of hazard (e.g. a bushfire), with exposure to the hazard (e.g. living nearby the bushfire prone area) and the degree of vulnerability to those hazards. Here, the concept of vulnerability is a complex interaction between sensitivity (i.e. susceptibility) and adaptive capacity—the ability to respond to and recover from the impact.

While the IPCC's HEV framing helps us understand "the risk to whom and what" they do not provide a methodology for conducting the HEV approach. The Victorian Climate Resilient Councils suggests drawing on the ISO31000-based methodology, and supplementing this with spatial analysis such as GIS mapping. Many local governments have the ability to map climate related variables such as bushfire risk, heat island effect, and flood risk, and overlay this with basic demographic and social data such as low-socioeconomic status, housing stock, and other factors that can provide insights into vulnerability.

Within the HEV approach, "exposure" is analogous to "likelihood" within the L&C approach, making the two approaches quite complementary.

Creating our climate adaptation plan

The following chapters outline our steps to create Banyule's climate adaptation plan.

1/Identifying our risks and opportunities

The main question driving the work in step 1 was,
"What are the risks and opportunities for climate adaptation for the community and our organisation?"

Data sources and approaches that helped us identify risks and opportunities

Building upon climate models and our potential future scenarios, we utilised existing data on climate hazards like bushfire and floods and feedback from the community and staff to help us identify our climate risks and opportunities.

Making sense of climate models and scenarios

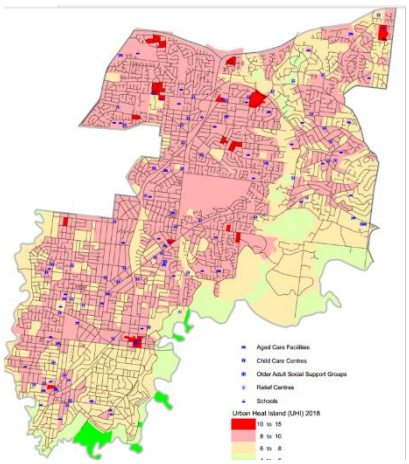
Banyule's Environment team organised a learning session in late 2024 with climate scientist, Dr. Chloe Mackallah from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to provide a general overview of climate modelling and CMIP6 for staff whose work entails climate change planning. This provided a foundational understanding of climate models which helped staff utilise the climate science more effectively.

To address the lack of localised climate scenario data for Banyule City Council's adaptation plan, we consulted with a climate scientist to create our own localised climate hazard scenario document.[66] This document examines hazards like extreme heat and multi-day heatwaves, flooding / extreme rainfall, severe storms, droughts, bushfires, grassfires, and their knock-on effects like water shortages, power outages, telecommunication outages, damage to infrastructure, and impacts to public health and safety. For more discussion on climate hazards and the risks we face, please see **Climate Hazard Scenarios for Banyule Council.**

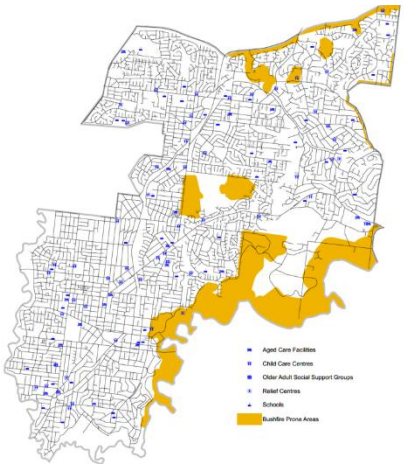
Climate Risk GIS maps

In 2023, Banyule created climate risk maps within our GIS mapping software, SSA that built upon State data on bushfire risk, flooding, urban heat islands, and heat vulnerability index. These maps were printed in A1 size and utilised in community and staff risk-identification brainstorming sessions in 2025 to help us think through locations and demographics more exposed to particular hazards. (Please note: Melbourne Water is currently creating updated flood maps based upon the 2100 scenario flood modelling and will be incorporated into our GIS system when it is officially released.)

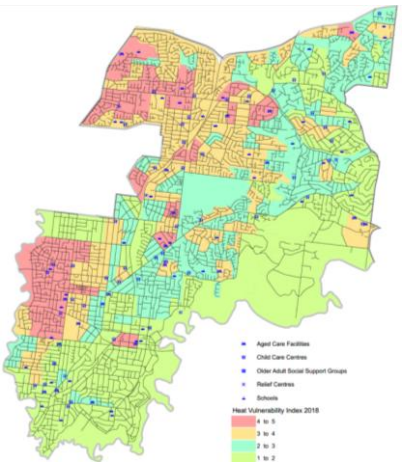
[66] K Hennessy, Climate Hazard Scenarios for Banyule Council: A report by Climate Comms for Banyule Council, Victoria, 2025.



Urban Heat Islands



Bushfire Prone Areas



Heat Vulnerability Index

CRM/BOM data linkage project

We consulted with Nation Partners who undertook a data linkage project connecting 10 years of customer requests (CRMs) with historical data on heatwaves and floods. This enabled us to identify areas which are more exposed and vulnerable to climate impacts.

Step 1: Establishing extreme weather events

An extreme weather timeline was developed to provide a reference for aligning CRM data. Data was compiled from four sources:

- Dr. Kevin Hennessy's Bureau of Meteorology (BoM) extreme weather dataset (2001 to present), provided by Council[67]
- Disaster Event Portal, Australian Institute for Disaster Resilience[68] (2005 to present)
- BoM Severe Storm Archive[69] (2001 to 2016)
- "Extreme Weather in Melbourne" Wiki[70] (2003 to present)

Events from each source were standardised into Month-Year format and plotted on adjacent timelines. Where the same event appeared in multiple sources, the date and event type were cross-checked. This produced a combined timeline covering 2001 to 2026.

The timeline includes heatwaves, extreme rainfall events, and storm events. Where available, supporting information such as temperature or rainfall was noted. The timeline is used as the reference dataset for linking CRM records to weather events.

Step 2: Review and categorisation of CRM data

A dataset of CRM records, including complaints, requests and submissions, was provided by Banyule City Council. Council completed an initial filter to identify records related to weather or climate hazards. This resulted in a subset of over 700 records.

Each record was first sorted by date to identify periods with high volumes of CRM activity. This showed that many requests were clustered within short timeframes, often with large numbers of records (for example, 60–90 requests) occurring within one to two days. These clusters were treated as single events and used to define

[67] K Hennessy. Climate Hazard Scenarios for Banyule Council: A report by Climate Comms for Banyule Council, Victoria, 2025.
[68] Australian Institute for Disaster Resilience, Disaster Event Portal.
[69] Bureau of Meteorology, Severe Storm Archive.
[70] Extreme Weather in Melbourne Wiki.

discrete weather-related periods. Each cluster was then matched to the extreme weather timeline to confirm the corresponding event type and timing. This process reduced the dataset to 14 events with associated CRM activity.

Records linked to each event were then grouped into categories:

- **Building and hardscape maintenance**: General maintenance and clean-up requests, including air conditioning issues, street sweeping and post-event clean-up
- **Stormwater drainage**: Requests relating to drainage infrastructure, including blockages and localised flooding
- **Tree management**: Requests for tree removal, pruning or vegetation management
- **Noise complaints**: Complaints related to mechanical noise, including air conditioning units
- **Other**: Records not related to weather, or not fitting the above categories.

Each record was assigned to one category. This enabled counting of total requests per event and comparison of request types across events.

Extreme Weather Events

Of the 14 clusters, the most recent nine events were analysed in further detail, dating back to June 2013. **Table 1** describes the date and type of extreme weather events related to the most recent 9 clusters of CRM requests received by Council.

Table 1- Extreme Weather Event Summary

Date	Event	Description
April 2024	Rainfall Event	Period of elevated rainfall leading to localised urban flooding following short-duration storms
February 2021	Rainfall Event	Episodic summer storm activity leading to localised urban flooding
March 2020	Rainfall Event	Period of elevated rainfall leading to localised urban flooding following
January/February 2019	Heatwave	Heatwave with multiple days exceeding 40˚C, high electricity demands and infrastructure disruptions
December 2017	Rainfall Event	Episodic summer storm activity leading to localised urban flooding
January 2017	Rainfall Event	Episodic summer storm activity leading to localised urban flooding
December 2016	Rainfall Event	Period of elevated rainfall leading to localised urban flooding
January/February 2014	Heatwave	Heatwave with multiple days exceeding 40˚C, high electricity demands and infrastructure disruptions
June 2013	Rainfall Event	Period of extreme rainfall, total rainfall high above monthly average

Table 2 presents the extreme weather events and CRM requests received by Council, disaggregated into request type.

Table 2 - CRM Data Summary

Event Date	Event	Total CRM Requests	Building and hardscape maintenance	Stormwater drainage	Tree Management	Noise	Other
April 2024	Rainfall Event	13	6	6	1	0	0
February 2021	Rainfall Event	15	6	6	0	0	3
March 2020	Rainfall Event	17	6	11	0	0	0
January/February 2019	Heatwave	43	21	9	7	2	4
December 2017	Rainfall Event	45	5	31	3	0	6
January 2017	Rainfall Event	93	43	40	1	0	9
December 2016	Rainfall Event	83	27	45	2	0	9
January/February 2014	Heatwave	68	38	4	12	12	2
June 2013	Rainfall Event	31	8	19	2	0	2
Total across event clusters (2013-2024)		**408**	**160**	**171**	**28**	**14**	**35**

The analysis identified 14 extreme weather events with associated CRM activity, with total request volumes varying significantly between events. Larger events generated between 80 and 100 requests, while smaller events typically generated fewer than 20. The highest volumes were observed in January 2017 (93 requests) and December 2016 (83 requests), indicating that a small number of events drive a disproportionate share of customer interactions.

Rainfall and storm events account for the majority of high-volume periods. These events are consistently associated with infrastructure-related requests, particularly stormwater drainage and general maintenance. In contrast, heatwave events generate fewer total requests but show a different distribution of request types.

Across all events, several consistent patterns were evident:

- Stormwater drainage and maintenance dominate rainfall events.
- High-volume events show a balanced split between drainage and maintenance. This suggests that larger or more intense events place pressure on multiple asset types simultaneously.
- Maintenance requests for air conditioning units within Council facilities dominate during heatwaves, accounting for 49–56% of requests. Vegetation management and noise complaints are more prominent than in rainfall events, each contributing up to 18% of requests.
- Tree management is a secondary but consistent category, generally remaining below 10% for rainfall events. Higher proportions are observed during heatwaves and some larger events, reflecting vegetation stress or risk management concerns, such as dropping branches.
- Noise complaints are exclusively associated with heatwave periods, likely linked to increased use of cooling systems.

With the knowledge from this linkage project, including a map of impacted assets, Council can work toward mitigating the volumes of CRM requests with proactive measures before flooding or heatwaves. Planning for this

in advance can ensure adequate budget and personnel are available to respond to community needs in a timely manner.

Community and Staff engagement

This section discusses the community and staff engagement processes which enabled us to co-design our climate-related risks and opportunities with stakeholders. For more details on our community engagement around climate adaption, please see our consultation findings report.[71]

We sought targeted engagement to include the people impacted by climate change

To co-create our adaptation plan, we conducted six weeks of official online and in-person community engagement methods that were available to the general public. Unofficially, the project lead was also available to discuss the plan with community members at their convenience. Multiple methods of community engagement were offered to appeal to a diverse population.

- One-on-one meetings were offered with the project lead as in-person, video meeting or phone conversations.
- Two in-person and two online adaptation brainstorming co-design workshops were held which produced a list of climate-related risks and opportunities.
- An online storytelling portal was created on Shaping Banyule to capture the lived experiences of individuals and provide qualitative detail.
- An online survey was available on the Shaping Banyule page, with printed copies available upon request.
- An online social map activity collected concerns associated with physical locations around the municipality.
- A community pop-up was held at Greensborough plaza during a workday.
- Community conversations were held at community at Tree Fest and Youth Fest events.

Many of the participants of our adaptation survey and storytelling portal self-identified as a demographic considered at-risk, such as those aged 60+ or people with disability, so there is representation amongst the general public's engagement which does speak to our at-risk demographic concerns.

- 63% of respondents identified as female; 34% identified as male; and 3% identified as 'other identity'.
- 11% of the respondents were aged 20-29 while 20% were aged 60-69, 12% were 70-79 and 6% were aged 80+.

At-risk community engagement

To reach the most at-risk populations, the project lead made presentations to specific provider networks to discuss climate adaptation and sought to connect with at-risk individuals[72] for one-on-one or group conversations. The project lead sent direct invitations to the participants of these networks inviting their participation in the co-design of the adaptation plan. The networks reached include:

- Banyule Health and Wellbeing Partnership Roundtable- July 2025
- Banyule Disability Services Network- August 2025
- Wurundjeri-Banyule Network- March 2026

Presentations to these networks did not lead to one-on-one interviews with individuals from the at-risk demographics as intended, however, service providers and group members did share feedback and best-practice literature which has guided the creation of our plan. The literature review for the CCRP draws on best

[71] Banyule City Council, Climate Adaptation and Climate Action Plan Consultation Findings Report- Stage 2, 2026.
[72] International Panel on Climate Change (IPCC), Working Group 2 report on Impacts, Adaptation and Vulnerability, 2022.

practices and advice from leading research institutions, peak bodies and organisations devoted to advocating for these at-risk demographics.

Further research into lived experiences of at-risk demographics

To learn more from current emergency practitioners, the project lead also attended online webinars within the climate emergency space around climate adaptation for vulnerable populations and heard from those who have survived floods in Lismore, NSW and others across Australia.

Staff engagement

A Climate Adaptation Project Working Group of Banyule staff members helped co-design the Adaptation Plan throughout the entirety of the project. They have contributed to the work by identifying risks and opportunities for Council and community, prioritising the action plan, contributing to the implementation plan and helping devise the monitoring, evaluation, reporting and improvement metrics. They have done so as a diverse subsection of the population, representing nearly every Council department, while bringing their lived experience to the Adaptation Plan. They also bring their professional expertise and insights as community advocates or educators and in some cases, service providers. Some of the staff also fit into the criteria of an at-risk demographic due to their age, disability, status as an outdoor worker, coming from a Culturally or Linguistically Diverse background, or being a single parent.

Staff collaborated on a shared document which explored each team's mission, climate-related risks to those missions, opportunities to address climate risks, and identification of potential barriers. Work was also done to cross-reference existing climate adaptation actions and other actions that are adaptation-adjacent but which could easily become climate adaptations with small adjustments.

For the detailed list of community-identified climate risks, please see Appendix 2 of the Climate Adaptation Public Engagement Results. To see the resulting actions that have come from our internal risk identification process, please see Appendix 1 of the Community Climate Resilience Plan for our identified climate-related risks and opportunities.

Table 3 - High-level climate-related risks and opportunities from community brainstorming sessions (2025)*

Risks by # of mentions	Opportunities by # of mentions (solutions for...)
Fractured public/low social cohesion (9)	Lack of community preparation (18)
Human health (7)	Extreme heat (12)
Extreme heat (6)	Drought management (8)
Mental health impacts (5)	Biodiversity loss (7)
Droughts (5)	Power outages (6)
Flooding (4)	Planning related (5)
Planning related (4)	Disengaged public (4)
Power outages (3)	Water scarcity (4)
Disengaged public (3)	Food system disruptions (4)
Advocacy (3)	Financial impacts (3)
Lack of community preparation (3)	Flooding management (3)
Biodiversity loss; Fire risks; Global destabilisation; Financial; Water scarcity; Infrastructure resilience; seasons shifting- (all 2)	Fractured public/low social cohesion (3)
Food systems; Lack of action from Council; Diseases- (all 1)	Human health; Fire risks; Transitions related to climate change; Advocacy – (all 2)
	Mental health impacts; Lack of action from Council; Infrastructure resilience; Seasons shifting; and Diseases- (all 1)
Total mentions- 69	**Total mentions- 87**

*See Appendix 2 of the Climate Adaptation Public Engagement Results for full list of risks and opportunities.

2/Prioritising risks and opportunities

The main question driving the work in step 2 was,
"How should we prioritise these risks and opportunities?"

Using the PESTLE, Dynamic Adaptive Pathways Planning, and ISO for Analysing and Prioritising Risks

To consider the climate change adaptation risks and opportunities in a holistic manner, we will utilise a combination of PESTLE and DAPP to complement the existing ISO risk treatment approach.

PESTLE analysis is a framework that examines how political, economic, social, technological, legal and environmental factors can impact an issue. The tool can be used as a lens with which to view the potential impacts of climate scenarios in different timeframes across the landscape of society and help us manage risk in an intersectional way.

VCRC also recommends the Dynamic Adaptative Policy Pathways (DAPP) decision-making approach to deal with the uncertainty of climate change. DAPP requires mapping out possible options and paths to achieving adaptation actions. The pathways identify key decision points where new or updated information emerges. These identified trigger points may point to another path or action when a certain condition is reached. For example, if drought impacts our local water supply to a certain point, an alternative path or action may be triggered to minimise negative impact to the community. The adaptation pathways are continually monitored using indicators and adjusted as needed. In theory, monitoring should create opportunities to adjust the path before a trigger point is exceeded.

ISO31000 provides guidance on the following risk treatment options:

- Avoiding the risk by deciding not to start or continue with the activity that gives rise to the risk
- Accepting or increasing the risk to pursue an opportunity
- Removing the risk source
- Changing the likelihood
- Changing the consequences
- Sharing the risk with another party or parties (including contracts and risk financing)
- Retaining the risk by informed decision

Prioritisation activities

Once community identified climate-related risks and opportunities, we engaged two separate groups to help us prioritise them, our Banyule Environment and Climate Action Advisory Committee comprised of local residents, and our staff adaptation project working group.

BECAAC prioritisation session

In October 2025, we conducted a workshop with members of the Banyule Environment and Climate Action Advisory Committee (BECAAC). BECAAC is comprised of 11 community members who possess deep knowledge of climate change and environmental issues who were selected by Council based on their experience and

knowledge and will serve on the committee for four years. Members of BECAAC play an important role in shaping Council's climate response by providing technical advice to ensure Council's environmentally focused work is informed by evidence and best practice.

Members were asked to prioritise a list of climate-related risks and opportunities the general community had created in the four brainstorming sessions held between September-October. BECAAC was provided with pre-reading which included Banyule's Climate Hazard Scenarios document and PESTLE considerations, and large poster-sized copies of the local GIS climate-related maps were physically posted in the meeting room. A prioritisation activity followed a presentation of the methodology and objectives needed for creating the climate adaptation Plan.

Advisory committee members found it challenging to prioritise the risks and opportunities related to climate change impacts but understood prioritisation must occur. The group considered not only exposure and vulnerability, but also local government roles, budgets, and feasibility constraints. The consensus was that each of these high-level categories carry much complexity within them and are seemingly of equal importance in terms of receiving urgent action.

- For weather-focused categories, the group prioritised the following as their top 3 risks: 1. Heat, 2. Droughts, 3. Fire Risks and Flooding.
- For social-focused categories, BECAAC rated the following as their top three: 1. Human Health, 2. Mental Health Impacts, Disengaged Public, and Fractured Public, and 3. Improper Planning and Lack of Action from Council.
- For systems-focused risks they rated: 1. Global destabilisation, 2. Power Outages, and 3. Food Systems as top risks.

Table 4 - BECAAC Prioritisation of Climate-Related Risks and Opportunities Identified by Community Members (2025)

Group 1- Weather-Focused categories	**Group 2-** Social-focused categories	**Group 3**- Systems-focused/larger scale categories
RISKS 1. Heat 2. Droughts 3. Fire Risks and Flooding 4. Water scarcity 5. Seasons shifting **OPPORTUNITIES** 1. Water scarcity 2. Droughts 3. Heat 4. Flooding 5. Fire Risks 6. Seasons shifting	**RISKS** 1. Human Health 2. Mental Health Impacts, Disengaged Public, and Fractured Public 3. Improper Planning and Lack of Action from Council **OPPORTUNITIES** 1. Human Health, Mental Health Impacts 2. Improper Planning, Lack of Action from Council 3. Fractured Public 4. Disengaged Public	**RISKS** 1. Global destabilisation 2. Power Outages 3. Food Systems 4. Biodiversity Loss 5. Diseases 6. Lack of Community Preparation **OPPORTUNITIES** 1. Lack of Community Preparation 2. Power Outages 3. Food Systems 4. Biodiversity Loss 5. Diseases 6. Global Destabilisation

Staff prioritisation session

During the April 2026 meeting of Climate Adaptation project working group (PWG), staff were tasked with replicating the same task that BECAAC completed in October 2025. This 45-minute activity sought staff expertise in prioritising a set of climate-related risks and opportunities identified by the community. Staff were reminded

of PESTLE and the GIS maps the group discussed within previous working group meetings when making their considerations.

The complexity and competing importance of each facet of climate-related risks and opportunities posed a challenge for staff, just as it had for BECAAC members during the prioritisation process. Staff asked whether they should prioritise the topics based on cost/feasibility and other Council barriers, or public need. Again, this highlighted the difficult choices Council makes in some scenarios.

Table 5 - Staff Adaptation Project Working Group Prioritisation of Climate-Related Risks and Opportunities Identified by Community Members (2025)

Group 1- Weather-Focused categories	**Group 2-** Social-focused categories	**Group 3**- Systems-focused/larger scale categories
RISKS 1. Water scarcity 2. Droughts 3. Heat 4. Flooding 5. Fire Risks 6. Seasons shifting **OPPORTUNITIES** 1. Water scarcity 2. Droughts 3. Heat 4. Flooding 5. Fire Risks 6. Seasons shifting	**RISKS** 1. Lack of Action from Council 2. Disengaged Public 3. Human Health 4. Fractured Public (low social cohesion) 5. Mental Health Impacts 6. Improper Planning **OPPORTUNITIES** 1. Lack of Action from Council 2. Fractured Public (low social cohesion) 3. Human Health 4. Mental Health Impacts 5. Disengaged Public 6. Improper Planning	**RISKS** 1. Lack of Community Preparation 2. Food Systems 3. Biodiversity Loss 4. Power Outages 5. Diseases 6. Global destabilisation **OPPORTUNITIES** 1. Lack of Community Preparation 2. Food Systems 3. Power Outages 4. Biodiversity Loss 5. Global Destabilisation 6. Diseases

Table 6 shows a side-by-side comparison of the BECAAC and staff prioritisation of risks and opportunities. For the most part, staff and BECAAC members were in alignment on their prioritisation of the community's climate-related risks and opportunities within the social-focused categories. The main differences were in the weather-focused categories with extreme heat being BECAAC's top risk where staff listed it as third, while bringing water scarcity to the top of their list. Amongst the systems focused / larger scale categories, again BECAAC and staff listed opposite priorities with BECAAC saying global destabilisation poses the top risk as staff pointed to the lack of community preparation [for climate risk related events and emergencies].

Prioritisation activities revealed the need for a multi-pronged approach that begins with climate models and local storylines and builds in PESTLE considerations, GIS climate-layer maps, and budget and resourcing constraints. This work will be iterative and ongoing as we work with each team across Banyule to add climate considerations into their work.

Table 6 - Staff Adaptation PWG vs BECAAC Prioritisation of Climate-Related Risks and Opportunities Identified by Community Members (2025)

(The green and red arrows below in the staff columns denote whether that particular topic was ranked higher or lower by staff as compared to BECAAC.)

Group 1- Weather-Focused categories (Heat, Droughts, Fire Risks, Floods, Water Scarcity and Seasons Shifting)		**Group 2-** Social-focused categories (Human Health, Mental Health Impacts, Improper Planning, Lack of Action from Council, Fractured Public and Disengaged Public)		**Group 3**- Systems-focused/larger scale categories (Lack of Community Preparation, Power Outages, Food Systems, Biodiversity Loss, Diseases, and Global Destabilisation)	
BECAAC	**Staff Adaptation PWG**	**BECAAC**	**Staff Adaptation PWG**	**BECAAC**	**Staff Adaptation PWG**
RISKS 1. Extreme Heat 2. Droughts 3. Fire Risks and Flooding 4. Water scarcity 5. Seasons shifting **OPPORTUNITIES** 1. Water scarcity 2. Droughts 3. Heat 4. Flooding 5. Fire Risks 6. Seasons shifting	**RISKS** 1. Water scarcity ↑ 2. Droughts 3. Heat ↓ 4. Flooding 5. Fire Risks 6. Seasons shifting **OPPORTUNITIES** 1. Water scarcity 2. Droughts 3. Heat 4. Flooding 5. Fire Risks 6. Seasons shifting	**RISKS** 1. Human Health 2. Mental Health Impacts, Disengaged Public, and Fractured Public 3. Improper Planning and Lack of Action from Council **OPPORTUNITIES** 1. Human Health, Mental Health Impacts 2. Improper Planning, Lack of Action from Council 3. Fractured Public 4. Disengaged Public	**RISKS** 1. Lack of Action from Council ↑ 2. Disengaged Public 3. Human Health 4. Fractured Public (low social cohesion) 5. Mental Health Impacts 6. Improper Planning **OPPORTUNITIES** 1. Lack of Action from Council 2. Fractured Public (low social cohesion) 3. Human Health 4. Mental Health Impacts 5. Disengaged Public 6. Improper Planning	**RISKS** 1. Global destabilisation 2. Power Outages 3. Food Systems 4. Biodiversity Loss 5. Diseases 6. Lack of Community Preparation **OPPORTUNITIES** 1. Lack of Community Preparation 2. Power Outages 3. Food Systems 4. Biodiversity Loss 5. Diseases 6. Global Destabilisation	**RISKS** 1. Lack of Community Preparation ↑ 2. Food Systems ↑ 3. Biodiversity Loss ↑ 4. Power Outages ↓ 5. Diseases 6. Global destabilisation ↓ **OPPORTUNITIES** 1. Lack of Community Preparation 2. Food Systems ↑ 3. Power Outages ↓ 4. Biodiversity Loss 5. Global Destabilisation ↑ 6. Diseases ↓

*Note that BECAAC members grouped some of their topics together, whereas staff did not.

3/Implementing our plan

The main question driving the work in step 3 was,
"How can we embed this work across our community and our organisation to ensure actions are delivered?"

ISO31000 Implementation guidance

Per ISO31000, the organisation will prepare an implementation plan that:

- documents the processes, including inputs and outputs, that ensure the actions identified in the adaptation plan are delivered
- sets out contingencies to attain successful implementation where actions are found to be incapable of delivering the desired outputs
- provides for adjustment where new learning and/or circumstances are recognised

The Capability-Opportunity-Motivation Model of Behaviour Change

Climate change adaptation, by definition, requires a change to business as usual for organisations and community members. This sort of change can often be difficult, particularly for organisations which have operated in systemic ways for long periods. VCRC recommends utilising a behaviour change approach to ensure the successful embedding of adaptation actions across an organisation or community. The Capability, Opportunity, Motivation- Behaviour (COM-B) model is an approach for creating change that assesses an individual's ability to participate in an activity (their capability) and seeks to create avenues and inspiration for change. Opportunity represents an external factor (like time or an authorising environment) which might make a behaviour possible. Motivations are the cognitive processes that directly or indirectly inspire a behaviour. For example, caring about one's child and their future climate experiences, which might inspire one to act for climate adaptation.

While working to embed the adaptation actions across the organisation and within the community, the Environment team leading this work has aimed to utilise the COM-B approach.

COM-B and the Community

In 2025 we launched the Banyule Loves workshop series and The Adaptation Game in 2025, both of which have a focus on climate-resilient living. To increase the capability of the community, our workshop series educates and upskills residents on a variety of topics, increasing capacity to recognise climate change and prepare themselves for associated disruptions. Likewise, The Adaptation Game educates players on the possible climate impacts they could see in their neighbourhoods. Our workshops and the game provide dedicated space and opportunity to do this work and connect with other like-minded community members. We sought to motivate the community by illustrating the importance of climate actions, no matter how small they may seem, and framed these actions in terms that residents care deeply about- such as their favourite natural spaces, or increasing the safety of their loved ones from hazards like heatwaves. Taken together, these components can result in behaviour change in the form of taking meaningful climate action, increased sense of personal efficacy, and a more connected community.

COM-B and Staff

Throughout the staff project working group's collaborative work, we aimed to increase capability by upskilling and educating staff through short presentations on local and global climate change impacts and evidence each meeting. We created opportunity for staff within our scheduled meetings to get our collaborative work done and to ask questions and explore the topic in a welcoming space. Lastly we sought to motivate staff on the topic of climate adaptation by demonstrating how each team's core mission could be negatively impacted by various hazards. These efforts culminated in staff realising the depth to which their work is impacted by climate change, with many seeking to keep our climate adaptation considerations front of mind.

Developing the 'adaptation lens'

The climate adaptation lens is a new mental model (or way of seeing the world) we are asking staff to develop and implement with the goal of facilitating the work needed for our organisation's climate adaptation approach.

According to the Victorian Climate Resilient Councils local government adaptation plans tend to fail at the implementation stage.[73] To address this and increase our success of making this an impactful plan, we have developed a working approach, the Adaptation Lens, to guide our ways of working. The adaptation lens evolved naturally out of the praxis within our staff adaptation working group and then worked to strengthen the project working group. This mental model shift is needed because climate change is not business-as-usual and thus requires a response from the organisation which goes beyond our standard ways of operating.

Most local government climate risk assessments or adaptation plans do not fail for a lack of care or mandate but instead happen when plans are constructed with little co-design leading to a lack of ownership over adaptation risks or actions.

The lack of ownership over organisational adaptation can stem from being confronted with high-level barriers that officers and middle managers may have little control over such as budgets, political sentiment, or resource constraints upon delivery of actions.

The lack of ownership also stems from cultural barriers within the organisation such as working in silos, lacking technical subject expertise, and having little capacity to collaborate. Our climate adaptation working group operated from the understanding that the one thing staff do have more control over are these organisational cultural barriers.

Our group aimed to address these issues by working to de-silo, solve problems together in real-time instead of asking people to do work outside the meetings, and we upskilled or educated staff where needed to better integrate our approaches to climate adaptation.

> "All our tools are made for doing better, but we need to do DIFFERENTLY."
>
> - Michael Dunlop CSIRO

Informed by research within the fields of climate adaptation, behaviour change, and communications, the following components were discussed repeatedly with project working group members to increase the uptake of this new mental model.

- **Justice-focused**— Puts Care for Country, inclusivity and equity at centre; recognises that certain demographics are more at-risk of climate-related risks than others.

[73] Victorian Climate Resilient Councils, Scoping a Climate Change Risk Assessment for Victorian Local Government: Findings Report, 2024.

- **Dynamic and iterative**— We pivot when disruptions occur and we plan for them; we iterate and 'repair the plane while flying it.'
- **Transformational**— This work requires us to go beyond business as usual and transform the ways we work, including:
    - **De-siloing** and collaborative approaches through our CoP and workplan review process.
    - Ongoing **upskilling** of staff and community around climate change risks and opportunities.
    - Incorporating **climate scenarios** into our planning approaches, including historical **storylines** to better prepare for and respond to climate disruptions.
    - **Continuous evaluation** techniques within our MERI framework to respond to needs as they arise and to pivot to dynamic adaptive pathways when necessary.
    - Operating within **time horizons of 2030, 2050, 2070, and 2090** not just next fiscal year or the next four years.
    - Expanding our risk analysis to include **exposure, vulnerability, and response**.
- **Systemic**— We know certain mechanisms & conditions are needed that support systems change.
- **Lived experiences are valued**— We value these qualitative ways of understanding as much as quantitative understandings of the world.
- **Scaling**— We work by thinking divergently and convergently and vice versa.
- **We think through PESTLE**— Political, Economic, Social, Technological, Legal, and Environmental factors that can help or worsen climate impacts.

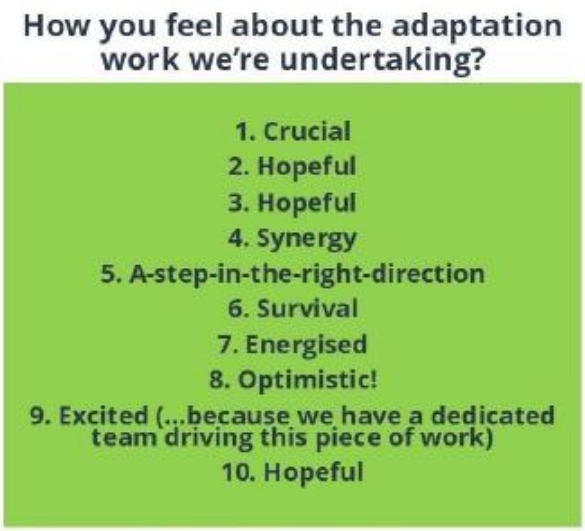
Efficacy over hopelessness

In her book *A Field Guide for Climate Anxiety*, author Sarah Ray outlines the importance of empowering others within the field of climate change work to build their sense of resilience and to decrease burn-out. Climate Change is a global, confronting problem and people often feel overwhelmed, stressed, and anxious when faced with the challenges before us. Creating a sense of efficacy in the face of such obstacles requires balancing truth with a knowledge that we can take meaningful action within our spheres of control or influence. This approach is particularly needed when working with people who might be early in their climate change awareness journey.

Building a sense of efficacy can look like: processing grief in healthy ways such as talking and journalling, engaging in supportive networks, taking action even in small ways, recognising our limits, and self-care in the form of taking breaks from this work as needed. Our project working group incorporated most of these actions within our meetings and ways of working.

To this end, a key indicator of the project working groups' success in building this efficacy can be found in a recent staff working group collective reflection.

Staff were asked to list one word which summarises their feelings at this point about our future or current climate. Many of them listed words such as 'concerned,' 'angry,' and 'worried.' However, when asked to list one word which summarises their feelings at this point about the adaptation work we are going to undertake their responses were all positive.



It is encouraging to see that while most staff were worried about our current/future climate, they could also hold hopefulness alongside this. Sitting with this complexity and being energised to do this work is required by everyone working in the climate change space.

Staff in the adaptation project working group shared their personal stories about the climate adaptation journey we've taken over the last year. Their stories shared the following themes:

- Learning more about what adaptation actually means to their work and utilising the adaptation lens more since being in this group.
- Learning the extent to which others are doing this work.
- Realising how adaptation will impact our entire organisation and the importance of being prepared.
- Recognising that we'll need to be highly collaborative and integrated in our approaches to adaptation.
- Acknowledging that this work will need to evolve over time.

The adaptation lens in action

To create a climate-resilient community, the Community Climate Resilience Plan is centered around the adaptation lens. We aim to incorporate this implementation mechanism across the work of Council. We can do this through our internal ways of working, our work plan specifics, and in our ways of working with community.

To keep the momentum for our adaptation work going, we plan to evolve our staff project working group into a community of practice that will continue to meet monthly. This will enable us to continue our de-siloed and collaborative approaches and increase our effectiveness at pivoting when needed. We will also utilise the group to work through various team's issues, do peer-learning, and conduct continuous evaluation of our climate actions. The member of this group can also act as adaptation boosters who can advise their teams or directorates of the work internally and serve as mentor and guide along with the Environment Team.

We also recognise that Banyule has many climate adaptations already underway, including:

- Launching the Banyule Loves workshops series to increase personal resilience and community connection in the face of climate change.
- An upcoming biodiversity audit to identify climate-resilient flora and fauna.

- Observing February's Extreme Heat Awareness Day with a workshop and emergency supply-bag giveaway.
- Providing hygrometers to aged care residents to help them track the temperature and humidity in their rooms.
- Updating the Banyule Keep Cool Map for 2026.
- Exploring CSIRO's Foresight- a climate and hazard risk analytics mapping tool for our assets.
- Working with a University of Melbourne student to conduct an urban heat island mitigation research study.

Two examples of the adaptation lens in action consist of continued training and education for both staff and community around the topics of climate change hazards and our preparedness for them.

A climate disruption expert from Lismore, NSW Dr. Jean Renouf of Safer Future was invited to deliver a *Leadership in Disruption* table-top scenario workshop for Senior Management at Banyule in June 2026. This workshop aimed to strengthen our ability to mobilise and collaborate during a disaster with the goal of improving our ways of working and increasing our organisational preparedness.

The same disruption expert also delivered an extremely popular *Community Resilience 101* workshop for Banyule residents in June 2026 which created a safe and supportive space to discuss climate change risks, personal preparedness, and community connection.

The Climate Adaptation Lens at-a-glance

Applying an 'Adaptation Lens'

This working approach is a new mental model developed for staff to help evolve our thinking and work practices. It sets out our values, including Care for Country, increases collaboration, de-silos our strategies and actions, and builds-in resiliency. It incorporates climate scenarios and requires us to think in timeframes beyond fiscal years to consider our climate futures in 2030, 2050, 2070 and 2090. The following elements are core to shifting our work from business-as-usual to climate-ready.

Focusing on Inclusion and Equity

We know climate change impacts everyone, however more at-risk communities are hit first and hardest since they experience more exposure or vulnerability. We aim to leave no one behind in our mitigation and adaptation work. Our support will be inclusive of diverse cultures, beliefs, abilities, bodies, sexualities, ages and genders.

Learning from Traditional Custodians

Care for Country requires us to take actions that preserve and conserve our ability to live well on our planet. We recognise there is much to learn from the Wurundjeri Woi-Wurrung peoples who have lived and adapted to planetary changes for over 60,000 years.

Integrating Council and Community Actions

Council and the community are often framed as separate entities, yet we're in this work together. Many staff at Banyule are local residents experiencing climate impacts too. Community members are volunteers, conservation group members, grant recipients, advisory committee members, and users of Council services and assets.

Using Transformative Approaches

The work of climate mitigation and adaptation is complex and requires agile approaches. We must factor in climate models, dynamic adaptive pathways, and future timeframes. Our climate actions must be relevant, impactful, and informed by evidence and continuous evaluation. This allows us to prepare for and react to conditions as they change.

Focusing on Lived Experiences

In addition to the standard community engagement methods we added a focus on collecting the stories and lived experiences of community members. Climate change is already impacting Banyule and these stories provide richness and a deeper understanding of true impacts to guide our work.

Providing Tools for the Community

Beyond outlining our strategy and actions for climate action, we are creating checklists and resources for our local Banyule municipality. The community told us they want specific, realistic, and actionable recommendations and we seek to create these for various audiences.

Creating New Data Points to Inform our Work

Our technical climate hazards document applied climate models to Banyule locally- outlining historical and future scenarios. Separately, we linked past rain and heatwave events to ten years of customer requests (CRMs) to better understand what we can expect from future flooding and extreme heat events.

Banyule will implement internal changes

We will prioritise teams to add the adaptation lens to their work plans, based on likelihood and consequence and hazard, exposure and vulnerability assessments.

We will work with our Risk team to embed climate models into our risk assessment and analyse our insurance risks.

We will create regular touchpoints with Councillors, Senior Management and our Climate Action Steering Committee to keep this work front-of-mind and responsive to changing conditions.

We will conduct ongoing education and upskilling of staff to increase our institutional understanding of climate change and to provide practical applications of the adaptation lens.

The climate adaptation working group will evolve into a community of practice which will meet monthly to implement and track our progress on actions.

The Environment Team will create a suite of tools to help guide the organisation's key work, including climate adaptation checklists to review before new projects or programs are created or before engaging with the public for feedback.

Banyule will hold adaptation roadshows across the organisation to discuss and celebrate accomplishments from each team / department which increases engagement.

We will create a fit-for-purpose internal database for tracking data against our goals and standard benchmarking to increasing our impact and transparency. This database will ideally have a dashboard functionality that links to a public-facing website to ease reporting needs and enable efficient tracking of actions that align with our broader organisational reporting.

Banyule will expand our adaptation work with the community

Advisory committees and population groups will be consulted regularly and invited to help us conduct continuous evaluation of our climate actions impacts. We will also seek their ongoing input into shaping future adaptation actions for at-risk populations.

We will uplift our Climate Change Adaptation Statement in our public-facing documents.

We have created a basic climate adaptation checklist for the community that provides guidance on the ways climate change may impact their way of live and will continue to produce more resources on topics related to home energy efficiency, health, and so on.

We will expand the Banyule Loves workshop series to focus on community preparedness and mutual aid support and will work with community groups to offer more Adaptation Game Banyule sessions.

We will continue to create opportunities for the Banyule Environment and Climate Action Advisory Committee (BECAAC) to advise the work of Council on climate adaptation.

We will celebrate community member's climate adaptation through our Greenwrap e-newsletter and community peer-learning events.

We aim to create a fit-for-purpose database and dashboard for tracking and evaluating Council's adaptation actions that is widely accessible to the public and interactive to allow community input.

4/Monitoring, Evaluation, Reporting and Improvement (MERI)

The main question driving the work in step 4 was,
"How should we effectively monitor, evaluate our impact now and into the future?"

MERI

This section will discuss our metrics, how we intend to evaluate them, how we'll report on them and how we will improve them. Important to this is not only formal reporting windows, but also continuous evaluation which results in more nimble ways of working and adjusting to climate impacts as they occur.

Climate Mitigation Monitoring Goals

- Improve our mitigation data collection, management, and impact evaluation to ensure all efforts are the best use of resources.
- Introduce continuous evaluation into our formal processes.

Climate Adaptation Monitoring Goals

- Create new data collection, management, and impact evaluation for adaptation actions and combine with mitigation actions.
- Introduce continuous evaluation into our formal processes.
- Create user-friendly tools (like online dashboards) for reporting both Council and community actions.

Measuring impacts of climate mitigation and adaptation actions

While climate adaptation and climate mitigation are related and sometimes overlapping, they have some key differences which impact the ways we measure and evaluate the impact of our actions. The main difference is that climate mitigation actions often have short term goals, whereas adaptation focuses on long term efforts. Adaptation is more difficult to document than mitigation actions which, for example, reduce our carbon emissions by a set number from one year to the next.

Measuring the positive impacts of climate adaptation actions requires cost-benefit analyses around the prices of adaptation actions versus the cost of inaction. It also requires us to address concepts of vulnerability as we prioritise our actions to focus on systems, services, infrastructure and community.

Climate Mitigation	Climate Adaptation
• Reducing the impact of human-caused climate change • Aimed at reducing greenhouse gases • Short term goals • National and global scale	• Adjusting to human-caused climate change • Aimed at preventing, or preparing for, the impacts of climate change • Long term efforts and strategies • Localised in scale and scope

Reporting Frequency

We will formally review our climate actions and produce a report every five years and report on our progress in the annual State of the Environment Report. Due to the nature of climate change, we will also be utilising continuous evaluation through a range of internal mechanisms, including a monthly staff community of practice meeting and through engaging our advisory committees which are comprised of local residents. Reporting more regularly enables us to be nimble and responsive in our work to issues as they occur. Critically change climate thresholds may happen which will trigger actions along a dynamic adaptive pathway.

Adaptation and vulnerability metrics

We partnered with Nation Partners to produce a set of climate adaptation and vulnerability metrics that we can utilise over time to track our progress. The following represent standard benchmarks we will include in our adaptation monitoring to produce a resiliency index.

Resource	Description of metric (verbatim)	Adaptation and vulnerability relevance to Council
United Nations Office for Disaster Risk Reduction, Sendai Framework[74]	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies	Supports alignment between Banyule's local disaster risk reduction planning and state and national strategies, strengthening governance coherence across levels. *Note: useful for benchmarking purposes but not scalable for neighbourhood or SA1 level analysis.*
C40 Cities. (2019). *Measuring progress in urban climate change adaptation*[75]	Percentage of population using cooling centres	Reflects the accessibility and utilisation of cooling facilities during extreme heat, crucial for protecting vulnerable populations.
	Percentage of city covered by climate risk insurance	Indicates the level of financial protection available to residents against climate-related damages, reducing economic vulnerability.
	Percentage of insurance programs active	Reflects the availability and uptake of insurance options for mitigating climate-related financial risks.
NYC Mayor's Office of Climate and Environmental Justice (2025). *One NYC* [76]	Increase in the number of flood insurance policies across the areas within the city	Reflects the growth in residents and businesses obtaining flood insurance, increasing financial resilience. Particularly relevant for neighbourhoods located along the Plenty River and near the Yarra River boundary.
Green Climate Fund (2016). *Resilience monitoring and evaluation scoping paper.* [77]	Number of food secure households (in areas/periods at risk of climate change impacts)	Climate change will likely impact food systems so adaptation measures may focus on improving the resilience of community food systems, such as by diversifying what is being grown produced and shifting towards climate-resistant crop varieties.
	Number of males and females benefitting from introduced health measures to respond to climate-sensitive diseases	Tracks the health benefits from climate-related adaptation interventions across a society, disaggregated by gender, as climate change may have different impacts based on different characteristics.
Adaptation Fund (2014). *Perspectives Adaptation Metrics*[78]	Percentage of public awareness activities carried out and population reached	Awareness is essential in increasing the adaptive capacity of communities. Metric can be used to indicate the reach of efforts to educate the public on climate adaptation, which is necessary for community-wide resilience.

[74] United Nations Office for Disaster Risk Reduction. Monitoring Sendai Framework, 2015.
[75] C40 Cities. Measuring progress in urban climate change adaptation, 2019.
[76] NYC Mayor's Office of Climate and Environmental Justice. OneNYC 2050, 2025.
[77] Green Climate Fund. (2016). Resilience monitoring and evaluation scoping paper, 2016.
[78] Adaptation Fund. Perspectives Adaptation Metrics, 2014.

Resource	Description of metric (verbatim)	Adaptation and vulnerability relevance to Council
	Increased income, or avoided decrease in income (in dollars, currency)	Enhanced resilience to climate impacts with income increased/losses avoided, such as pivoting to climate-resilient gardening and agriculture, or income losses avoided by adapting to the climate impacts at hand.
Ministry of Natural Resources and Environment. (2020). *Adaptation Technical Paper Monitoring and Evaluation* [79]	Number of government staff that have received training on adaptation	Trained staff are better equipped to develop and implement climate adaptation policies, plans and programs with an understanding on key climate information.
	Percentage of road infrastructure that have been made 'climate resilient' or that are not considered vulnerable	Directly relevant to infrastructure resilience[80]. Roads can be vulnerable to a range of climate impacts. Metric can be used to indicate infrastructure adaptation efforts to ensure road networks remain functional and safe under changing climate conditions.
	Percentage of people and women in areas vulnerable to climate change impacts receiving vocational training and livelihood transformation	Measures efforts to build adaptive capacity by equipping vulnerable populations with skills and sustainable livelihoods, ensuring equitable adaptation.
Department for Environment, Food and Rural Affairs (2013*).* In: *Adaptation Community Guides Indicator Repository* [81]	Number of businesses with risk management plans considering climate change aspects or adaptation options	Risk management plans integrating climate adaptation can increase the adaptive capacity, and thereby resilience, of business owners to bounce back in wake of impacts from an extreme climate event.
Government of France. (2011). In: *Adaptation Community Guides Indicator Repository* [82]	Number of communication tools that incorporate climate change adaptation	Communication tools can help raise awareness of the importance of climate change adaptation and can build support and understanding of necessary interventions to create a more resilient Council.
Mekong River Commission. (2014*). Mekong River Commissions Climate Change Adaptation Initiative Mid Term Review Report.* [83]	Reduction of flood damage and disaster relief costs in cities due to increased standards for flood protection and improved flood emergency preparedness	By implementing measures such as upgraded flood defences, improved drainage systems, and early warning systems, towns can reduce the severity of flood events, minimising property damage, economic losses, and community safety impacts.
City of Melbourne. (2009). *Climate change adaptation strategy* [84]	Percentage of the city with tree canopy cover	A key neighbourhood level measure cited in literature[85]. Trees can significantly reduce impacts of extreme heat, providing shade and air cooling through transpiration. Trees also offer air quality and biodiversity benefits, particularly in urbanised areas.

[79] Ministry of Natural Resources and Environment. Adaptation Technical Paper Monitoring and Evaluation, 2020.

[80] MF Shehzad, et. al. A scoping review of climate vulnerability indicators: implications for neighbourhood-level vulnerability. Climatic Change, 179(49). 2026.

[81] Department for Environment, Food and Rural Affairs. Adaptation Community Guides Indicator Repository, 2013.

[82] Government of France. Adaptation Community Guides Indicator Repository, 2011.

[83] Mekong River Commission. Mekong River Commissions Climate Change Adaptation Initiative Mid Term Review Report, 2014.

[84] City of Melbourne. Climate change adaptation strategy, 2009.

[85] MF Shehzad, et. al. A scoping review of climate vulnerability indicators: implications for neighbourhood-level vulnerability. Climatic Change, 179(49). 2026.

Monitoring

Key questions will drive the monitoring and evaluation of the climate change adaptation plan. These include:

- What can Banyule City Council do to better prepare for and recover from climate change hazards?
- What does a climate resilient community look like?
- Have our identified climate risks shifted and do we need to update them?
- How do we know that our actions are fit-for-purpose and cost-effective?

Banyule's climate change adaptation actions are organisation-wide responsibilities, just like all other Council strategies and plans, yet the Environment Team will drive the implementation of the actions by monitoring and tracking the completion of actions. The adaptation working group / community of practice will assist in the implementation of the actions across the organisation by acting as boosters who can help their teams and department monitor their adaptation actions.

Anticipated costs for actions will be tracked and supplemented by actuals upon completion. Benefits of each action and the costs of inaction will also be listed for each action.

Evaluation

We recognise that our Community Climate Resilience Plan is a living document that may need to be modified to stay fit-for-purpose. We will utilise continuous evaluation through our staff community of practice and our advisory committees which represent at-risk populations. Both ISO14090 and the VCRS's Dynamic Adaptation Policy Pathways recommends a yearly evaluation of climate adaptation implementation efforts. To this end, we will also seek to include climate-related evaluation questions in our social program and event evaluations to be aware of emergent needs and have an annual review of our implementation approach and climate actions as we report on them for the annual State of the Environment Report.

We will continually assess:

- Process inputs and outputs
- Resources
- Organisational capability and overall adaptive capacity
- Measured indicators across time horizons
- The comparability of indicators with an eye toward corrective actions

Reporting

Per ISO14090 we will update our policies, strategies and plans using the outcomes of the implementation evaluation. We will formally report on our Community Climate Resilience Plan every five years. Evaluation findings will be reported to Council and the community annually, including in the State of the Environment Report or the Council's Annual Report. We will report our findings from the continuous evaluation undertaken with our internal community of practice through existing organisation working groups and manager updates. We will also share key program and event updates through our social media and community newsletters for timeliness and to spur community action where relevant.

The community has informed us via the early 2024 consultations that they want to be part of creating climate change adaptation solutions and that they want to be kept informed of all our work along the way. Reporting our progress on climate actions in a transparent manner will go a long way to building trust with the community on this issue which can often feel overwhelming.

Our reporting methods will also create avenues for celebration of creative co-designed opportunities that may arise. A climate action dashboard will be created for the Banyule website and posted with real-time updates, where relevant. This dashboard can include a portal for the community to report their own actions such as planting trees, installing solar and batteries and so on—driving home that both Council and the community are doing the work of climate adaptation together.

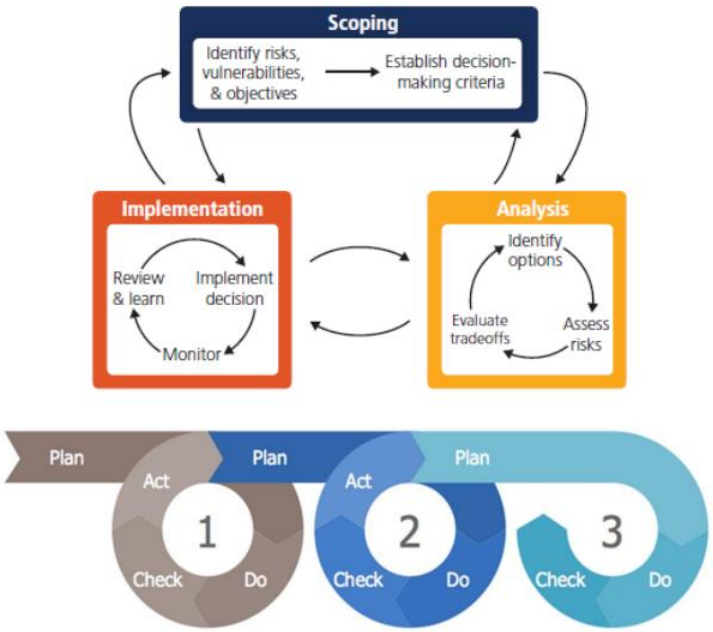
Reporting will be open, comprehensive, and clearly understandable. It will describe the methods used and explain the justification behind chosen actions and alternative actions. Lastly, reporting will explain the monitoring and evaluation plan and results to date.

> "Have real data and be transparent."
>
> "It's okay for Council to fail, but please communicate!"
>
> "Bring people along for the journey and there will be less scepticism."
>
> -Quotes from separate focus group participants, Ivanhoe Library and Community Hub, February 2024

Improvement

Per ISO14090, we will adopt a formal structure to capture learnings from monitoring and evaluation utilising a data management system that will allow efficient reporting and increase our ability to inform current and subsequent policies, strategies and plans. Improvements may include actions like procurement from organisations that meet Australian Climate Reporting Standards and changes to our way of delivering services and programs to the community. The periodicity of monitoring and evaluation will be developed during the implementation cycle. We will utilise an iterative approach for continual improvement modelled on Merri-bek's Climate Risk Strategy[86].

Figure 8 – Iterative Cycle of Climate Risk Planning
(Source: Merri-bek Council Climate Risk Strategy)



Within our MERI approach, Banyule will:

Monitoring- Utilise an iterative approach to monitor our climate actions, guided by key questions that will enable us to approach the work in a nimble, fit-for-purpose way.

Evaluation- We will utilise continuous evaluation with our community of practice and advisory committees. We will also seek to add climate-related questions within our service and events to identify emergent issues.

Reporting- We will report on our continuous evaluation internally to management and through our social communications channels when relevant. We will report annually on our actions in the State of the Environment Report and every five years in a formal evaluation. We will also create an organisation and community online dashboard.

Improvement- We will seek continuous improvement through our mechanism and approach our Community Climate Resilience Plan as a living, evolving document that needs to respond to changing conditions.

[86] Merri-bek City Council, Climate Risk Strategy, 2022.

The evolution of Banyule's climate action work

2019 - We joined other councils in taking climate change seriously

On 7 October 2019, Council passed a notable Climate Action Resolution declaring a Climate Emergency, following significant community consultation and a review of best practice action within the local government sector. The resolution consisted of significant components including:

- the recognised need for urgent action and leadership
- endorsement of an initial $5m climate action package
- request for identification of long-term carbon abatement options for Council operations, and
- identified intention to provide stronger support of the community, including a new and more transparent communication approach

Though taking this action Banyule acknowledges that every level of government, as a well as communities and businesses, have a responsibility to take urgent action to reduce emissions and mitigate the effects of climate change.

2019 - We created a Corporate Emissions Reduction Plan

Banyule's first Corporate Emissions Reduction Plan (CERP) was adopted in December 2019. This plan guides Council's efforts to reduce the impact of carbon emissions from our activities, services and facilities. It established a target for Council to become a certified carbon neutral organisation by 2028, known as Target28. This includes actions taken by staff to reduce emissions and embed collaboration across Council departments, the community and with other Councils in our region.

2020 - We created a Community Climate Action Plan

Banyule's first Community Climate Action Plan (CAP) was adopted in August 2020. It established a target for the municipality to become carbon neutral by 2040 and identified eight priority themes:

1. Whole of community engagement
2. Electrification and energy efficiency
3. Renewable energy
4. Green buildings
5. Zero emissions transport
6. Circular economy
7. Adaptation and resilience
8. Monitor and report

The plan, a first of its kind for Banyule, outlined how Council will support residents, businesses, and organisations to reduce emissions and become more resilient to the impacts of climate change.

While 'adaptation and resilience' were outlined as a priority theme, much of the CAP focused on mitigation actions, or carbon emissions reductions.

The CAP was reviewed in late 2025 alongside the community engagement we conducted around climate adaptation. The community continued to support the priority themes but did point out more robust actions were needed around adaptation.

We have since combined our climate adaptation focus with the CAP to created the 2026 Community Climate Resilience Plan for Banyule.

2022 – We conducted a risk audit

An internal audit was also completed in September 2022 by Crowe Australasia, reviewing the adequacy of the systems and processes Banyule City Council has in place to manage the adaptation necessary to address the impacts of climate change. The audit report found that the current controls in place would benefit from further strengthening in line with ISO14090: 2019 requirements.

The following recommendations were made which the 2026 Community Climate Resilience Plan addresses:

- **Assessment and identification of future risks and impacts**
    - Place climate change adaptation as a standalone risk within the existing Risk Framework.
    - Include a vulnerability assessment for social, environmental and financial vulnerabilities.
    - Assess the organisation's adaptive capacity.
- **Strategies for managing change**
    - Create an overarching adaptation plan.
    - Create an implementation plan to track progress of key targets.
    - Extend the sustainable building guidelines beyond council owned buildings to include using recycled materials (circular economy), parks and recreation best practice for vegetation and irrigation, upgrading surfacing materials, and upgrading drainage.
- **Considerations of impacts on assets and services**
    - All strategies and plans referencing climate change impacts should explicitly reference adaptation activities and link to the overarching framework.
    - The decision-making framework for the organisation which is mostly focused on mitigation currently should be strengthened to include adaptation.
- **Roles, responsibilities and management and oversight**
    - A reporting cycle should be developed that aligns with adaptation strategy and targets.
    - Improvement control measures of Council assets and private buildings could be strengthened with an audit process

2022 - We mapped our vulnerabilities

In 2022 Council developed a GIS module to assess climate risk. The module overlaid State datasets such as flooding risk, bushfire risk, urban heat island, and socioeconomic data to be overlaid with Banyule's infrastructure and biodiversity assets to improve our ability to conduct more detailed risk assessments internally before beginning new projects or creating new services.

2024 – We conducted preliminary engagement with the community and staff

Community consultation

Council undertook a series of community engagement activities under the banner of responding to climate change from 15 January to 24 March 2024. These activities sought input to help shape both the redevelopment of the Corporate Emissions Reduction Plan and the development of this Climate Change Adaptation Framework.

Community engagement was sought through an online survey that was open to everyone and promoted to members of the Banyule Environment and Climate Action Advisory Committee. Public forums were held across the municipality including a pop-up at Greensborough Plaza, the Banyule Eco Festival, the Ivanhoe Learning and

Community Hub. An online forum was held for those who could not attend the public forums, and input was sought from the Banyule community advisory and population committees.

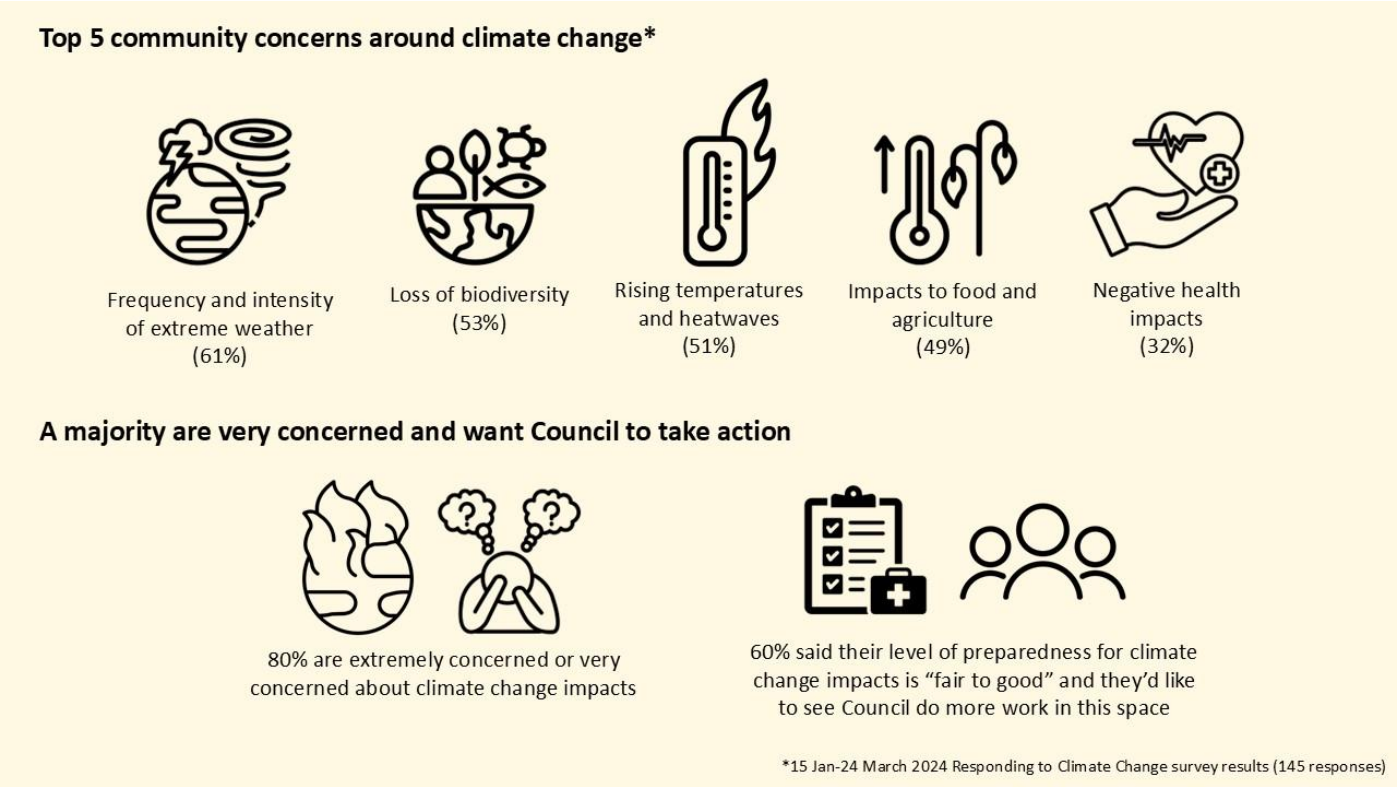
The full findings report is available on Shaping Banyule[87] with feedback relevant to the adaptation framework summarised here.

The three key engagement objectives identified for the adaptation framework included:

- Raising awareness
- Identifying community priorities and needs
- Fostering community ownership and collaboration

Feedback received emphasised the community's concern for climate change impacts and the need for proactive adaptation measures including "education and training programs to support people to adapt to climate change." Key concerns around climate change raised by the community are outlined in Figure 1.

Figure 9 - Banyule Community Member's Top Climate Change Concerns (2024)



Source: Banyule Council community consultations, 2024

"How do we anticipate the future?"

"The year 2100! What will it look like for our future grandchildren?"

"Where will the future budget come from if we keep rebuilding?"

"People are dying in winter as well!"

"Internally in the council and in the community, we need to risk-assess everything moving forwards."

[87] Results from the Responding to Climate Change community consultation https://shaping.banyule.vic.gov.au/ClimateResponse

Quotes from separate focus group participants, Ivanhoe Library and Community Hub, February 2024

Engagement for the preliminary community consultations included representation from all Banyule suburbs, age groups from 12 years old and over and included key demographic groups. The online survey had 145 responses and the conversion rate was 7.02% which was above average for both Shaping Banyule and projects in the preceding 12 months. However, people identifying as female outnumbered male by 2:1 and the contribution of people speaking English as a second or language was 4%, significantly below the 21% of people who identified as using a language other than English in the 2021 Census.

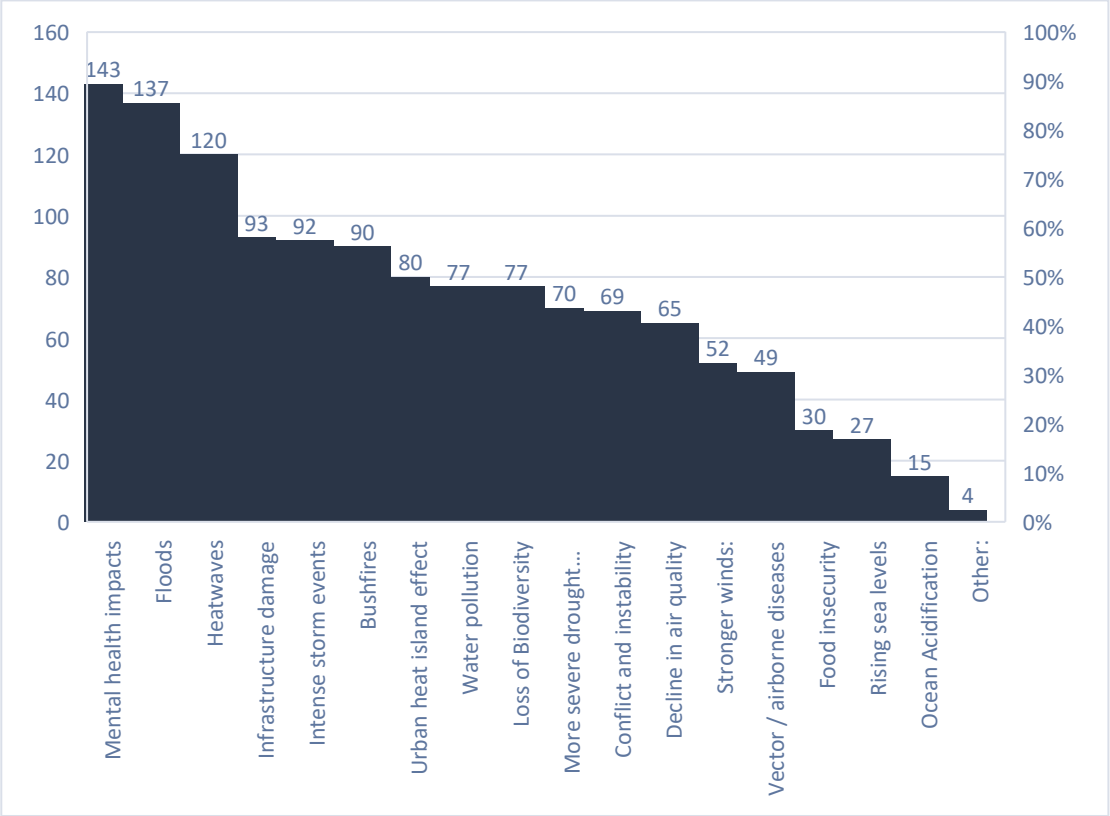
Staff Consultation

An internal workshop was conducted at Banyule City Council on 22 April 2024, to engage Banyule Council staff in the development of this framework. The session aimed to gather insights regarding potential hazards arising from climate change and the likely impacts of those hazards on Council's services now and in the future. An additional two addendums to the forum were held for City Futures staff and Parks and Natural Environment staff, at subsequent events in May 2024.

Results from the three internal staff events are summarised in **Figure 2**. The top five potential hazards were mental health impacts closely followed by floods. Heatwaves, infrastructure damage and intense storm events rounded out the remaining hazards, with bushfires following a close sixth concern.

A table of staff-identified risks are included in chapter 5-Identifying Risks and Opportunities, where they are contextualised within discussion of the risk assessment approaches we will utilise.

Figure 10 – Potential hazards / impacts of climate change on Council Services Identified by Staff (2024)



2024- We created our internal methodology to guide our adaptation planning

Utilising best-practice advice from Victorian Climate Resilient Councils' review of existing local government climate risk assessments, we developed a methodology to create our adaptation plan aiming to increase likelihood of implementation success. This document is an updated version of the original document.

2025-2026 – We updated the Corporate Emissions Reduction Plan

From 5 September - 19 October 2025, we sought feedback on the draft Corporate Emission Reduction Plan (CERP) through an online survey, with additional feedback received through community events, advisory committees and community drop-in sessions.

The CERP 2025 - 2029 outlines 32 key actions across 8 key areas to help us cut emissions from operations. It builds on our 2028 real zero goal and introduces a new 2035 target to reduce emissions from our supply chain and services (Scope 3 other indirect emissions).

Since adoption of the CERP 2020-23, a number of sustainability initiatives have been delivered.

- **Purchasing 100% renewable energy** - from 2021, Council has been a part of the Victorian Energy Collaboration (VECO), which has resulted in the generation of 100% of Council's electricity from wind farms. This change led to a reduction in nearly 60% of Council's annual greenhouse gas emissions.
- **Purchasing electric vehicles** - Council's passenger vehicle fleet has undergone a partial transition, with a number of zero emissions vehicles in the fleet and full transition expected to be achieved by 2028.
- **Energy efficient facilities** – we have undertaken several energy efficiency upgrades across our facilities, including installing LED lighting, upgrading heating and cooling and new insulation. We have also made improvements to our aquatic centres including pool blankets, more efficient pumps, automatic doors and an upgrade to more efficient fans.
- **Getting off gas** – 60% of our small facilities (childcare centres and community halls, for example) have been electrified, meaning that all gas appliances and systems have been changed to electric.
- **Solar installations** - we have rolled out solar panels on more than 85 Council buildings, helping to reduce our carbon footprint, cutting costs and moving away from traditional energy sources.
- **Continuous improvement** - as part of climate leadership, a culture of climate action has been embedded across the organisation and is seen as an all-of-staff responsibility.

2025 – We began drafting the adaptation plan, now known as the Community Climate Resilience Plan

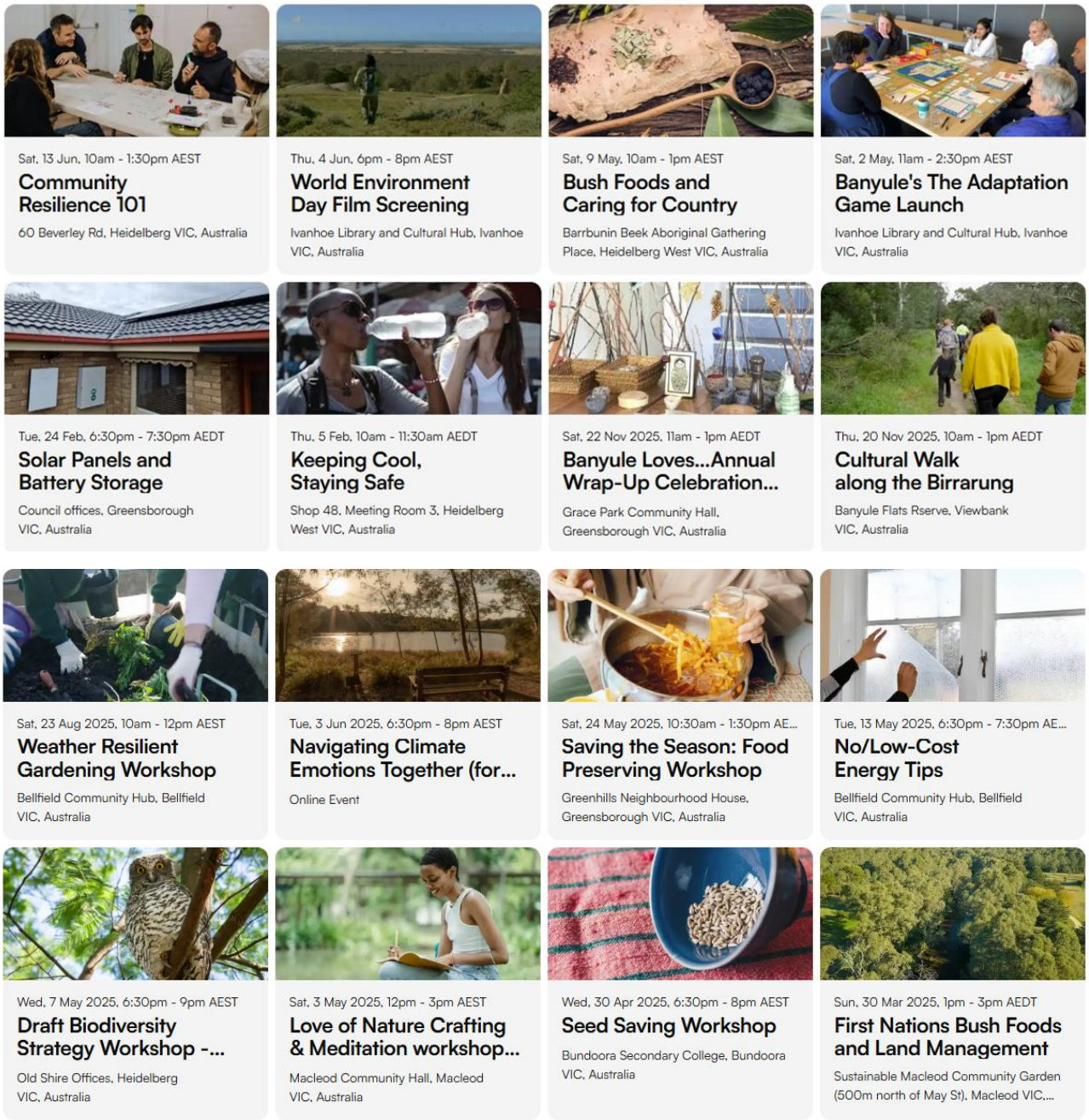
We conducted community engagement and utilised a staff project working group to help co-design our adaptation plan. We also create the following supporting documents:

- Climate Hazard Scenarios for Banyule Council – a technical document which localises climate models to provide Banyule-specific insights
- Adaptation Community Engagement Findings Report – a detailed report of our community findings from our survey, storytelling portal, social map activity, and in-person and online brainstorming sessions.
- Gender Impact Assessment – this document explores the intersections of various identities to explain the climate risks for certain demographics.
- This methodology document

2025- We created a climate-resiliency upskilling workshop series- Banyule Loves...

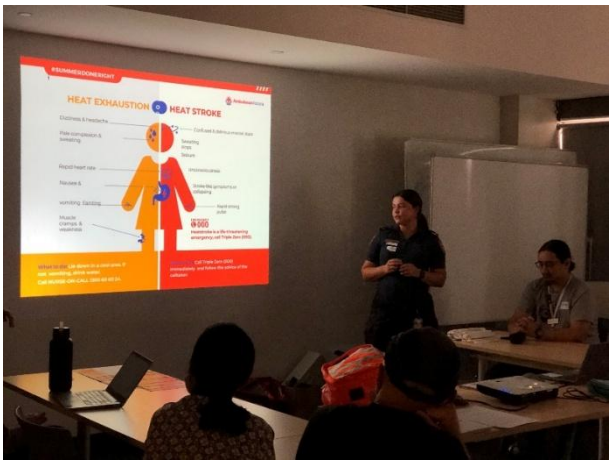
We Launched the Banyule Loves...Workshop Series in March 2025. This no-cost workshop series explores the lost art of sustainable, climate-resilient living. It celebrates the things about Banyule which our community loves- from gardening to connecting to Country to saving money on our energy bills. These workshops aim to upskill community members while connecting them to like-minded neighbours increasing social connection. Attendees are entered in a drawing for a prize for participating in each workshop, with the drawing held at the annual wrap-up celebration and showcase event in November. Each attendee will receive a certification of completion for the workshops they attend.

At the time of this publication, the Environment Team have hosted 18 workshops for the community since March 2025 and have reached over 560 community members. The workshops have been popular, with attendees rating them 9 out of 10 stars on average.



2026 – We observed Extreme Heat Awareness Day

In February, we observed Sweltering Cities' Extreme Heat Awareness Day (EHAD) by hosting an event with the community in one of our suburbs which experiences heat island effect to share useful information about heat stroke, climate-related risks and preparedness tips. Ambulance Victoria paramedics shared medical-related information around heat mitigation techniques. We also gave away emergency preparedness go-bags which included first aid supplies and other tools.



2026 – We launched The Adaptation Game: Banyule

In September 2024, Banyule Council began working with Amble Studio to create *The Adaptation Game: Banyule* which is a municipality-focused game that encourages residents to consider climate adaptation and preparation for themselves and their neighbourhoods. This cooperative board game is an engagement tool already being used in 16 other local council areas across Victoria. Created with Banyule maps and citing specific risks based on both historical experience, GIS risk mapping and future projections, community members can imagine how they'll respond to things such as floods, heatwaves, and extreme storms.

The Adaptation Game focuses on the use of storytelling and collaboration to imagine oneself now and in the future, enabling participants to better prepare and plan to minimise harm. It also encourages creativity and builds a sense of connection and personal efficacy as players learn how they can take actions locally to protect people and places they love while working with their neighbours. We launched the game officially in May 2026 and are currently seeking volunteers who would like to become Game Guides to run the game in their community networks.

Full footnote references

1 The Australia Institute. Costs of climate-driven disasters and local government revenue. September 2025. https://australiainstitute.org.au/wp-content/uploads/2025/09/P1895-Climate-costs-and-local-government-revenue-Web.pdf

2 Infrastructure Victoria. Warning Signs: Climate change risks to Victoria's infrastructure. 2026. https://www.infrastructurevictoria.com.au/resources/warning-signs-4

3 K Hennessy, Climate Hazard Scenarios for Banyule Council: A report by Climate Comms for Banyule Council, Victoria, 2025. https://shaping.banyule.vic.gov.au/download_file/5079/1439

4 Standford Social Innovation Review. Climate Adaptation Means Building Social Infrastructure. 2026. https://ssir.org/articles/entry/climate-adaptation-social-infrastructure

5 Scoping a Climate Change Risk Assessment for Victorian Local Government: Findings Report, October 2024.

6 Department of Land, Water and Planning. Local government climate change adaptation roles and responsibilities under Victorian legislation: Guidance for local government decision-makers, 2020. https://www.climatechange.vic.gov.au/__data/assets/pdf_file/0030/490476/Local-Government-Roles-and-Responsibilities-for-Adaptation-under-Victorian-Legislation_Guidance-Brief.pdf

7 Northern Alliance for Greenhouse Action. Embedding Action on Climate Change in your Council Plan. https://www.naga.org.au/uploads/9/0/5/3/9053945/embedding_action_on_climate_change_in_your_council_plan.pdf

8 Victoria Department of Health. Tackling climate change and its impacts on health through municipal public health wellbeing planning: Guidance for Local Government, 2024. https://www.health.vic.gov.au/publications/tackling-climate-change-impacts-health-municipal-public-health-wellbeing-planning

9 International Panel on Climate Change (IPCC), Working Group 2 report on Impacts, Adaptation and Vulnerability, 2022. https://www.ipcc.ch/working-group/wg2/

10 Australian Institute of Health and Welfare. Let's talk about the weather: Injuries related to extreme weather, 2023. https://www.aihw.gov.au/reports/injury/extreme-weather-injuries/contents/extreme-heat

11 Australian Council of Social Services (ACOSS). Heat in Homes Survey Report, 2025. https://www.acoss.org.au/wp-content/uploads/2025/03/Heat-Survey-Report-v1.0-Digital.pdf

12 International Panel on Climate Change (IPCC), Working Group 2 report on Impacts, Adaptation and Vulnerability, 2022. https://www.ipcc.ch/report/ar6/wg2/

13 Commission for Gender Equality in the Public Sector, Understanding gendered issues in emergency management, online, 2026. https://www.genderequalitycommission.vic.gov.au/understanding-gendered-issues-emergency-management

14 M Verner, et.al. International Public Opinion on Climate Change: Differences by Gender and Income/Emission Levels. Yale University. New Haven, CT: Yale Program on Climate Change Communication, 2024. https://climatecommunication.yale.edu/publications/climate-opinion-gender-income-levels/

15 R Mahendran, et. al. Interpersonal violence associated with hot weather. The Lancet Planetary Health, 5, e571-e572, 2021. https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00210-2/fulltext

16 Australian Climate Service. Aboriginal and Torres Strait Islander Peoples Technical Report, 2025, online. https://www.acs.gov.au/pages/systems-atsip

17 Collaborating4Inclusion. Disability Inclusive Disaster Risk Reduction (DIDRR) Framework and Toolkit, 2024. https://collaborating4inclusion.org/wp-content/uploads/2024/05/DIDRR_Framework_FULL-DOC_FINAL_2024.pdf

18 Collaborating4Inclusion. Disability Inclusive Disaster Risk Reduction (DIDRR) Framework and Toolkit, 2024. https://collaborating4inclusion.org/wp-content/uploads/2024/05/DIDRR_Framework_FULL-DOC_FINAL_2024.pdf

19 Australian Climate Service. Aboriginal and Torres Strait Islander Peoples Technical Report, 2025, online. https://www.acs.gov.au/pages/systems-atsip

20 City of Banyule Community Profile, ID Community, online. https://profile.id.com.au/banyule/population?Sex=1

21 R Mahendran, et. al. Interpersonal violence associated with hot weather. The Lancet Planetary Health, 5, e571-e572, 2021.

22 A. Erman, et. al. Gender Dimensions of Disaster Risk and Resilience. World Bank. 2021. https://wrd.unwomen.org/sites/default/files/2021-11/Gender-Dimensions-of-Disaster-Risk-and-Resilience-Existing-Evidence.pdf

23 City of Banyule Community Profile, ID Community, online. https://profile.id.com.au/banyule/population?Sex=1

24 R Mahendran, et. al. Interpersonal violence associated with hot weather. The Lancet Planetary Health, 5, e571-e572, 2021. https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00210-2/fulltext

25 United Nations (UN). Colliding Crises: How the climate crisis fuels gender-based violence, 2025, Online. https://www.spotlightinitiative.org/sites/default/files/publication/2025-04/Colliding%20Crises%20How%20the%20climate%20crisis%20fuels%20gender-based%20violence_0.pdf

26 M Gombert-Labedens, et. al. Effects of menopause on temperature regulation. Temperature (Austin). 2025 Apr 23;12(2):92-132. https://pmc.ncbi.nlm.nih.gov/articles/PMC12051537/https:/pmc.ncbi.nlm.nih.gov/articles/PMC12051537/

27 L Ironmonger. From hot flushes to night sweats: how to deal with menopause in a heatwave. Sydney Morning Herald, 2025. https://www.smh.com.au/lifestyle/health-and-wellness/from-hot-flushes-to-night-sweats-how-to-deal-with-menopause-in-a-heatwave-20241211-p5kxh3.html

28 United Nations Children's Fund, The climate-changed child: A children's climate risk index supplement, UNICEF, New York, November 2023. https://www.unicef.org/reports/climate-changed-child

29 E M Montoro-Ramirez, et. Al. Climate change effects in older people's health: A scoping study, Journal of Advanced Nursing, 81. 8066-8079. https://onlinelibrary.wiley.com/doi/full/10.1111/jan.16270

30 E M Montoro-Ramirez, et. Al. Climate change effects in older people's health: A scoping study, Journal of Advanced Nursing, 81. 8066-8079. https://onlinelibrary.wiley.com/doi/full/10.1111/jan.16270

31 L Ayalon, Climate change and aging: From vulnerability to action, Innovation in Aging, 2023 Dec 21;7(Suppl 1):152. https://pmc.ncbi.nlm.nih.gov/articles/PMC10735367/

32 L Ayalon, Climate change and aging: From vulnerability to action, Innovation in Aging, 2023 Dec 21;7(Suppl 1):152. https://pmc.ncbi.nlm.nih.gov/articles/PMC10735367/

33 A Kriebel-Gasparro, Climate Change: Effects on the Older Adult, The Journal for Nurse Practitioners, Volume 18, Issue 4, 372-376, 2022. https://www.sciencedirect.com/science/article/abs/pii/S1555415522000071

34 K Myers. Hurricane Helene shattered lives- and the systems that keep people sober, Grist, 2026. https://grist.org/health/hurricane-helene-shattered-lives-and-the-systems-that-keep-people-sober/?utm_medium=email&utm_source=newsletter&utm_campaign=weekly

35 S MacLean, et.al. How does climate change impact people who use alcohol and other drugs? A scoping review of peer reviewed literature. International Journal of Drug Policy, Volume 134, 2024. https://doi.org/10.1016/j.drugpo.2024.104649

36 M F Rossie, Heat-related risk in outdoor workers in the context of climate change: a systematic review, European Journal of Public Health, Vol. 34:3, November 2024, 906. https://www.jstor.org/stable/10.2307/27364640

37 K Sambrook, et. Al. Outdoor sport in extreme heat: Capturing the personal experiences of elite athletes, Weather, Climate and Society, July-September 2023, V. 15:3:619-631.

38 K. Dahl and R Licker, Too hot to work: Assessing the threats climate change poses to outdoor workers, Union of Concerned Scientists, 2021. https://www.jstor.org/stable/resrep34182

39 R Daniel Bressler, et.al. Working Under the Sun: The Role of Occupation in Temperature-Related Mortality in Mexico. Institute of Labor Economics, 2025. https://www.jstor.org/stable/resrep70580

40 K Ricketts and S Whitnall, From heat stress to economic stress: Exploring the future of Australian agriculture and labour productivity, Australian Farm Institute, 2025. https://www.farminstitute.org.au/wp-content/uploads/woocommerce_uploads/2025/06/RickettsWhitnall-FPJ_No.1_202

41 I Bonita, et.al. Exposure to wildfires exposures and mental health problems among firefighters: A systemic review. Atmosphere, 2024, 15, 78. https://doi.org/10.3390/atmos15010078

42 S Kim. Leave no one behind: a call to include people with disabilities in climate change and health research. Lancet Planet Health, 2026. https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(26)00013-6/fulltext

43 Collaborating4Inclusion. Disability Inclusive Disaster Risk Reduction (DIDRR) Framework and Toolkit, 2024. https://collaborating4inclusion.org/wp-content/uploads/2024/05/DIDRR_Framework_FULL-DOC_FINAL_2024.pdf

44 Disability in Banyule, Social Research Report (June 2024).

45 City of Banyule Community Profile, ID Community, online. https://profile.id.com.au/banyule/population?Sex=1

46 S Sharma and O Anikeeva, Impacts of climate change and related weather events on the health and wellbeing of culturally and linguistically diverse communities: A systematic review, Journal of Racial and Ethnic Health Disparities, 2025. https://doi.org/10.1007/s40615-025-02527-1

47 N Laurie, et. al. Translation urgency in our climate-challenged times: co-producing geographical knowledge on El Niño in Peru. *Scottish Geographical Journal*, *140*(1–2), 248–261. https://doi.org/10.1080/14702541.2023.2289496

48 KE Simmonds. Health impacts of climate change on gender diverse populations: A scoping review. Journal of Nursing Scholarship, 54, 81–91, 2022. https://doi.org/10.1111/jnu.1270

49 E Simmonds. Health impacts of climate change on gender diverse populations: A scoping review. Journal of Nursing Scholarship, 54, 81–91, 2022. https://doi.org/10.1111/jnu.12701

50 Climate and weather are often confused. Weather refers to short-term conditions in the atmosphere that take place over hours to days-like cold, rainy, or windy. Climate refers to the long-term averages and patterns of weather over decades or longer.

51 K Hennessy. Climate Hazard Scenarios for Banyule Council: A report by Climate Comms for Banyule Council, Victoria, 2025. https://shaping.banyule.vic.gov.au/download_file/5079/1439

52 Commonwealth Scientific and Industrial Research Organisation (CSIRO), Victoria's climate science report, 2024. https://www.climatechange.vic.gov.au/victorias-changing-climate

53 Commonwealth Scientific and Industrial Research Organisation (CSIRO), Victoria's climate science report, 2024. https://www.climatechange.vic.gov.au/victorias-changing-climate

54 Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Bureau of Meteorology (BoM), State of the Climate, 2024. https://www.csiro.au/en/research/environmental-impacts/climate-change/State-of-the-Climate

55 K Hennessy. Climate Hazard Scenarios for Banyule Council: A report by Climate Comms for Banyule Council, Victoria, 2025. https://shaping.banyule.vic.gov.au/download_file/5079/1439

56 Time horizons, or time frames or time slices, are the periods for which climate data will be collated and risks assessed.

57 S Kelly, et. Al. The Use of Climate Scenarios in Australia. Climate-KIC & UTS Institute for Sustainable Futures, 2020. https://www.uts.edu.au/globalassets/sites/default/files/2021-08/The-Use-of-Climate-Scenarios-in-Australia.pdf

58 Victoria's Future Climate Tool https://vicfutureclimatetool.indraweb.io/project https://vicfutureclimatetool.indraweb.io/project

59 Climate Change in Australia: Climate information, projections, tools and data. Greenhouse gas scenarios, 2025. https://www.climatechangeinaustralia.gov.au/en/changing-climate/future-climate-scenarios/greenhouse-gas-scenarios/

60 Australian Sustainability Reporting Standard AASB S2. 2024. https://standards.aasb.gov.au/aasb-s2-sep-2024

61 Climate Systems, National Environmental Science Program, What are SSPs? https://nesp2climate.com.au/wp-content/uploads/2024/01/Understanding-SSPs-1.pdf

62 K Hennessy. Climate Hazard Scenarios for Banyule Council: A report by Climate Comms for Banyule Council, Victoria, 2025. https://shaping.banyule.vic.gov.au/download_file/5079/1439

63 C Harris. Impactful climate adaptation goes beyond projections. Australian Water Association, 2025. https://www.awa.asn.au/resources/latest-news/impactful-climate-adaptation-goes-beyond-projections

64 International Standards Organization. Adaptation to climate change: Principles, requirements and guidelines (ISO14090:2019), pp. 20. https://www.iso.org/standard/68507.html

65 K Hennessy, Climate Hazard Scenarios for Banyule Council: A report by Climate Comms for Banyule Council, Victoria, 2025. https://shaping.banyule.vic.gov.au/download_file/5079/1439

66 K Hennessy. Climate Hazard Scenarios for Banyule Council: A report by Climate Comms for Banyule Council, Victoria, 2025. https://shaping.banyule.vic.gov.au/download_file/5079/1439

67 Australian Institute for Disaster Resilience, Disaster Event Portal. https://knowledge.aidr.org.au/disasters/

68 Bureau of Meteorology, Severe Storm Archive. https://www.bom.gov.au/australia/stormarchive/

69 Extreme Weather in Melbourne Wiki. https://en.wikipedia.org/wiki/Extreme_weather_events_in_Melbourne

70 Banyule City Council, Climate Adaptation and Climate Action Plan Consultation Findings Report- Stage 2, 2026. https://shaping.banyule.vic.gov.au/ClimateResponse/Adaptation

71 International Panel on Climate Change (IPCC), Working Group 2 report on Impacts, Adaptation and Vulnerability, 2022. https://www.ipcc.ch/report/ar6/wg2/

72 A climate tipping point is critical threshold beyond which a system reorganises, often abruptly and/or irreversibly.

73 United Nations Office for Disaster Risk Reduction. Monitoring Sendai Framework, 2015. https://www.undrr.org/implementing-sendai-framework/monitoring-sendai-framework

74 C40 Cities. Measuring progress in urban climate change adaptation, 2019. https://c40.my.salesforce.com/sfc/p/#36000001Enhz/a/1Q000000MdWn/MOPLpb4xcQ_TDOllsCDrBvpXtSzSyX2q9beoWvQl7lI

75 NYC Mayor's Office of Climate and Environmental Justice. OneNYC 2050, 2025. https://www.nyc.gov/site/cpp/our-programs/onenyc.page

76 Green Climate Fund. (2016). Resilience monitoring and evaluation scoping paper, 2016. https://documents1.worldbank.org/curated/en/577241468184764561/pdf/105159-WP-P155632-PUBLIC-Resilience-ME-Scoping-Paper-5April2016-FOR-PUBLICATION.pdf

77 Adaptation Fund. Perspectives Adaptation Metrics, 2014. https://backend.orbit.dtu.dk/ws/files/175846716/UDP_Perspectives_Adaptation_Metrics_WEB.pdf

78 Ministry of Natural Resources and Environment. Adaptation Technical Paper Monitoring and Evaluation, 2020. https://unfccc.int/sites/default/files/resource/AC_TechnicalPaper_AdaptationMandE_2023.pdf

79 MF Shehzad, et. al. A scoping review of climate vulnerability indicators: implications for neighbourhood-level vulnerability. Climatic Change, 179(49). 2026. https://link.springer.com/article/10.1007/s10584-026-04122-7#citeas

80 Department for Environment, Food and Rural Affairs. Adaptation Community Guides Indicator Repository, 2013. https://www.adaptationcommunity.net/download/me/me-guides-manuals-reports/giz2014-en-climate-adaptation-indicator-repository.pdf

81 Government of France. Adaptation Community Guides Indicator Repository, 2011. https://www.adaptationcommunity.net/download/me/me-guides-manuals-reports/giz2014-en-climate-adaptation-indicator-repository.pdf

82 Mekong River Commission. Mekong River Commissions Climate Change Adaptation Initiative Mid Term Review Report, 2014. https://www.adaptationcommunity.net/download/me/me-guides-manuals-reports/giz2014-en-climate-adaptation-indicator-repository.pdf

83 City of Melbourne. Climate change adaptation strategy, 2009. https://www.melbourne.vic.gov.au/sitecollectiondocuments/climate-change-adaptation-strategy.pdf

84 MF Shehzad, et. al. A scoping review of climate vulnerability indicators: implications for neighbourhood-level vulnerability. Climatic Change, 179(49). 2026. https://link.springer.com/article/10.1007/s10584-026-04122-7#citeas

Appendix 1 –Best Practice Context for this Climate Adaptation Framework

Legislative, Global, and Local Guidance

UN Sustainable Development Goal 13

The United Nations Sustainable Development goals were developed in 2015 as a call to action for ending poverty, addressing inequality, protecting our planet and ensuring the prosperity, health and justice of all people globally. Goal 13 is Climate Action and explicitly states all countries must "take urgent action to combat climate change and its impacts"[88]. Targets for the goal related to climate change adaptation at the local government level include[89]:

- strengthening resilience and adaptive capacity to climate related hazards and natural disasters in all countries.
- Improving education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

Australian Sustainability Reporting Standard AASB S2 Climate-related Disclosures

Legislated in September 2024, this Standard requires an entity to disclose information about climate-related risks and opportunities that could reasonably be expected to affect the entity's cash flows, its access to finance or cost of capital over the short, medium or long term. For the purposes of this Standard, these risks and opportunities are collectively referred to as 'climate-related risks and opportunities that could reasonably be expected to affect the entity's prospects'

Australian Government's *Climate Change Act* 2022

This federal policy sets a standard for carbon emissions reduction and leads the way for state and local governments to act by setting an example for reduction targets, tracking progress and setting standards for periodic review and public consultation.

The Australian Government has committed to reduce greenhouse gas emissions by 43% below 2005 levels by 2030 and to achieve net zero emissions by 2050. The government's *Climate Change Act* 2022[90] passed the Senate in September 2022.

At this time, Australia was one of 27 nations to have legislated its net zero targets. The commitment forms part of Australia's Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC), submitted in June 2022.

This act establishes that the Federal government recognises human-induced climate change must be acted upon. It sets out Australia's greenhouse gas emissions reduction targets and mandates the Minister prepare an annual climate change statement.

[88] United Nations Sustainable Development Goal 13 https://sdgs.un.org/goals/goal13.
[89] United Nations Sustainable Development Goal 13 Targets https://www.undp.org/sustainable-development-goals/climate-action
[90] Australian Government, Department of Climate Change, Energy, the Environment and Water Climate Change Act 2022 (No 37, 2022)

The Victoria *Local Government Act* 2020

The *Victorian Local Government Act 2020* mandates local councils act on climate change by trying to minimise our contributions to global warming and to prepare for its related risks. The law outlines that Councils must provide good governance for the benefit and wellbeing of their community, including addressing climate change.

> "Councils are required to promote "the economic, social and environmental sustainability of the municipal district, including mitigation and planning for climate change risks." (*Local Government Act* 2020[91])

Other relevant overarching mandates within the *Local Government Act* 2020 include:

- Councils are required to give priority to achieving the best outcomes for the municipal community, including future generations
- Regional, state, and national plans and policies must be taken into account during council's strategic planning
- Council must ensure its decisions, actions, and information are transparent
- The long-term adverse consequences of climate change for future generations must be incorporated into council planning, decisions and actions

National Climate Resilience and Adaptation Strategy

The *National Climate Resilience and Adaptation Strategy 2021-2025* recognises that adaptation is a shared responsibility that requires sustained and ongoing action.

The government's role in the adaptation space is to:

- Provide leadership on national adaptation reform
- Manage Australian Government assets and programs, including embedding climate change impacts into existing risk management frameworks and working with all governments to manage climate risks to nationally significant public assets
- Provide and manage national science and information that is high quality and includes national and regional climate projections to allow Australia to effectively adapt
- Maintain a strong, flexible economy and a well-targeted social safety net to ensure resources are available to respond to climate change and climate change does not disproportionately affect vulnerable groups

The strategy operates across four domains – natural, built, social and economic. It details three objectives to enable more effective adaptation across Australia:

- Drive investment and action through collaboration
- Improve climate information and service
- Assess progress and improve over time.

The Australian Government's National Adaptation Policy Office (NAPO) oversees implementation of this strategy, coordinates work on climate adaptation across all governments, reports on Australia's adaptation progress and provides a central point of contact and information on adaptation for businesses and communities.

Victorian Government

The Victorian Government has implemented policies and regulations to integrate climate change adaptation into planning and decision-making processes at state and municipal levels of government.

[91] The State Government of Victoria, Local Government Act 2020 (Act No. 9/2020). https://content.legislation.vic.gov.au/sites/default/files/2020-03/20-009aa%20authorised_0.pdf

The state government's role includes:

- Provide leadership on state-level adaptation initiatives.
- Manage state government assets and programs, including incorporating climate change impacts into existing risk management frameworks and collaborating with other levels of government to mitigate climate risks to significant public assets within Victoria.
- Manage state-specific scientific research and information, including climate projections tailored to Victoria's regions, to enable effective adaptation measures.
- Sustain a resilient and dynamic economy and ensuring an equitable social safety net to mitigate the impacts of climate change, particularly on vulnerable communities within the state.

Victorian Public Health and Wellbeing Plan

Tackling climate change and its impacts on health is one of the top ten priorities of the 2023-2027 Victorian Health and Wellbeing Plan[92]. Specifically relevant to this climate change adaptation plan are the following planned achievements:

- Increase action to reduce greenhouse gas emissions across systems at the scale and pace required to reduce the impacts on health and wellbeing and realise associated health co-benefits.
- Create resilient and safe communities that can adapt to the public health impacts of climate change.
- Accelerate action to support communities to adapt to climate change and its impacts on health.
- Share successes and promote good practice examples of climate action.

Victorian Climate Change Act 2017

The *Climate Change Act 2017* (the Act)[93] is legislation that introduced systems-based planning for adaptation by focusing on key systems that are either vulnerable to the inevitable impacts of climate change, or are essential to ensure Victoria is prepared. Under the Act, Adaptation Action Plans (AAPs) are required to be developed every five years covering the following key systems:[94]

- built environment
- education and training
- health and human services
- natural environment
- primary production
- transport, and
- the water cycle

Victoria's Climate Change Strategy

Victoria's Climate Change Strategy[95], released in 2021, sets out a five-point plan detailing how Victoria will meet its emissions reduction targets, transition to a net zero emissions future and adapt to the impacts of climate change. Point five focuses on adaptation in 'A climate resilient Victoria' and includes actions in three priority focus areas:

- Efforts to address current climate change impacts

[92] Victorian Public Health and Wellbeing Plan 2023-27. https://www.health.vic.gov.au/victorian-public-health-and-wellbeing-plan-2023-27#our-priorities

[93] The State Government of Victoria. Climate Change Act 2017 , Division 2:34 (2017). https://content.legislation.vic.gov.au/sites/default/files/2024-06/17-5aa010-authorised.pdf

[94] The State Government of Victoria, Building Victoria's Climate Resilience (2022)

[95] The State Government of Victoria Department of Environment, Land, Water and Planning, Victoria's Climate Change Strategy (May, 2021)

- Reduce barriers to adaptation
- Lay the foundations for transformational adaptation.

Built Environment Climate Change Adaptation Plan 2022-2026

Victoria's Built Environment Climate Change Adaptation Plan (2022) details how local councils are key in planning and responding to climate change and natural hazards. [96] They do this by:

- Managing planning schemes and providing local flood mitigation infrastructure
- Developing and implementing Municipal Emergency Management Plans and investing in preventative measures and risk assessments
- Offering community wellbeing services that complement climate change adaptation, like home maintenance services for older citizens in preparation for heatwaves

Northern Alliance for Greenhouse Action

The Northern Alliance for Greenhouse Action (NAGA) formed in 2002. NAGA is a network of nine councils located in Melbourne's North – Banyule, Darebin, Hume, Manningham, Melbourne, Merri-bek, Nillumbik, Whittlesea and Yarra.

Key work happening within NAGA that has been instrumental to this adaptation framework includes:

- The 2014 vulnerability assessment, *Adaptation in the North, 2014*[97] which identified populations, infrastructure and assets at particular risk from climate change in northern metropolitan Melbourne.
- The 2018 gap analysis for done for the Victorian Government's Department of Environment, Land, Water and Planning (DELWP). This collaboration with the Western Alliance for Greenhouse Action (WAGA), the South East Councils Climate Change Alliance (SECCCA) and the Eastern Alliance for Greenhouse Action (EAGA) assisted in developing regional priorities for adaptation based on the climate change impacts that the Port Phillip (Greater Melbourne) region is likely to experience, the needs and values of the community, and work undertaken to date.
- The 2021 Exploring Vulnerabilities desktop review and recommendations report.[98]
- The operationalisation of the Climate Emergency Australia (CEA) group supported by 13 founding councils, including Banyule City Council. The group now works on a membership model and since 2022 has been hosted and run by Hume City Council to function as a community of practice and site of shared learnings.
- The 2023 formation of a Climate Adaptation Community of Practice which shares learnings and resources amongst local councils to ensure best practice.

[96] The State of Victoria Department of Environment, Land, Water and Planning. Built Environment Climate Change Adaptation Plan 2022-2026 (2022).
[97] Northern Alliance for Greenhouse Action (NAGA), Adaptation in the North, 2014.
[98] Northern Alliance for Greenhouse Action (NAGA), Exploring Vulnerabilities in Port Phillip Region, Desktop Review, 2021.