

Victorian Greenhouse Alliances Annual Conference 2022

Cost and Benefits of Climate Adaptation

Panel:

- Dan Pleiter, SECCCA, and Rhiannan Mundana, Spatial Vision
- Mitchell Perry, Natural Capital Economics
- Scott McKenry, EAGA

Facilitator: Daniel Pleiter, South East Councils Climate Change Alliance



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Acknowledgement of Country

We acknowledge the Wurundjeri, the Traditional Owners of the land we are meeting on today, and pay respect to their elders: past, present and emerging. We acknowledge that their sovereignty was never ceded and that they have looked after this country for millennia.

Likewise we acknowledge Traditional Owners around Victoria, whose lands provide us with the energy, food, water and other resources we are using today.



BARWON SOUTH WEST
CLIMATE ALLIANCE



casbe
Council Alliance for a
Sustainable Built Environment



CENTRAL
VICTORIAN
**Greenhouse
Alliance**

EAGA
EASTERN ALLIANCE
FOR GREENHOUSE ACTION



goulburn murray
climate alliance

naga

northern alliance for
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SECCCA
South East Councils
Climate Change Alliance

WAGA

Western Alliance for
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The SECCCA Asset Vulnerability Assessment Project



Daniel Pleiter (SECCCA) and Rhiannan Mundana (Spatial Vision)



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Regional Collaboration



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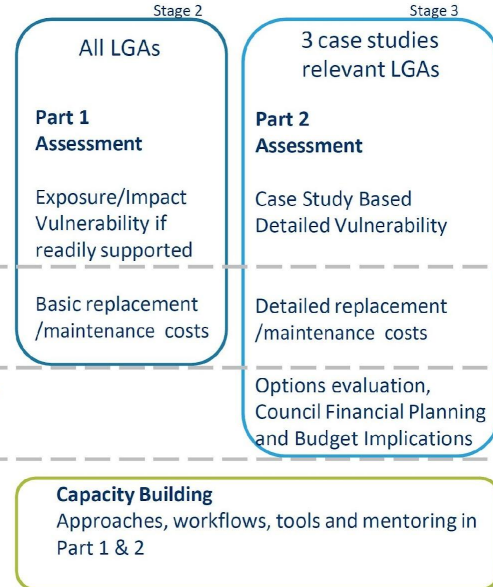
Council Asset Vulnerability

- How are SECCCA member councils' **buildings, roads and drainage** are impacted by climate change?
- How do councils appropriately plan for identified changes and influence decision making to create prioritised, costed works plans to make asset more resilient to climate change?
- Help councils to have a deeper understanding of how climate change may impact the delivery of community services and a better understanding of potential associated risk to community

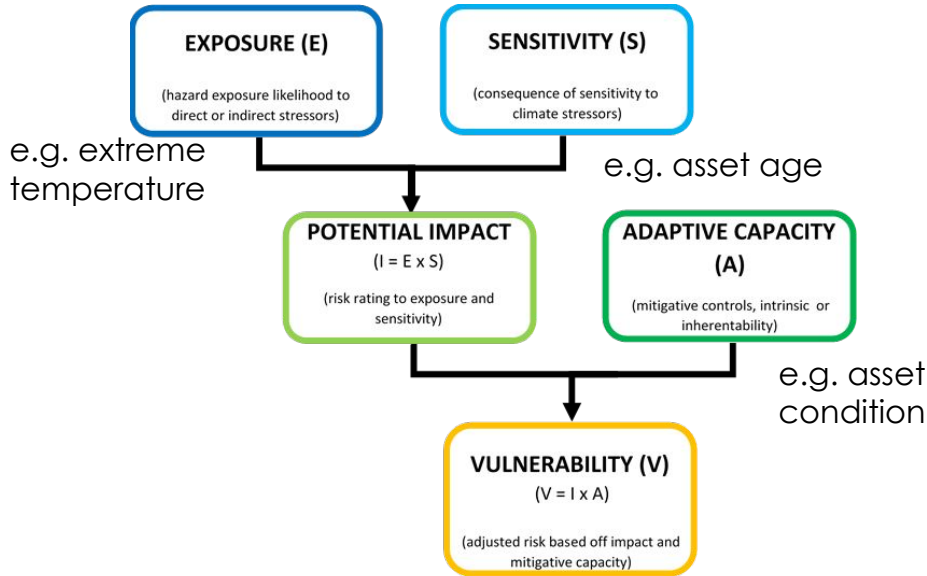
Evidence based methodology

Project Outputs

- Asset Vulnerability Assessments
- Financial Impact Assessments
- Adaptation Options & Economic Analysis
- Tools to assist decision making



First-Pass Vulnerability Analysis



- Scoring of S and A determined through interactive workshops with Asset Managers to incorporate knowledge
- Representation of spatial and temporal variability across the municipalities



Why Multiple Climate Projection Models?

- Many models available to present the different climate future possibilities
- In reality – likely going to be experiencing different extremes (e.g., heatwaves, intense rainfall events) at different times
 - Critical for councils to be considering multiple models

Data-Driven: Climate Change Projection Data & Council Asset Data

Global Climate Modes:

- maximum consensus
- "wetter and warmer"
- "drier and hotter"

Carbon Emission Scenarios:

- RCP 4.5 (moderate)
- RPC 8.5 (high)

Time frames:

- Baseline (1981)
- 2030 projection
- 2050 projection
- 2070 projection

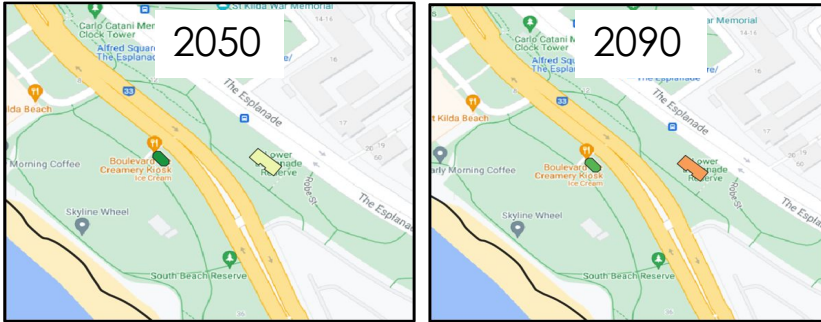
Asset Attributes to inform Sensitivity and Adaptive Capacity (materials, age, condition, etc.)

24 vulnerability scores per asset

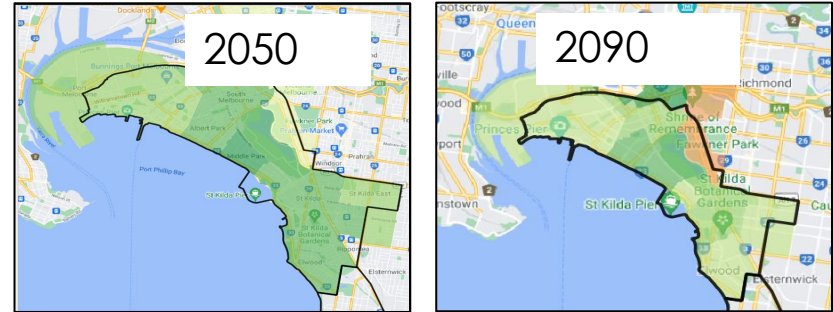


Spatial Output Example – Building Vulnerability to Extreme Temperature

Individual Asset Level



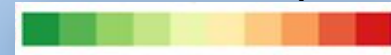
Suburb Level Summary



GCM Model:
ACCESS 1.0

Carbon Emission Scenario:
RCP 8.5

Vulnerability



Low

High

Prioritise Council Assets & Areas of Concern

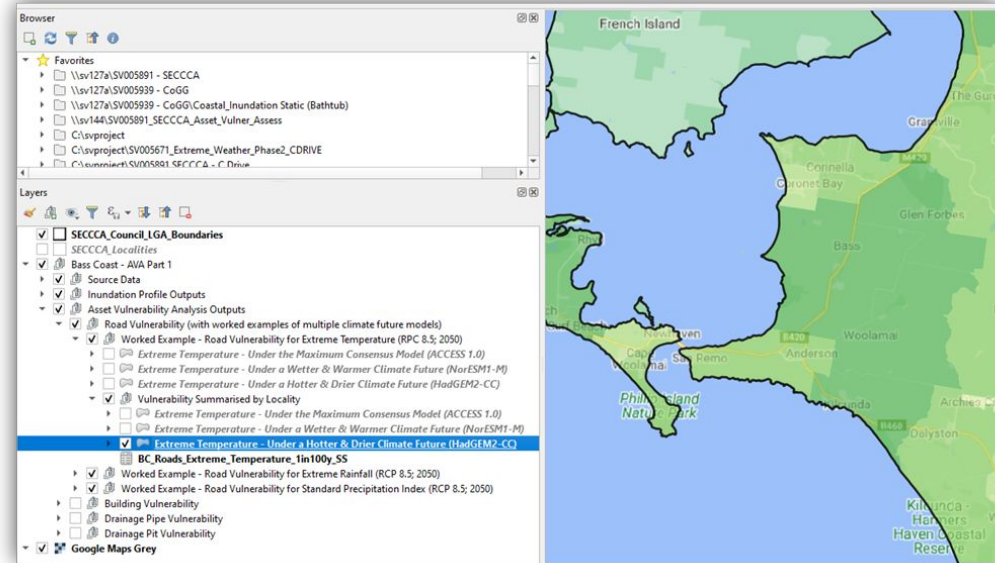
Capacity Building in two stages:

1. QGIS Introduction Course

2. Interactive mentoring on application of data, with worked examples:

- *"What's the relative change in the number of heatwaves per year in Inverloch expected to be over time?"*
- *"Will Building 'X' be impacted by different inundation scenarios, and if so what areas?"*
- *"Which localities in my LGA should I be most concerned about in regard to the vulnerability of roads to extreme temperature?"*

Repeatable framework to allow for new & updated data



Foundation for cost-benefit analyses – supporting prioritisation and focus



Learnings and Resources

1. Strong governance oversight
2. Address the data challenges
3. Actively evaluate (& adapt)

For more information go to '[Climate Vulnerability Guide](#)' – A toolkit for councils to assess the vulnerability of assets to climate change'

Next steps – people, houses and businesses

1. The most vulnerable community segments, their locations, exposures and develop co-designed resilience building responses. *(Funded by the Minderoo Foundation)*
2. The likely impacts on the most exposed and vulnerable residential dwellings in the community and potential protection options. *(Funded by the Insurance Council of Australia)*
3. Undertake with businesses Climate Change Risk Assessments and Adaptation Plans *(Funded by DELWP Regional Adaptation Strategy)*

www.seccca.org.au for more information

Thank you & Contact



Daniel Pleiter

Acting Chief Executive Officer

SECCCA

 <https://www.linkedin.com/in/daniel-pleiter-17075b190/>

E: dpleiter@seccca.org.au



Rhiannan Mundana

Senior Geospatial Analyst

Spatial Vision

 <https://www.linkedin.com/in/rhiannan-mundana/>

E: Rhiannan.Mundana@spatialvision.com.au



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Scoping Study: Costs and Benefits of Climate Change Adaptation Options for Community Assets

Mitchell Perry

Natural Capital Economics



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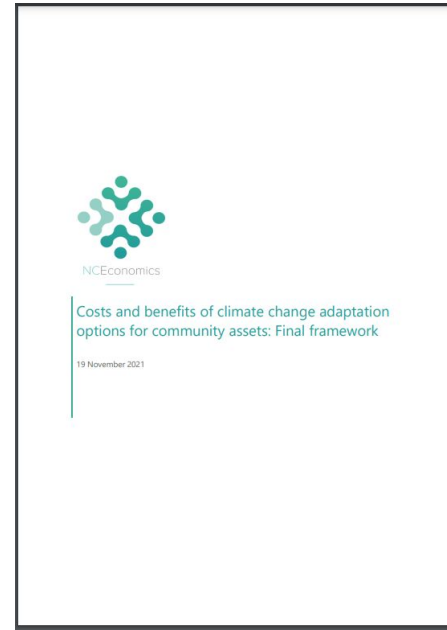
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Project drivers

Councils have a obligation to manage climate change risks

The CBA framework developed will assist councils to:

- Determine the most appropriate climate change adaptation options
- Establish clear business cases to secure funding



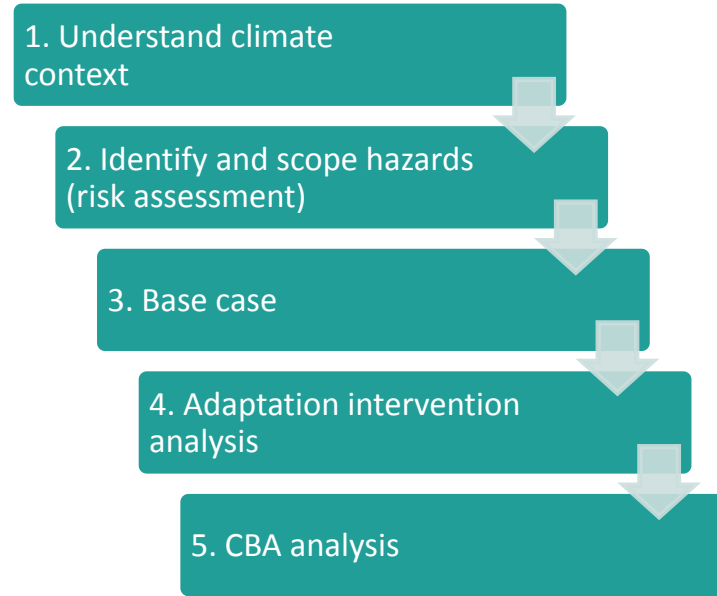
Access the framework here:

https://www.naga.org.au/uploads/9/0/5/3/9053945/cba_framework_for_adaptation_options.pdf

CBA Framework

The framework is:

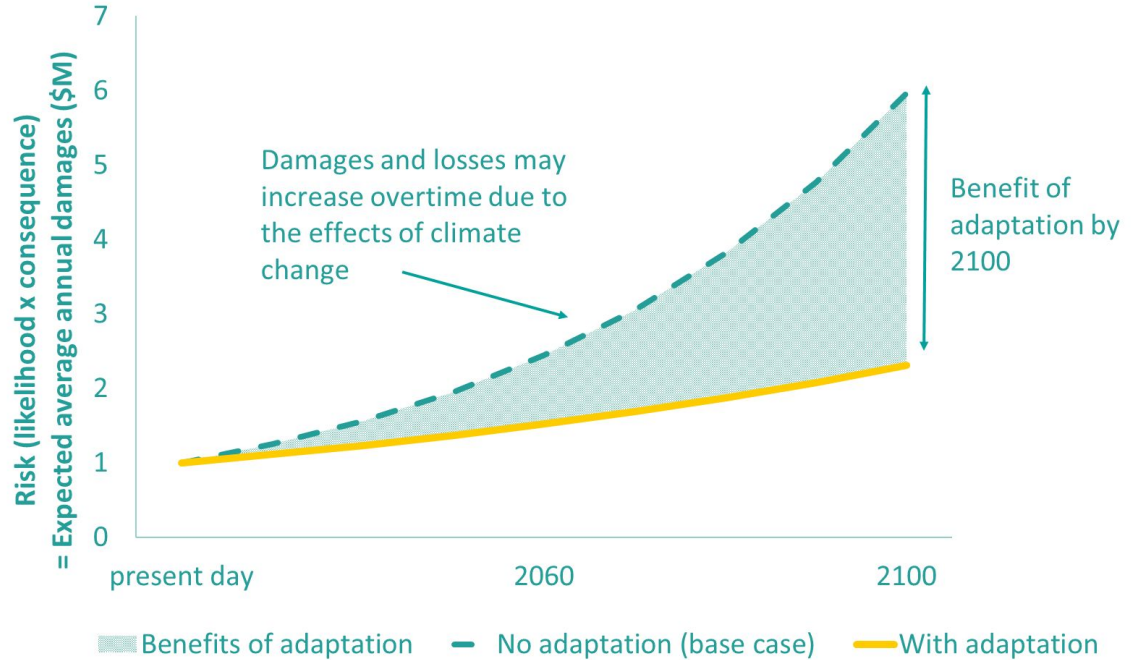
- Broken into 5 steps
- Underpinned by a cost-benefit analysis
- Adaptable to a range of different hazards and assets
- Can accommodate hard and soft adaptation measures



Overview of the framework

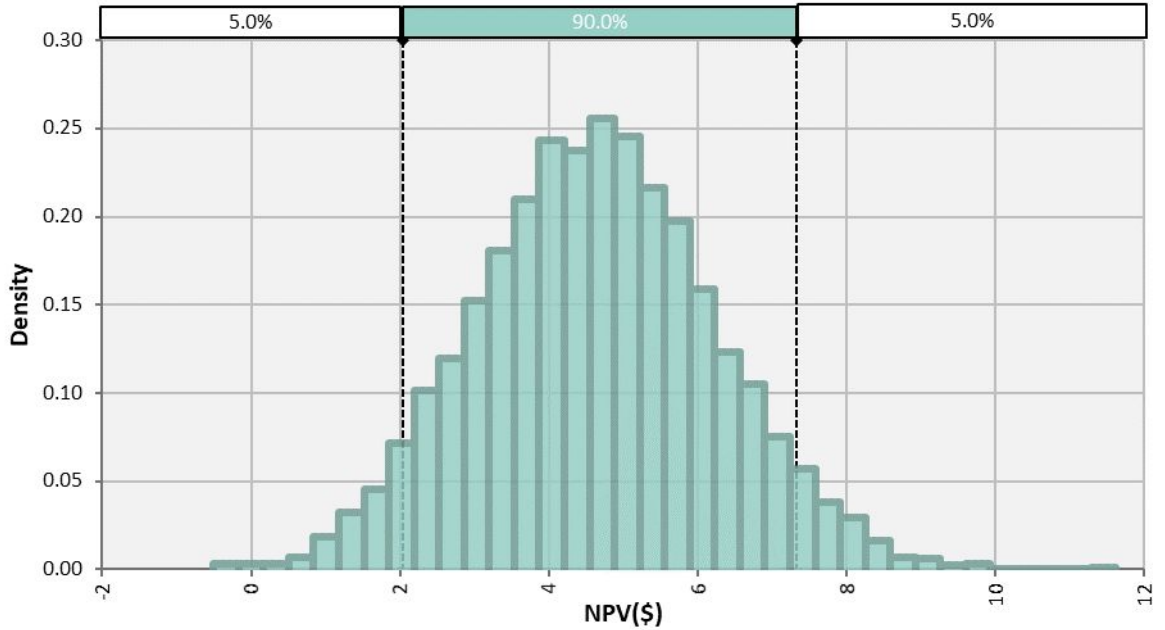
Benefits of adaptation

- Benefit of adaptation is the reduction in risk
- Risk (likelihood x consequence) = expected average annual damage (AAD)
- Consequences can include direct tangible, indirect tangible and intangible impacts



Data inputs

- Council asset data
- Climate projections
- Results will be within a range to accommodate uncertainty
- Sensitivity analysis is critical



Example of probabilistic distribution of net present value from Monte Carlo simulation

Thank you

Mitchell Perry
Natural Capital Economics
M +61 476 866 990
E mitchell.perry@nceconomics.com
W www.nceconomics.com



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Resilient Emergency Relief Centres

- › Assess the vulnerability of 23 Emergency Relief Centres (ERC)
- › Identify opportunities to improve the resilience and cost upgrades
- › Build the capacity of council facility managers to integrate climate asset management plans
- › Dedicated project manager across 8 councils
- › Update [Building Vulnerability Assessments \(BVA\)](#) methodology develop by Arup
- › Individual reports for each council

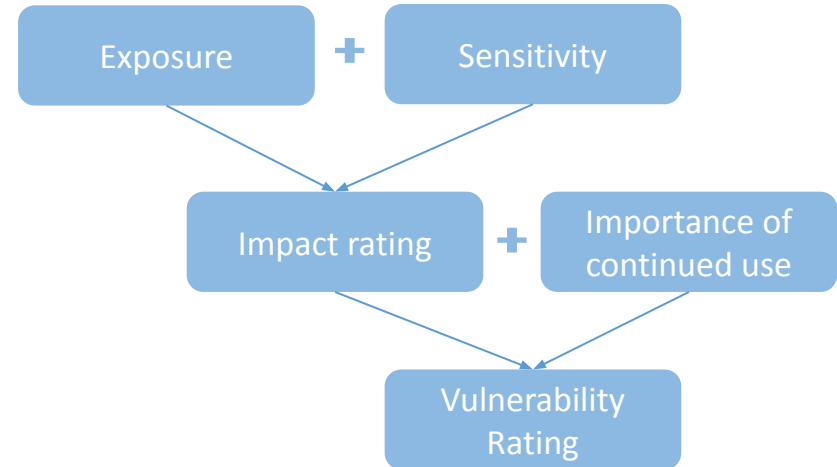


Figure 2: Vulnerability assessment approach

Key Building Vulnerability Findings – top 5

Functional Requirement	Building component	Vulnerability description	Risks	Adaptation measures	Adaptation measure Av \$/m ²
Power	Electricity - grid & building	Electricity grid supply failures/blackouts	No electricity Safety compromised (no lighting, air conditioning, IT services, communications) Building continuity is lost/restricted	Investigate options for back-up supply and install/connect best option	\$8.13
	Cooling equipment	Extreme heat/higher temperatures	Increased wear and tear, shorter life, high running costs, high greenhouse gas emissions, inability to achieve safe indoor temperature	Shade equipment, improve thermal efficiency of building envelope	
Thermal comfort	Cooling& heating equipment	Extreme wind & impact by vegetation	Damage to equipment, function and service continuity	Manage vegetation risks	\$15.52
	Roofs, external walls, floors, windows and doors	Higher outdoor temperatures being transferred into building via conduction and/or air infiltration	Inability to achieve safe indoor temperature, function and service continuity	Improve thermal efficiency of building envelope	

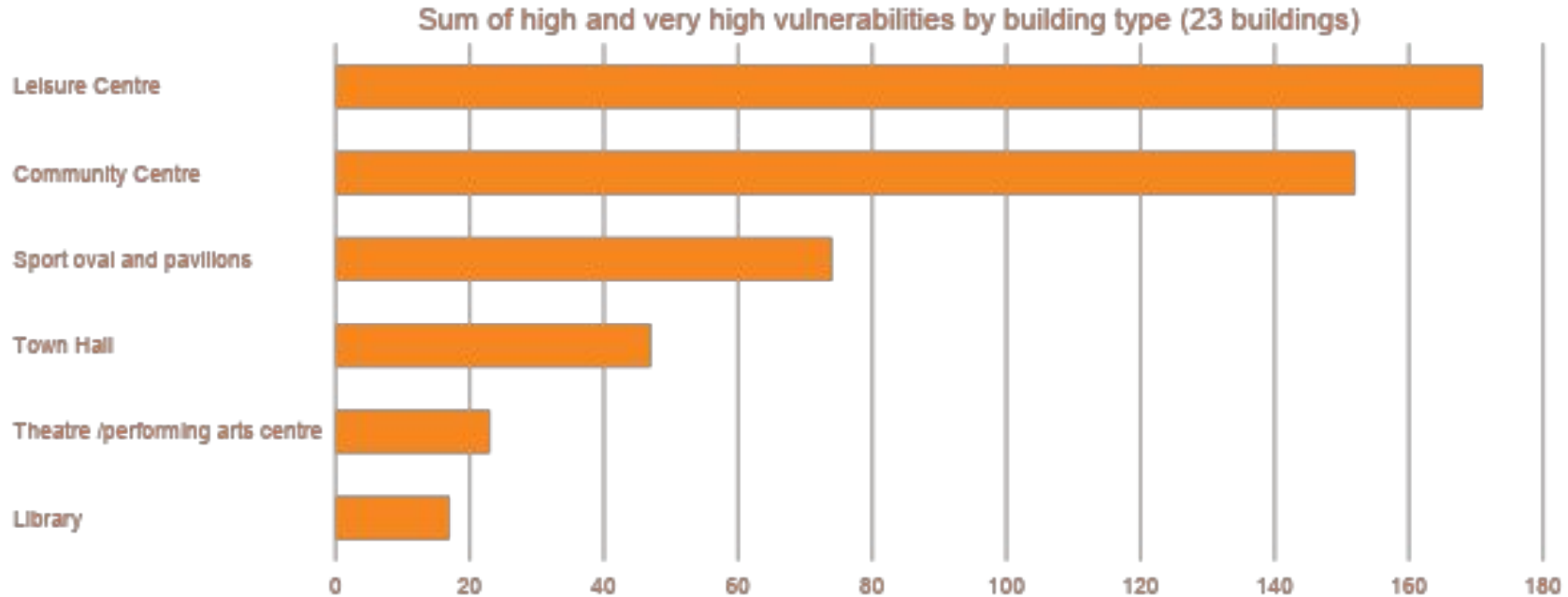
Key Building Vulnerability Findings – top 5

Functional Requirement	Building component	Vulnerability description	Risks	Adaptation measures	Adaptation measure Av \$/m ²
Structural performance	Roofs, external walls, windows and doors	Higher outdoor temperatures leading to increased expansion of materials	Structural failure, safety, function and service continuity	Review structural integrity with a view to manage climate change vulnerabilities	\$5.42
	Roofs, external walls, windows and doors	Extreme winds	Structural failure, safety, function and service continuity		
	Foundation and ground slabs	Heavier rainfall	Structural failure, function and service continuity		
	Foundation and ground slabs	Lower average rainfall	Structural failure, function and service continuity		
	Foundation and ground slabs	Extreme winds	Structural failure, function and service continuity		

Key Building Vulnerability Findings – top 5

Functional Requirement	Building component	Vulnerability description	Risks	Adaptation measures	Adaptation measure Av \$/m ²
Indoor air quality	Indoor air quality	Dust/smoke movement into building	Poor/unhealthy indoor air quality Dust accumulates inside and makes floor slippery/unsafe, requiring cleaning, function and service continuity	Manage threat either at source or via pathway into building	\$2.15
Weather proofing	Roofs, drainage and stormwater systems	Heavy rainfall	Structural failure Water leaks into building, compromising structure, health and safety, usability, requiring cleaning/make safe	Review and identify specific risks and risk management plan at each site	\$2.81

Most at-risk facilities



Findings

- › The BVA process enables councils to act on climate change risks in an informed way. Under current legislation (Local Government Act 2020, Climate Change Act 2017), councils have a '*duty of care*' and failure to act on known risks may leave councils open to claims of negligence
- › Council buildings are at risk from climate change related events. These risks are more extreme when the sites are activated as ERCs versus standard building use. This is particularly acute when ERCs are required in heat waves events and cannot maintain safe indoor temperature while providing refuge to vulnerable community members
- › Buildings are likely to be safer, more comfortable, more affordable to operate (and lower greenhouse gas emissions) following implementation of the recommended adaptation measures
- › Simplifying and streamlining the BVA framework will be necessary before it can be effectively mainstreamed in asset management practices in councils

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Question time



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