



# Evaluation of flood mitigation options

16 Oct 2023

*Presented by Nigel Raj (The CIE)*

# Presentation overview

---

## n Purpose of this presentation

- To report on the preliminary findings of the evaluation of 3 flood mitigation options

## n The 3 options:

- L4B: North Wagga Levee and associated works
- PR1: Voluntary House Raising & Voluntary House Purchase
  - We have applied this to Res properties *within* North Wagga only where the risks are sufficiently large to 'payoff'. The VHP is applied first 'tranche', then the VHR to the next 'tranche'.
- PR1 & L4B Combined
  - The L4B option is constructed, then we apply the VHP & VHR to properties *outside* North Wagga (for high risk properties).

## n We have tested VHP & VHR applied to all properties in North Wagga only

# Approach to evaluation

---

- n Task 1. Assess *current* risk and *change* in risk associated with options
  - Utilise the flood modelling conducted by WMAWater (8 different flood 'events' with different probabilities). Data includes flood extent/depth/velocity (hazard rating).
  - Utilise GIS maps including satellite imagery of building footprint, 'property' boundary in the LGA, Census Meshblock
  - Sales data from Land Valuer General, Census 2021
- n Task 2. Evaluation of current damages and change in damages with the option
  - Utilise an Excel tool developed by the NSW Government which, released in August 2023 (**Higher AAD estimates**)
  - Generates an AAD (structural, internal, external), TheCIE.com.au

# Conservative assumptions adopted

---

- n We have adopted a number of assumptions which will overstate the risks and the benefits from actions. For example,
  - If the flood extent touches a corner of the building, the whole building footprint is assumed to be impacted
  - If the flood is, for example, 0.5m at one corner of the building but 1.0m at the other corner, we assume that the whole building is impacted at the 1.0m level
  - For some properties, the reduction in damages can be higher than the property price. No caps are applied.
- n For the buildings impacted we present two scenarios:
  - n Scenario 1: *All buildings* on the same property are treated as a residential building (which incurs larger damages).
  - n Scenario 2: Only the *largest building* is treated as the residence and sheds etc get a lower value.

# Change in Building Footprint impacted by flooding from L4B (by Suburb)

Change in area of building footprint impacted, by Suburb

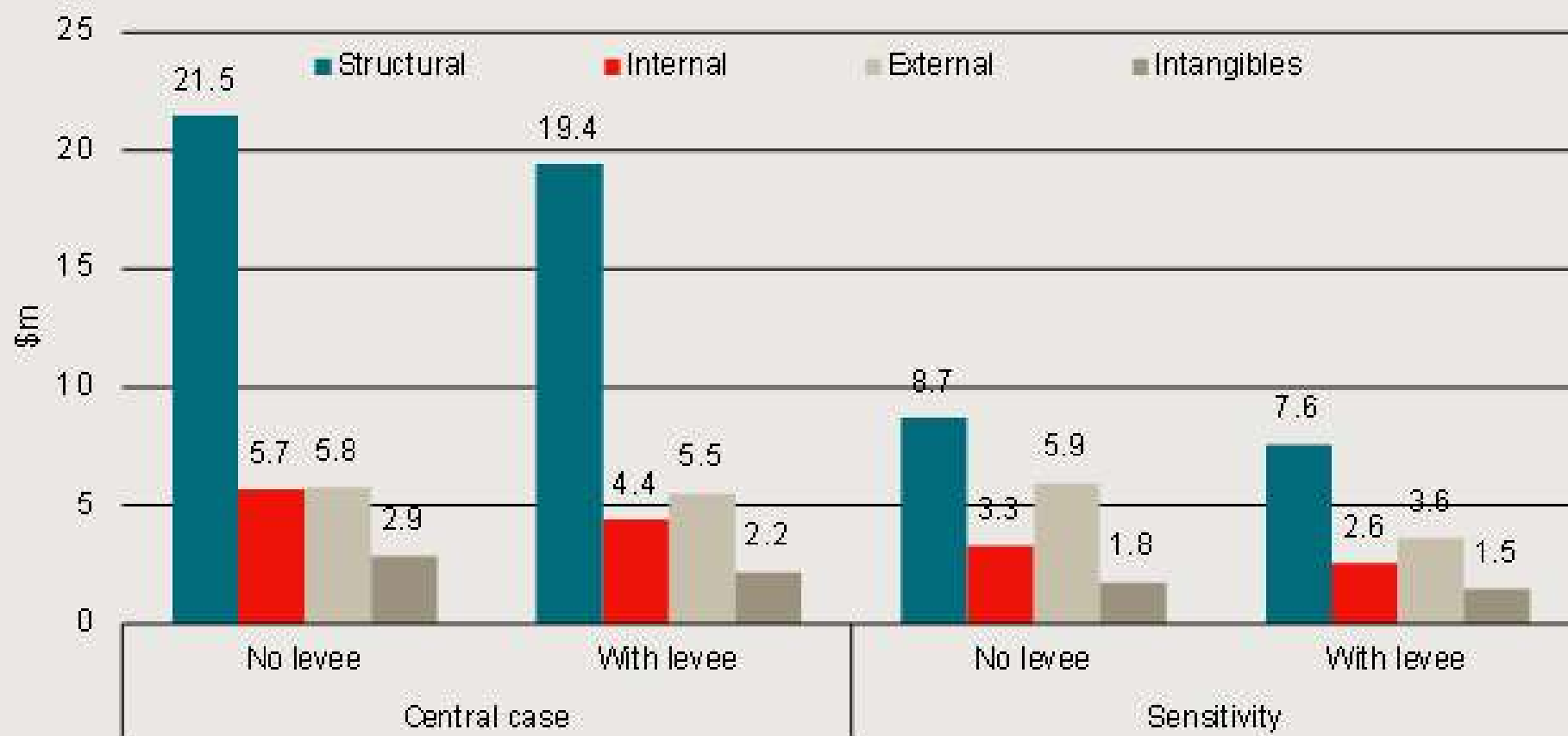
Suburb	PMF	AEP 0.2%	AEP 0.5%	AEP 1%	AEP 2%	AEP 5%	AEP 10%	AEP 20%
	Sqm	sqm	sqm	sqm	sqm	sqm	sqm	sqm
Alfredtown	0	0	0	0	0	0	0	0
Ashmont	0	0	0	0	0	0	0	0
Bomen	0	0	0	0	0	0	0	0
Boocooma	0	0	0	0	0	0	0	0
Cartwrights Hill	0	0	0	0	0	0	0	0
East Wagga Wagga	0	353	0	182	155	-5 278	-3 230	0
Estella	0	0	0	0	0	0	0	0
Eunanoreenys	0	0	0	0	0	0	0	0
Forest Hill	0	0	0	0	0	0	0	0
Gobbagombalin	0	0	0	0	0	0	0	0
Gumly Gumly	0	0	0	0	0	0	0	0
Koorlingal	0	8	0	0	0	0	0	0
Lake Albert	0	0	0	0	0	0	0	0
Moorong	0	0	0	0	0	0	0	0
North Wagga Wagga	0	0	19	-450	-50 282	-68 485	-5 470	-759
Oura	0	0	0	0	0	0	0	0
Turvey Park	0	0	0	0	0	0	0	0
Wagga Wagga	0	12 717	0	0	0	0	0	543
<b>Total</b>	<b>0</b>	<b>13 078</b>	<b>19</b>	<b>-268</b>	<b>-50 127</b>	<b>-73 763</b>	<b>-8 700</b>	<b>-216</b>

# Change in Building Footprint impacted by flooding from L4B (by ABS Meshblock)

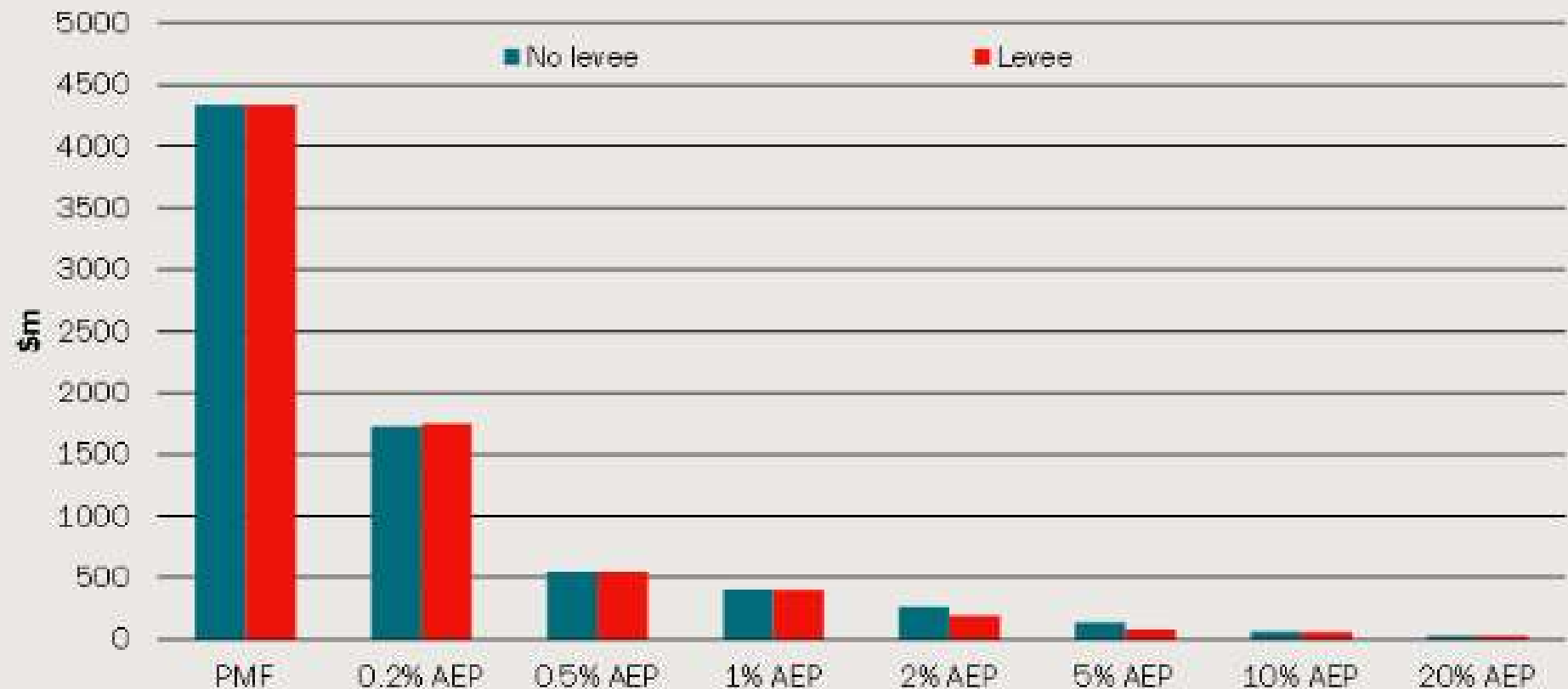
Change in area of building footprint impacted, by Meshblock

Suburb	PMF	AEP 0.2%	AEP 0.5%	AEP 1%	AEP 2%	AEP 5%	AEP 10%	AEP 20%
	Sqm	sqm	sqm	sqm	sqm	sqm	sqm	sqm
Residential	0	10 840	19	-621	-41 190	-68 841	-564	0
Commercial	0	2 177	0	0	64	-770	0	0
Education	0	0	0	0	-2 067	-2 705	0	0
Hospital/Medical	0	0	0	0	0	0	0	0
Industrial	0	61	0	162	0	-1 125	-3 230	0
Parkland	0	0	0	0	0	0	0	45
Primary Product	0	0	0	171	-6 834	-12 324	-4 806	-804
Other	0	0	0	0	0	0	0	543
<b>Total</b>	<b>0</b>	<b>13 078</b>	<b>19</b>	<b>-268</b>	<b>-50 127</b>	<b>-73 763</b>	<b>-8 700</b>	<b>-216</b>

# Impact of L4B on AAD for a single year

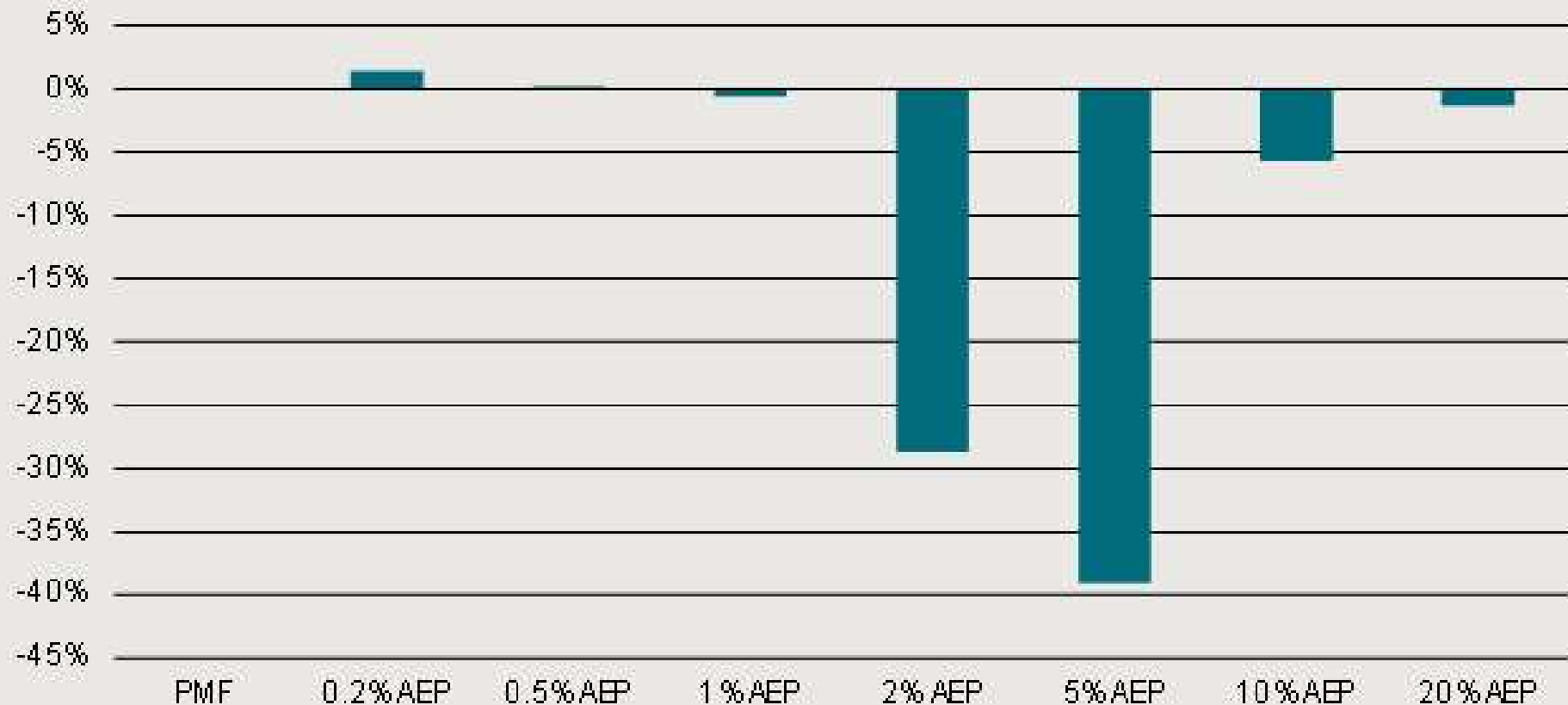


# Total damage in an AEP event, with and without L4B





# Percentage change in AAD from L4B relative to “no levee” option, by AEP



# Draft Results

---

- n The L4B levee raising option results in a net **cost** of \$30m-11m to the community (i.e. benefits of between \$65m-\$36m and build costs of \$76m)
- n A VHP targeting all residential properties in North Wagga results in a net **cost** of \$38m, based on a \$400,000/property purchase price.
- n A VHR targeting all residential properties in North Wagga results in a net **benefit** of \$30m, based on raising each property by 3m above ground level, based on a raising cost of \$120,000/property.

# Draft Results

---

- n The option that combines L4B, as well as, the VHP&VHR applied to the highest risk properties *outside* North Wagga results in a net **cost** of \$7m.
- n A Combined VHP & VHR which targets properties with the largest risks in all areas delivers the best result, with a net **benefit** of \$34m
- n This suggests that the best policy is likely to be a **targeted** policy VHR and, to a lesser extent, VHP that focuses on the highest risk is best (rather than focusing on all properties in a suburb).

# Draft findings and next steps

---

- n The analysis undertaken suggests that the L4B option does substantially reduce risks particularly in the 2% & 5%AEP events, however, the value of the risk reduction is not sufficient to outweigh the construction cost.
  - Note that the costs currently do not include the biodiversity offset costs. These will be considered further for the final report
- n The best policy is likely to be a targeted VHR and, to a lesser extent, VHP policy that focuses on the highest risk properties (rather than applying it more broadly to all properties in a suburb).
  - For the final report we will further test alternative height adjustments for the VHR policy.

Nigel Rajaratnam  
*Managing Director*

02 9250 0802  
nrajaratnam@thecie.com.au



*www.TheCIE.com.au*