COST-EFFECTIVE MITIGATION STRATEGY DEVELOPMENT FOR FLOOD PRONE BUILDINGS

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## End-Users

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
</tr>
</thead>
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<td>Myles Fairbairn</td>
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</tr>
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OUTLINE

• Problem Statement
• Research Objectives
• Key Project Activities
  o Completed
  o Next Steps
• Utilisation Project: Launceston Flood Risk Mitigation Assessment
• Summary
PROBLEM STATEMENT

- Australia has experienced floods on a regular basis and some communities have been impacted repeatedly over a period of few years due to inappropriate urban development in floodplain areas.

RESEARCH OBJECTIVES

- To assess cost-effective strategies to mitigate damage to residential buildings from riverine floods.
- To provide an evidence base to governments and property owners to inform decision making regarding mitigation of future losses.
KEY PROJECT ACTIVITIES
BUILDING STOCK CLASSIFICATION (COMPLETED)

- Review of building classification schema
- Development of a new schema

Selected Storey Types

Type 1

Type 2

Type 3

Type 4

Type 5
REVIEW OF MITIGATION OPTIONS (COMPLETED)

- Elevation
- Relocation
- Dry Floodproofing
- Wet Floodproofing
- Flood Barriers
## COSTING OF MITIGATION OPTIONS (COMPLETED)

### Floodproofing Matrix and Costings

<table>
<thead>
<tr>
<th>Storey Type</th>
<th>Elevation (Extending walls)</th>
<th>Elevation (Building a second storey)</th>
<th>Elevation (Raising the whole house)</th>
<th>Relocation</th>
<th>Flood Barriers (Temporary)</th>
<th>Flood Barriers (Permanent)</th>
<th>Dry Floodproofing</th>
<th>Wet Floodproofing (existing)</th>
<th>Wet Floodproofing (renovation)</th>
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<tbody>
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TESTING OF BUILDING COMPONENTS (COMPLETED)

Test Types

Ceramic Tiles

OSB/HB Bracing

Floor Joists
NEXT STEPS

- Vulnerability of selected storey types to a wide range of inundation depths will be assessed for existing and retrofitted buildings.

- All retrofit options will be assessed in cost benefit analysis through a consideration of a range of severity and likelihood of flood hazard covering a selection of catchment types.

- The work will provide information on the optimal retrofit types in the context of Australian construction costs and catchment behaviours.
Flood Risk and Mitigation Framework

Cost Benefit Analysis Framework

1. Risk Assessment Before Mitigation
2. Mitigation Work
3. Risk Assessment After Mitigation
4. Benefit Cost Ratio

Hazard → Exposure → Vulnerability → Risk → Mitigation
### Aimed to assess:

- Avoided damage cost (June 2016)
- Number of people displaced (20 year ARI up to the PMF)
- Building damage (20 year ARI up to the PMF)
- Long term cost before mitigation (20 year ARI up to the PMF)
- Long term cost after mitigation (20 year ARI up to the PMF)
- Cost Benefit Analysis
- Further mitigation options
## Sources of Estimated Losses

<table>
<thead>
<tr>
<th>Tangible Residential Losses</th>
<th>Tangible Non-residential Losses</th>
<th>Intangible Losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Building repair/rebuild</td>
<td>• Building repair/rebuild</td>
<td>• Physical Health (Fatalities)</td>
</tr>
<tr>
<td>• Contents damage</td>
<td>• Clean-up</td>
<td>• Mental Health</td>
</tr>
<tr>
<td>• Rental income</td>
<td>• Inventory &amp; equipment</td>
<td>• Social Disruption</td>
</tr>
<tr>
<td>• Clean-up</td>
<td>• Stock</td>
<td>• Amenity</td>
</tr>
<tr>
<td></td>
<td>• Income &amp; turnover</td>
<td>• Safety</td>
</tr>
</tbody>
</table>
Spatial Distribution of Building Losses

Legend

Building Loss ($)
- < 100k
- 100k - 200k
- 200k - 400k
- 400k - 600k
- 600k - 800k
- 800k - 1M
- > 1M
The economic losses due to floods have been increasing in recent decades due to vulnerable construction types and because of rapid urban development in floodplains.

Flood risk management not only includes the measures taken by government but also includes mitigation measures adopted by private property owners to reduce the potential losses.

This BNHCRC project aims to conduct a comprehensive analysis of mitigation options and evaluate each of them through cost benefit analysis for use in Australian conditions.

The result will be an evidence base to inform decision making by governments and property owners to reduce building vulnerability and future flood losses.
THANK YOU


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