
# Regional and strategic land use planning issues: The good, the bad and the ugly

## Moving beyond the 1 in 100 Quagmire towards improved flood resilience

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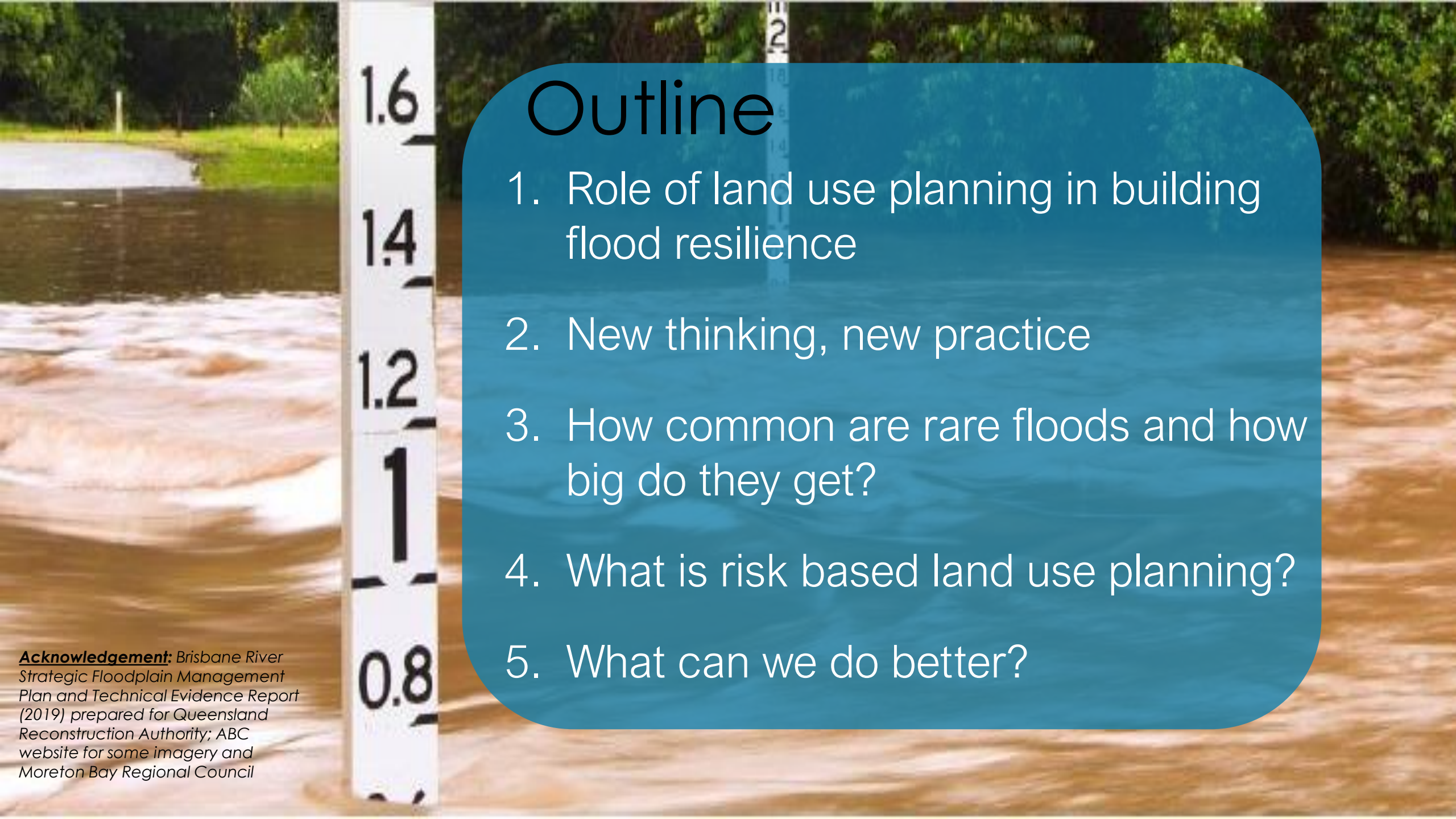
15 October 2022

***Please note – the views in this presentation do not purport to represent the views of the Moreton Bay Regional Council***

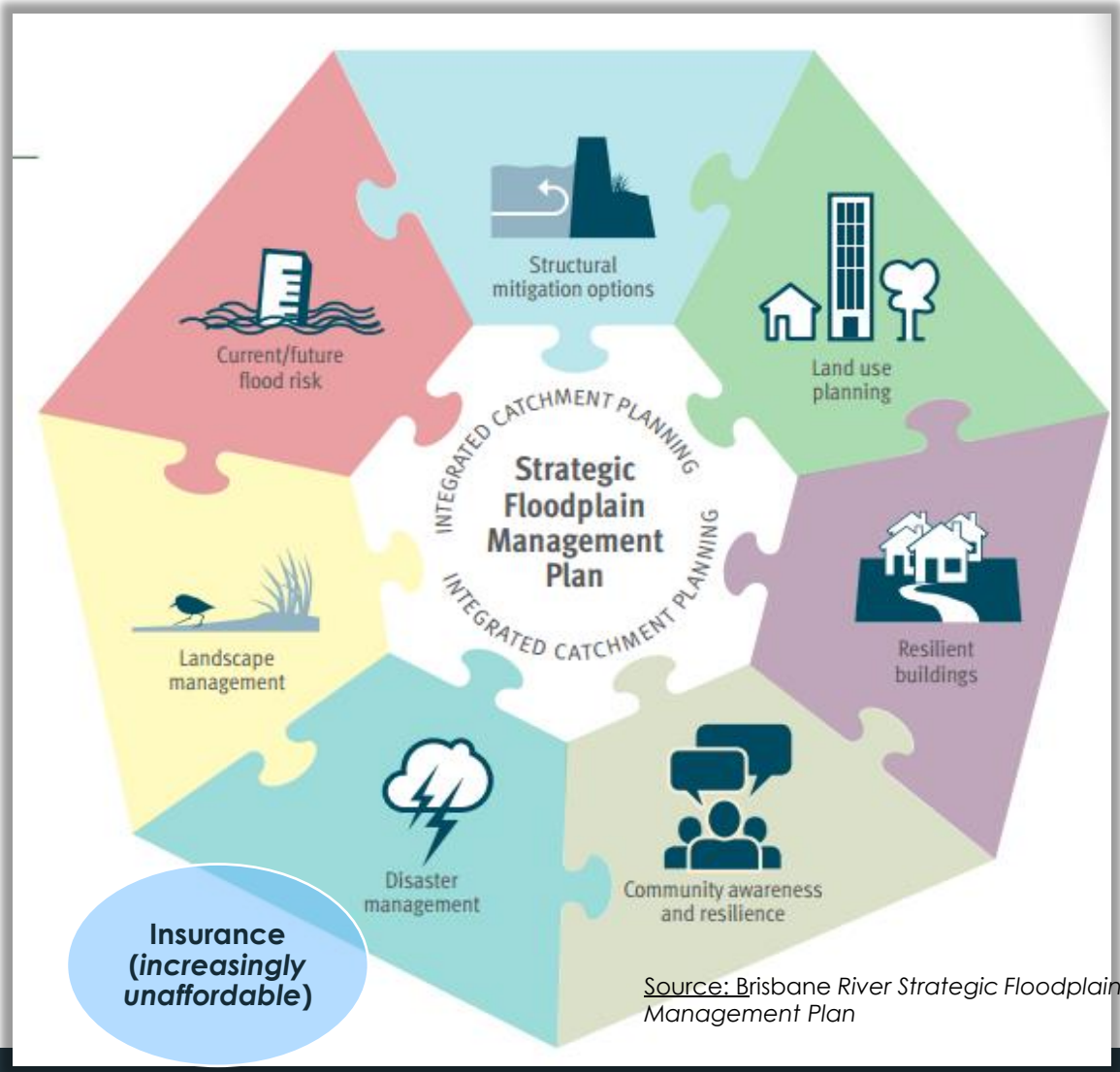



# Outline

1. Role of land use planning in building flood resilience
2. New thinking, new practice
3. How common are rare floods and how big do they get?
4. What is risk based land use planning?
5. What can we do better?

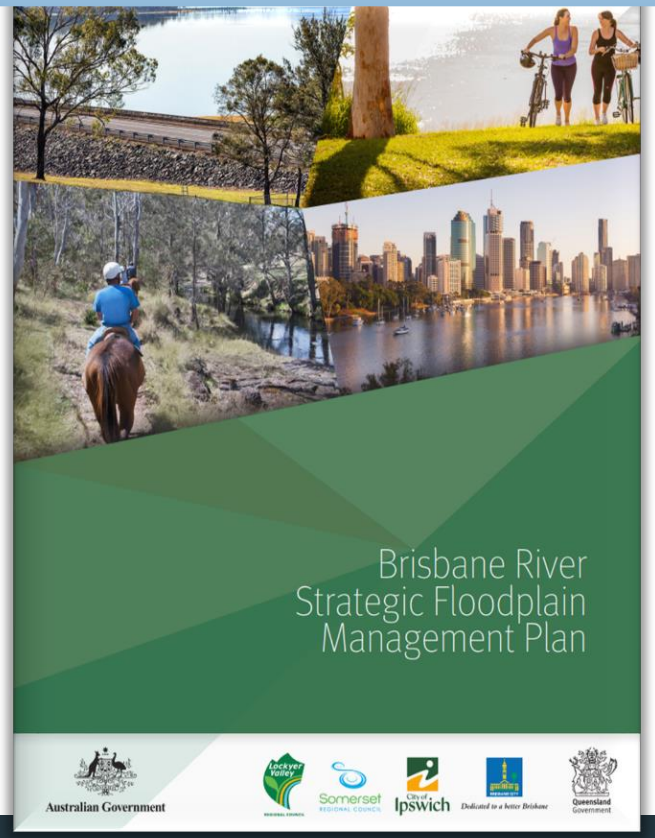
***Acknowledgement:*** *Brisbane River Strategic Floodplain Management Plan and Technical Evidence Report (2019) prepared for Queensland Reconstruction Authority; ABC website for some imagery and Moreton Bay Regional Council*

# Flood risk needs an integrated response using a suite of "tools"




Source: Brisbane *River Strategic Floodplain Management Plan*

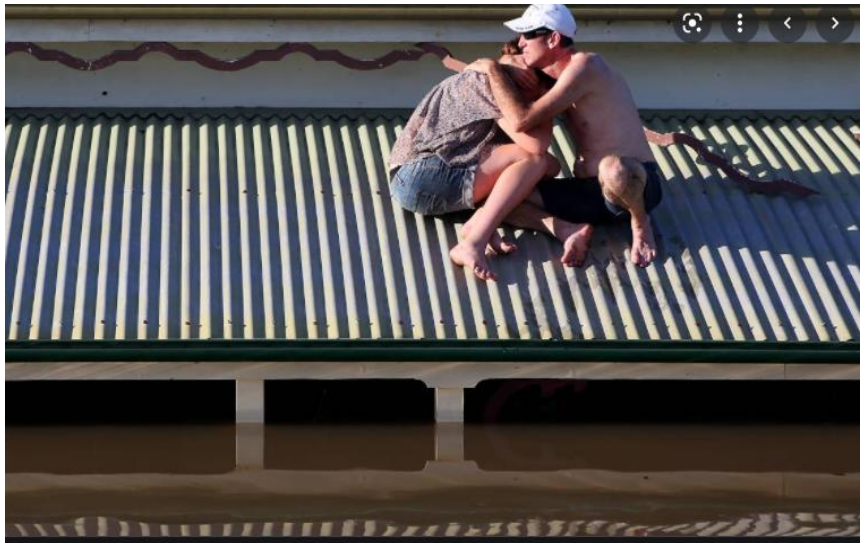
**A Flood Risk Management Strategy provides a 'plan' for coordinated action**

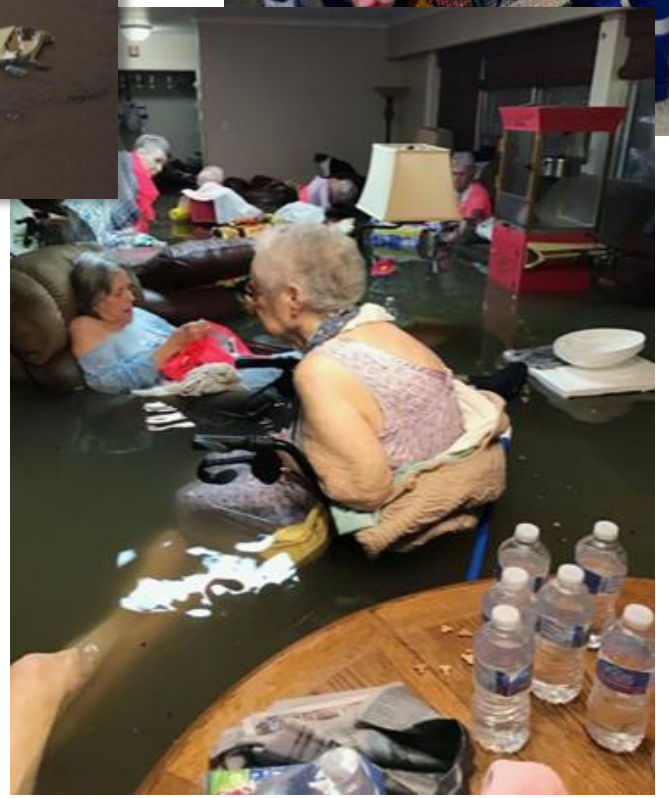


# Role of land use planning in responding to flood risk

- Planning shapes how cities and regions grow, change, adapt and transform to achieve good community outcomes
- How we plan, design and build cities either **strengthens resilience to flood risk or makes things worse (by increasing disaster risk)**
- Planning is the **most cost-effective way to influence the future exposure of people** and infrastructure to flood risks
- Planning can **limit increases in the current risk profile** of existing development.
- Planning can respond to legacy issues and **transition settlements over time** (managed retreat)
- **Our regional settlement pattern** and how we accommodate population growth **needs to be 'flood responsive' and risk-informed**.

# Our communities depend on us getting the land use right



# New thinking, new practice

**Key 'game-changers' since the 2011 Floods**

- Queensland Floods Commission of Inquiry (2012)
- Significant advancement in flood modelling technology
- State Planning Policy (2017) mandates that planning for 'natural hazards, risk and resilience' must consider climate change (as should all other State interests)
- Brisbane River Catchment Flood Study (2017)
- Brisbane River Strategic Floodplain Management Plan (2019)
- Local government flood risk assessments and Floodplain Management Plans

# New thinking, new practice

- Implications of future climate flood risk.
- Disaster impact is no longer a 'one-off'. There's a clear repeating trend across multiple natural hazards.
- Increasing number of unusual events and weather patterns never experienced before.
- 2022 flood event exceeded 'traditional' design requirements in many areas. Flood risk profile is changing.
- Plan for more extreme events or at least understand the consequences of what we are not planning and designing for.
- Access to insurance and implications for people inside (and outside of) flood risk areas. Impacts on housing affordability and finance eligibility. How will people afford repairs? Homelessness may increase?

***We need to re-think and 'divorce' ourselves from planning and building to a single design event eg: 1 in 100 AEP 'Defined Flood Event' (DFE)***

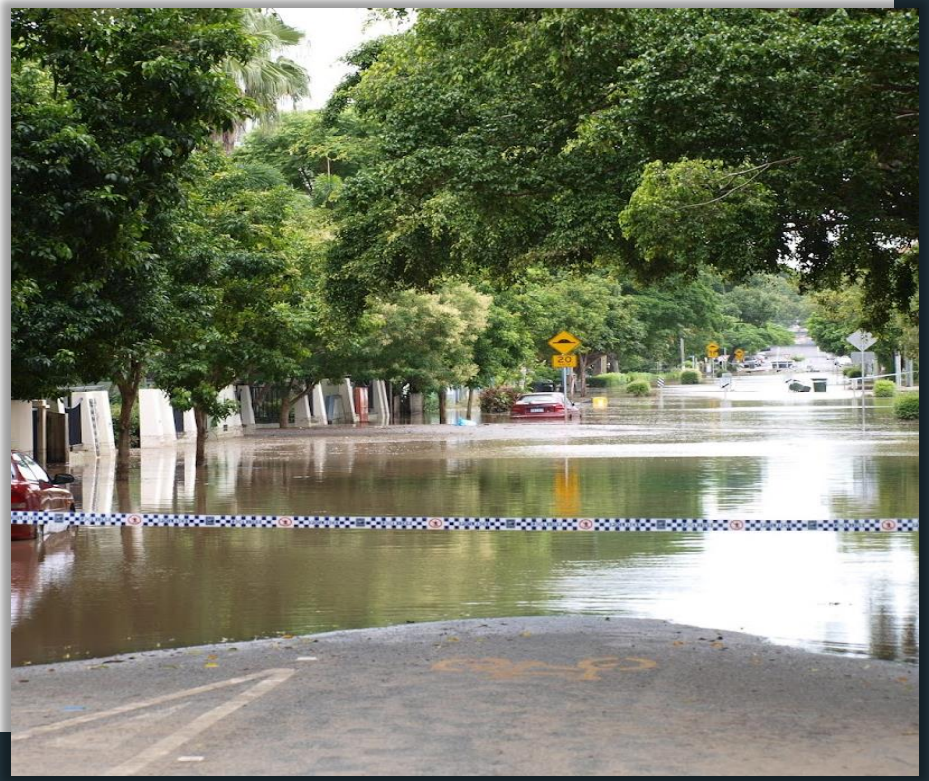
# Sources of flood and types of flood risk

## DIFFERENT SOURCES OF FLOOD

- Riverine flooding, flash flooding and overland flow

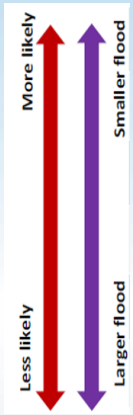
## TYPES OF FLOOD RISK

- **Inundation** – getting wet!
- **Isolation** – being physically surrounded by water
- **Loss of access** – similar to isolation; loss of evacuation routes
- **Loss of services and functioning of community facilities and critical infrastructure** – water, electricity, sewer, groceries, medical supplies and assistance, schools, employment, supply chain implications etc
- All types of flood risk should be considered when assessing risk and determining a land use planning response



# How common are rare floods ?

# How big is that flood; What's the likelihood of experiencing that flood?



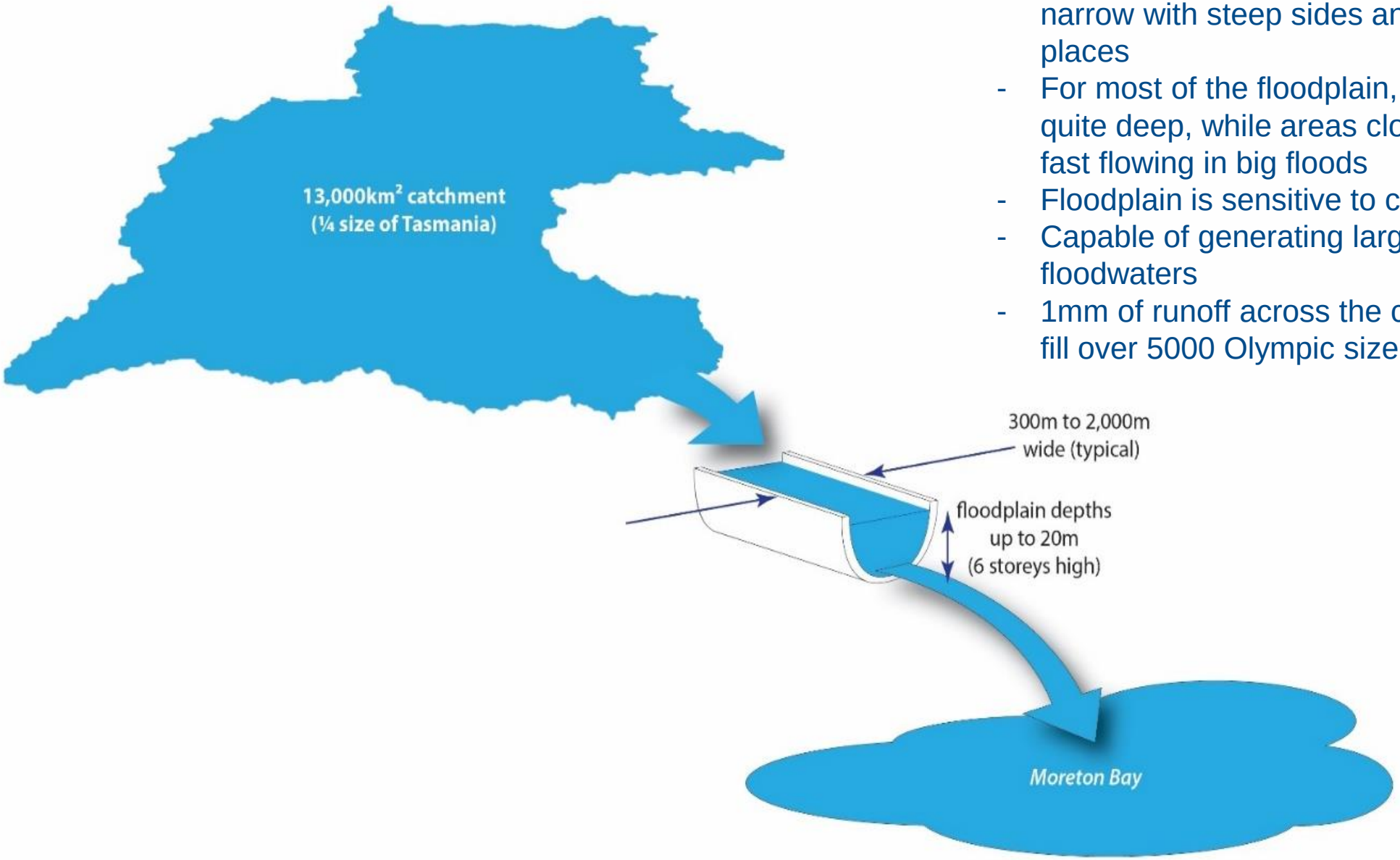

| How big is that flood? (AEP) | At least once in 80 years | At least twice in 80 years | Brisbane City gauge (m, AHD) |
|---|---|---|---|
| 10% (1 in 10 chance per year) | 100% | 100% | 1.8 |
| 5% (1 in 20) | 98% | 91% | 2.2 |
| 2% (1 in 50) | 80% | 48% | 3.2 |
| 1% (1 in 100) | 55% | 19% | 4.5 |
| 0.2% (1 in 500) | 15% | 1% | 7.3 |
| 0.05% (1 in 2000) | 4% | 0.1% | 9.9 |
| 0.001% (1 in 100,000) | 0.1% | ‹ 0.1% | 23.7 |

*Source: Adapted from Brisbane River Strategic Floodplain Management Plan (2019)*




**Remembe**r: 1% annual exceedance probability (AEP) flood means there's a 1% chance a flood of this size *or larger* will occur in any given year

# Catchment characteristics



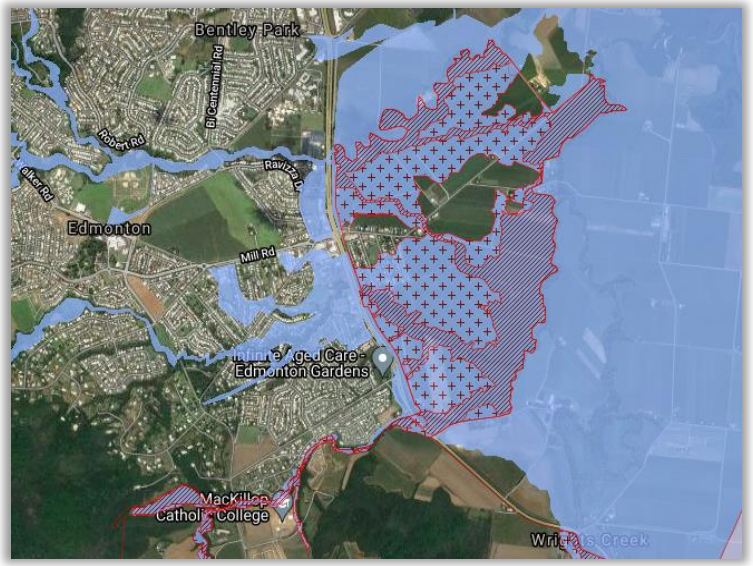

- Downstream of Wivenhoe Dam, the river valley is narrow with steep sides and restricted in some places
- For most of the floodplain, floodwaters can be quite deep, while areas closer to the river can be fast flowing in big floods
- Floodplain is sensitive to changes in landform
- Capable of generating large volumes of floodwaters
- 1mm of runoff across the catchment is enough to fill over 5000 Olympic size swimming pools!!!!!

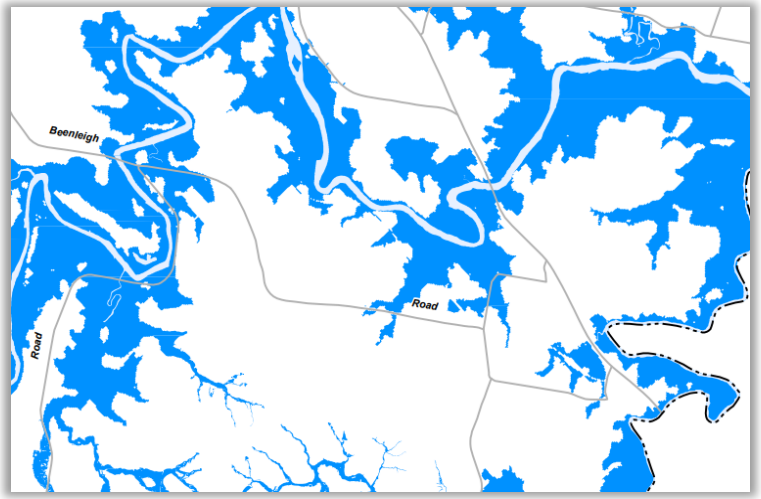
# Limitations of historical approaches to addressing flood risk and land use planning

# Typical approaches to planning for flood hazard

- Flood maps in planning schemes typically (but not all) show 'one shade of blue' for the extent of one flood event (e.g. 1 in 100 AEP). Sometimes include depth and velocity.
- Most do not identify the full floodplain extent (out to the probable maximum flood).
- Most do not include climate change factors
- We rely heavily on site-based risk assessments at the development application (DA)stage to determine if development is appropriate.
- Typically rely on one solution across a floodplain: build to the identified Flood Planning Level (Defined Flood Event + freeboard allowance)

**These approaches don't identify the full flood risk**

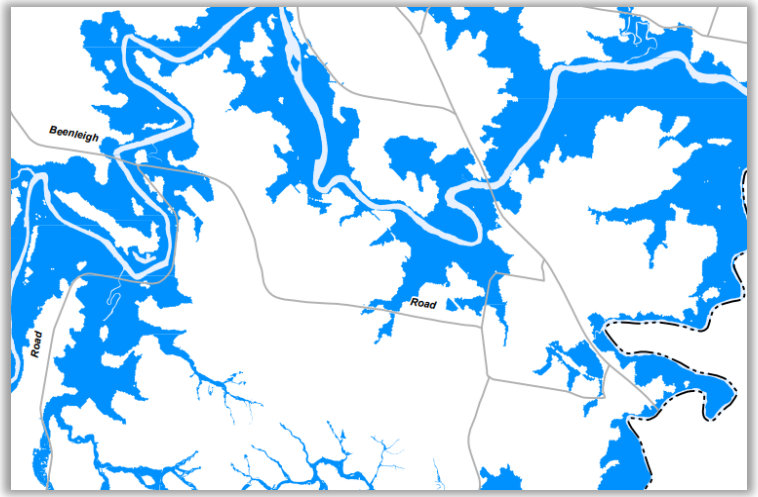


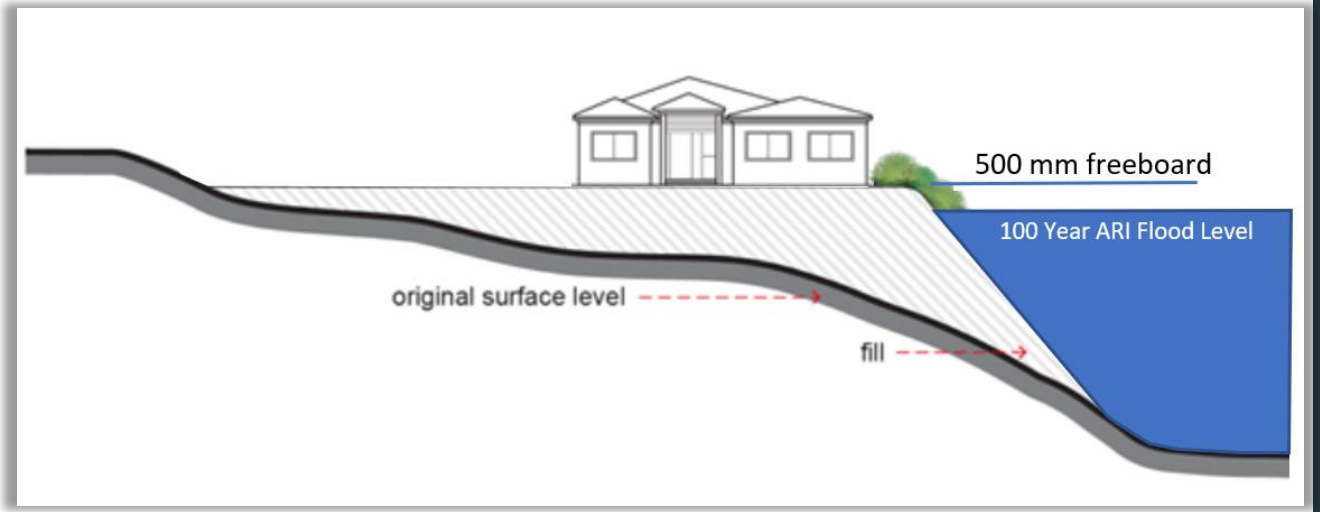



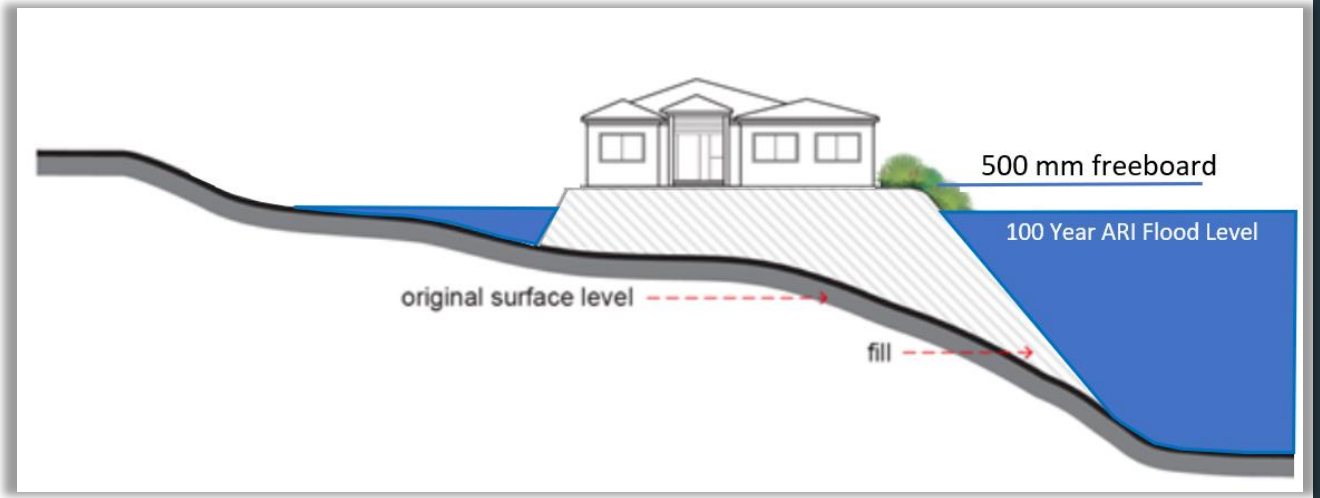
# Typical approaches to planning for flood hazard

## Strong reliance on a 'Flood Planning Level':

- Minimum floor levels typically set relative to 1 in 100 AEP flood level
- "Set and forget" approach
- Planning only to a single design event is too simplistic




*Adapted from Brisbane City Plan 2014*

# Typical approaches to planning for flood hazard

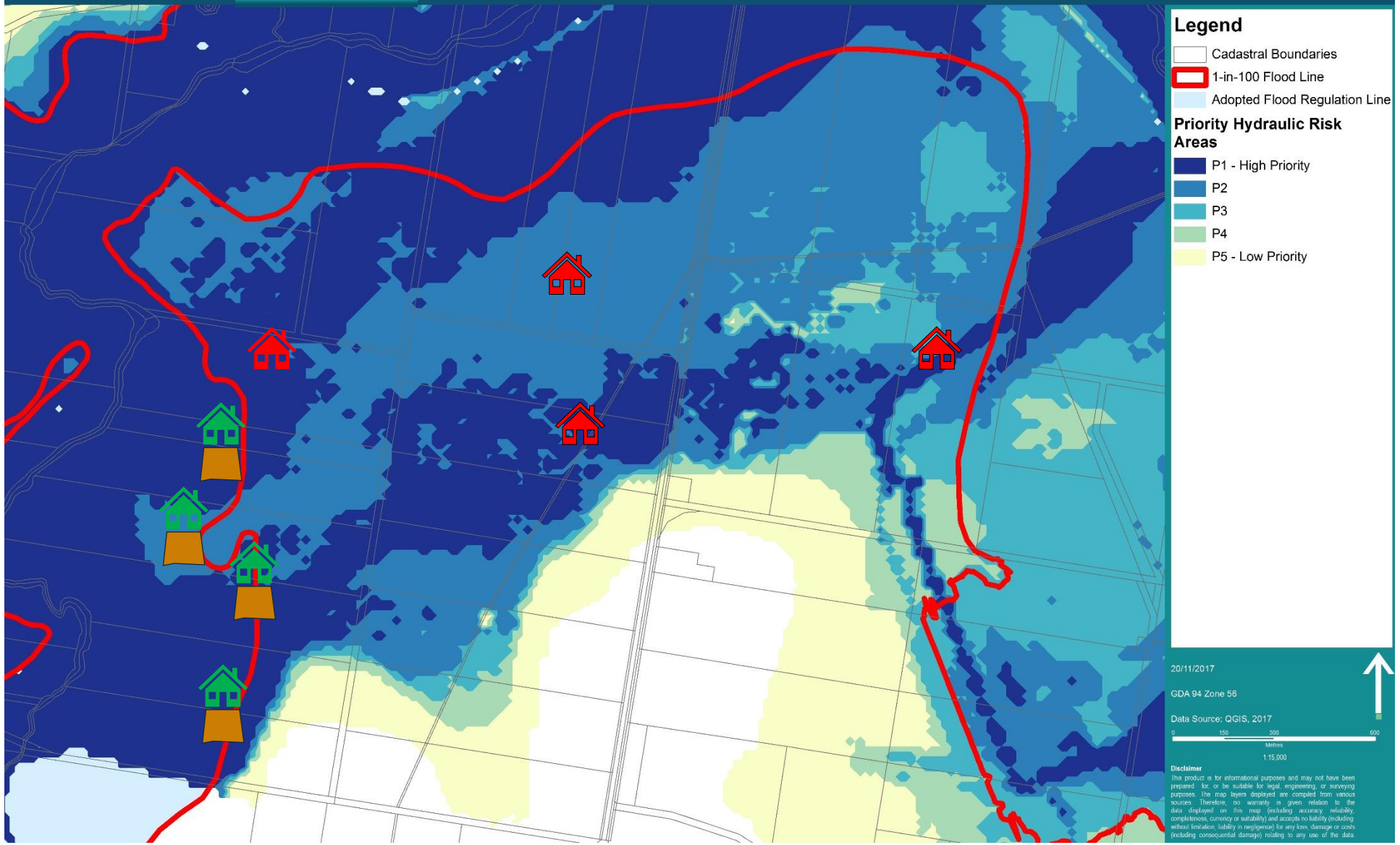
***Flood risk is <u>not fully understood</u> if land use and built form are based only on consequences of the 1 in 100 AEP flood extent***

- Focusing on the 1 in 100 AEP is too simplistic and does not mark the boundary between safety and hazard

- This approach **<u>does not</u>** comprehensively consider:
  - The full range of possible flood magnitudes
  - The full spatial extent of potentially affected areas
  - Any differences in the nature of the hazard within and outside the Defined Flood Event (DFE)
  - The risks that the hazard poses to people, property, infrastructure and the environment

*Adapted from Brisbane City Plan 2014*

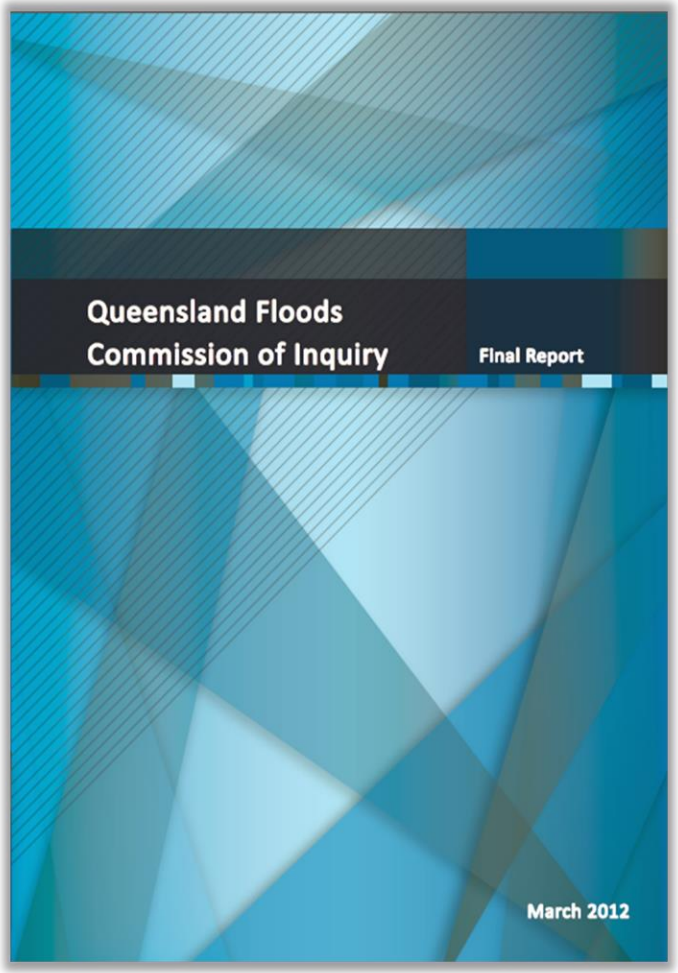
# Overlay Mapping
## 1 in 100 Flood Line vs. Hydraulic Risk



# Some key findings from Queensland Floods Commission of Inquiry

*"Focus on the Q100 and one defined event should not continue"*

*"The various areas to which planning controls apply should be selected having regard to the likelihood, behaviour and consequences of the full range of possible floods, up to and including the probable maximum flood"*



# So, what is risk-based land use planning?

# A resilient settlement pattern is made up of land uses that are 'risk responsive' and in the right place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# What is risk based planning? con't

- Informed by a flood risk assessment and an appreciation that **different people, land uses and built forms have different sensitivities** and **vulnerabilities** to flood risks

- **Matching the land use** with an acceptable or tolerable level of risk is the outcome sought by 'risk based land use planning'.
- This can mean that some land uses:
    - **avoid areas of flood hazard**, where the level of risk is too high, or
    - **occur without treatment** of the risk because uses are compatible, or
    - **occur where the risk can be treated** to a level where it is acceptable or tolerable for that land use.

*Courier Mail*

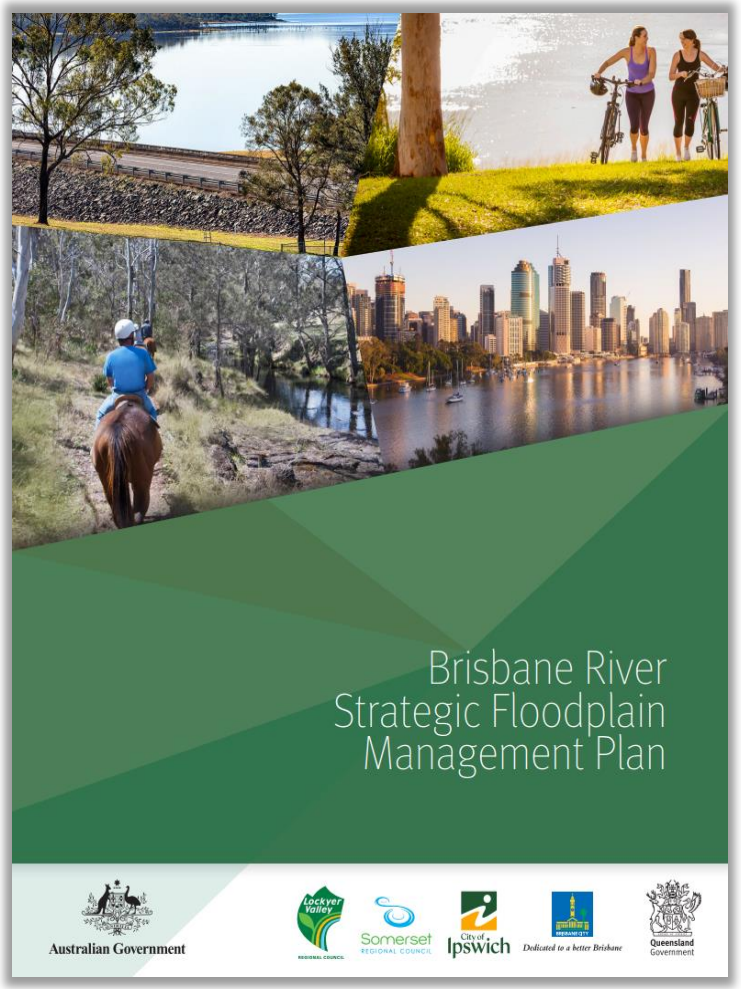
# Brisbane River Flood Catchment Study and Strategic Floodplain Management Plan

*"The Brisbane River Strategic Floodplain Management Plan is an outstanding example of how locally-led, regionally focused and state-supported resilience can achieve improvements for all parts of the community."*

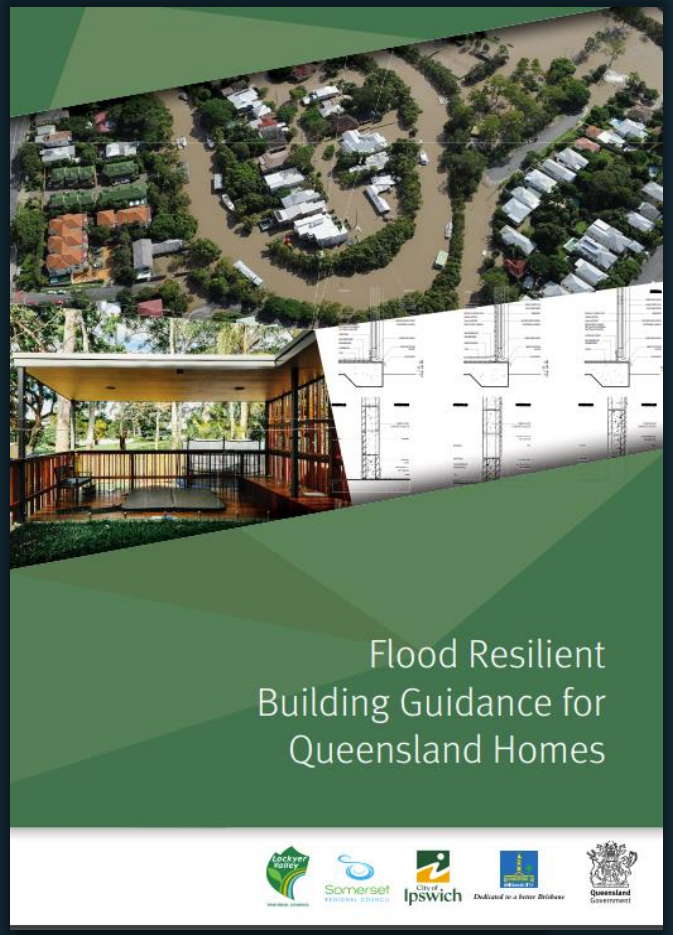
*(Queensland Resilience Awards 2019)*

*"… the most detailed and comprehensive flood study ever undertaken in Australia"*

(Queensland Deputy Premier, 2017)

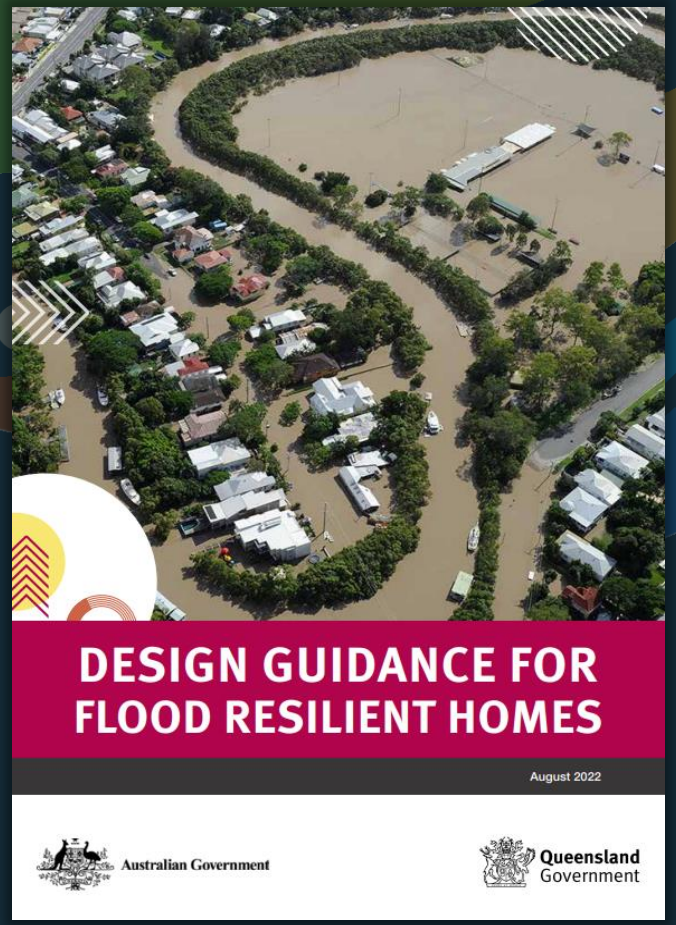


# Flood Resilient Design and adapting homes to be ‘flood smart’




February 2019


March 2022




August 2022

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# What can planning do to help our communities live with floods?

1. **Plan for more extreme events and consider climate change**

2. **Examine our regional settlement patterns**. What needs to change to improve resilience 'at scale' and reduce disaster risk from current and future climate flood risk?

3. **Vulnerable land uses** – avoid in the floodplain altogether, or at least avoid locating in medium and higher risk areas

4. **Ditch "1 in 100 year**" description; **deepen 'flood risk literacy'** and understanding of how water moves through the landscape.

5. **'Divorce' from a single 'defined flood event'** of 1 in 100 AEP and take a nuanced risk-based approach. **Consider implications of flood behaviour for the full range of floods and full floodplain extent** (up to and including the PMF)

6. **Strengthen building codes** to make it mandatory for new builds to be 'flood resilient' and **incentivise retrofitting existing homes** to be 'flood smart' (in appropriate areas).

# Thank you

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