

# Understanding the Resilience of the Australian Built Environment to Flood, at Scale

Locate / FIG Working Week 2025)

Tom Spencer, Chief Product Officer  
April 2025



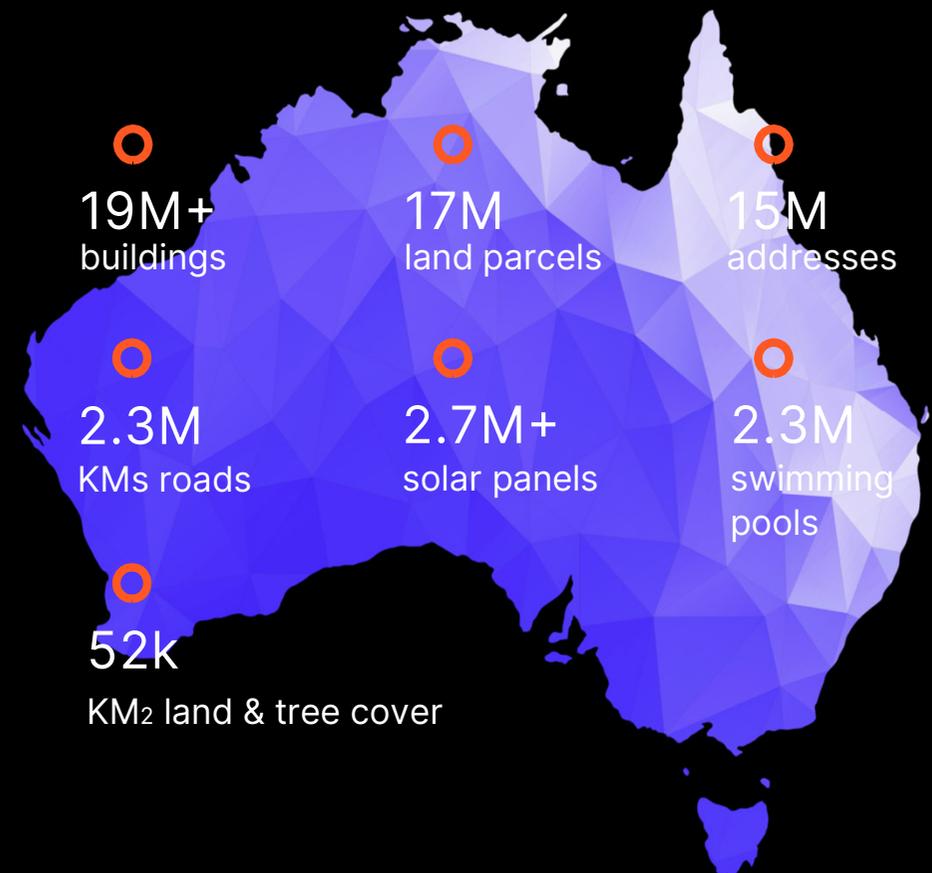
*Presented at the FIG Working Week 2025,  
6-10 April 2025 in Brisbane, Australia*



# Geoscape Australia

Delivering location intelligence for the nation

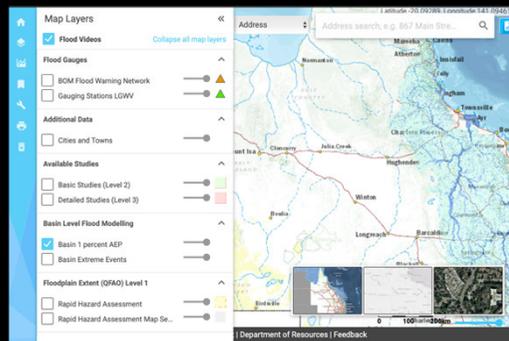
- Owned by 9 governments of Australia
- Self-funded
- 25 years in operation
- Deliver location intelligence to enable economic, social, environmental outcomes across Government and Industry.
- Helping build a smarter, safer, more productive Australia





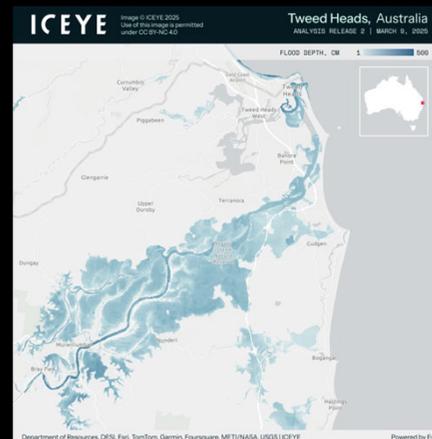
# Australia's growing maturity in mapping floods

Significant expertise, and assets held through government, academia, and industry in describing flood and flood risk in Australia



Historical flood boundaries

(QLD FloodCheck)



Flood prediction & tracking

(©ICEYE 2025)



Flood risk models

(JBA Risk)



# The impact of flood on the built environment continues to challenge us

ABC NEWS Your location: SYDNEY

National Latest Politics World Videos Live Today Show ACA 60 Minute

Ad Explore the Red Centre  
Feel Alice's heartbeat

News / National

## Devastating toll on outback Queensland as region is smashed by record-breaking floods

ABC NEWS Just In Australia Votes For You Politics World Business More

## Insurance premiums soar for South Australians after River Murray floods and Adelaide Hills bushfires

Stateline

Sydney Today 17 ° / 26 ° news.com.au Sign Up

National World Lifestyle Travel Entertainment Technology Finance Sport Shopping

Technology > Environment > Climate Change

## Aussie towns 100km apart face planning rules making land 'worthless'

A doomsday '1 per cent' flooding prediction has rendered homes along a huge stretch of Victoria's coastline effectively 'worthless' – and residents are furious.

Today's Paper Markets Data Events Lists Subscribe Log in

FINANCIAL REVIEW Newsfeed

Home Companies Markets Street Talk Politics Policy World Property Technology Opinion Wealth Work & Careers Life & Luxury

Companies Financial Services Floods Print article

## 32nd storey deemed 'flood risk' in insurance farce

ABC NEWS Just In Australia Votes For You Politics World Business More

## Huge demand for sandbags in south-east Queensland, record numbers collected as Cyclone Alfred approaches

By Gemma Ferguson Disaster Preparedness

Tue 4 Mar



# Industry challenges

How we represent the built environment into industry flood related applications is often heavily assumptions based or limited in coverage

- Commonly using the address location to assess the risk or impact at a property
- Making assumptions on a building's habitable elevation e.g. ground level or 0.x metres above ground level

## Impacting a range of use cases:

Flood studies, community resilience, disaster response, community engagement, dam failure studies, insurance pricing, estimated insurance losses, insurance claims validation, property valuation, home loan approvals...



Riverlea, VIC



# Significant numbers of buildings in risk zones

Building Type [by zoning] <sup>(i)</sup>	National Number	National Proportion	Flood Risk Zone <sup>(ii)</sup>	Fire Risk Zone
Water	2,625	0.01%	50%	46%
Recreation	161,126	0.8%	42%	53%
Infrastructure	29,549	0.2%	40%	48%
Community Use	239,772	1.3%	30%	31%
National Park	164,701	0.9%	27%	85%
Industrial/Utility	359,748	1.9%	28%	30%
Mixed Use	259,164	1.5%	26%	35%
Commercial	395,445	2%	24%	21%
Rural/Primary Prod.	3,686,732	19%	21%	85%
Residential	12,966,303	68%	15%	22%
Special Use	540,161	2.8%	15%	30%
Other	204,713	1%	26%	48%

*(i) Geoscape National Buildings dataset*

*(ii) 1:100 flood overlay / unspecified State/LGA designated flood zone*



# Modelling Australia's buildings

## Current Knowledge

- Building 2d outline
- Building Height
- Ground Elevation
- Solar Panels
- Swimming Pool
- Roof Material
- Roof Shape
- Total Floor Area
- Volume
- Primary Building

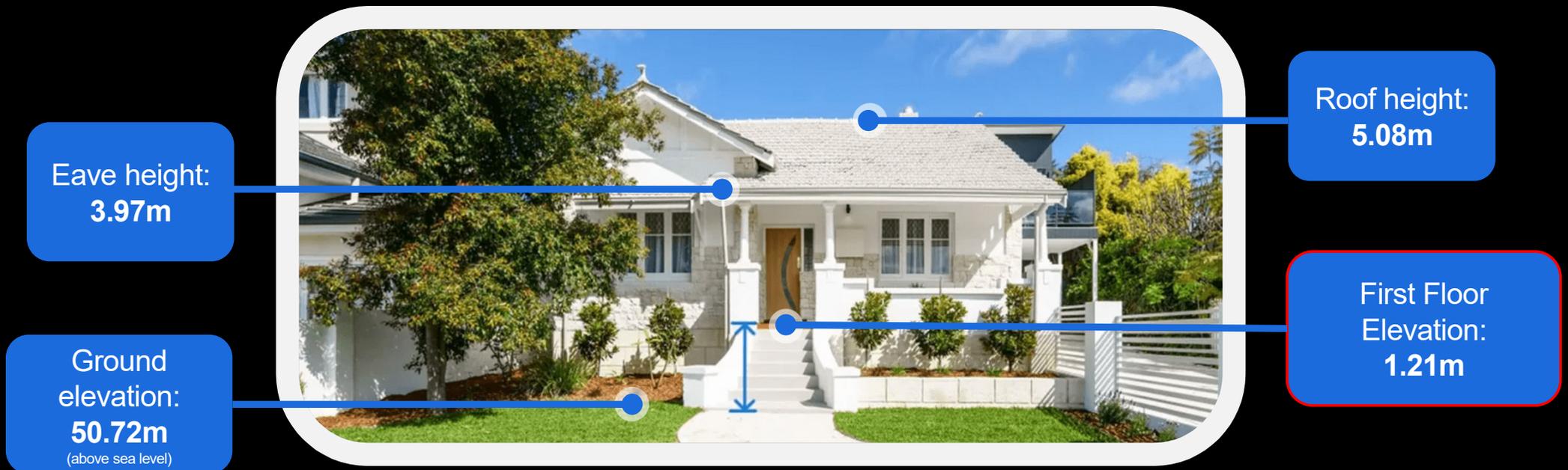


## In Demand

- Building Use
- Building Material
- Building Age
- First Floor Elevation
- Nett Lettable Area



# Buildings exist at different elevation levels



Geoscape utilizes AI powered aerial & street level imagery to measure building elevation. Identification of garage, basement and primary residence from Geoscape Buildings dataset.



# 163 Church Street is more flood resilient than its neighbor because of its 1.5m higher inundation elevation

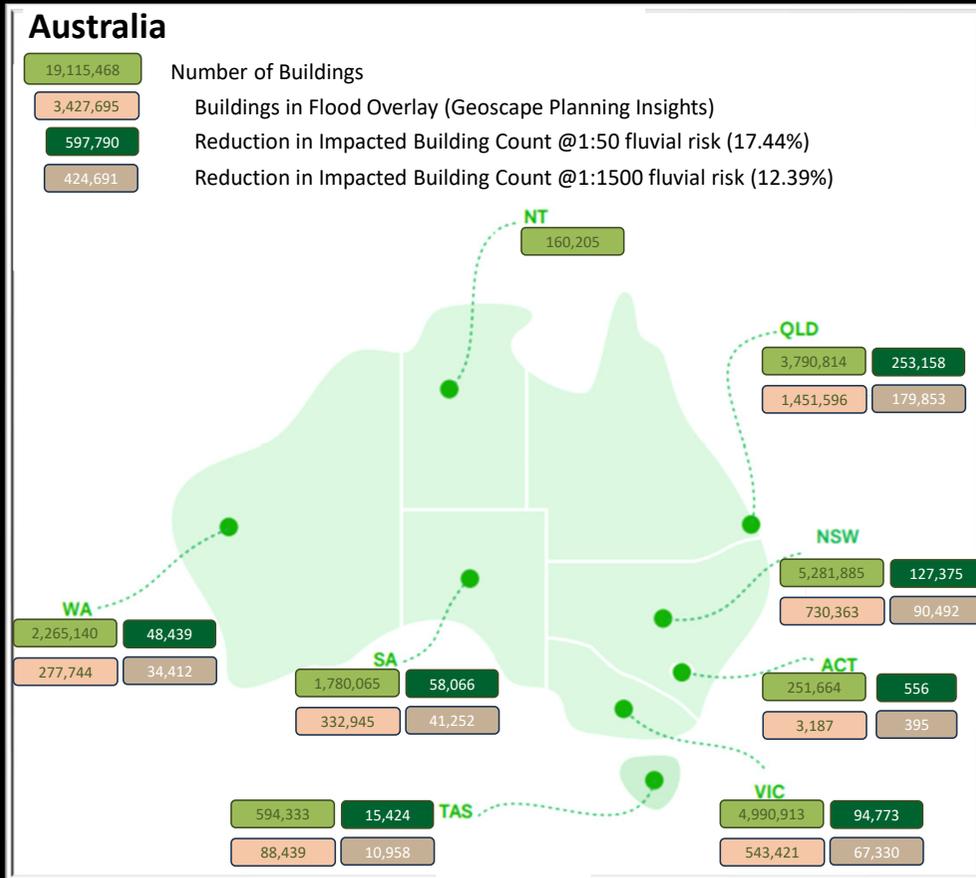


163 CHURCH ST, SOUTH WINDSOR NSW 2756	
Planning Zone	Residential
Ground Elevation	13.95m
First Floor Elevation	1.98m
First Floor Elevation Confidence	80%
Inundation Elevation	15.93m
Eave Height	6.53m
Roof Height	7.34m
Basement	No
Garage	Yes

161 CHURCH ST, SOUTH WINDSOR NSW 2756	
Planning Zone	Residential
Ground Elevation	14.24m
First Floor Elevation	0.17m
First Floor Elevation Confidence	90%
Inundation Elevation	14.41m
Eave Height	4.5m
Roof Height	5.72m
Basement	No
Garage	No



# The impact of incorporating elevation data is significant!



Up to ~600,000 buildings nationally have an overestimated flood risk leading to reduced accessibility and affordability of financial and insurance products

*National projection from sample dataset 2025 integrating Geoscape Buildings with JBA Risk Management flood Risk*



# Deploying and localising the capability at scale

## Prototype

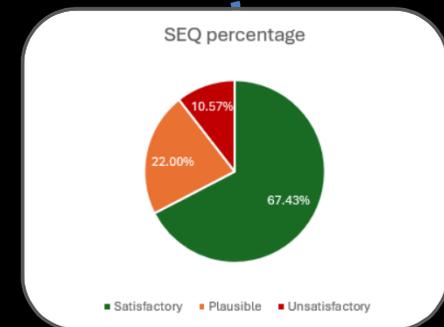
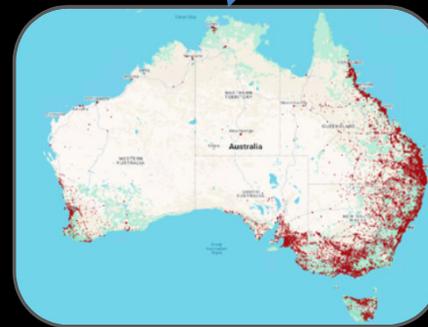
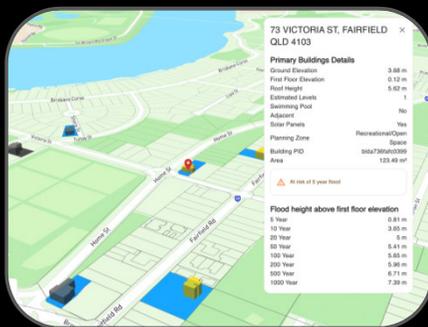
- Initial 2,000 addresses tested using overseas capability to understand performance in Australia
- Engaged users and domain experts with the data to further understand the problem space
- Built demonstrators using JBA flood models

## Production

- Measured the 1M most flood risk addresses for a major financial institution
- Supporting analysis of current portfolio & product accessibility (finance & insurance)

## Refinement

- Support for Commonwealth & State response to recent cyclone & flood events
- Feedback sessions with partners
- Engaging industry, peak bodies, domain experts, and research to continue to invest and work in the national interest



# Thank you



Tom Spencer  
Chief Product Officer  
[tom.spencer@geoscape.com.au](mailto:tom.spencer@geoscape.com.au)

Helping build a smarter, safer, more productive Australia

