

**From:** [NSW Government](#)  
**To:** [Flood Inquiry](#)  
**Subject:** Floods Inquiry  
**Date:** Thursday, 7 April 2022 12:30:44 PM  
**Attachments:** [Lismore Floods - floating houses.docx](#)

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## Your details

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## Submission details

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<b>I am making this submission as</b>	An academic/researcher
<b>Submission type</b>	I am making a personal submission
<b>Consent to make submission public</b>	I give my consent for this submission to be made public

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## Share your experience or tell your story

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## Terms of Reference (optional)

The Inquiry welcomes submissions that address the particular matters identified in its [Terms of Reference](#)

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## Supporting documents or images

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**Attach files**      • [Lismore Floods - floating houses.docx](#)



## **NSW Government Flood Inquiry – 2022**

### **Re: Creating truly flood proof dwellings in Lismore and other low-lying areas of the State.**

While the recent two spates of flooding in Lismore are tragic, with the onset of likely further catastrophic flood events due to climate change and weather events, it's time something was done to better protect the housing stock of Lismore and its residents from the grief and financial pain such endless re-flooding creates.

Historically, government responses to such flooding issues have been static. The construction of levees, upriver dams, bypass channels and so on.

As it's clear from the sheer size/height of both the recent Lismore floods that such static measures could not possibly have protected Lismore – nor could in the future protect Lismore – perhaps it's time we 'flipped' the approach and sought dynamic, rather than static, solutions to riverine flooding events?

Firstly, let's consider the actual issues:

- Flood prone houses cannot be insured against flooding, inevitably leading to either individual residents direct costs to refit and refurbish, or taxpayer-funded flood relief and mop up costs, or both
- Flood prone dwellings, because they can't be insured, cannot be mortgaged, which again invariably means that only cashed up investors buying homes to rent out are able to purchase them – even though such homes would usually sell at a considerable discount to non-flood-affected homes in the same area, and thus be considered 'affordable' housing
- This ensures that rents are cheaper, and this attracts those already marginalised in society, further compounding the clean up and renewal after flood events
- Such lower-socio-economic residents have few or no resources or capital to assist with their own recovery, leaving them either at the mercy of the market, or in need of taxpayer-funded govt assistance

What if there was a way that most of the above negative outcomes could be avoided?

Potentially, there might be.

Instead of simply doing the same-old, same-old, as per every other previous flood, and relining and refitting every house, at considerable expense - especially when it has to be done again, year on year on year....perhaps we could look 'outside the square' at something that, on the surface at least, appears a somewhat radical solution.

#### **Why don't we turn the flood-prone homes into houseboats?**

Yes, I admit, it sounds far-fetched, but it could provide at least one solution, and probably not be any more costly than any other potential solution.

Would it even be possible? Yes, I believe so. As a rough guide, a typically older, timber-framed house probably weighs about 200kg per square metre. It takes approximately 1.0 litre of 'floatation' for each kilo of mass. So a 100sqm home would need 20,000L of floatation.

That's approximately the size of a pretty standard domestic rainwater tank. So it's not massive, by any means.

If, for example, government were to commission a roto moulding company to make a 'standard' floatation chamber of, let's say, 1.0m x 1.0m x 5.0m, that equates to 5 cubic metres, or 5,000L. So only four of these would be required to provide floatation for our 100sqm home. Probably, you'd allow a margin of 20%, so it would be 25,000L of floatation, or 5 x 5,000L floatation chambers.

But, I hear you ask; wouldn't the houses then simply float away in the first flood?

Well, no, because of course you would tether them! Anchor them to the block on which they sit. Technology to do this is well understood, from an engineering perspective, and is how marinas contain and tether the pontoons that the boats in the marina are tied up to.

It's called 'pilings'.

These can be either 'driven piles' or 'bored piles', the principal difference being that one is a solid object driven into the silt and soil beneath the house, while the bored pile is dug out by a screw-type borer and the resultant hole filled with steel reinforcing and concrete. Driven piles are usually cheaper, and require less infrastructure and materials to install. A 10m long pile, driven into the ground at the four corners of the house, and protruding 5.0m into the air, would enable a 'floating home' to rise up to the height of the piles without disappearing off down the river.

Yes, I am perfectly well aware that I am over-simplifying a complex engineering solution, but sometimes 'simplify' is the right adjective, as opposed to 'over-complicate'.

So, yes, there would need to be attachments designed for each house, to attach the house to the piles. New footings would need to be designed, such that the home would 'slot' back into or onto them, as the flood waters retreat. New "quick-to-disconnect" connections would need to be agreed to connect water, sewer and power to such homes – or longer, flexible couplings used so that services could remain connected.

Cost-wise, such a solution might be significantly less than a "Grantham solution" – involving moving all the affected households to higher ground and building entirely new homes for the residents. Such an approach would probably cost at least \$125K per block of land, and an additional \$500K for a simple home. No change out of half a million, for sure.

Conversely, the floatation chambers would probably only cost \$2500 each, so \$12,500 per home.

Piles are probably somewhere around \$10,000 each – especially as a piling crew would have ongoing work for several months, thus reducing the cost per pile, installed, but approx. \$40-50K per dwelling.

Add in an additional \$10K per dwelling for footings and altered foundations, plus the alterations to services and utility connections.

So maybe as little as \$72,500 per dwelling to – effectively – flood proof the home in situ. Even if the costs were actually double this guess-timate, it's still WAY cheaper than purchasing land and building entirely new homes. Even if you add in the one-time cost of refurbishing the interiors after the last flood event, say an additional \$50K, worst case scenario per home cost might be around \$200K.

Why would this be desirable, as opposed to moving the entire town to higher ground?

- History and ongoing relationships within neighbourhoods are maintained
- Historical fabric of the town is maintained
- Homes would likely be insurable and thus mortgageable, enabling disadvantaged residents to perhaps purchase the home in which they already live

- There would be no ongoing, repetitive, repair and refitting of each dwelling after each subsequent flood event, saving home owners (and taxpayers) a fortune
- Potentially, such riverfront, or near-riverfront homes could, in time, become even more desirable, once it's clear they will not again be subject to the ravages of a flood event
- The idea of 'full-floating' homes in flood-prone – or even 'potentially flood-prone' areas of the State frees up additional land for housing that otherwise could not, or should not be used, due to flood risk
- No doubt a new 'standard' or additions to the Building Code of Australia will eventually be required, but 'fully-floating-tethered homes' could one day become as ordinary as the ubiquitous 'slab-on-ground' construction style

Probably, such a proposal might still mean Emergency Services recommending temporary, short-term evacuation during significant flood events, but imagine how much brighter the aspect will be for those 'temporary refugees' knowing they will be very soon (often in only a few days) able to return to a fully functioning and undamaged home?

The reduction in mental health stress and ongoing mental health issues probably is enough to justify investigating this proposal in much greater depth.

Certainly, many of the residents of North and South Lismore have indicated they do not wish to move, as did many of those in Grantham. Sadly, many of these 'remainder' Grantham residents have since been flooded again – which would NOT have been the case had their homes been converted to 'fully floating homes'.

Obviously, not every home will be able to take advantage of such a scheme. Those built 'slab-on-ground' for example could not, without fully rebuilding them, or a massive process to gently jack them up and retrofit timber floors and steel support beams beneath them.

But enough of the housing stock in Lismore, and in most other, older, riverine communities, consists of precisely the type of light-weight timber framed construction that could benefit from the methodology suggested in this proposal.

While nothing should be ruled out, every possible option should, equally, be ruled in!

If you ask the people of Lismore; "would you stay if your house could float, and not be destroyed by every significant flood event?" I suspect the answer would be resoundingly in the affirmative, and probably also in the majority.

No resident wants to leave the home and community they know and love.

'Fully-floating homes' would enable our riverine communities to remain "communities", rather than separating and breaking them up, dispersing them to surrounding areas.

Doing so would enable our post-Colonial settlements to remain in their existing locations, thus maintaining that historical position and the community and heritage thus created.

Sincerely yours,

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