

# Lower Hunter Floodplain Cumulative Development Impact Study and Plan

PSC FRM Committee Meeting

06.02.2024



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# Overview



# Aim of Presentation

1. Provide an overview of the Project: objectives, methodology and results.
2. Inform the committee of the status of the study and preliminary recommendations.
3. Outline the next steps in the study process.

# Why the study is needed

1. To facilitate development permissible under current planning controls filling of land to reduce flood liability is often proposed.
2. The 3 study area Councils have different planning requirements for the consideration of the potential impact of such filling and recognise a lack of guidance on how to address the cumulative impacts of all such developments.
3. It is particularly difficult for individual Councils to consider cumulative impacts that inevitably extend across LGA boundaries.

# Aim of Study

1. Principally to contribute to improved flood risk management for the lower Hunter River floodplain by providing planning recommendations that address the management of cumulative impacts through an update of existing planning controls and by providing direction to assist strategic planning.
2. For the 3 study area Councils to collaboratively undertake the study to ensure that there is an agreed outcome that provides for the equitable distribution of any fill potential and consistent planning controls.

# Project Overview

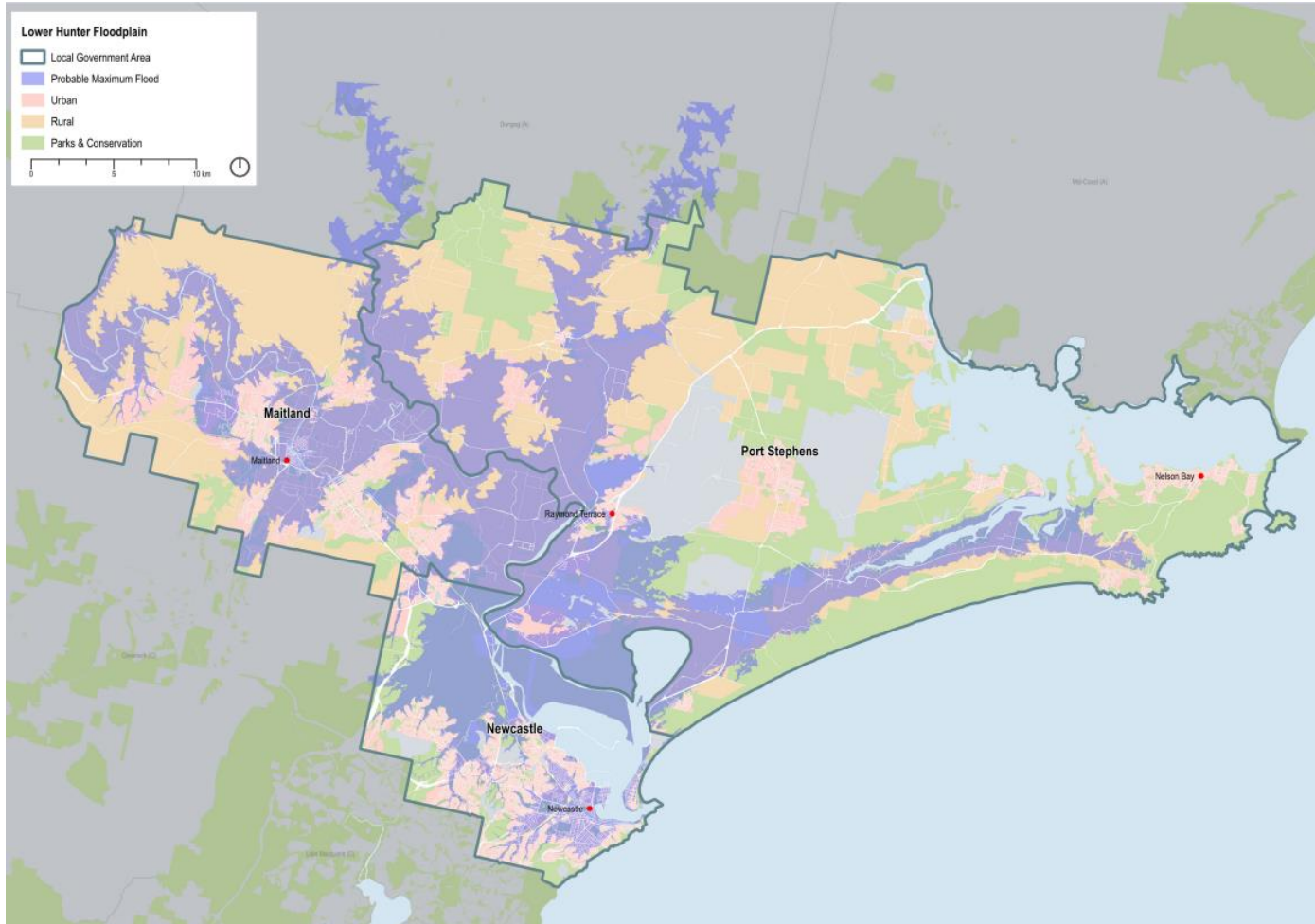
- **Stage 1**
  - completed by UNSW Water Research Laboratory
  - scoping study that looked at existing data and recommend a methodology for the subsequent stages of the project.
- **Stage 2**
  - computer modelling to assess the sensitivity of the floodplain to filling.
  - analysed the cumulative impact of future development (including any significant public infrastructure upgrades)
  - examined a range of floods and climate change considerations
  - informed the planning recommendations required from Stage 3.
- **Stage 3**
  - recommendations for catchment-wide consistent strategies, policies and development controls to manage the cumulative filling of the Lower Hunter floodplain.

# The Study Team

- The study team for Stage 3 comprises the following:
  - GLN Planning – Study leader and Planning Review
  - KBR - Specialist Flood Engineering Input
  - Dr Steve Liaros -Peer Review
- KBR has provided technical assistance for Stage 3 and is preparing the Stage 2 component of the Study

# The Study Area

- Floodplain in Port Stephens, Maitland and Newcastle LGAs.
- Comprises the floodplain of the Hunter River and major components of tributary rivers and creeks





# The Study Area

- Over 40,000 properties within the study area - about 90% are occupied.
- Approximately half of all properties are occupied residential-urban lots in the Newcastle LGA.
- In the order of 2,300 vacant lots of varying size with development potential.
- Also, land identified for urban release and major infrastructure projects.

# Preliminary Modelling Results



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# Stage 1

- High level assessments undertaken as part of the Maitland FRMS and Stage 1 Scoping Report anticipated that considerable filling of flood storage areas can be accommodated without causing significant impacts,
- However, it was recognised that this could vary depending the specific location of filling.
- The Newcastle FRMS considered that there could be some places in the floodplain where filling would be acceptable, but this would be generally unsuitable within floodways and flood storage areas

# Stage 2 Cumulative Impact Modelling

- Stage 2 modelled a series of filling scenarios in an iterative process.
- Initial iteration investigated a worst-case filling scenario that involved the filling of all urban land to the FPL, fill pads on all vacant rural lots and all known infrastructure projects, revealing impacts beyond potential thresholds of acceptability
- A significantly revised iteration for the worst affected part of the floodplain indicated that there could be further capacity in some parts of the floodplain.
- Further modelling was is being finalised to identify acceptable thresholds of filling for different land use activities that allows for equitable and sustainable filling across the floodplain and reasonable development outcomes.

# Stage 2 Localised Impact Modelling

- Stage 2 also simulated typical development examples for the assessment of localised flood impacts.
- Six scenarios were modelled to identify which situations result in localised adverse impacts on flood behaviour, such as heightened flood heights due to afflux effects or material increases in velocities.
- The modelling outputs will inform the proposed DCP controls for localised impacts.

# How to decide on acceptable impacts - Base Principles & Metrics

# Aim

- To lay a foundation for qualitative and quantitative criteria to determine:
  - the acceptability of impacts derived from the Stage 2 modelling.
  - the DCP controls
- 4 base principles

# 1.

The assessment of flood impacts should be based on consideration of the effects of development across the whole of the floodplain, irrespective of administrative boundaries.



## 2.

Any change to the natural or built conditions in the floodplain should not have a material economic, environmental or safety impact on other properties or users in the floodplain.

# 3.

When determining whether a change will have a material impact, an allowance should be made for tolerances in the accuracy of flood modelling and in consideration of the relative vulnerability of different properties and users that may be potentially impacted. (eg residential dwellings should be afforded lower tolerances than parks or rural land).

# 4.

The tolerance for criteria for assessing the acceptability of impacts from an individual development should be less than for the criteria for assessing cumulative impact. This takes into account that there could always be further development in the floodplain that should be allowed for when assessing acceptability.

# Criteria for determining acceptable cumulative flood impacts

# Existing Guidance

- No single definitive existing guidance as to how to assess the acceptability of cumulative flood impacts.
- Often applied as an extension of a FIA or FIRA
- Mostly qualitative – sometimes quantitative
- Can be in 2 steps – site specific assessment not required until numerical threshold exceeded.
- Can relate to broadscale changes to flood levels within the floodplain (storage impacts) and localised changes to flood behaviour (conveyance impacts).
- The new Flood Risk Management Manual provides a comprehensive range of criteria, including examples of some numerical standards, as a “starting point”, but there is an implied expectation that further analysis will ultimately determine the acceptability of potential impacts for individual floodplains.

# Existing Study Area Councils

- Thresholds to trigger the need for a FIA for DAs
  - Maitland - **net importation of fill** within the 1:100 ARI flood extent **or** if for **stock refuge 3,500m<sup>3</sup> or 10% of the total 1:100 ARI flood storage volume**.
  - Port Stephens - if filling was proposed in a **floodway or flood storage area that exceeded 20% or 2000m<sup>3</sup> of the flood volume** of the lot in the 1% AEP (2100) flood and local drainage is unaffected, **or** if for **stock refuges then this is determined based on the height and size of the mound and setback** from the boundary.
- Newcastle restricts **filling in floodways** other than associated with minor alterations, and **filling of onsite flood storage capacity by more than 20%**.
- No quantitative controls for assessing the acceptability of any impact that could be determined by a FIA.

# Other Councils & Authorities

- Reviewed planning controls in the DCPs or related policies of those NSW Councils with a population of over 70,000 persons (34 Councils)
- 74% required a merit-based assessment
- 3 Councils had specific numerical criteria increases in off-site flood levels for individual proposals ranging between of 10mm and 100mm
- Remainder had no specific provisions
- About a third required an assessment of cumulative impacts in some form.
- Only 3 specifically required the assessments to consider climate change.
- TfNSW have nuanced criteria including increases in off-site flood levels including 50mm for non-urban land and 100mm for urban land.
- 2 Court cases – 20mm increase in off-site flood levels
- The Manual – “starting point” 100mm increase in off-site flood levels .
- Northbank major project assessment adopted a 40mm increase in off-site flood levels (10 years ago).

# The Manual

- The Manual (pg,49-50) also defines:

***Floodways: Areas*** of the floodplain which generally convey a significant discharge of water during floods and are sensitive to changes that impact flow conveyance. They often align with naturally defined channels or form elsewhere in the floodplain.

***Flood storage areas:*** Areas of the floodplain that are outside floodways which generally provide for temporary storage of floodwaters during the passage of a flood and where flood behaviour is sensitive to changes that impact on temporary storage of water during a flood

- Discourages any constriction to floodways or critical flood storage areas on the basis that any changes, individually or cumulatively are expected to adversely impact flood behaviour.



# Adopted Criteria for Cumulative Impact

- Increase in flood level determined to be the key criteria (as opposed to other factors such as changes in flood velocities, duration of flooding, and warning times).
- The impacts tested were not linear or homogeneous across the whole of the floodplain.
- The determination of what was an acceptable cumulative impact was consequently based on an iterative modelling process that sought to minimise impacts applying the starting point cumulative impact assessment criteria in the Manual.
- The process allowed for consideration as to what land uses were impacted and to what degree.
- A flood level increase of 100mm was used as a maximum but generally flood level increases exceeding in the order of 50mm were avoided in urban residential areas.

# Review of Planning Controls

# Application of controls

- Proposed DCP will have three steps:
- 1. If the cumulative flood impact threshold criteria are not exceeded then no further assessment of cumulative flood impacts is required.
- 2. If the cumulative flood impact threshold criteria are exceeded then:
  - a. Any additional fill in flood storage areas above that allowed for by the threshold criteria must be addressed.
  - b. No additional fill permitted in floodway.
  - c. Any proposed changes to ground levels and the height of a building must also be acceptable.
- 3. A site-specific FIA is required only where local siting criteria are not satisfied, to demonstrate that there will not be localised unacceptable impacts because of proximity to other development or structures.

# Where to from here



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# Next Steps

- KBR finalising Stage 2 modelling
- Preliminary draft Stage 3 report issued to Council staff to comment
- Final reports to Council staff for reporting to Council in next few months.
- Consultation – public, agencies, FRM Committee
- Consideration of submissions and final endorsement of Council
- Implementation

# Thank you

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# Key DCP Matrix

