

LAKE MACQUARIE CITY COUNCIL



NORTH CREEK WARNERS BAY FLOOD RISK MANAGEMENT STUDY AND PLAN SUMMARY

DRAFT FOR PUBLIC EXHIBITION
SUMMARY REPORT



OCTOBER 2025

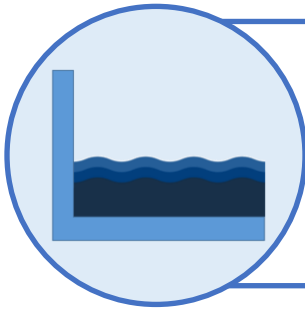
NORTH CREEK WARNERS BAY FLOOD RISK MANAGEMENT STUDY AND PLAN SUMMARY

This document has been prepared to summarise the draft North Creek Warners Bay Flood Risk Management Study and Plan, for the purpose of communicating the report to the community during Public Exhibition. This document should be read in conjunction with the information and figures contained in the full report.

The study area comprises the entire North Creek catchment, located on the northern hinterland of Lake Macquarie. The catchment covers an area of approximately 5.3 km² and includes the suburb of Lakelands, the majority of the Warners Bay and a small portion of Speers Point. The catchment is largely developed for residential and commercial/light industrial purposes. While North Creek is the primary waterway, there are a number of unnamed tributaries that flow across the catchment and join North Creek upstream of its outlet to Lake Macquarie at Warners Bay.

A **Flood Study** was prepared by WMAwater and adopted by Council in March 2025. The flood study defines the flood behaviour in the catchment for both local overland flooding (rainfall runoff flowing overland toward watercourses) and mainstream flooding (water rising in channels and creeks and inundating surrounding land). The flood study developed a computer flood model for the catchment that was calibrated to real flood events, providing confidence that the model can replicate real flooding conditions. Flood events of various sizes were simulated to determine aspects such as when water breaks out of creeks, when roads are inundated and what properties may be at risk. Flood hot spot areas were identified including New Road, Hughes Avenue, Lakelands Branch, the Hillsborough Road industrial area, local road low points in east Warners Bay, the King Street Branch, North Creek at the Hillsborough roundabout and the downstream area of North Creek.

This **Flood Risk Management Study and Plan** is about how Council can best manage the flood risk. The Flood Risk Management Study seeks to investigate methods by which to manage existing, future and residual flood risk in the study area while the Flood Risk Management Plan documents the recommended options for the management of flood risk into the future. Management measures fall into one of three categories:



FLOOD MODIFICATION MEASURES

Modify the physical behaviour of a flood including depth, velocity and direction of flow paths. Typical measures include flood mitigation dams, retarding basins, channel improvement, levees, culvert or bridge modifications, flow path redirection and defined floodways. Pit and pipe improvement and even pumps may also be considered where practical.



PROPERTY MODIFICATION MEASURES

Modify the existing land use or development controls for future development. This is generally accomplished through means such as flood proofing, house raising or sealing entrances, strategic planning such as land use zoning, building regulations such as flood-related development controls or voluntary purchase / voluntary house raising.



RESPONSE MODIFICATION MEASURES

Modify the response of the community to flood hazard by educating flood affected residents about the nature of flooding so that they can make better informed decisions. Examples of such measures include provision of flood warning and emergency services, improved information, awareness and education of the community, and the provision of flood insurance.

Several options were identified in each of these categories for the North Creek catchment. The options were subject to a screening and assessment process to determine which ones may be feasible and result in benefits to the community. The assessment process included modelling flood modification (infrastructure) options with the flood model to determine how much they reduce flooding. A number of options such as culvert modifications, road raising, channel modifications and levees were not considered viable at the high-level assessment stage. Several options for detentions basins, low point relief and drainage upgrades were dismissed based on modelling results. A detailed assessment was undertaken for the remaining options, which included undertaking a cost-benefit analysis, considering the cost of construction versus the benefit to flood damages.

The options that were considered viable were then assessed using a multi-criteria analysis, which considered flood impacts, construction feasibility, economic merits and the alleviation or exacerbation of property damages, risk to life and pressure on emergency responders. The recommended options for implementation in the Floodplain Risk Management Plan are presented in the table and figure below.

Table 1: Recommended options for the management of flood risk in the draft North Creek Warners Bay Flood Risk Management Plan

	Option ID Report Section	Option	Description	Benefits	Concerns	Cost	Priority
Flood Modification Options	FM01 8.3.2.4	Lakelands Embankment	Raising the existing embankment on the Lakelands Pond to 6 mAHD.	- Reduces flood levels downstream on Medcalf Street. - Reduces flood damages at properties downstream.	- May cause social disruption during construction. - Primarily commercial properties immediately downstream.	\$340,000	Low
	FM02 8.3.2.5	Wilton Close Basin	Increase storage capacity of existing reserve through excavation and construction of an embankment or wall.	- Reduces downstream inundation on private properties and roads. - Reduces flood damages.	- May cause social disruption during construction. - Safety and social perception of a high embankment in close proximity to residential properties.	\$490,000	Low
	FM03 8.3.3.1	Channel and Drainage Maintenance	Maintenance involves regularly removing unwanted vegetation and other debris from the drainage network, particularly at culverts, inlet pits and within channels. Council should identify specific areas prone to blockage and periodically review and update these areas based on feedback from the community. Council should also inspect and record channels and drainage structures following flood events to assess debris build up and clear blockages.	Removal of vegetation and debris blockage from structures will enable a more efficient conveyance of water.	- The major release of debris is during the storm event, and hence regular maintenance may not necessarily reduce blockage during a flood event. - Vegetation in open channels is not a significant constraint to the hydraulic capacity of the channel.	N/A	Low
Property Modification Measures	PM08 8.4.8	Future Flood Resilience Policy	A future flood resilience policy guides Council's operations and policies at a high level. This would likely feed into other Council operations such as coastal management, asset design, flooding and planning controls.	Ensures future rainfalls are incorporated into current planning controls and infrastructure design (as sea level rise is currently).	Uncertainties in future rainfall predictions. The changes expected for future rainfalls and runoff response is largely unknown.	N/A	High
	PM04 8.4.4	Flood Planning Levels	The current adopted flood planning level is considered appropriate for mainstream flooding. It is recommended to use flood levels derived from the flood study. Levels could be updated considering: - Lower freeboard for overland flow situations. - Potential to include future climate (rainfall increase) – part of PM08. - PMF level for basement car parking.	Ensures new buildings are protected to an appropriate level.	Current freeboard of 500 mm in overland flow areas may be excessive given the scale in the range of flood events.	N/A	High

	Option ID Report Section	Option	Description	Benefits	Concerns	Cost	Priority
Property Modification Measures	PM06 8.4.6	Flood Planning Policy	Flood planning policy is typically governed by the LEP and DCP, which outline flood-related development controls. Consideration should be given to the following: - Updating terminology and references. - Implementation of a matrix-style approach for controls. - Specifying requirements for modelling of flood impacts. - Including controls for structural soundness and storage of hazardous goods. - Specifying evacuation or shelter-in-place requirements. - Application of the Special Flood Considerations in the LEP.	Ensures adequate flood planning controls to reduce the flood damage and risk to life for new developments.	- Clarity in planning controls and their application to ensure adherence. - Will apply LGA-wide, so consistency and application across the entire LGA to be considered.	N/A	High
	PM05 8.4.5	Flood Planning Area	It is recommended to adopt the provisional flood planning area as defined in the North Creek Flood Study.	Ensures that flood planning controls are applied to lots that are flood affected.	There are issues with the traditional approach of applying freeboard and 'stretching' the surface to identify the flood planning area, particularly with steep overland flow paths in urban areas.	N/A	High
	PM07 8.4.7	Section 10.7 Certificates	Section 10.7 Certificates are required to show flood notation. This informs the land owner of flood risk and applicable development controls. Notations should be updated based on the flood planning area and Council to continue providing free flood information at the property level via the online tool.	Informs land owners of flood affectation of the lot and applicable flood planning controls.	Typically only accessed for the purpose of redevelopment or in the sale/purchase of land.	N/A	High
	PM03 8.4.3	Flood Proofing	Flood proofing of non-residential buildings with temporary flood barriers (both existing and new structures, where floor levels are allowed to be lower). This could also be extended to existing residential development, but not recommended for new residential development – floor level controls should be applied instead.	Reduces flood damage.	Costs and implementation of flood proofing measures are the responsibility of the property owner / business.	Varies	Medium
	PM01 8.4.1	Voluntary House Raising	Physically raise existing dwelling structures above the flood planning level. Three main areas are identified for further investigation covering approximately 28 properties.	Reduces exposure to flood damage.	Generally there is a low uptake of voluntary house raising due to the cost and inconvenience.	\$30,000 to \$100,000	Very Low

	Option ID Report Section	Option	Description	Benefits	Concerns	Cost	Priority
Response Modification Measures	RM01 8.5.1	Flood Emergency Management Planning and Coordination	It is recommended that the SES: - Use the information and modelling developed as part of the North Creek Flood Study to update their flood intelligence and local flood plan for the Lake Macquarie LGA. - Consider providing an updated brochure or information on their website for the flood risk in the LGA – specifically creek and overland flooding. It is recommended that Council and SES: - Hold regular meetings of all responders and training exercises between flood events to identify roles and responsibilities, and build relationships between agencies.	Flood emergency planning enables a more coordinated, timely and targeted response to flood events.	As the interval between flood events increases, the coordination of flood response can lack attention.	N/A	High
	RM02 8.5.2	Community Flood Awareness and Education	It is recommended to design and implement an ongoing community flood education program to maintain a high level of flood awareness and understanding of the risk and appropriate response to flooding in the North Creek catchment (likely in conjunction with the wider LGA).	An informed community can better respond to flood risks, including preparation for and making wise decisions during flood events.	Community education programs are typically well received by those interested in and already aware of flood risk, and it is difficult to engage the wider community.	Varies	High
	RM03 8.5.3	Flood Warning System	It is recommended that the severe weather and severe thunderstorm warnings issued by the BoM be used to prepare for potential flash flooding events. Community awareness campaigns may assist residents in interpreting warnings from the BoM, anticipating the impacts and preparing accordingly. The Lake Macquarie FloodWatch system provides a platform for monitoring current conditions during these events. Council and SES operations should also be reviewed in light of this study.	Enable Council and SES to be on alert to potential flash flooding events. The community can also benefit by being aware of potential flash flooding and respond accordingly.	Education about what these warnings mean and actions that should be taken by residents in different locations is key.	N/A	Medium
	RM04 8.5.4	Improvements to Drive Safety	Installation of flood signs and flood depth indicators can improve driver safety, in conjunction with community education about the risks of driving through floodwaters. It is recommended that a detailed study is undertaken to confirm the preferred locations, residual flood risk (i.e. need for road closure) and safe alternative routes and how traffic can be diverted in flood events. Following the detailed study, installation can proceed in accordance with the outcomes of that study.	One of the primary risks for flash flooding in urban areas is motorists driving through floodwaters. This reduces that risk by warning motorists of flooded roads.	There is the chance that these signs and warnings will be ignored by motorists.	Not Estimated	Medium

SUMMARY FIGURE
NORTH CREEK WARNERS BAY FRMS&P
FLOOD RISK MANAGEMENT PLAN
SUMMARY

FLOOD RISK MANAGEMENT PLAN:

High Priority:

- PM08: Future Flood Resilience Policy
- PM04: Flood Planning Levels
- PM06: Flood Planning Policy
- PM05: Flood Planning Area
- PM07: Section 10.7 Certificates
- RM01: Flood Emergency Management
- RM02: Community Flood Awareness

Medium Priority:

- PM03: Flood Proofing
- RM03: Flood Warning System
- RM04: Improvements to Drive Safety

Low Priority:

- FM01: Lakelands Embankment
- FM02: Wilton Close Basin
- FM03: Drainage and Channel Maintenance

Very Low Priority:

- PM01: Voluntary House Raising

- North Creek Catchment
- 1% AEP Flood Extent (>150mm depth)
- RM04: Road Flood Sign Locations
- Flood Modification Options (FM01 & FM02)
- PM01: Voluntary House Raising Areas
- Creeks

0 0.125 0.25 0.5 0.75 1 Kilometres

