Memorandum

Date:	Friday, 16 September 2022	**Pages:**	3
To:	Dan Maurici	**Copy:**	
From:	Troy Eyles	**Ref:**	21-000093

Subject: **10-12 Boondah Road Warriewood - SES Preliminary Advice**

Particulars	Response
▪ A significant portion of the site at 10-12 Boondah Road is subject to frequent inundation, that is, in a 50% Annual Exceedance Probability (AEP) flood. With the provided Water Management Report indicating that the road remains flood free to the north up to and including the 1% AEP event (contradicting the Narrabeen Lagoon Flood Study 2013).	The proposal raises the development above the 1% AEP + Climate change. The undeveloped areas only will remain below the 1% and flood more frequently. Boondah Road to the north has been constructed above the 1% AEP as part of the neighbouring development, however the Council modelling has used a road surface level prior to the upgrade. The modelling has been performed as part of this study using recent survey data to demonstrate that the road to the north will remain flood free in the 1% AEP storm event.
6 Jacksons Road is almost entirely inundated in a 50% AEP flood, and the Reserve Fields 2, 3, 4, 6 and 7 are isolated by such event and completely inundated by the time the level of a 1% AEP flood is reached by high hazard flood water. This appears to be in line with the draft Ingleside, Elanora and Warriewood overland flow flood study referred to in the Flood Planning Assessment provided.	Noted. 6 Jackson Road and playing fields are not part of this submission.
Risk assessment should consider the full range of flooding, including events up to the Probable Maximum Flood (PMF) and not focus only on the 1% AEP flood. Although the PMF is considered in the risk assessment, the Flood Planning Assessment should consider the risk from incremental floods below and above the 1% AEP flood, up to and including the PMF. It is identified that the velocity generally remains under 0.5m/s on the site, but increases to 0.5-1.0m/s on Boondah Road.	We have modelled the variables and events as council has stated. As the residential extents are clear up to the 1% AEP, and the velocities are tolerable across the region, the risk from smaller storm intensities is negligible
Noting the proposal includes cut and fill and development in a floodway and flood storage area, this may have significant impacts on the flood behaviour and adjacent community. This should be consulted with the Environment and Heritage Group of the Department of Planning.	The afflux impacts have been accounted for in all modelled storm intensities and are generally within council's tolerances. The report has been provided as part of the ecological assessment.
Risk assessment should have regard to flood warning and evacuation demand on existing and future access/egress routes. Consideration should also be given to the impacts of localised flooding on evacuation routes. The Flood Planning Assessment identifies 4.5 hour travel time as "significant". Based on research, including Opper et al 2010 and a number of publications on the NSW SES website, 4.5 hours is generally an insufficient amount of time to enact evacuation successfully.	Earlier warning evacuation will occur as the flows progressively and slowly backs up from ponding of the wetlands. The travel time to the evac point is around one minute by car. Vertical evacuation is available for anyone not evacuated prior to the flood waters cutting off a route.
This site is also not an area that is warned to by the Bureau of Meteorology. It is noted that a sensor is proposed to warn	The flood evacuation route is flood free up to and including the 1% AEP with climate change. Shelter in place is also

the community (Water Management Report). However, NSW SES does not support early evacuation as a strategy for future development.	available for those that have not evacuated. Flood sensors provide additional warning for residents to choose to evacuate without the reliance of SES.
It is noted that the proposal includes an upgrade of the road to 3.2m AHD to allow evacuation north in a 1% AEP flood. This is based on the revised flood information in the Water Management Report provided, which identifies Boondah Road is not affected by 50% AEP flooding. However this does not appear to include climate change impacts (as noted in the Water Management Report).	The upgrade is proposed to 3.9, and it does include climate change impacts (see Table 1 of the stormwater report)
In the context of future development, self-evacuation of the community should be achievable in a manner which is consistent with the NSW SES's principles for evacuation. Future development must not conflict with the NSW SES's flood response and evacuation strategy for the existing community.	Clarification with details of SES strategy for this community is required to ensure no conflict.
Evacuation must not require people to drive or walk through flood water.	The evacuation route is clear of flood water up to and including the 1% AEP + Climate change.
Development strategies relying on deliberate isolation or sheltering in buildings surrounded by flood water are not equivalent, in risk management terms, to evacuation. Section 7.4 of the Flood Planning Assessment identifies the option for shelter in place and a complex and high risk strategy detailed on page 54 of the Water Management Report. 'Shelter in place' strategy is not an endorsed flood management strategy by the NSW SES for future development. Such an approach is only considered suitable to allow existing dwellings that are currently at risk to reduce their risk, without increasing the number of people subject to such risk. The flood evacuation constraints in an area should not be used as a reason to justify new development by requiring the new development to have a suitable refuge above the PMF. Allowing such development will increase the number of people exposed to the effects of flooding. Other secondary emergencies such as fires and medical emergencies may occur in buildings isolated by floodwater. During flooding it is likely that there will be a reduced capacity for the relevant emergency service agency to respond in these times. Even relatively brief periods of isolation, in the order of a few hours, can lead to personal medical emergencies that have to be responded to. IN addition, this particular site is adjacent to the sewer treatment works, which is likely to result in contaminated floodwater surrounding the development.	The flood evacuation route is flood free for storms up to and including the 1% AEP + climate change and is consistent with council controls. During extreme rainfall, the rainfall and other factors such as wind can make driving difficult or more dangerous. Shelter in place is ALSO provided in accordance with the Warriewood Valley Strategic Review 2011 and council controls.
Noting that this site is subject to flash flooding any development that does occur must be designed for the potential flood and debris loadings of the PMF so that structural failure is avoided during a flood. This should include not only velocity (as identified in the Water Management Report), but also depth. In addition, adequate services should be provided so people are less likely to enter floodwaters. This includes access to ablutions, water, power and basic first aid equipment. Consideration must be given to the availability of on-site systems to provide for	The residential areas are subject to flooding only in long storm durations. The site is not subject to flash flooding. Flood resistant design shall be considered via structural and other detailed assessment as part of the design process.

power, water and sewage services for the likely flood duration of surrounding areas (which may exceed several hours) plus a further period to provide allowance for restoration of external services.	
Development strategies relying on an assumption that mass rescue may be possible where evacuation either fails or is not implemented are not acceptable to the NSW SES.	The strategy provides a flood free route upto the 1% AEP + climate change with shelter in place above the PMF ALSO available for those that do not evacuate.
The NSW SES is opposed to the imposition of development consent conditions requiring private flood evacuation plans rather than the application of sound land use planning and flood risk management. It is noted that an evacuation plan will be prepared for this. NSW SES encourages businesses and residences to be prepared through the creation of business and home emergency plans and kits and exercising them regularly. However, we have no role in reviewing or approving these, in accordance with sections 3.6, A-5, L-5, L-6.9.6 and N-7 of the NSW Floodplain Development Manual, 2005. NSW SES has resources available on the NSW SES website that may assist.	Such plans can be developed and refined as part of the design process.