

Flood Impact and Risk Assessment, PP-2022-731 488-492 Old South Head Road and 30 Albemarle Road, Rose Bay, 13 December 2024

Comments provided by the Chief Engineer

Purpose

The Chief Engineer (CE) has been requested to review the Flood Impact and Risk Assessment prepared by Northrop, dated 4 October 2024 (Revision B) referred to herein as the FIRA. The CE was also requested to make comment on the advice provided by the Biodiversity, Conservation and Science (BCS) Group dated 7 November 2024.

Reports/Correspondence Reviewed

- Flood Impact and Risk Assessment for 488-492 Old South Head Road and 30 Albemarle Road, Rose Bay for Woolworths Group, Northrop Consulting Engineers, 4 October 2024, Revision B
- RTS – 488-492 Old South Head Road and 30 Albemarle Ave, Rose Bay (PP-2022-731), Department of Climate Change, Energy, the Environment and Water, Biodiversity, Conservation and Science (BCS) Group, 7 November 2024, Ref: DOC24/839369
- Local Planning Directions issued by the Minister for Planning, issued to commence 1 March 2022 (replaces previous Direction 5.10). Focus area 4: Resilience and Hazards, 4.1 Flooding.
- Considering flooding in land use planning, Guideline, July 2021, Department of Planning, Industry and Environment.
- Flood impact and Risk assessment, Flood risk management guideline LU01, 2023, Department of Planning and Environment
- Flood risk management manual, The Policy and manual for the management of flood liable land, 2023, Department of Planning and Environment
- The Estimation of Probable Maximum Precipitation in Australia: Generalised Short-Duration Method, Commonwealth Bureau of Meteorology, June 2003

Introductory Comments on PP-2022-731

The FIRA was prepared for the proposed development at 488-492 Old South Head Road and 30 Albemarle Road, Rose Bay, referred to herein as “the site” or “the project”. The FIRA was prepared to “review the impact potential development at the subject site has on existing flood behaviour within the subject site and adjacent properties” – FIRA page 4. For clarity the FIRA was prepared for a hypothetical development scenario, to demonstrate a workable flooding solution is achievable at the site. It is acknowledged that the FIRA reviewed is not the “working” FIRA for the project.

BCS has advised that they were of the opinion that the FIRA has not adequately addressed flooding and emergency management and has not demonstrated consistency with the Ministerial Direction referenced above.

Ministers Direction 4.1

The FIRA has provided detailed information with respect to the Ministers Direction referenced above, referred to herein as the Direction. The suggestion by BCS that the FIRA has not provided sufficient information regarding consistency with the Direction is contested by the CE. There are approximately 15 pages dedicated in the FIRA that provides specific information with regard to specific compliance with the Direction. The information provided in the FIRA has been critically reviewed. No errors or misleading information was identified in the FIRA with respect to consistency with the Direction. The CE does not concur with the BCS that insufficient information has been provided in the FIRA.

BCS Matters of Particular Concern

BCS in their advice of 7 November 2024 have identified three matters of particular concern these being as per below.

- A - The site is a floodway in the Probable Maximum Flood (PMF) event
- B - Excessive flood afflux in the developed scenario
- C - Emergency management constraints

The issues raised by BCS concern the Probably Maximum Flood (PMF) event.

Understanding the PMF at the Site

The PMF is an extremely rare event. The Australian Rainfall & Runoff (ARR) describes the PMF event as a parameter beyond the limit of credible extrapolation (Fig 8.1.1 Book 8). At the site the PMF is caused by a localised storm event. This meteorological event has more than 0.5m of rain falling in a short duration. In lay persons terms it is absolutely hammering down, like no other storm ever experienced.

The PMF event has a duration of approximately 90 minutes, with little to no warning. Also, the flood waters from the PMF recede relatively quickly. After approximately 90 minutes the flood waters recede to a safe level.

Such a storm (that causes the flooding) will likely cause significant devastation. The intensity of the storm event will result in huge devastation to the local street tree canopy. There will be numerous fallen trees, debris in the local road network and within private property in the surrounding community.

On 2 December 2024 the CE conducted a site inspection to review the site and surroundings. Sample images from the site inspections are shown below (Figure 1).



Figure 1. Site inspection of 488-492 Old South Head Rd and 30 Albemarle Rd

The site and surrounds have a heavy street tree canopy. The street tree canopy will be heavily impacted in the PMF event. Fallen trees and debris will make the local roads impossible or unsafe to be trafficked. Until that road network devastation by fallen / damaged trees is removed no vehicles will be able to safely utilise the road network. The road network will not be functional until the trees and associated debris are cleared. The effect of the damaged caused by the fallen tree canopy will be the major concern for any emergency response teams, not the actual flood waters in a PMF event.

The site inspection on 2 December 2024 also revealed that there a numerous “old type residential dwellings” (in some circumstances atheistically upgraded), as shown in the sampled photos below (Figure 2).



Figure 2. Old type residential buildings

These buildings would not have been designed or built to be able to remain fully intact in a PMF event. These buildings are likely to partially or completely fail in a storm event such as a PMF as a result of rainfall intensity and high winds. These buildings will also fail due to the impact of the storm event to the tree canopy.

Well after the PMF flood waters have receded to a safe level the impacts of fallen trees and failed buildings will remain. The PMF emergency recovery activities will not take

place in flood waters. Emergency responders to the PMF will not prioritise their actions to address the short-term challenges of flood waters. Emergency responders in all likelihood be assisting persons either tapped in damaged houses or trying to clear the road network.

BCS Concern A – Site is a Floodway in the PMF

BCS have not clearly stipulated what their particular concern is. However, for BCS to have “particular concern” it would appear that their concern would be that the development may block natural drainage paths. The flood modelling indicates that the flood water in the PMF is continued to be conveyed down the flood ways, with no change to the flood hazard. In advice, BCS are incorrect to state that flooding is exacerbated in surrounding areas. BCS are also incorrect in advice to suggest drainage paths have been blocked by the proposed development, and a subsequent worsening of flood risk for nearby properties.

BCS Concern B – Excessive Flood Afflux due to the development.

The FIRA indicates that the planning proposal results in an overall reduction in flood impacts. There are areas where flood levels have increased and there are areas where flood levels have decreased due to the development. The CE has assessed the development scenario as presented in the FIRA. Graphically shown in Figure 3 below.



Figure 3. Flood impact

Areas A2, A3, A4 Flood Impact has increased.

Areas A1, A5, A6, A7 Flood Impact has decreased (improved).

The areas where the flood levels have been increased is approximately 24,000 m². The areas where the flood levels have been decreased is approximately 60,000 m². The development scenario has resulted in an overall flood level improvement of 43% in area. The elevation of the PMF flood level existing scenario is 12.59m – 13.55m, in the development scenario the development PMF flood level is 13.2m – 13.48m. The highest elevation of the PMF has decreased in the development scenario. A short section of Albemarle Road will have a flood water depth increase of 200mm (slightly more than the length of an iPhone). This 200mm increase in depth of a short approximate 75m section of Albemarle Road will be inconsequential in the PMF event. In an emergency do you think for a second emergency responders would be of the opinion “if only this was 200mm less”? It could be considered misleading for BSC to suggest that the proposal has caused significant flood impacts to other properties and roads.

With regard to the itinerant population referred to by BSC in B. The FIRA has argued that by providing public space (that is currently not available to the itinerant population) that is above the PMF, the plight of the itinerant population has been enhanced by the development.

BSC Concern C – Emergency Management Constraints

The PMF event at the site is a short duration storm. When assessing the emergency management response, no comparison should be made with the response required (for example) at the 2022 Lismore floods where mass evacuation was required. BCS in providing their advice on the PMF for the site would appear that they have the notion that mass evacuation would occur (similar to Lismore 2022). At the site in a PMF the emergency response will not include an attempt for mass evacuation, based on the short duration of the PMF event and given there would be no prior warning of an impending PMF.

The challenges faced by emergency management response teams in a PMF event will not involve trying to execute a mass evacuation. Emergency management will be addressing the dramatic and potentially catastrophic consequences of the PMF storm, as previously discussed in these comments. Emergency responders will be dealing with rescuing persons from collapsed structures and clearing of critical infrastructure from the damage created as a result of the PMF storm. Specifically, the issue raised by BCS of “hinderance to evacuation of the population” by the proposal. There will be no way for, nor time for evacuation of the population, in the 90-minute PMF event. The PMF event response will not be hindered by flood waters. The PMF response will be dedicated to protecting those people and residents that are impacted by the storm, building collapse, and infrastructure failure. To suggest that the development proposal affects the emergency response for evacuation is not reasonable.

With regards to BCS not supporting shelter in place and preferring evacuation at the site. In a 90-minute catastrophic PMF storm shelter in place is likely to be the only option for safety. It is most unlikely that right minded person would leave a newly built structure, out into the PMF storm event, to find a high-level plot of ground that is still exposed to the torrential storm of the PMF. The FIRA proposal offers a solution whereas persons can shelter in place in a modern, well-engineered structure that has anticipated and been designed to withstand the PMF event.

Concluding Comments

The FIRA is considered fit for purpose and has demonstrated that the proposal is consistent with the Directions.

The specific matters of concern raised by BCS have been reviewed and commented on. The matters raised are not considered to be relevant nor consequential to the proposal detailed in the FIRA.



Rex Wightley BE (Civil), MBT, FIEAust, EngExec, CPEng, NER, APEC

Chief Engineer