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19 December 2024

Enquiries: Garry Neville
Project No: 304000938

Scentre Group
85 Castlereagh Street, Sydney New South Wales 2000

Attention: Jane Macpherson

Dear Jane

Reference: Warringah Mall Ticketless Parking Flood Impact and Civil Review

As requested, we have reviewed the Ticketless Parking plans prepared by Scentre Group and write to advise of impacts of the proposed works on overland flooding at the site.

Stantec has previously prepared a detailed 2D flood model using XP-SWMM software for the Warringah Mall site and its upstream catchment. The site is located at the base of a large catchment and has historically been susceptible to significant flooding. The extent of flooding at the site was reduced significantly following construction of major stormwater upgrades works designed by Stantec, in 2018/2019. Flooding that occurs at the site following these upgrades is generally contained to at grade car park areas and is characterised by low flood depths and low flow velocities.

The extent of flooding in a 1% Annual Exceedance Probability (AEP) event is shown in **Figure 1** overlayed on the proposed Ticketless Parking plans. Inset plans showing more detail are included in **Attachment A** for reference.

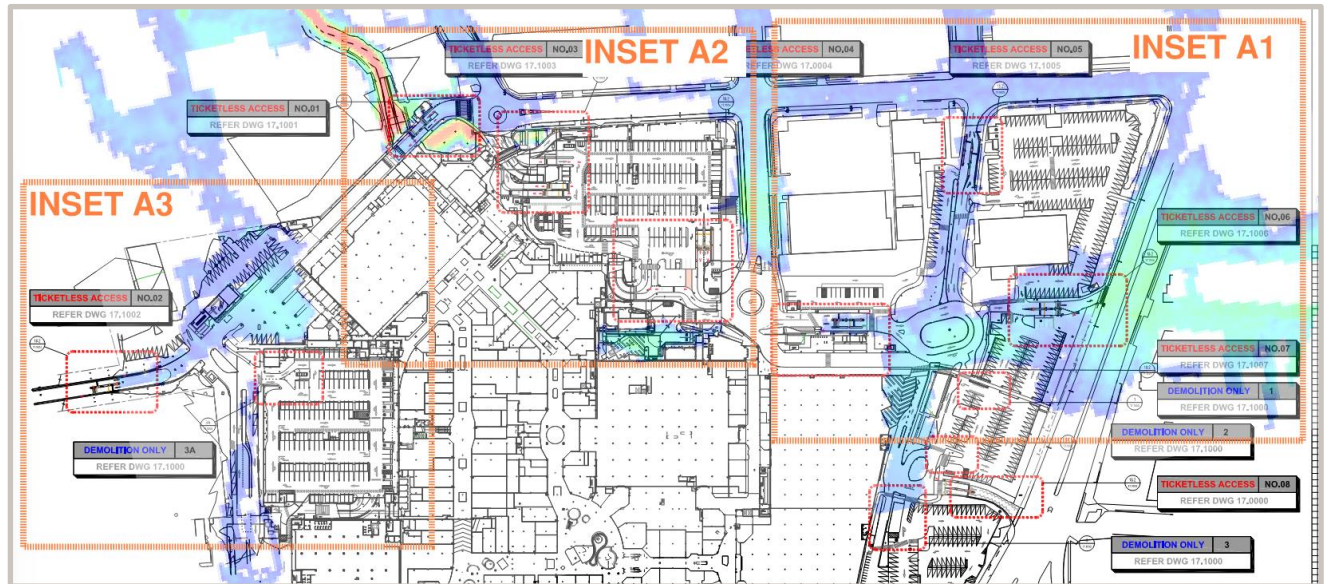


Figure 1: Flooding overlay 1% AEP extent (blue shading).

It is evident from the flooding overlay that, of the eight (8) ticketless sites proposed (refer **Attachment A**);

- Three (3) are located beyond the 1% AEP flood extent (Site No.3, No4 and No.8).
- Three (3) are located on the flood fringe where depths and velocities a very low (No.1, No.2 and No.4).
- Two (2) are located within the 1%AEP flood extent. Site No. 5 includes narrow channelisation islands oriented parallel to the overland flow path direction. Site No. 6 includes a narrow channelisation island parallel to the flow and adjustments to existing kerbs.

Based on our review of these locations and the proposed features of each site, it is our opinion that the proposed ticketless parking works will have a nil or negligible impact on existing flood behaviour on the site. This is due to the following considerations.

- Sites as noted above are not located within the flood zone as identified by the 2D SWMM modelling carried out for the existing site.
- The works are minor in nature and the extent of new kerb works as well as the height and width of traffic islands have been minimised in response to Stantec's recommendations for the Ticketless Parking works from a flood impact perspective.
- Breaks in channelisation islands have been included to allow passage of overland flow and minimise changes in flow paths.
- Traffic/channelisation islands are narrow and oriented parallel to flow paths where they are located within the flood zone, thereby minimising disruption to existing overland flow paths.

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- No works are proposed immediately adjacent to the site boundary that have the potential to change flow behaviour off-site, thereby removing the risk of impacts to neighbouring property/road reserves.

The proposed works can be further optimised during detail design with a view to ensuring nil impact to existing flood behaviour. As part of the construction certificate process, civil engineering documentation will be prepared in accordance with Australian standards AS/NZS2890.1:2004 Off Street Car Parking and AS3600.1 and AS3600:2018 Concrete Structures.

Please contact the undersigned should you require anything further.

Yours sincerely

Stantec Australia Pty Ltd



Garry Neville

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Encl Attachment A – 1%AEP Flood map and tickles parking overly.

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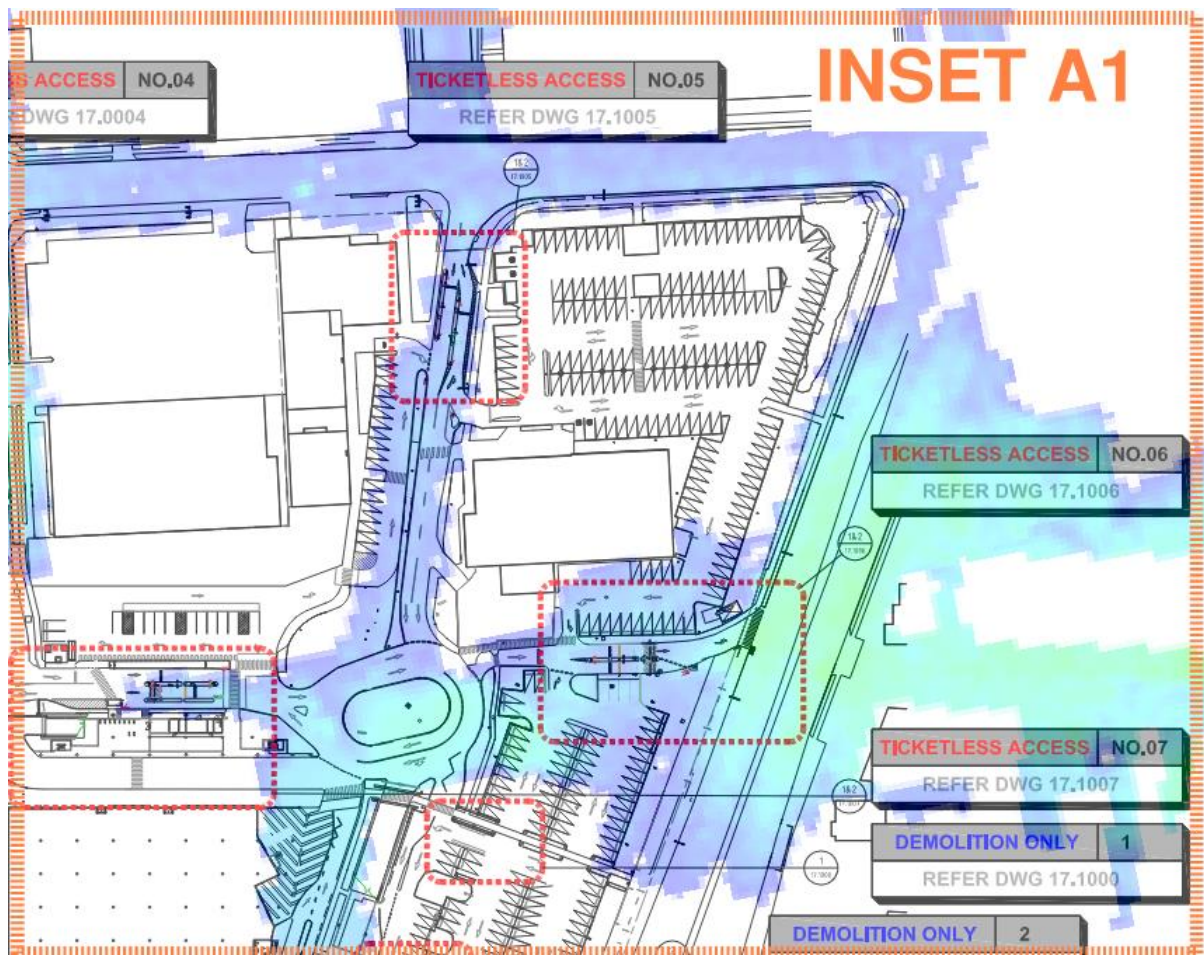
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Attachment A. 1% AEP Flood map and tickles parking overly.

Inset A1, A2 and A2



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