

16 October 2024

WRL Ref: WRL2024007 LR20241016 JTC

SUBJECT TO LEGAL PRIVILEGE

Eskil Julliard, Northern Beaches Council
C/o- King & Wood Mallesons (Contact: Steven Adler)
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By email: steven.adler@au.kwm.com; Stella.Zhao@au.kwm.com; kate.dean@au.kwm.com

Dear Steven,

**RE: Newport SLSC seawall physical model
– wave trajectory on SLSC wall**

1. Introduction

This letter provides additional commentary, additional tests and additional analysis undertaken on the same physical model reported in Carley and Doherty (2024), Newport SLSC stepped seawall physical modelling, WRL Technical Report 2024/20, UNSW Water Research Laboratory (WRL), and on WRL's letter report dated 11 October 2024.

2. Wave trajectory on SLSC wall

The model was tested with planar vertical walls setback 4 m from the proposed wave parapet. With the present design having projecting structures (such as balconies), the possibility of wave uplift on these projecting structures has been considered.

For an eroded beach condition, the seawall structure has a vertical component and additional wave return feature below the lowest bleacher step.

For the short duration (<0.1 s) Pmax event, a short extract from the test video was extracted to coincide with the Pmax event. This footage was analysed, with the commentary provided in Table 2.1.



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In all cases, the following was observed:

- The vertical component and additional wave return feature below the lowest bleacher step redirected much of the horizontal wave momentum into vertical momentum, with reduced horizontal momentum
- The wave parapet on the seaward edge of the promenade redirected much of the remaining horizontal wave momentum into vertical momentum, with further reduced horizontal momentum towards the SLSC building
- By the time that the remaining horizontal momentum reached the SLSC building face, the vertical momentum was by then either:
 - Falling (downwards) for 100 and 1000 year ARI 2024 events
 - Predominantly horizontal (at the peak impact) and falling either side of the peak impact for 100 and 1000 year ARI 2084 events
- For setbacks greater than 4 m, the potential for upward vertical forces at the SLSC building face would be further reduced
- No analysis has yet been undertaken for the case with no wave parapet

Table 2.1 Observations of predominant wave overtopping at SLSC building face for Pmax event

ARI	Year	SLR (m)	ID	Observation
100	2024	0	0100	Overtopping water is falling (downwards) at point of impact with building
100	2084	0.53	0103	Overtopping water is predominantly horizontal at point of impact with building, with an initial gap below the horizontal jet (due to the wave parapet)
1000	2024	0	0101	Overtopping water is falling (downwards) at point of impact with building
1000	2084	0.53	0104	Overtopping water is predominantly horizontal at point of impact with building, with an initial gap below the horizontal jet (due to the wave parapet)

3. Summary

Please contact James Carley (james.carley@unsw.edu.au ; 0414 385 053) should you require further information.

Yours sincerely,



Dr Francois Flocard
Director, Industry Research