1 May 2025

WRL Ref: WRL2025012 LR20250501 JTC

PRIVILEGED AND CONFIDENTIAL

UNSW Water Research Laboratory

Ms Ballanda Sack and Mr Andrew Beatty
Beatty Hughes and Associates
Level 21
8 Chifley Square
SYDNEY NSW 2000

By email: ballanda@beattyhughes.com.au
andrew@beattyhughes.com.au

Dear Ballanda and Andrew,

DRAFT: Cliff stabilisation works at 217A Beach Road, Denhams Beach – wave forces

1. Introduction

The Water Research Laboratory (WRL) of the School of Civil and Environmental Engineering at UNSW Sydney is pleased to provide this letter report to Canplay Pty Ltd via Beatty Hughes and Associates.

This letter report specifically estimates wave forces on the cliff stabilisation works and supplements WRL's letter report dated 28 April 2025 (WRL2025012 LR20250428ab – signed) for 217A Beach Road, Denhams Beach (in Batemans Bay, NSW) – "the subject property".

2. Wave forces

An extract from the drawing: Job J000167; Drawing C0011; Issue DA-C; Date 11.10.24 is shown in Figure 2-1. Along with Drawing C0010, this indicates the following key variables:

- Elevation of crest of seaward wall: 4.3 m AHD
- Elevation of crest of landward wall: 7.35 m AHD
- Distance between the rear face of seaward wall and front face of landward wall: 4.8 m
- Assumed eroded (bedrock) toe elevation: 1.27 m AHD

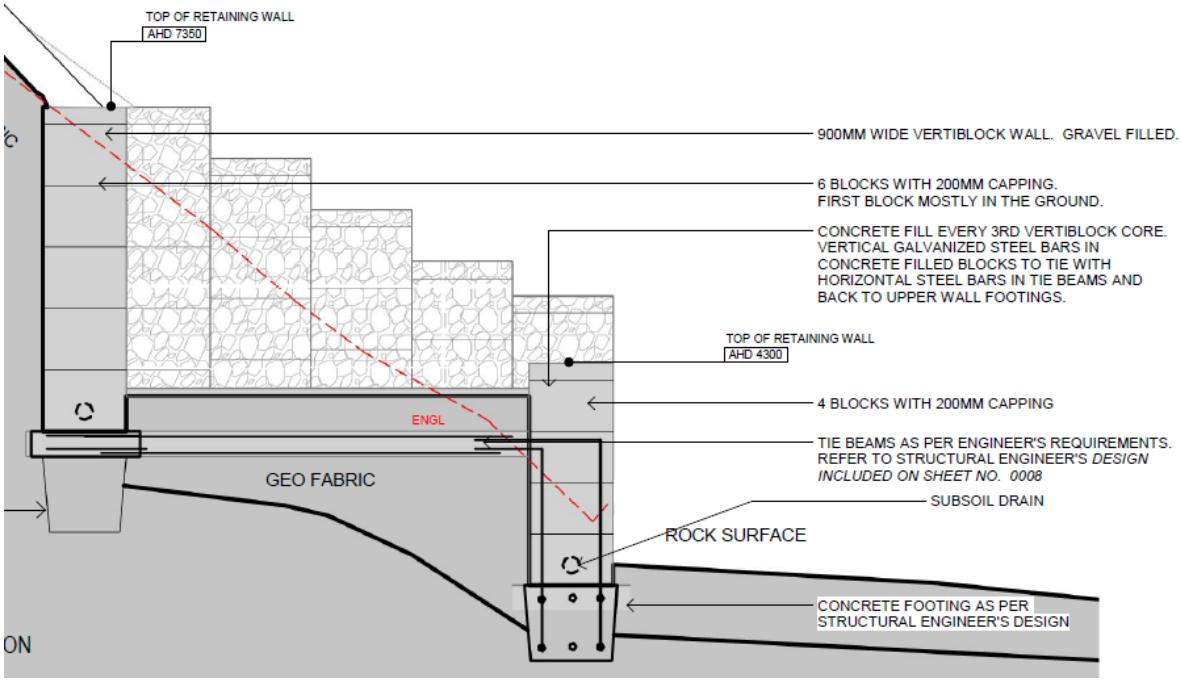


Figure 2-1 Extract from Drawing C0010 showing cross section of structure

Wave forces/pressures have been calculated using Equation 8.6 from the US Federal Emergency Management Agency Coastal Construction Manual (FEMA, 2011). This method considers both a hydrostatic component and a dynamic wave component, to estimate the total force/pressure. The configuration of the forces is shown in Figure 2-2, with the forces tabulated in Table 2-1.

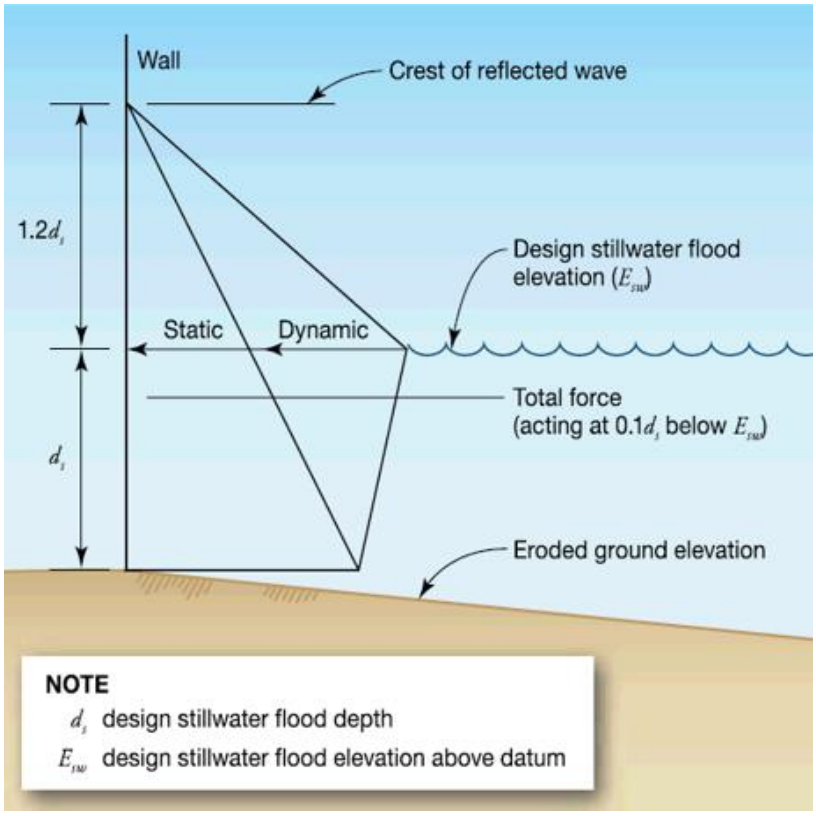


Figure 2-2 FEMA (2011) wave force configuration

Table 2-1 Wave pressure at elevation

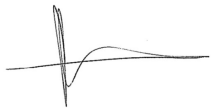
Planning period (year), ARI and variable	2025 100 year ARI	2025 500 year ARI	2075 100 year ARI	2075 500 year ARI
Runup level (crest of reflected wave) (level of zero pressure, m AHD)	3.89	4.22	4.64	5.01
Still water level (SWL, m AHD)	2.46	2.61	2.80	2.97
Pressure at SWL (kPa)	39.0	55.6	82.8	113.6
Pressure at bed (1.27 m AHD) (kPa)	26.3	29.6	33.8	37.6

3. Summary

Thank you for the opportunity to provide this advice. Please contact James Carley or myself should you require further information.

Yours sincerely,

James Carley
Principal Coastal Engineer



Dr Francois Flocard
Director, Industry Research

4. References

FEMA 2011, Coastal Construction Manual, Fourth Edition (FEMA P-55), Volume 1, August 2011, accessed 29 April 2025, <https://www.fema.gov/sites/default/files/2020-08/fema55_voli_combined.pdf>.

WRL 2025, Cliff stabilisation works at 217A Beach Road, Denhams Beach, Letter report WRL2025012 LR20250428ab, UNSW Water Research Laboratory.