

8 August 2024
E25203.G20.02

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Geotechnical Statement, Groundwater Drawdown Settlement 1112-1116 Barrenjoey Road, Palm Beach NSW

1. INTRODUCTION

EI Australia (EI) has prepared this geotechnical Statement for the above property at 1112-1116 Barrenjoey Road, Palm Beach NSW (the site), addressing groundwater drawdown settlement associated with construction stage dewatering for the proposed basement excavation.

The following documents are relevant in preparation of this Statement:

- Architectural drawings prepared by Koichi Takada Architects – Project at 1112-1118 Barrenjoey Road, Palm Beach, Drawing Nos. A0001, A0010 to A0013, A0019, A0022, A0050, A0051, A0099 to A0105, A0200 to A0203, A0300 to A0305, and A0320, latest revision I, dated 31 July 2024;
- Structural drawings prepared by M&G Consulting Engineers Pty Ltd – Job No. 5598, Drawing Nos. S010, S011, S015 and S020, Issue 1, dated 7 August 2024; and
- Site survey plan prepared by Beveridge Williams – Project No. 2101343, Drawing Ref. 2101343, Version B, dated 6 September 2021. The datum in the survey plan is in Australian Height Datum (AHD), hence all Reduced Levels (RL) mentioned in this report are henceforth in AHD.

EI has completed following reports for this site:

- Geotechnical Investigation (GI) report, referenced E25203.G03_Rev2, dated 7 December 2021;
- Additional Geotechnical Investigation (AGI) report, referenced E25203.G04_Rev1, dated 8 August 2024;
- Groundwater Monitoring Report No. 1, referenced E25203.G11.01, dated 28 February 2024;
- Groundwater Take Assessment (GTA), referenced E25203.G12_Rev2, dated 8 August 2024;
- Landslide Risk Assessment (LRA), referenced E25203.G14, dated 8 August 2024; and
- Construction Methodology Report (CMR), referenced E25203.G15, dated 8 August 2024.

This Statement is based on the assessment results from the GTA.

2. ESTIMATED GROUND SETTLEMENT

Elastic compression occurs for a soil or rock layer when a compressive stress is applied across the layer. The magnitude of the compression (d) is determined from the equation:

$$d = (\text{stress change}) \times H/E$$

stress change	= 10kN/m ³ x 10.8m = 108kPa
H= layer thickness	= 10.8m
E = elastic modulus	= 300MPa

$$d = 108 \times 10.8 / 300 \times 10^3 = 3.9\text{mm}$$

There are two phases/models for groundwater assessment at this site location.

- Model 1: representing the soil and groundwater at the western boundary of the site, under influence of the nearby Pittwater tidal marine system.
- Model 2: representing the steep slope at the rear eastern boundary of the site, with a relatively thin residual soil layer overlying weathered siltstone bedrock, becoming less weathered with depth, and a sloping groundwater profile.

The assessed groundwater responses and ground settlement resulting from the basement excavation, and keeping it dry by sump and pumping during the building stage, are as follows:

Models	Design GWL RL (m AHD)	Lowered GWL RL (m AHD)	Groundwater Drawdown Depth (m)	Stratum affected by GWL Lowering	Settlement (mm)
Model 1	2.0	1.98	0.02	Sand alluvium	Practically nil
Model 2	8.1	-2.7	10.8	Residual soil and siltstone bedrock Class IV / III	3.9

3. CLOSURE

Please do not hesitate to contact the undersigned should you have any questions.

For and on behalf of:

EI AUSTRALIA



Warwick Davies
Principal Geotechnical Engineer