

25 November 2020

Boston Blyth Fleming Pty Ltd
Attn: Greg Boston
By email

Dear Greg,

RE: PRELIMINARY GROUNDWATER LEVEL ASSESSMENT: BASEMENT CARPARK DESIGN FOR 8 FOREST ROAD, WARRIEWOOD, NSW.

OVERVIEW

This letter provides a review of whether groundwater is expected to be encountered during the construction and operation of the basement carpark at 8 Forest Road, Warriewood, NSW ('the site') by Martens and Associates Pty Ltd (MA).

A Water Cycle Management Report (MA, 2017) was previously completed for the site to provide an assessment of the proposed development with respects to stormwater management, including water quality and quantity. The report included the results of the monitoring of two groundwater monitoring wells located on the north side of the site.

The groundwater assessment and monitoring results can be compared to the expected basement excavation elevations to determine whether the basement carpark will require tanking or groundwater inflow management.

PROPOSED DEVELOPMENT AND INVESTIGATION SCOPE

The proposed development details and investigation scope are summarised in Table 1.

Table 1: Summary of proposed development and investigation scope.

Item	Details
Proposed development	We understand from the proposal plans (Jackson Teece, 2020) that the proposed development will include construction of a new one-level basement carpark (Basement 1) as part of a 3 storey housing complex. The basement will have finished floor levels of RL 21.4 m to Australian Height Datum (mAHD) in the north and 22.4 mAHD in the south. Assuming a 150 mm thick floor slab underlain by an approximately 150 mm layer of drainage aggregate, the bulk excavation for the basement is expected to extend up to RL 21.1 mAHD in the northern portion and RL 22.1 mAHD in the southern portion of the site.
Additional investigation scope of work	MA's previous investigation (MA, 2017) included installation of groundwater monitoring wells (MW) in the north portion of the site. The field investigation was conducted on 7 February 2016 and included: <ul style="list-style-type: none"> o Drilling and logging of 3 boreholes (BH101, BH102, BH103) up to 8.5 metres below ground level (mBGL). o Installation of 2 groundwater monitoring wells (MW102 in BH102, MW103 in BH103). o Measurement of groundwater depth by discrete dipping only in MW102 and MW103. Further field investigations undertaken on 10 February 2016 included: <ul style="list-style-type: none"> o Measurement of groundwater depth by discrete dipping only in MW102 and MW103.

World Class Sustainable Engineering Solutions

Environmental

EIS & REF
Streams & rivers
Coastal
Groundwater
Catchments
Bushfire
Monitoring

Geotechnics

Foundations
Geotechnical survey
Contamination
Hydrogeology
Mining
Terrain analysis
Waste management

Water

Supply & storage
Flooding
Stormwater & drainage
Wetlands
Water quality
Irrigation
Water sensitive design

Wastewater

Treatment
Re-use
Biosolids
Design
Management
Monitoring
Construction

Civil

Earthworks
Excavations
Pipelines
Roads
Pavements
Parking
Structures

Suite 201, Level 2, George St, Hornsby, NSW, 2077
Ph 02 9476 9999 Fax 02 9476 8767

> mail@martens.com.au

www.martens.com.au

MARTENS & ASSOCIATES P/L

ABN 85 070 240 890 ACN 070 240 890

GROUNDWATER LEVEL MONITORING RESULTS

The depths to groundwater measured on 07.02.2017 and 10.02.2017 ranged between 17.25 mAHD and 18.00 mAHD, as shown in Table 2. For the purposes of this assessment, the highest observed groundwater level of 18.00 mAHD was adopted.

Table 2: Measured groundwater level data.

Monitoring Well ID	Surface Level (mAHD)	07.02.2017		10.02.2017	
		Groundwater depth (mBGL)	Groundwater level (mAHD)	Groundwater depth (mBGL)	Groundwater level (mAHD)
MW102	22.50	5.00	17.50	5.25	17.25
MW103	22.00	4.00	18.00	4.17	17.83

CONCLUSION

Based on our observations during drilling, groundwater level dip results as well as engineering judgements we infer and conclude the following:

- The groundwater levels in the northern portion (between approximately 17.25 mAHD and 18.00 mAHD in MW102 and MW103) of the site were measured below the proposed excavation levels in the north (i.e. 21.1 mAHD) and south (i.e. 22.1 mAHD) of the site.
- The bulk excavations associated with the proposed development, are not likely to intercept the permanent groundwater table across the site.

DISCUSSION AND RECOMMENDATIONS

Groundwater is unlikely to be encountered during excavation for the basement carpark. As such, a dewatering management plan and approval from Water NSW for a water access license (WAL) for temporary / permanent dewatering is not expected to be required.

However, this conclusion is based on data from 2017 that may not be representative of current groundwater conditions. To better understand the permanent groundwater level and level fluctuations at the site, MA recommends that groundwater elevations in monitoring wells MW102 and MW103 be monitored over an extended time period using submersible pressure transducers and then compared to the basement elevations.

If you require any further information please contact the undersigned.

For and on behalf of

MARTENS & ASSOCIATES PTY LTD

DR. MARK LAIDLAW

B.S. (Geo), M.S. (Geo), PhD (Env Sci)

REFERENCES

Jackson Teece (2020). Floor Plan – Basement 1: 8 Forest Road, Warriewood. Drawing DA-109, Issue E.

Martens and Associates (2017) Water Cycle Management Report – 8 Forest Road, Warriewood, NSW (Ref: P1504988JR03V04).