JK Geotechnics
GEOTECHNICAL & ENVIRONMENTAL ENGINEERS

PO Box 976, North Ryde BC NSW 1670
115 Wicks Rd, Macquarie Park NSW 2113
Tel: 02 9888 5000 Fax: 02 9888 5003
www.jkgeotechnics.com.au

22 July 2014
Ref No 27296ZH Let

Moorgate Finance Pty Ltd
Level 1, Suite 1
27 Belgrave Street
MANLY NSW 2095

ATTENTION: Mr Sam Petinsky

Dear Sir

GEOTECHNICAL ASSESSMENT OF INFLOW RATE
PROPOSED RESIDENTIAL DEVELOPMENT
7 LAWRENCE STREET AND 18 MARMORA STREET, FRESHWATER, NSW

The details of the supplied letter, Reference 10ERM2014/0562, prepared by NSW Office of Water (NOW) have been noted.

Based on the following assumptions and simplified hand calculations using Darcy's Law ie. Q=k.i.A, where Q is the seepage volume, k is the hydraulic conductivity, i is the hydraulic gradient and A is the cross-sectional area, we calculate an approximate inflow rate of about 0.02ML/year.

The above inflow rate is based on the following:

- Based on the investigation results and available groundwater information, groundwater is within the lower soil/upper bedrock profile;
- A 'k' value of $1x10^{-7}$ m/s for the clayey soil profile/sandstone bedrock, which is considered conservative, based on our experience;
- With the available groundwater level information, an 'i' of 0.033, based on a 0.8m difference in groundwater head across a distance of 24m (ie. 0.8/24 = 0.033). This was calculated from the difference between the groundwater RL in BH301 (RL14.25m) and BH209 (RL15.05m) and distance between these borehole locations. We note that the surface RL for BH301 was shown incorrectly on the borehole log and should be 17.7m not 18.7m. The bedrock and ground surface levels slope at a similar gradient;
- Based on the groundwater RLs in BH301 and BH209, we estimate the groundwater will be on average about 1.9m above bulk excavation level. The area where seepage may occur through the cut sides of the basement excavation around its perimeter is calculated to be about ([80m x 1.9m – cut sides into groundwater seepage where it is flowing into the basement]) = $152m^2$. We note that the full length of the basement perimeter is about 160m. We expect neglible seepage into the basement up through the base of the excavation.

Hence, we estimate an approximate an inflow rate of about 0.02ML/year (ie. $1x10^{-7}$ m/s x 0.033 x 152m^2) into the basement. If the k value of the clayey soil profile/sandstone bedrock profiles was increased by an order of magnitude (ie. $1x10^{-6}$ m/s), which is extremely conservative, the calculated inflow rate would still only be about 0.2ML/year.

As the above calculated inflow rates are significantly lower than 3ML/year (which is the inflow rate where NOW will stipulate a tanked basement), a temporary dewatering licence should not be required and a drained basement will be feasible.

Should you require any further information regarding the above, please do not hesitate to contact the undersigned.

Yours faithfully
For and on behalf of
JK GEOTECHNICS

Adrian Hulskamp
Senior Associate