

Date: 24 February 2022

Ref: 31078Slet7

APG

Attention: Joe Wood

Email: joe@apg.com.au

**RESPONSE TO DPIE WATER
PROPOSED RESIDENTIAL DEVELOPMENT
89 JOHN WHITEWAY DRIVE, GOSFORD, NSW**

JK Geotechnics prepared a report on groundwater issues dated 30 July 2020 (Ref 31078Plet6) which was a response to DPIE Water questions that had been raised in the course of seeking planning approval for the above development. That report referred to bulk excavation of the proposed basement to give a FFL at RL61.9m. We understand that minor revisions to the excavation are now planned and the FFL of the basement will be at RL 61.4m.

It was demonstrated in our previous report that the groundwater levels in the hillside are well below either of the above levels and therefore that our previous comments remain applicable to the revised development.

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



Paul Stubbs
Principal

Attachments: Report 31078Slet6 dated 30 July 2020



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Date: 22 July 2020

Ref: 31078Plet6

JWD Developments Pty Ltd
C/- APG

ATTENTION: Mr Trent Klouzal
Email: trent@apg.com.au

Dear Sirs,

**RESPONSE TO DPIE WATER
PROPOSED RESIDENTIAL DEVELOPMENT
89 JOHN WHITEWAY DRIVE, GOSFORD, NSW**

We have received a copy of the letter from DPIE Water referenced OUT20/4333, undated. JK Geotechnics have been requested to address issues raised that are within our area of expertise, being geotechnical and hydrogeological.

Firstly and most importantly we refer to our geotechnical report of 14 November 2019, particularly Section 6.2.4 which we reproduce here in part for ease of reference:

Groundwater seepage was not encountered during the excavation of the test pits or auger drilling of the boreholes. Groundwater monitoring carried out by Douglas Partners measured groundwater levels at between RL61m and RL63.6m which is above the proposed bulk excavation level. However, the recent testing has shown that the wells appeared capable of holding water up to approximately RL63.5mAHD at the high end of the site (BH203) and RL61.8mAHD near the downslope edge (BH201). We note that these levels may define the relative height of an open defect (possibly continuous between borehole locations) which allows free drainage to the 'cliff' to the west. At the location of BH202 (near the existing entry gate to the site, where it seems that minimal depths of excavation have taken place) the well appeared to discharge slowly below RL62.5mAHD. We infer that the observed slow discharge likely occurs through rock defects within the 'response zone' indicated by the gradient of data collected during the interval between filling and pumping.

Following removal of excess water on 8 November 2019, groundwater levels were monitored and observed to remain constant (ie no 'recharge' occurred) over a period of four days. What further water could be removed by pumping was removed from each borehole on 12 November and the water levels monitored overnight. Further data from the electronic data loggers indicated no change in groundwater levels (ie again no 'recharge').

From the above we conclude that the wells have confirmed the previous interpretation of groundwater conditions which is that a groundwater table does not exist within the site due to its location at the crest of a ridgeline and immediately adjacent to a quarry face of some 16m depth which would result in any groundwater draining to the level of the site to the west.



We note that the existing fill may hold a volume of perched water following rainfall but that capacity will largely be removed by the proposed development. We confirm the advice in our previous report as follows:

We expect some groundwater inflow into the excavation will occur as local seepage flows within the fill, at the soil/rock interface, as well as through joints and bedding partings within the bedrock profile, particularly during and immediately following periods of heavy rainfall. Given the massive unbroken nature of the rock mass, we expect seepage volumes into the excavation to be small and easily controllable by conventional sump and pump methods. Notwithstanding, groundwater seepage monitoring should be carried out during excavation so that any unexpected conditions can be addressed.

Based on the above observations we advise that there will be no take of groundwater as such and the issue of exceeding 3Ml/annum is not brought into question. There will of course be seepage in the unsaturated zone, particularly following wet weather and as with any properly engineered retaining structure or building slab there must be appropriate drainage measures so that seepage does not build up and cause dampness or other problems. The collected seepage from the drains should be disposed of in the normal way which is to the stormwater system, whether this occurs by gravity flow or via a pumped sump from within the basement will be dependant on the relative levels of the collection drains and the outlet.

In light of the above we consider there is no need to carry out further monitoring, such as by installation of wells around the development, as the water table is not going to be affected.

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



Paul Stubbs
Principal | Geotechnical Engineer