

9 October 2015
Ref No 28300Z. Let

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JK Geotechnics

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ATTENTION: Mr James Chryssafis

Dear Sirs

HYDROGEOLOGICAL ASSESSMENT
PROPOSED RESIDENTIAL DEVELOPMENT
1 VILLAWOOD PLACE, VILLAWOOD, NSW

This letter presents the results of our hydrogeological assessment of the proposed residential development at the above address.

INTRODUCTION

JK Geotechnics have previously undertaken a geotechnical assessment for the above site and the results were presented in our report (ref 28300ZTrpt) dated 17 April 2015. We have used the results of the geotechnical assessment, updated where appropriate, to prepare this hydrogeological assessment.

The architectural drawings prepared by Tony Owen Partners (Architects) indicate that it is proposed to construct a new multi-level commercial and residential building over three levels of basement car parking. The lowest basement level is to be at RL11.4m. This proposed construction will require demolition of the existing buildings and bulk excavation down to about 10m below existing levels.

The purpose of this assessment was to estimate the effect of the proposed development on the groundwater regime in the area and, in particular, to estimate the groundwater level and to comment on the suitability of the site to accommodate the proposed development.





SITE DESCRIPTION

The site description is the same as that presented in our previous report. The site description is repeated below for ease of reference.

The surrounding topography was characterised by gently undulating terrain with low hills. The site itself was located on the lower slopes of a hill that sloped gently down to the east. Figure 1 presents a site locality plan sourced from Google Maps. The detail survey (Job No. 24.109 dated 5 February 2015) prepared by Higgins Surveyors indicates that surface levels fall from about RL21.7m at the westernmost corner of the site and the south-west corner of the existing building to about RL20.2m at the south-east and north-east corners of the site.

At the time of our inspection, the site comprised a battle axe shaped area which was occupied by a single storey, precast panel clad building at its northern end, a two storey rendered residential and retail building along its eastern side, and a car parking area. The car parking area was located along the western side of the two storey building and was surfaced with asphaltic concrete, generally in good condition. The northern portion was in poor, cracked condition with pot-holes adjacent to a concrete pavement to a loading dock area further to the north. The concrete pavement was also in a poor, cracked condition.

The neighbouring properties to the south were occupied by one and two storey brick retail buildings at similar levels to the subject site. The closest single storey brick building was located on the common boundary with the two storey building on the subject site.

The site was bounded by Villawood Road to the north and Villawood Place to the east. Kamira Court was located to the west. One arm of Kamira Court was also adjacent to the southern side of the single storey building on the subject site where it ran towards the east, then turned to the south running past the car park. There was a Council car park further to the south-west. The footpaths adjacent to the site was in a fair to poor, cracked condition.



SUBSURFACE CONDITIONS

The Sydney Geological Map shows the area to be underlain by Bringelly Shale (shale, carbonaceous claystone, claystone, laminite and fine to medium grained lithic sandstone) of the Wianamatta Group.

Based on the available geotechnical information from our archive search, we infer that the subsurface profile may comprise the following at the proposed development site. These conditions are consistent with our limited observations from near the crest of the rail cutting adjacent to Villawood Road to the north-east of the site.


- Shallow, mainly clay fill.
- Residual silty clays of medium to high plasticity, in the stiff to hard strength range.
- Weathered shale bedrock, initially of poor quality comprising extremely low strength rock with clay properties at about 2.5m to 5m depth while the shale improves with depth and may contain iron indurated bands. Reasonable quality (low to medium strength) shale might be encountered at about 6m to 8m below existing surface levels.
- The natural regional groundwater level is well below the proposed bulk excavation level. However, localised groundwater seepage from joints or bed partings may be encountered within the shale rock mass.

COMMENTS AND RECOMMENDATIONS

Based on the above, we recommend that allowance be made for localised groundwater seepage inflows through joints and bedding planes within the shale bedrock. Localised seepage may also occur through the fill or permeable gravelly layers in the clay, especially during and following periods of heavy rainfall.

We anticipate that groundwater seepage volumes will be low and should decrease when excavations have drained the local area.

Seepage volumes into the excavation are expected to be controllable by conventional sump and pump dewatering systems during construction and over the long term. The groundwater flows would be able to drain through drainage provisions behind the retention system and a free-draining gravel bed or perimeter drains below the basement floor slabs. The piped drains should be graded to sumps for automatic pump discharge of collected seepage to the stormwater system.



An assessment of likely seepage, its quality, and required pumping capacity would best be made during and following completion of the bulk excavation, when seepage could be observed. We therefore recommend that groundwater seepage into the excavation be monitored by site personnel and the geotechnical engineer to confirm that seepage volumes are within the range anticipated.

CONCLUSIONS

- 1 We anticipate that the regional natural groundwater level is well below the proposed bulk excavation level.
- 2 However, localised groundwater seepage of limited volume into the excavation can be expected from joints and bed partings within the shale rock mass. This seepage is considered to be associated with transient or perched groundwater.
- 3 We anticipate that the localised groundwater seepage volumes will be controllable using conventional sump pump drainage systems.
- 4 Given all of the above, and the expected low permeability of the soil and bedrock profile, we consider that construction of a drained basement would be feasible and appropriate.
- 5 We also consider the site to be suitable for the proposed development, provided the above drainage recommendations are adopted.

If you have any queries regarding this report, please do not hesitate to contact the undersigned.

Yours faithfully
For and on behalf of
JK GEOTECHNICS



A ZENON
Principal Geotechnical Engineer.

Encl: Figure 1: Site Locality Plan.



Image sourced from Google earth.

Site Locality Plan

To be read in conjunction with text of report.

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