

29 June 2018
Ref No 30808YFLet

Austino Property Group Pty Ltd

By email: will@austino.com.au
ATTENTION: Mr Will Wang



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 5001
www.jkgeotechnics.com.au

Dear Sir

HYDROGEOLOGICAL ANALYSIS
PROPOSED DEVELOPMENT
1 MURRAY ROSE AVENUE, SYDNEY OLYMPIC PARK, NSW

INTRODUCTION

This letter presents the results of our hydrogeological analysis completed for the proposed development at the above site. A Site Location Plan is presented as Figure 1. The analysis was completed using SEEP/W, a 2D finite element groundwater flow analysis computer program. The analysis was completed to assess the potential dewatering volumes and drawdown during construction and provide further advice on the feasibility of a drained basement.

This letter should be read in conjunction with our geotechnical report Ref: 30808YFrpt dated 9 October 2017.

The following information was used to create the model used for this analysis

- Architectural drawings prepared by PTW Architects;
- Craig and Rhodes survey drawing: Ref: Reference No. 258-14, Drawing File. 258 14G T01 [01], printed 27 January 2015;
- JK Geotechnics Borehole logs, BH1, BH2, BH3 and BH4 (Ref: 30808YFrpt).

HYDROGEOLOGICAL MODEL

A single representative cross section was analysed, running approximately east-west through the site, including through the proposed basement excavation which has Bulk Excavation Level of RL1.4m. The subsurface conditions was based on the available borehole information.

Initial groundwater levels of RL3.0m (western end) and RL2.1 (eastern) were adopted, based on water levels measured in our boreholes. Total head boundary conditions were adopted at the sites of the analysis model, and the model extended a significant distance from the site boundaries to represent the in-situ total head conditions.

During a site visit on 8 June 2018, a borehole pump out test was undertaken to measure the permeability of the subsurface conditions. Based upon the test results and using established formulas, the coefficient of permeability of the shale bedrock was calculated to be 2×10^{-7} m/s for the weathered shale bedrock which has been adopted in analysis.





RESULTS OF ANALYSIS

The results of the analysis is shown in the attached Figures 2 and 3 and are tabulated below.

Shale Bedrock Permeability	Dewatering Volume (litres per day)	Dewatering Volume (Megalitres per year)
2 x 10 ⁻⁷ m/s	3,235	1.18

The total dewatering volume was calculated from the results of the analysis, which are per m run, multiplied by the width of the lower basement level which is to be dewatered. It should not be unexpected for there to be some natural variability in the above volume.

As the soldier pile walls are permeable, groundwater drawdown outside the basement excavation will effectively be to the same level as within the basement excavation. However, we note that while permeable, the soldier pile walls will be less permeable than the shale bedrock, and hence, the dewatering volumes in the table above are considered conservative, and actual dewatering volumes are expected to be lower than presented above.

COMMENTS

Given the subsurface profile generally consists of residual silty clay overlying shale bedrock and the groundwater table is wholly located within the shale bedrock, we consider that any fluctuations in groundwater levels as a result of the drawdown of the groundwater table beyond the building footprint will have negligible effect on nearby structures.

In summary, we consider the proposed development will not have any adverse impact on the surrounding developments and that any groundwater inflows should be manageable using conventional drainage techniques, such as sump and pump techniques, without the need for basement tanking. The long-term groundwater inflows are predicted to remain relatively low. It should be noted that whilst the coefficient of permeability adopted from the infiltration testing completed agree well with published data, the permeability of shale bedrock is determined by the defects present within the rock mass. Consequently, it should not be unexpected that the permeability of the shale bedrock may range by more than one order of magnitude from the value adopted in our analysis.

A hydraulic engineer should be engaged to provide an appropriate hydraulic design for the groundwater inflows stated above, including applying appropriate contingencies for higher than expected flows. We also recommend monitoring and seepage measurement's during construction, if applicable, and a review of our groundwater assessment if required.

GENERAL COMMENTS

This letter has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose. If there is any change in the proposed development described in this report then all recommendations should be reviewed. Copyright in this report is the property of JK Geotechnics. We have used a degree of care, skill and diligence normally exercised by consulting engineers in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report. The report shall not be reproduced except in full.

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



Owen Fraser
Senior Geotechnical Engineer

Reviewed by:



Woodie Theunissen
Senior Associate | Geotechnical Engineer

Encl: Figure 1 – Site Location Plan
 Figure 2 – Hydrogeological Seepage Model
 Figure 3 – Hydrogeological Seepage Results
 Figure 4 – BH1 Groundwater Level and Daily Rainfall versus Time Plot
 Figure 5 – BH4 Groundwater Level and Daily Rainfall versus Time Plot

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AERIAL IMAGE SOURCE: GOOGLE EARTH PRO 7.1.5.1557
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Title:

SITE LOCATION PLAN

Location:

1 MURRAY ROSE AVENUE
SYDNEY OLYMPIC PARK, NSW

Report No:

30808YF

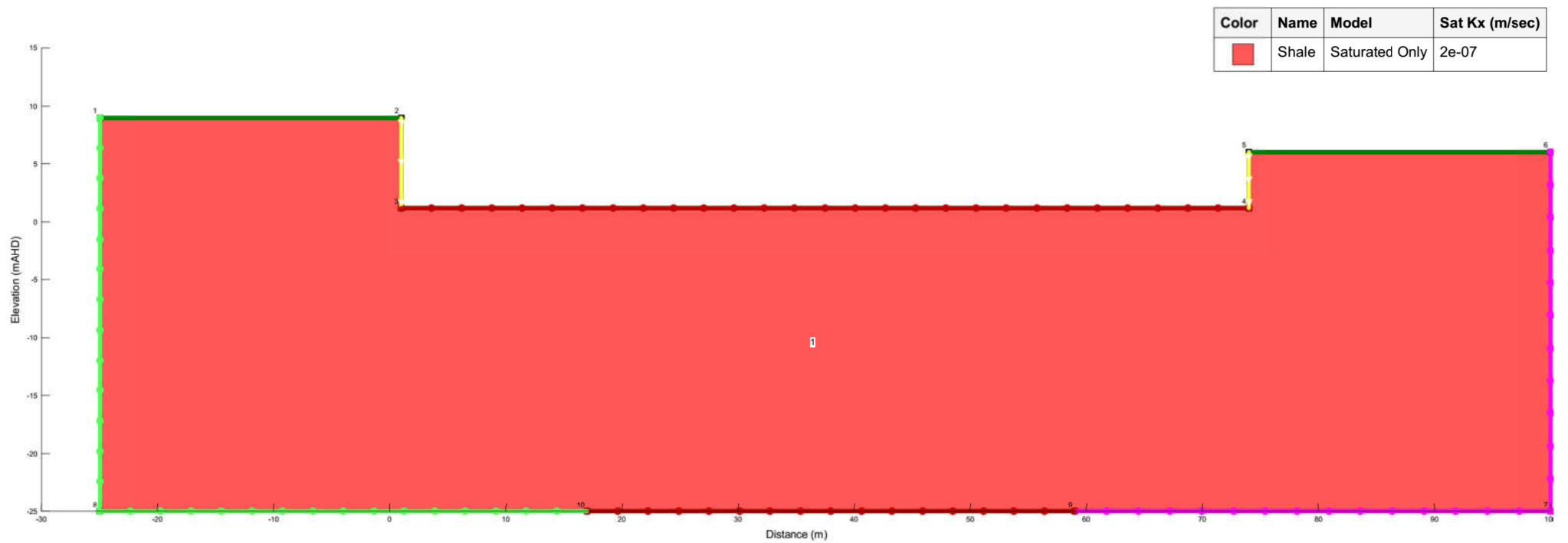
Figure No:

1

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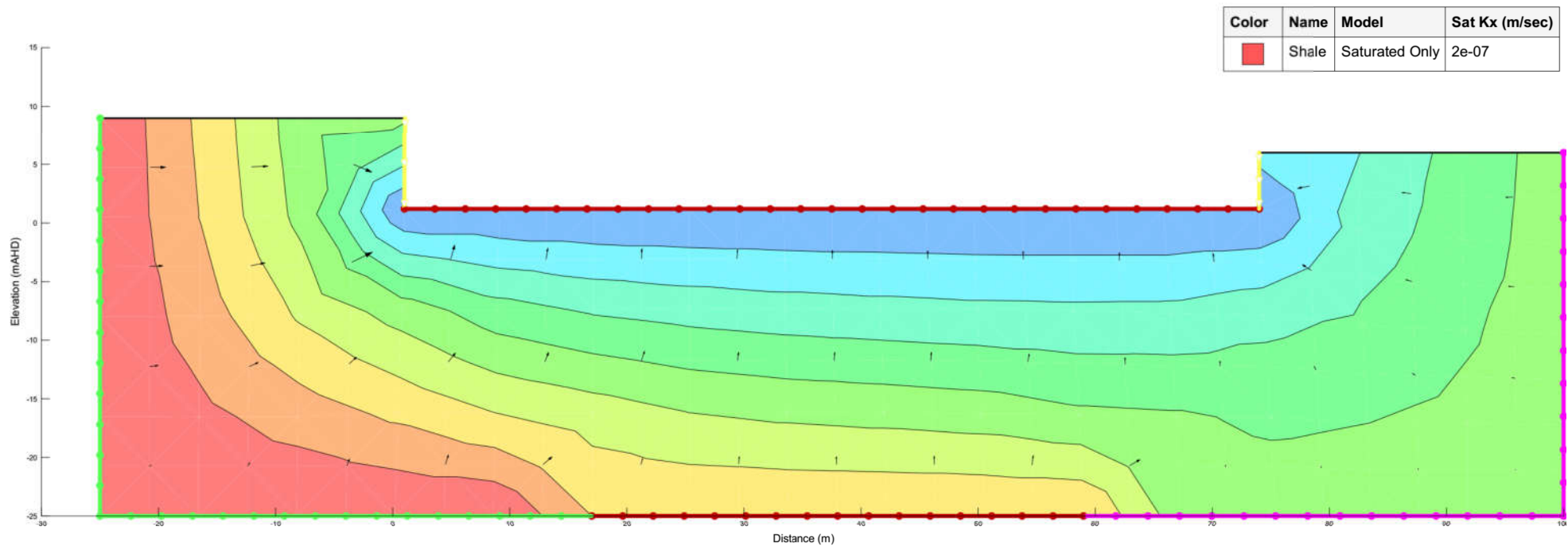


This plan should be read in conjunction with the JK Geotechnics report.



Title: HYDROGEOLOGICAL SEEPAGE MODEL	
Location: 1 Murray Rose Avenue, Sydney Olympic Park, NSW	
Report No: 30808YF	Figure No: 2
JK Geotechnics	

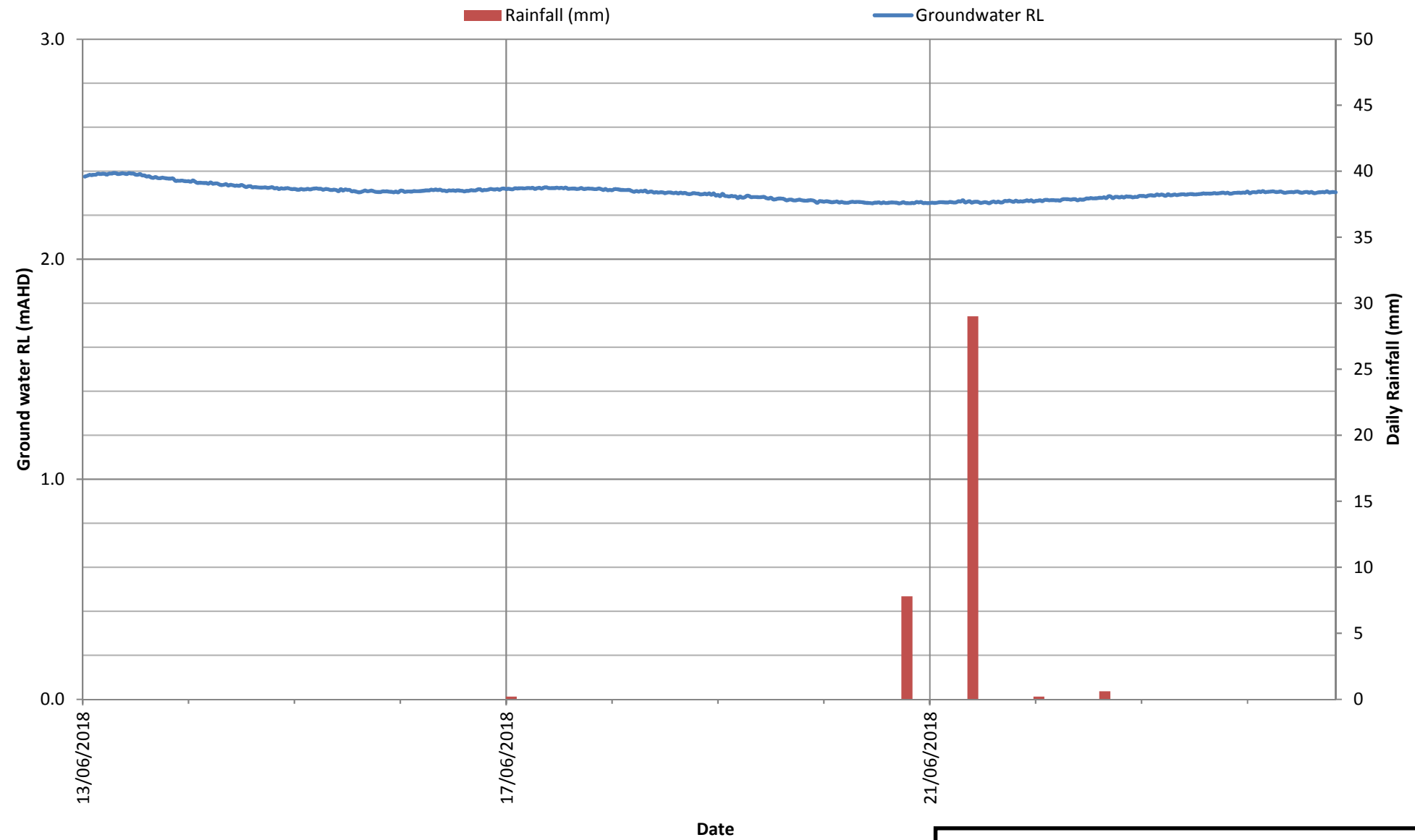




Title: HYDROGEOLOGICAL SEEPAGE RESULTS	
Location: 1 Murray Rose Avenue, Sydney Olympic Park, NSW	
Report No: 30808YF	Figure No: 3
JK Geotechnics	

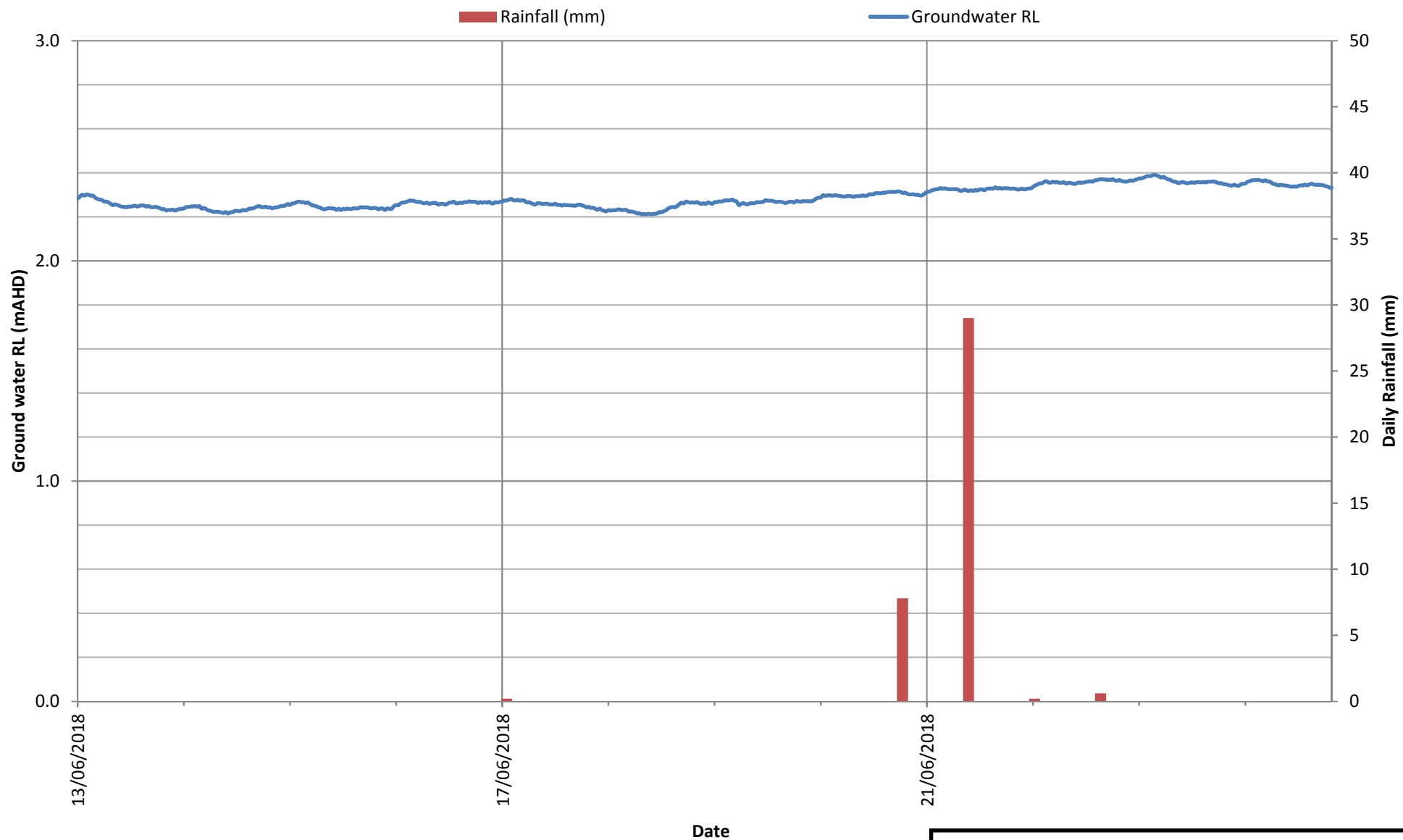


Ground Water Level and Daily Rainfall -v- Time Plot BH1



Rainfall data from Sydney Olympic Park AWS

Ground Water Level and Daily Rainfall -v- Time Plot BH4



Rainfall data from Sydney Olympic Park AWS