

The University of Technology, Sydney
PO Box 123
ULTIMO NSW 2007

Project 84895.01
17 December 2015
PMO

Attention: Mr Greg Moore

Dear Sirs

Report on Desktop Geotechnical Assessment
UTS City Campus Redevelopment
Broadway, Ultimo

1. Introduction

This report presents the results of a desktop geotechnical assessment undertaken for Phase 1 and Phase 2 of the UTS City Campus redevelopment project at Broadway, Ultimo. The work was commissioned by The University of Technology Sydney.

The project involves the redevelopment of Building 2 and the area between Building 1 and Broadway. The approximate development areas are shown on the attached Drawing G1. The various components of the project include:

- Site preparation works, including demolition and clearance of the existing Building 2 down to approximately ground level, and associated tree removal;
- Retention and re-use of existing basement Level 1 and Level 2;
- Construction and use of a new podium building fronting Broadway (Building 1 extension and new Building 2);
- Construction and use of new floors above new Building 2 podium;
- Public domain improvements surrounding the site;
- Landscaping works to roof levels;
- Retention of existing vehicle access and parking arrangements; and
- Extension and augmentation of physical infrastructure/utilities as required.

The geotechnical assessment was undertaken to provide information on expected subsurface conditions to aid with the State Significant Development approval process. The assessment included a review of information from previous investigations, published information on the geology of the area and a site inspection by a Senior Geotechnical Engineer.

A Preliminary Site Investigation for contamination assessment purposes was undertaken at the same time as the geotechnical assessment and is reported separately.

2. Site Description

Building 2 is located at the south-western corner of the block bounded by Thomas Street to the north, Harris Street to the east, Broadway to the south and Jones Street to the west. The existing building has seven levels; Levels 1 and 2 are basement levels and Levels 3 to 7 are generally at or above the surrounding street levels. Building 2 directly adjoins Building 1 (UTS Tower) and vehicular access to the basement levels is via a driveway into Building 1 from Thomas Street.

At the time of the assessment Levels 1 and 2 of Building 2 were occupied by numerous laboratories and teaching facilities associated with the Faculty of Engineering and Information Technology.

3. Regional Geology and Hydrogeology

The *Sydney 1:100 000 Geological Series Sheet* shows that the site is underlain by Hawkesbury Sandstone which typically comprises medium to coarse-grained quartz sandstone with minor shale and laminite lenses. An extract of the geological map is shown in Figure 1. The black lines show mapped locations of known dykes (igneous intrusions that usually present in Sydney as clay) and the red lines show the mapped location of a fault and associated joint swarm known as the Martin Place Joint Swarm.

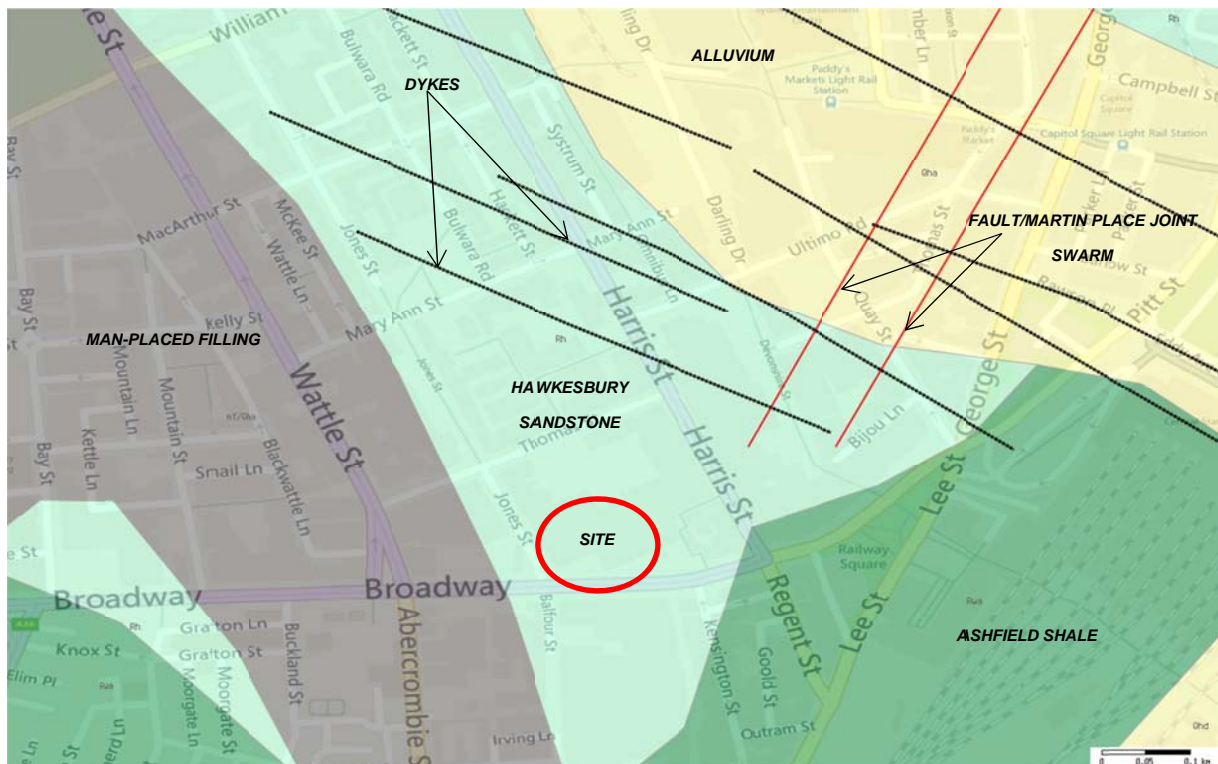


Figure 1: Extract from geological map

The groundwater table is likely to be well below the bedrock surface. Near-surface Hawkesbury Sandstone and Ashfield Shale generally exhibit low permeabilities which result in very low groundwater yields.

4. Previous Geotechnical Investigations

4.1 Douglas Partners 2015

Douglas Partners undertook a geotechnical investigation in the Building 2 basement in 2015 to assess the foundation conditions and dimensions of nine selected footings to determine the capacity of the existing footings to support the redeveloped building. The investigation included core drilling through existing footings and underlying sandstone foundation material, and the exposure of the edges of the footings to confirm plan dimensions. The results of this investigation are outlined in the *Report on Geotechnical Investigation* for Project 84895.00.

The investigation confirmed that the existing building is founded on sandstone of at least high strength.

4.2 Jeffery and Katauskas 2009

Jeffery and Katauskas Pty Ltd undertook a geotechnical assessment of the wider City Campus in 2009 to provide preliminary information on the expected subsurface conditions for various stages of redevelopment proposed for the campus. The results of the assessment are outlined in the report *Geotechnical Assessment for Concept Plan* (Ref. 22549SPrptFinalRev1).

The assessment confirmed that the Building 1 and Building 2 basements are likely to be within Hawkesbury Sandstone bedrock.

5. Preliminary Geotechnical Model

The existing Building 1 and Building 2 are likely to be founded on sandstone bedrock of at least high strength. This has been confirmed by the 2015 investigation by Douglas Partners, inspections of exposed rock behind basement walls and an inspection of a large drainage pit below the Building 2 basement. As the Phase 1 and Phase 2 development areas are wholly above the existing basement areas, the new structures will also be founded on sandstone bedrock either on existing footings or, where required, on new footings.

The regional groundwater table is likely to be below the existing basement levels. Seepage would be expected to periodically flow through the rock faces behind the basement walls, however a recent inspection of the drainage pit in Building 2 and a small sump well in Building 1 indicated relatively dry conditions. Seepage is therefore more likely to occur during and following period of wet weather.

6. Site Suitability

On the basis of the desktop assessment outlined in this report, Douglas Partners confirms that the site is suitable for the proposed redevelopment from a geotechnical perspective. The new structures are likely to be founded below the existing basement levels and advice on foundation capacity was provided in our previous investigation report.

7. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for Phase 1 and Phase 2 of the proposed UTS City Campus – Broadway redevelopment, in accordance with the contract between Douglas Partners Pty Ltd and The University of Technology Sydney. The report is provided for the use of The University of Technology Sydney for this project only and for the purpose(s) described in the report.

The information contained in this report is based on previous investigations and a general assessment of expected subsurface conditions. Specific intrusive investigations were not in the scope of the assessment. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

This report must be read in conjunction with all of the attached notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by a statement, interpretation, outcome or conclusion given in this report.

Yours faithfully

Douglas Partners Pty Ltd



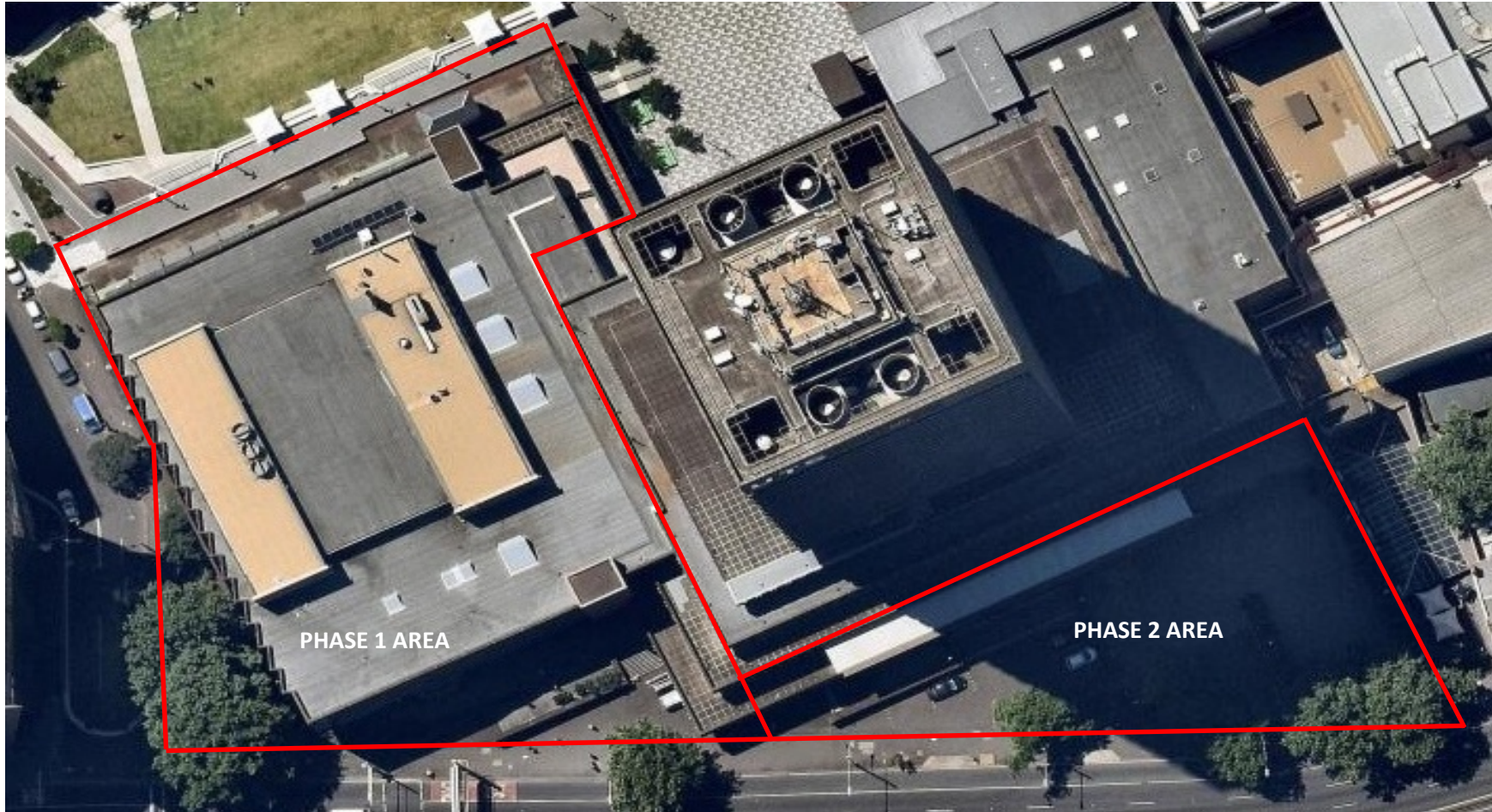
Peter Oitmaa
Senior Associate

Reviewed by



Michael J Thom
Principal

Attachments: Drawing G1
 Notes Relating to This Report



CLIENT: The University of Technology, Sydney

OFFICE: Sydney

DATE: 27 Nov 2015

Proposed Redevelopment Areas

UTS City Campus

Broadway, Ultimo

PROJECT No: 84895.01

DWG No: G1

REVISION: 0

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.