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# Construction Soil and Water Management Plan

UNSW Health Translation Hub

**Prepared for: Hansen Yuncken**

**Document no: B-ACO-CEC-RPT-0001**

**Revision no: Revision 02**

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## Revisions

Revision	Description	Date	Prepared by	Approved by
00	Draft Issue	08.02.2023	SC	SN
01	90% CWC 1 Draft	03.03.2023	SC	SN
02	90% CWC 1	27.03.2023	SC	SN

## Review Panel

Division/ office	Name
Civil	Stephen Naughton

Unless otherwise advised, the parties who have undertaken the Review and Endorsement confirm that the information contained in this document adequately describes the conditions of the site located at UNSW HTH, 49 Botany Street, Randwick NSW 2052

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## 1 Introduction

ACOR has been engaged by Hansen Yuncken to prepare a Construction Soil and Water Management Plan (CSWMP) for the UNSW Health Translation Hub (HTH) at 49 Botany Street, Randwick NSW 2052.

This CSWMP forms part of the Construction Environmental Management Plan (CEMP) to satisfy the SSDA Conditions of Consent, outlined in Section 1.2.

### 1.1 Client

Hansen Yuncken

### 1.2 Purpose and Scope of Report

This CSWMP addresses stormwater & sediment/ erosion control related items (bolded below) in Condition B15 and all of Condition B20 under 'Part B Prior to Commencement of Construction' in the State Significant Development Application (SSDA) Conditions of Consent, which states the following:

*Condition B15*

*Prior to the commencement of construction, the Applicant must submit a Construction Environmental Management Plan (CEMP) to the Certifier and provide a copy to the Planning Secretary. The CEMP must include, but not be limited to, the following:*

*(a) Details of:*

*(i) hours of work; NSW Government 13 UNSW Health Translation Hub*

*Department of Planning, Industry and Environment (SSD 10822510)*

*(ii) 24-hour contact details of site manager;*

*(iii) management of dust and odour to protect the amenity of the neighbourhood;*

***(iv) stormwater control and discharge;***

***(v) measures to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the site;***

***(vi) groundwater management plan including measures to prevent groundwater contamination;***

*(vii) external lighting in compliance with AS 4282-2019 Control of the obtrusive effects of outdoor lighting; and*

*(viii) community consultation and complaints handling;*

*(b) an unexpected finds protocol for contamination, asbestos or other unexpected finds and associated communications procedure;*

*(c) an unexpected finds protocol for Aboriginal and non-Aboriginal heritage and associated communications procedure; and*

*(d) waste classification (for materials to be removed) and validation (for materials to remain) be undertaken to confirm the contamination status in these areas of the site.*

Reference to Douglas Partners Geotechnical Report, Reference No. 99852.00 and Hansen Yuncken Emergency Response Plan (ERP), Reference No. PLN-CORP-HSE-0003, has been made to address Item (vi) of Condition B15 above.



#### *Condition B20*

*The Applicant must prepare a Construction Soil and Water Management Plan (CSWMP) and the plan must address, but not be limited to the following:*

- (a) be prepared by a suitably qualified expert, in consultation with Council;*
- (b) describe all erosion and sediment controls to be implemented during construction;*
- (c) provide a plan of how all construction works will be managed in a wet-weather events (i.e. storage of equipment, stabilisation of the Site);*
- (d) detail all off-Site flows from the Site; and*
- (e) describe the measures that must be implemented to manage stormwater and flood flows for small and large sized events, including, but not limited to 1 in 1-year ARI, 1 in 5-year ARI and 1 in 100-year ARI).*

### **1.3 Project Description**

Expansion of existing hospital facilities at Randwick Hospitals Campus (RHC) with the partnership between NSW Government and UNSW Sydney to provide additional health education, training and research with acute healthcare services. The UNSW HTH is proposed to include:

- A 15-storey building accommodating research and health education use (incl. one basement level),
- Pedestrian link bridge between UNSW Kensington Campus to RHC via Wallace Wurth Building,
- Education, training and research rooms,
- Clinical schools,
- Ambulatory care clinics,
- Support facilities including retail premises,
- More than 2,500 square metres of landscaping and public domain works for publicly accessible open space for staff, students, patients and the community.

### **1.4 Approving Authority**

NSW Department of Planning, Industry and Environment (NSW DPIE)

### **1.5 Preparation of this Plan**

This plan was prepared by Shana Cai and reviewed by Stephen Naughton. Details of their qualifications are provided below:

**Shana Cai**

BE(Civil)BSc, MIEAust

**Stephen Naughton**

CPEng NER RPEQ MIEAust NSW Design Practitioner NSW Registered Engineer

## 1.6 Available Data

The following available information was utilised in the preparation of this report.

- Randwick City Council (RCC) DCP, 2013
- Randwick City Council (RCC) Private Stormwater Code, 2013
- Landcom Managing Urban Stormwater – Soils and Construction 2004 ('Blue Book')
- Australian Rainfall and Runoff (AR&R), 2019
- NSW Government spatial information exchange (SIX) topographic maps
- Geotechnical Report by Douglas Partners dated February 2021 (Reference Project 99852.00)

## 2 Site

### 2.1 Location

The Site is located on the corner of High Street and Botany Street, Randwick, within the Randwick City Council (RCC) Local Government Area (LGA).

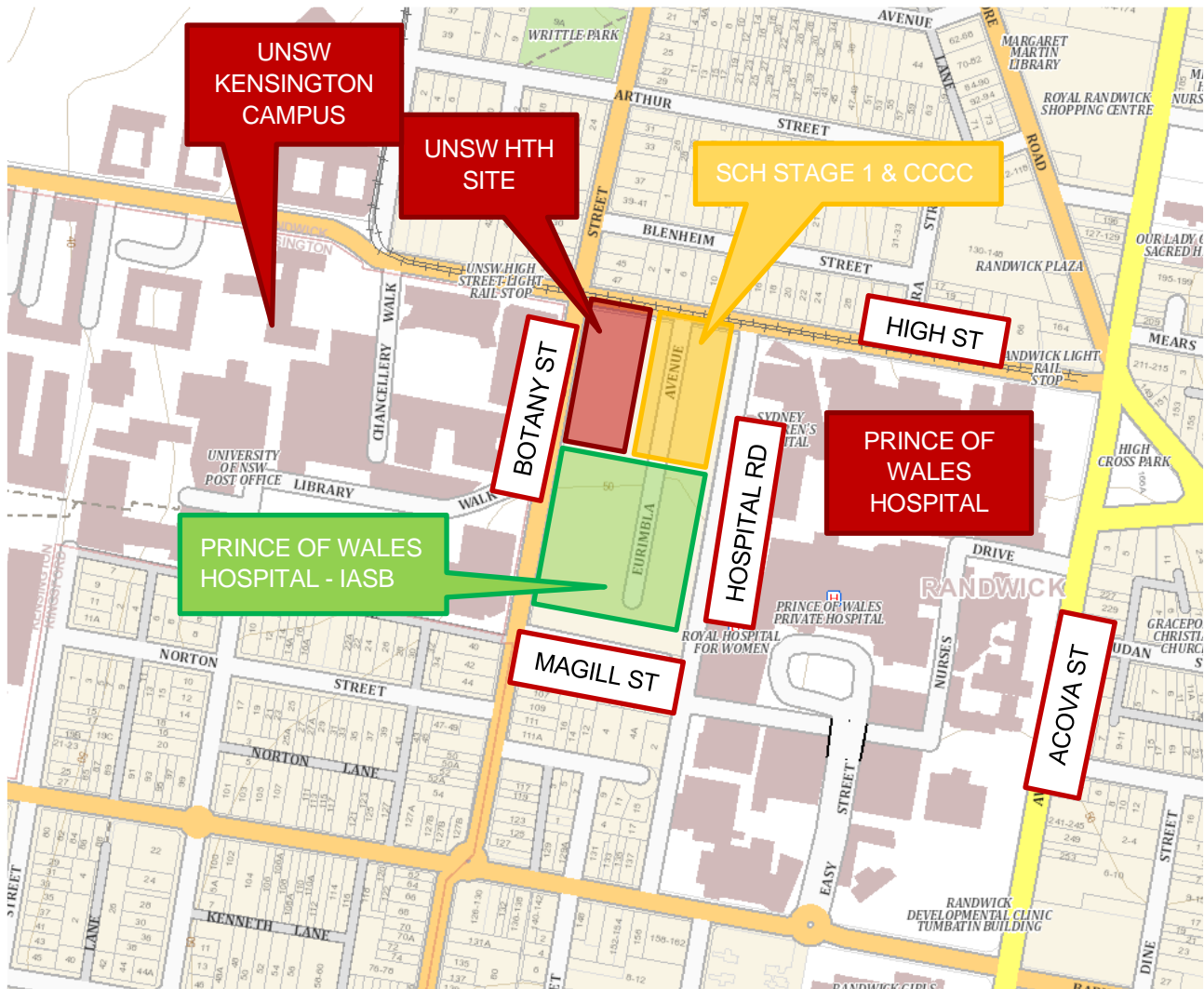


Figure 1 – Site Location (Source: Sixmaps)

### 2.2 Property Description

Lot A1, DP1282403

## 2.3 Topography

The Site generally falls from North-West to South-East and lies within the Birds Gully and Bunnerong Road Catchment area.

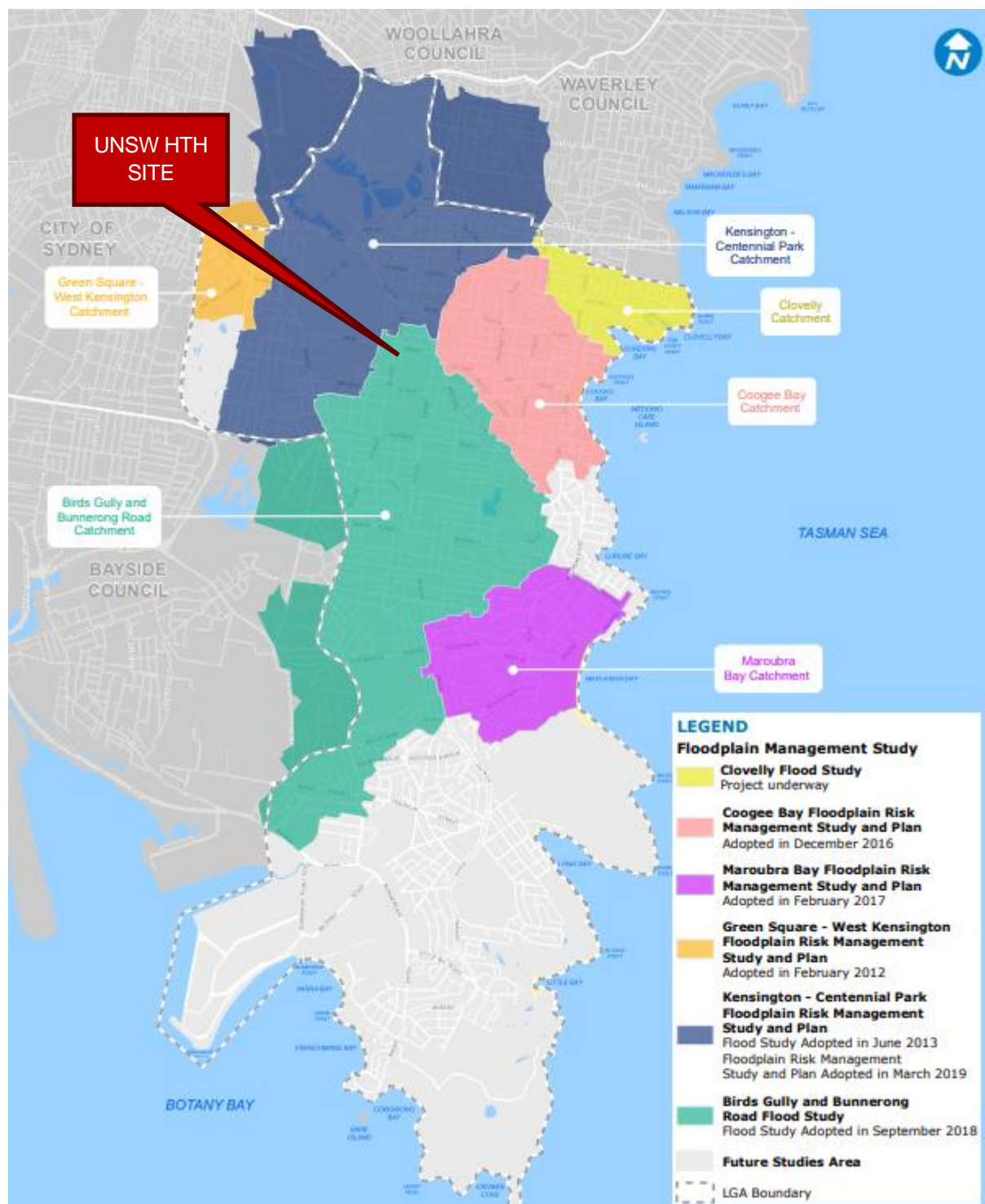


Figure 2 – Randwick City Council Flood Study Areas (Source: RCC, 2019)

## 2.4 Existing Land Use and Vegetation

The existing land use is R2 Low Density Residential and R3 Medium Density Residential with minimal vegetation, see Figure 3 below.



Figure 3 – Land Use Map (Source: NSW ePlanning Spatial Viewer)

### 3 Construction Soil and Water Management

Landcom Managing Urban Stormwater – Soils and Construction ('Blue Book') contains erosion, sediment and waste control measures are required to mitigate the impacts of land disturbance activities on soils, landforms and receiving water, including:

- Reduce pollution to downstream areas and receiving waters;
- Reduce land degradation;
- Raise an awareness of ecologically sustainable development (ESD) principles and their application to the development.

Chapter 2 of the Blue Book states that a Soil and Water Management Plan (SWMP) should be prepared for all development works where more than 2,500sqm of land is disturbed.

Section 9.3 of the Blue Book states that all SWMPs should include relevant calculations of capacities for any sediment basins and other structures. These calculations should be:

- Based on an assessment of site-specific area
- Account for the pollution potential of the site
- Consider the sensitivity of receiving waters and other ESD matters

#### 3.1 Flood Impact Assessment

The Site is located within the flood zone where RCC DCP requirements for the Site development's habitable spaces (Critical Use Infrastructure) is to be above the Probable Maximum Flood (PMF) with an additional 500mm freeboard.

The PMF level on High Street is RL55.738<sup>1</sup>, as such, the habitable spaces of HTH are to be at minimum RL56.238<sup>2</sup>.

As part of the SCH Stage 1 & CCCC construction works (staged prior to the HTH Site's proposed works), a temporary flood wall has been constructed along the Northern boundary to prevent external catchment flows from the North (High Street) and protects the Site from flooding and overland flow for events up to and including the PMF.

The temporary flood wall along the Northern edge of the Site (with top of wall higher than RL56.238) provides flood protection up to and including the PMF event. As such, the entire site is flood free during the PMF event as shown in the modelling results in Figure 4, for the developed option (adjacent site, protected by Northern flood wall).

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<sup>1</sup> Provided by adjacent Sydney Children's hospital (SCH) Stage 1 and Comprehensive Children's Cancer Centre (CCCC) project team – based on flood model developed for Integrated Acute Services Building (IASB)

<sup>2</sup> RL55.738 + 500mm freeboard = RL56.238



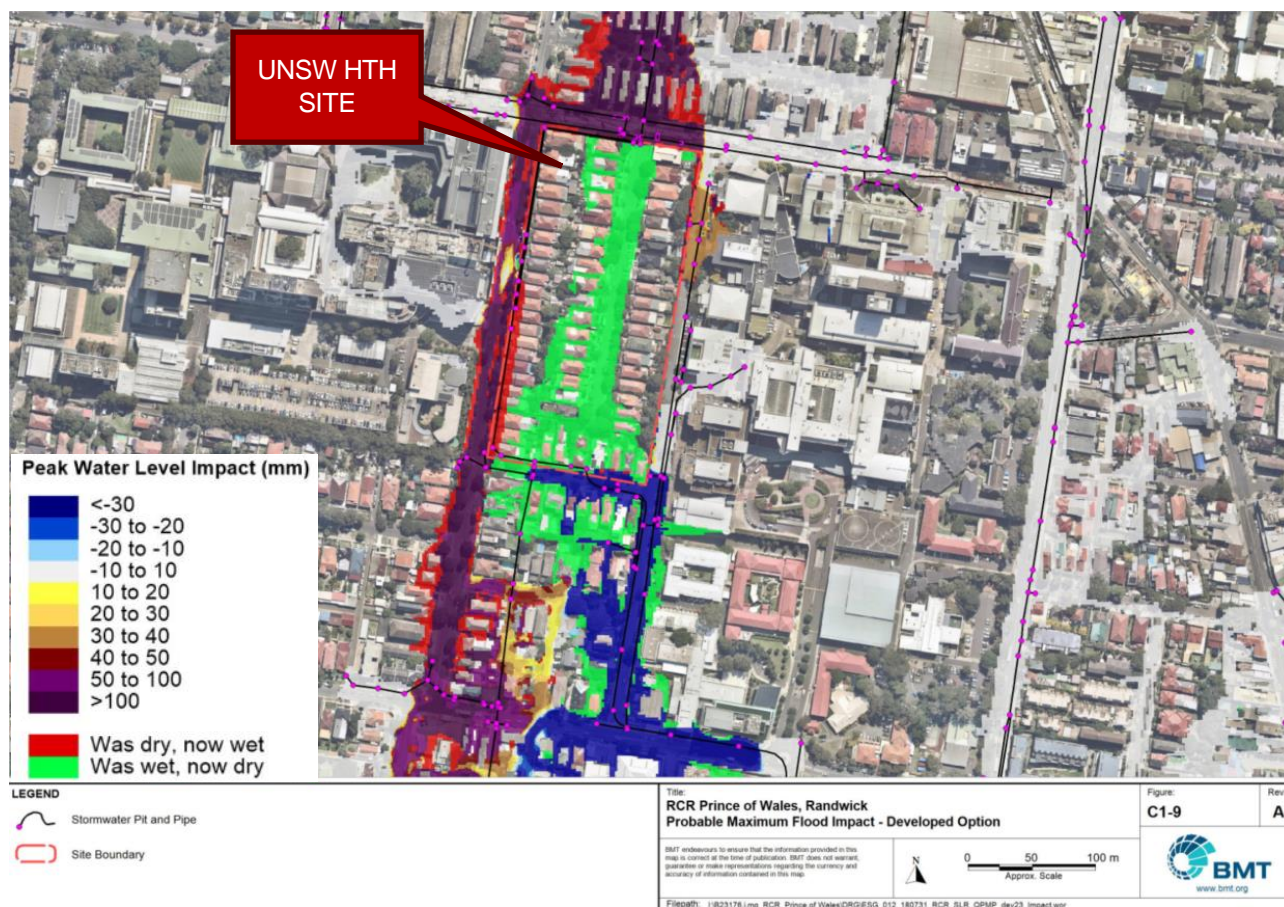


Figure 4 – Peak Water Level Impacts during PMF Event – Developed Option (Source: BMT, 2018)

### 3.2 Soil and Water Management

A Soil and Water Management Plan (SWMP) has been prepared in accordance with the Blue Book and included in Appendix 6A.1. The plan details the following control measures during construction to minimise the risk of sediment laden water leaving the site.

- Sediment diverting measures to minimise sediment in Council's stormwater drainage networks (i.e., sandbags and/or geo-textile filter fabric protecting existing and proposed drainage pits);
- Overland flow;
- Indicative temporary stockpile locations;
- Sediment control fencing location & extents;
- Covering and revegetating disturbed areas (as soon as practicable & as required to prevent sediment laden runoff from leaving the site); and
- Provision of temporary sediment basins (provided by excavated basement & underground On-Site Detention [OSD) tank, during construction)

### 3.3 Site Constraints and Characteristics

Site constraints were calculated using the Revised Universal Soil Loss Equation (RUSLE) to size sediment basins, see Appendix 6B.1.

Constraint/ Opportunity	Value
Rainfall erosivity (R-factor)	3,110
Soil erodibility (K-factor)	0.013 (from Appendix C – North Head Soil Landscape, USCS Class: SC)
Slope gradients	< 10% (average 4%)
Potential erosion hazard	Low (from Figure 4.6 in Blue Book)
Rainfall Zone	1
Calculated soil loss	41 t/ha/yr = 32 m <sup>3</sup> /ha/yr
Soil Loss Class	1
Soil texture group	Type C
Percent dispersible (subsoil)	Assumed > 10%
Runoff coefficient	0.76
Disturbed site area	9,000m <sup>2</sup>

Based on the calculated R-factor of 3,110, slope gradients less than 10% falls below the A-line in Figure 4.6 of the Blue Book is classified as low erosion hazard.



It is noted that the 75<sup>th</sup> percentile has been adopted for the design rainfall depth as earthworks are anticipated to take place over a period of less than 6 months. Protection for battered areas is to be implemented by the contractor if portions of the site are intended to be unvegetated for an extended amount of time (i.e., > 6 months).

### 3.3.1 Calculations

Catchment Name	Area (Ha)	Soil Loss (m <sup>3</sup> /ha/yr)	Soil Loss Class	Average Yearly Soil Loss <sup>3</sup> (m <sup>3</sup> /yr)
Site area	0.9	32	1	28.8
<b>Total</b>				<b>28.8</b>

According to the Blue Book, a sediment basin isn't required for average yearly soil losses of less than 150 cubic metres per year. However, despite there being no requirement for the provision of a sediment basin for the site, the excavated lower basement and underground OSD will be utilised as temporary sediment basins during construction works for soil and water management.

### 3.4 Off-Site Flow Management

Potential off-site flows from the site will be contained by temporary sediment basins (excavated basement). The flood wall along the Northern property boundary (located approximately 2.2m from boundary line) prevents external flows from entering site for flood events up to and including the PMF event.

It is anticipated for flows (based on a time of concentration of circa 15 minutes) up to the 1 in 1-year ARI (peak flow circa 64 L/s), 1 in 5-year ARI (peak flow circa 195 L/s) and 1 in 100-year ARI (peak flow circa 414 L/s) critical storm events be contained within the temporary sediment basin (contaminated water), where construction site grading will direct disturbed area flows (i.e., site area minus sediment basin area) to the temporary sediment basins.

It is noted the above estimated peak flows for the respective storm events are for stage 1 works only (disturbed area includes the basement excavation area and external). Disturbed area will be significantly reduced and limited to external areas after the basement has been constructed and the podium will be constructed subsequently above, in stage 2 works.

The provision of a temporary sediment basin (approximately 11,050m<sup>3</sup> of fully excavated lower basement volume and 300m<sup>3</sup> of excavated underground OSD) despite RUSLE calculations demonstrating that the development does not warrant the introduction, will ensure construction soil and water will be adequately managed on site.

Clean runoff from completed/ stabilised areas is to be directed downstream of sediment measures.

### 3.5 General

During the construction phase of the development, a Soil and Water Management Plan will be implemented to minimise water quality impacts. A detailed Soil and Water Management Plan will be prepared at the detailed design stage and will be employed throughout the site. The control measures shall include silt fences, cut-off

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<sup>3</sup> Soil catchment area (ha) x soil loss (m<sup>3</sup>/ha/yr) = 0.9 x 32 = 28.8

drains for polluted stormwater and diversion channels for clean stormwater run-off, gully pit sediment barriers, field inlet sediment traps and temporary bioretention filter protection.

Details of the required construction phase control measures will be provided on the detailed engineering drawings and shall be in accordance with the required standards. However, the contractor shall be responsible for the provision of the construction phase water quality objectives which shall be enforced by the preparation and implementation of a Soil and Water Management Plan.

The following information is provided to identify controls and procedures, and who is responsible for them, and should be incorporated into the Soil and Water Management Plan.

### 3.5.1 Pre-Construction

- Establish two (2) stabilised entry/exit points for each stage of construction. These points should also include a vehicle shakedown device to mitigate the transportation of dust and dirt.
- Sediment fences are to be placed along the low side of the site to slow flows, reduce scour and capture some sediment runoff.
- Sediment fences are to be constructed at the base of fill embankments.
- Divert up-slope water around the work site and appropriately stabilise any drainage channels.
- Areas for plant and construction material storage are to be designated along with associated diversion drains and spillage holding ponds.
- Diversion banks are to be created at the upstream boundary of construction activities to ensure upstream runoff is diverted around any areas to be exposed. Catch drains are to be created at the downstream boundary of construction activities.
- Construction of temporary sediment basins where required.
- Site personnel are to be educated to the sediment and erosion control measures implemented on site.

### 3.5.2 During Construction

- Progressive stabilization of filled areas and fill batters.
- Construction activities are to be confined to the necessary construction areas.
- The provision of a construction entry/exit to prevent the tracking of debris from tyres of vehicles onto public roads and to limit the movement of construction equipment.
- The topsoil stockpile location will be nominated to coincide with areas previously disturbed. A sediment fence is to be constructed around the bottom of the stockpile to trap sediment. A diversion drain is to be installed upstream of the stockpile if required.
- Roof downpipes should be installed as soon as practicable after the roof is constructed.
- Transport loads that are subject to loss through wind or spillage shall be covered or sealed to prevent entry of pollutants to the stormwater system.
- Regular inspection and maintenance of slit fences, sediment basins and other erosion control measures. Following rainfall events greater than 50mm inspection of erosion control measures and removal of collected material should be undertaken. Replacement of any damaged equipment should be performed immediately.

### 3.5.3 Post Construction

- The Contractor/ Developer will be responsible for the maintenance of erosion and sediment control devices from the possession of the site until stabilisation has occurred to the satisfaction of the superintendent and Principal.
- The Erosion and Sediment Control Management Plans should be provided to all people involved with the site, including sub-contractors, private certifiers, body corporates and regulators.

## 4 Groundwater Management

Based on the Geotechnical Report by Douglas Partners dated February 2021 (Reference Project 99852.00) and additional borehole logs undertaken in March 2023 (locations shown in Figure 5), groundwater levels on the site have been identified.

Detected groundwater levels in the borehole logs on the HTH site are summarised below (and identified by a blue circle in Figure 5 below):

- BH105 (dated February 2019) detected groundwater at RL47.70 – located in Southern HTH basement,
- BH1002 (dated March 2023) detected groundwater at RL49.50 – located in Northern HTH basement,
- BH1003 (dated March 2023) detected groundwater at RL49.00 – located in Northern HTH basement,
- BH1008 (dated March 2023) detected groundwater at RL49.20 – located in Northern HTH basement,
- BH1009 (dated March 2023) detected groundwater at RL49.30 – located in Northern HTH basement.

All other borehole logs (BH7, BH103-104, BH607-608, BH16-17, BH1001, BH1004-1007) at the HTH site recorded did not detect groundwater.

Previous borehole logs contained within the appendices of the Geotechnical report dated February 2021 detected groundwater levels. However, these boreholes are not relevant to the project as they lie outside of the HTH site and therefore not assessed for groundwater management.

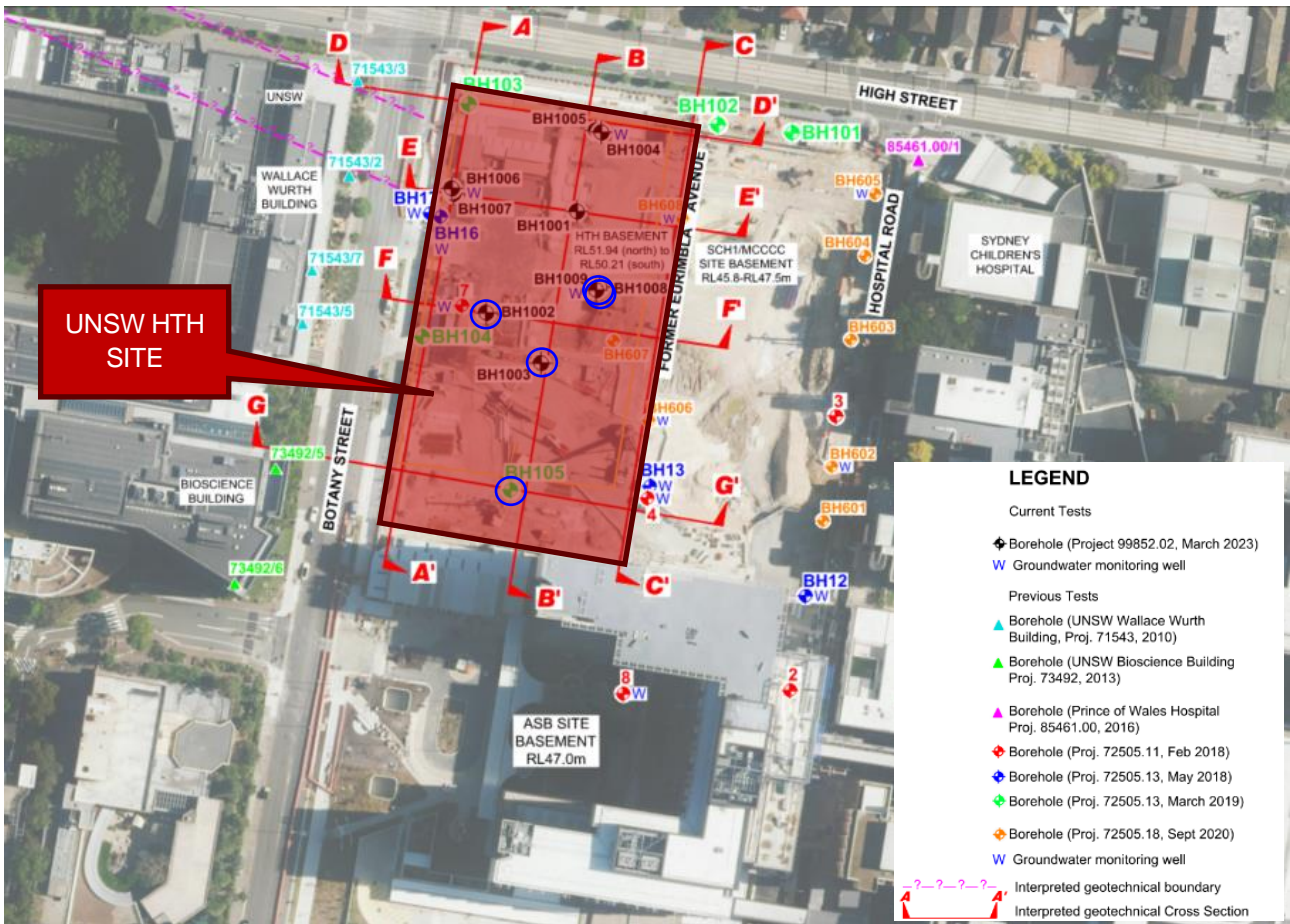


Figure 5 – Locations of boreholes (Source: Douglas Partners, 2023)

The Southern (lower) basement for HTH is proposed at RL50.21 (BEL<sup>4</sup>47.71) and the Northern (upper) basement at RL51.94 (BEL51.59), which lie above the highest detected level of groundwater (RL49.50 at BH1002). As such, it is not anticipated there will be contamination to groundwater due to groundwater interception.

<sup>4</sup> BEL = Bulk Earthworks Level

## **4.1 Groundwater Management Methodology**

Potential spillage on site (i.e., fuel spills, chemical spills) are to be identified in the construction site's risk register & management plan to mitigate groundwater contamination via seepage in sandy soils. Section 3.5 Major Fuel Spill and Section 3.6 Chemical Spill of Hansen Yuncken's Emergency Response Plan (ERP) details the methodology to respond to spills that may occur on site.

### **4.1.1 Spill Prevention**

All construction personnel are to undertake essential induction and training before accessing the construction site. Prior to handling chemicals and major fuels, additional training and induction is to be undertaken to ensure safe handling of chemicals and fuels to prevent potential spillage.

In the unlikely event of spillage, assessment and response is to be actioned as per Hansen Yuncken's ERP procedures – refer to Section 4.1.1 and 4.1.1.1 for major fuel and chemical spillage management/ response procedures extracted from Hansen Yuncken's ERP.

#### 4.1.1.1 Major Fuel Spill

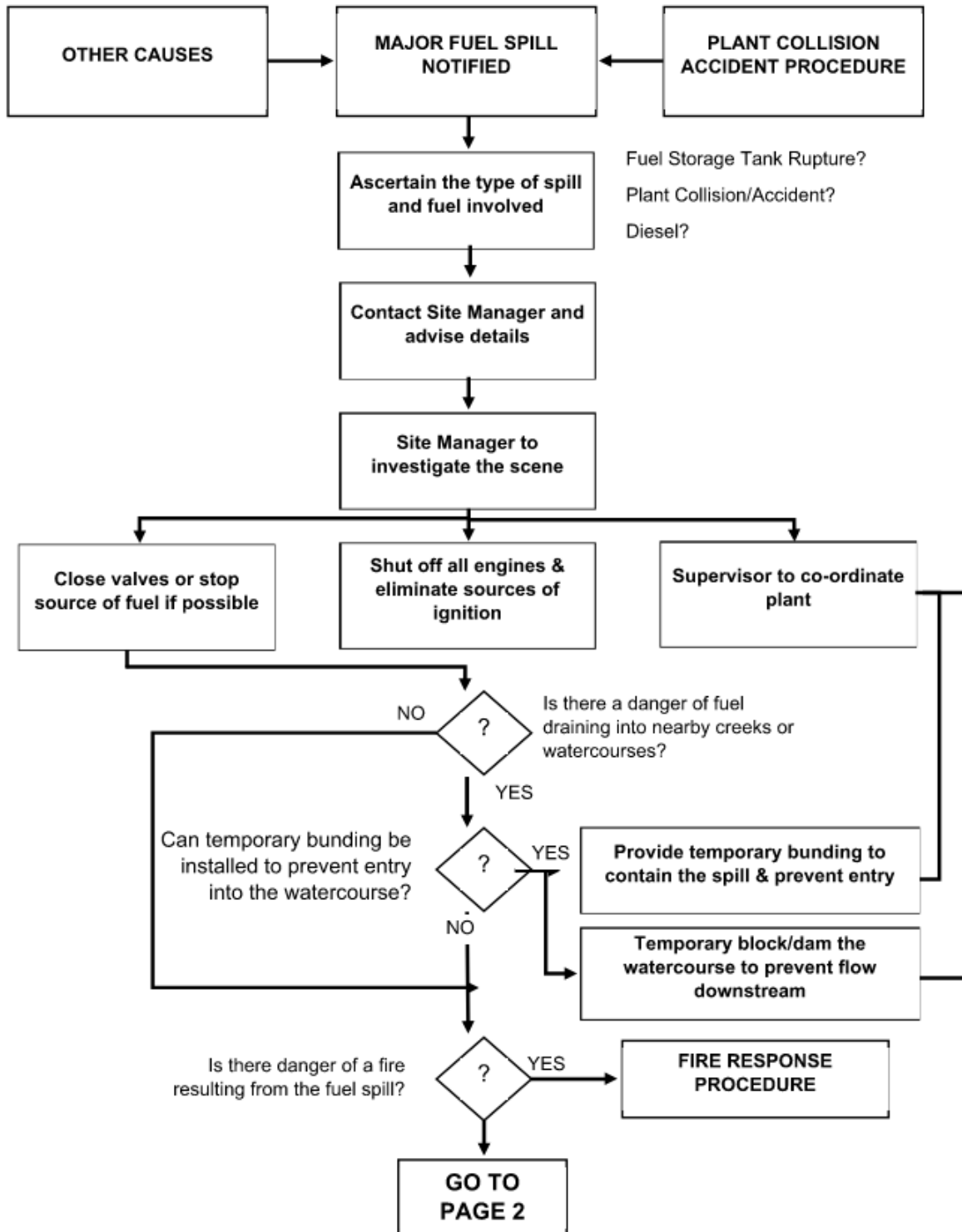


Figure 6 - Major Fuel Spill Response Part 1 Flow Chart (Source: Hansen Yuncken, 2022)

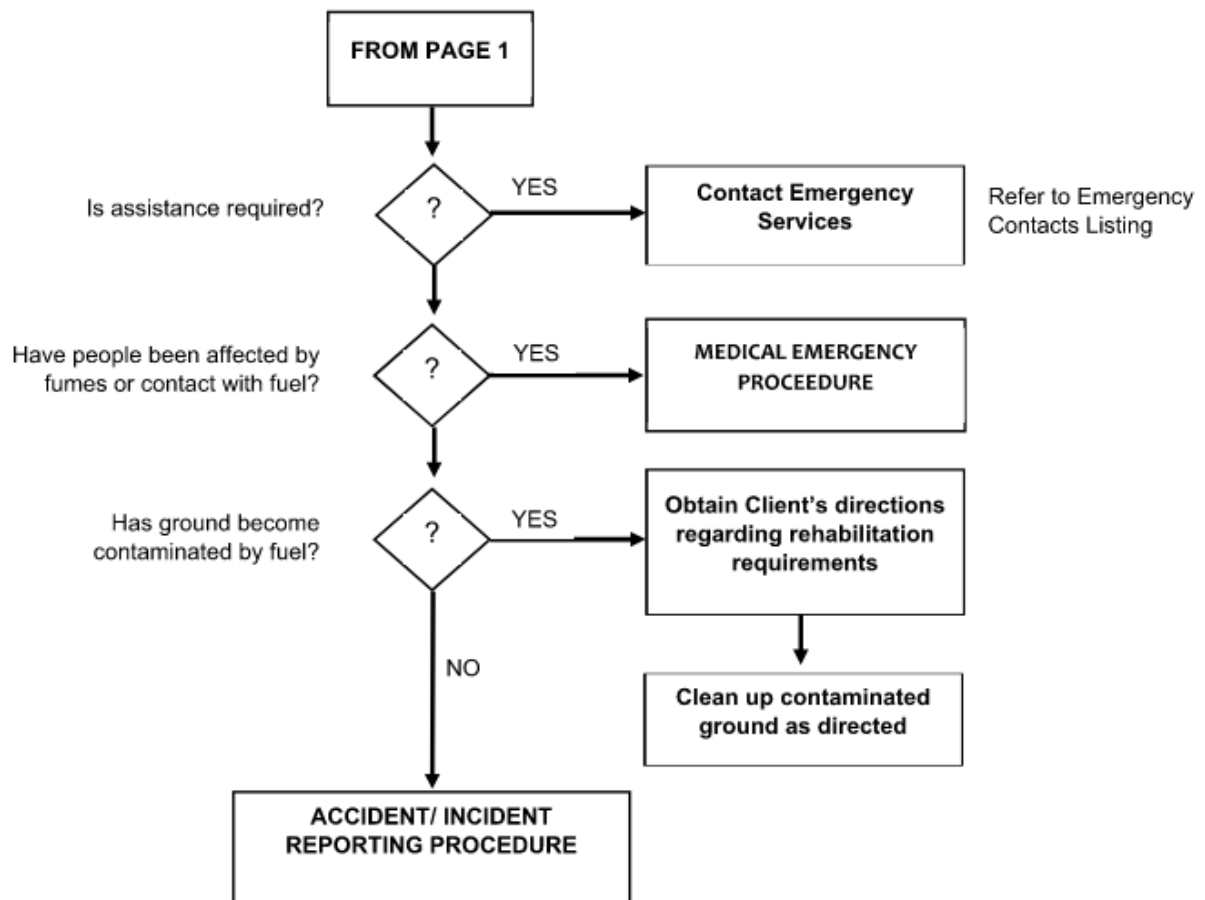


Figure 7 – Major Fuel Response Part 2 Flow Chart (Source: Hansen Yuncken, 2022)



#### 4.1.1.2 Chemical Spills

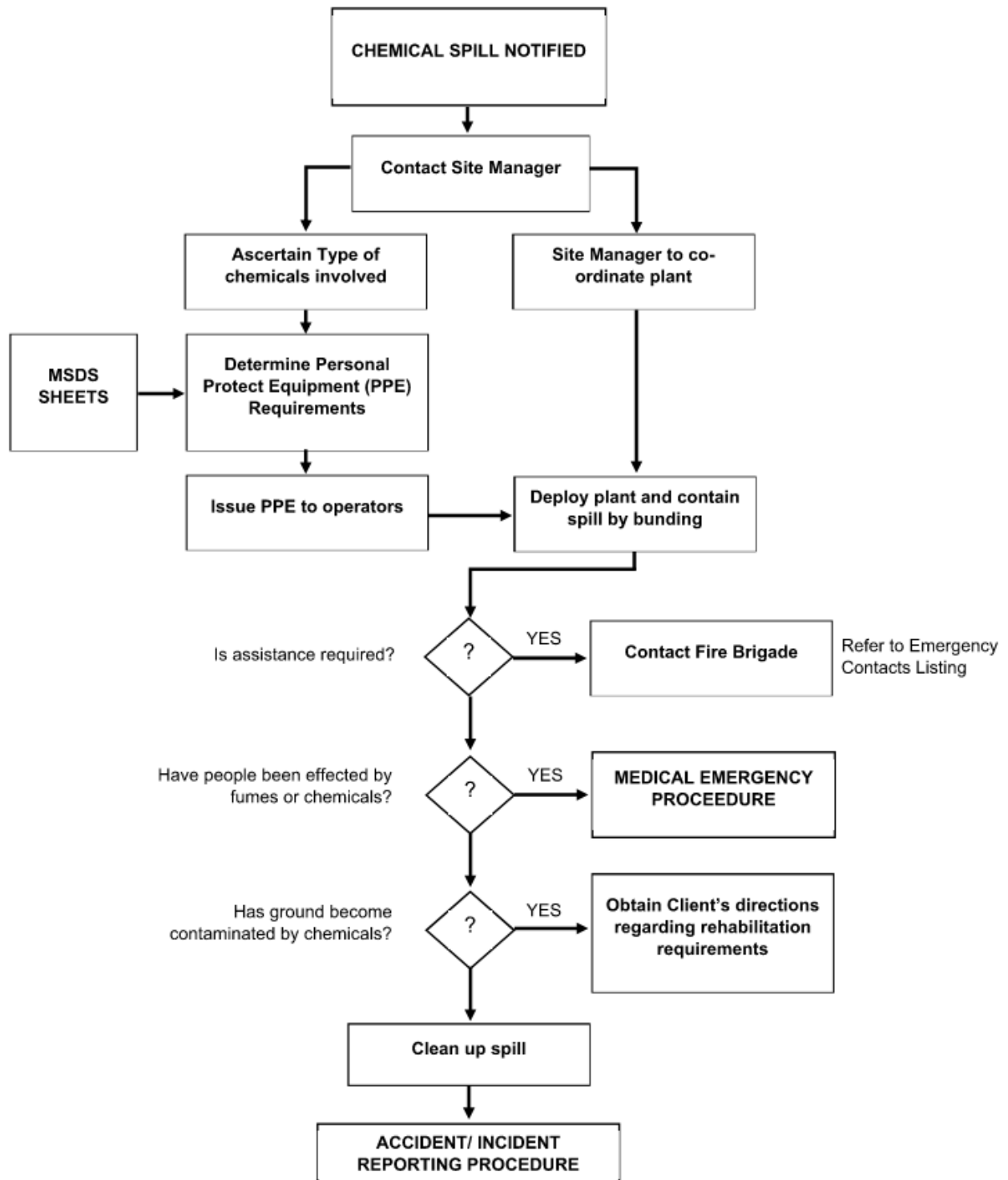


Figure 8 – Chemical Spills Response Flow Chart (Source: Hansen Yuncken, 2022)

## 5 Conclusion

This CSWMP addresses Condition 20 by describing all erosion and sediment controls to be implemented during construction, and details of how construction works will be managed in wet-weather events through measures of equipment storage, site stabilisation, etc.).

Item (iv) of Condition B15 has been addressed in this SWMSP where all flows are anticipated to be contained within the site. The flood wall along the North for flood protection up to the PMF event in conjunction with sediment fencing will ensure flows from upstream areas are diverted around the construction site. Construction site grading will direct disturbed area flows to sediment control measures (temporary sediment basins at the excavated basement and underground OSD) illustrated on the SWMP attached in Appendix 6A.1.

The provision of temporary sediment basins despite RUSLE calculations demonstrating that the development does not warrant the introduction, will ensure construction soil and water will be adequately managed on site for small and large sized events including, but not limited to 1 in 1-year ARI, 1 in 5-year ARI and 1 in 100-year ARI.

Item (v) of Condition B15 has also been addressed in the SWMP (refer drawing no B-ACO-CEC-0600) via the provision of stabilised vehicular entry/ exit locations with vehicle shakedown systems (i.e., vehicle shake down devices at localised construction vehicle access/ egress points).

Item (vi) of Condition B15 has been addressed in Section 4 with reference to the Geotechnical Report borehole logs prepared by Douglas Partners dated February 2021. Water detected in the Southern borehole log (BH105) to be below the lower basement level of RL50.21 (Bulk Earthworks Level BEL47.71) on the HTH site and therefore it is not anticipated that excavation works will result in groundwater contamination.

Essential construction personnel training and induction to mitigate potential spillage and assessment/ response methodology per Hansen Yuncken's ERP is to be implemented, as sandy soils allow seepage and may lead to groundwater contamination.

Yours faithfully,



**Stephen Naughton**  
CPEng NER RPEQ

For,

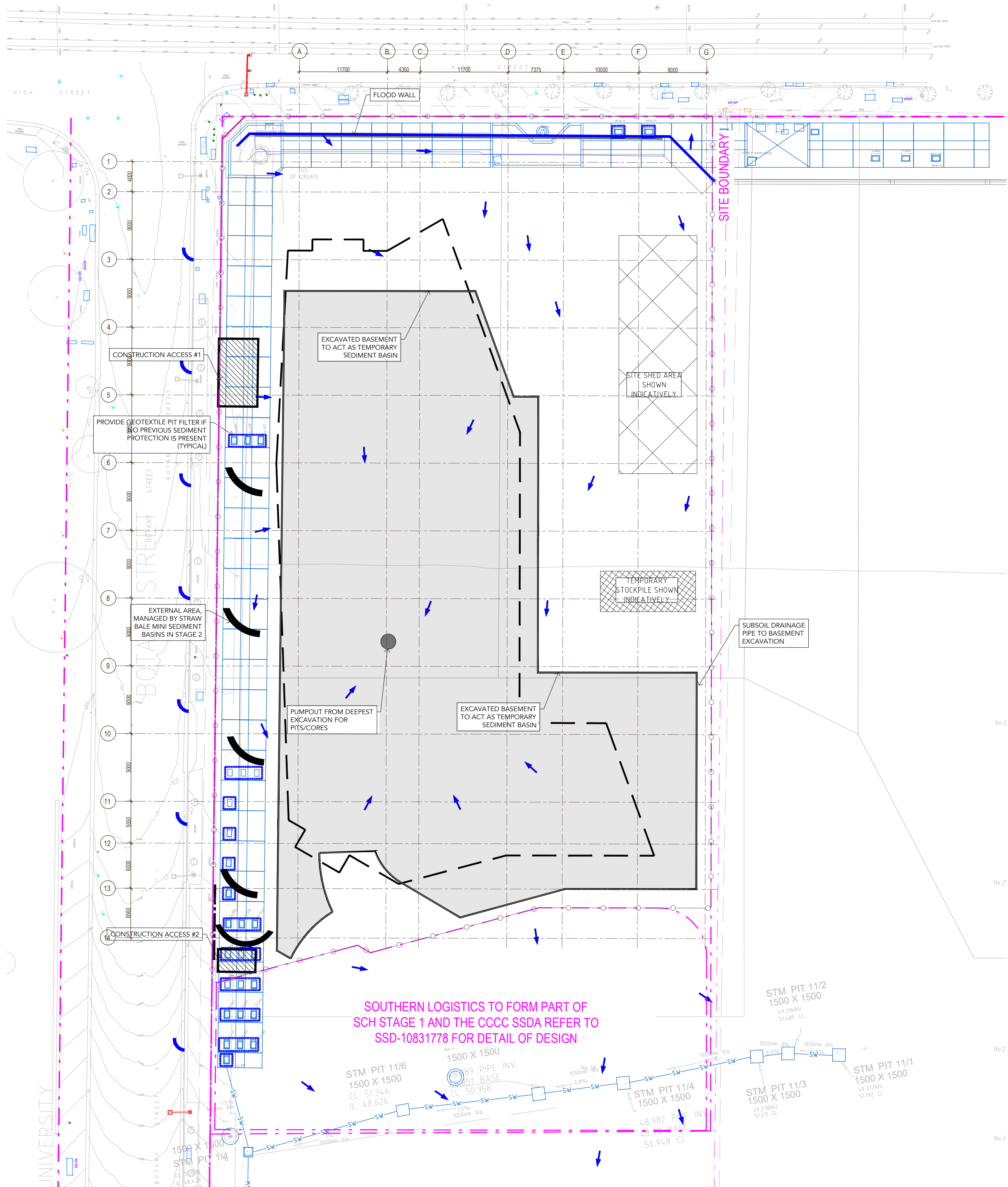
**ACOR Consultants Pty Ltd**

## 6 References

- UNSW Health Translation Hub Development Application Report (Warren Smith & Partners, 2021)
- Randwick Campus Redevelopment (RCR) ASB Project Flood Summary Flood Report (BMT, 2018)
- RCR Prince of Wales, Randwick Flood and Stormwater Modelling Response letter (BMT, 2019)  
Reference mpg: L.B23176.011.Council Query.docx

## Appendix A Drawings

### A.1 Soil and Water Management Plan & Details (Drawing No. B-ACO-CEC-0600 & B-ACO-CEC-0601)



LEGEND:

- CADASTRAL BOUNDARY
- EX SURFACE LEVEL
- EX SURFACE CONTOUR
- EXISTING FLOOD WALL
- NOM HOARDING/ SITE FENCE LINE WITH GATES FOR ACCESS AS REQUIRED
- TEMPORARY SHAKER RAMP ON ENTRY/EXIT
- BASEMENT EXCAVATION AREA
- PODIUM LEVEL EXTENTS (ABOVE)
- SITE SHED AREA SHOWN INDICATIVELY
- TEMPORARY STOCKPILE AREA SHOWN INDICATIVELY
- OVERLAND FLOW
- GEOTEXTILE PIT FILTER 2
- SANDBAG INLET SEDIMENT TRAP (AT APPROX. 15-20 METRE SPACING)
- STRAW BALE MINI SEDIMENT BASIN (STAGE 2)

- SOIL & WATER MANAGEMENT NOTES:
- REFER TO SPECIFICATIONS NOTES FOR SEDIMENT AND SOIL EROSION CONTROL GENERAL REQUIREMENTS.
  - ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
  - ALL SEDIMENT AND SOIL EROSION CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH THE 'BLUE BOOK' CONTRACTOR TO ENSURE THESE MEASURES ARE IN PLACE AND MAINTAINED AT ALL TIMES DURING CONSTRUCTION WORKS.
  - CONTRACTOR TO PROVIDE 'WIRE MESH AND GRAVEL SEDIMENT FILTER' TO ALL PAVED / ROAD AREAS (BOTH PROPOSED AND EXISTING) IN ACCORDANCE WITH THE 'BLUE BOOK'.
  - REFER TO CONSTRUCTION DRAWINGS FOR FURTHER INFORMATION ON SITE ESTABLISHMENTS.
  - IT IS EXPECTED TO HAVE SITE FENCE/HOARDING ON SITE BOUNDARIES.

STAGING:  
STAGE 1 - EXCAVATION AND SITE SHEDS TO EXTERNAL  
STAGE 2 - PODIUM OVER BASEMENT BUILT, DISTURBED AREA LIMITED TO EXTERNAL AREAS

Do not scale drawings. Verify all dimensions on site

issue	amendment	date
0	ISSUED FOR INFORMATION	28.11.2022
1	ISSUED FOR TENDER	01.12.2022
2	ISSUED FOR SUBMISSION	15.12.2022
3	ISSUED FOR SUBMISSION	21.12.2022
4	ISSUED FOR SUBMISSION	22.12.2022
5	90% CWC 1 DRAFT	03.03.2023
6	90% CWC 1 DRAFT	09.03.2023
7	90% CWC 1 DRAFT	22.03.2023
8	90% CWC 1 DRAFT	27.03.2023

**Plenary**

**HANSEN YUNCKEN**

**architectus™**

**UNSW SYDNEY**

**NSW GOVERNMENT**

**Health Infrastructure**

ABN 90 131 245 684

Project  
**UNSW HEALTH TRANSITION HUB**

Drawing  
**SOIL AND WATER MANAGEMENT PLAN**

Scale  
1:250@B1

Drawn  
J. Eaton

Checked  
S. Cai

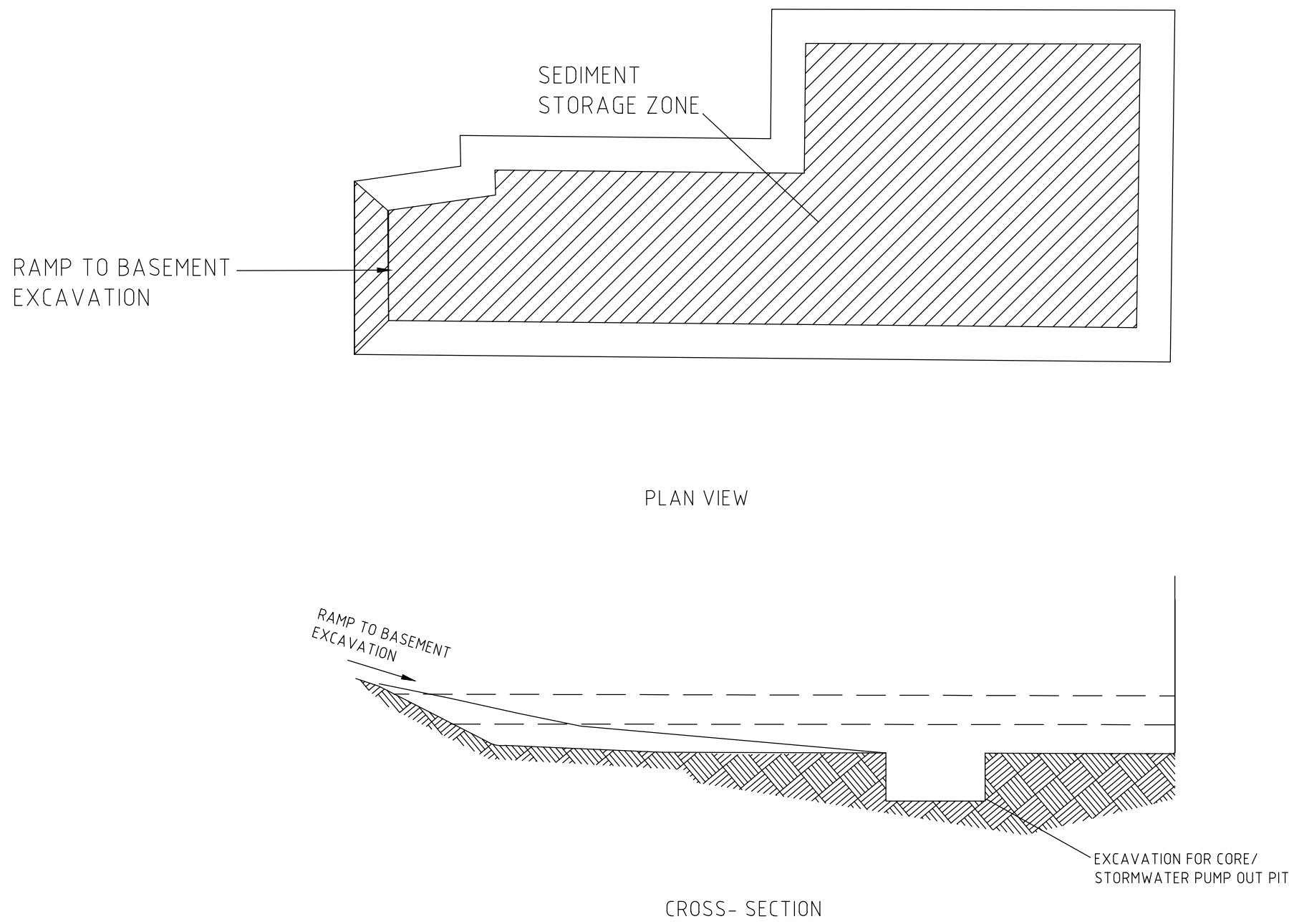
Project no  
NSW212628

drawing no.  
**B-ACO-CEC-0600**

issue

8



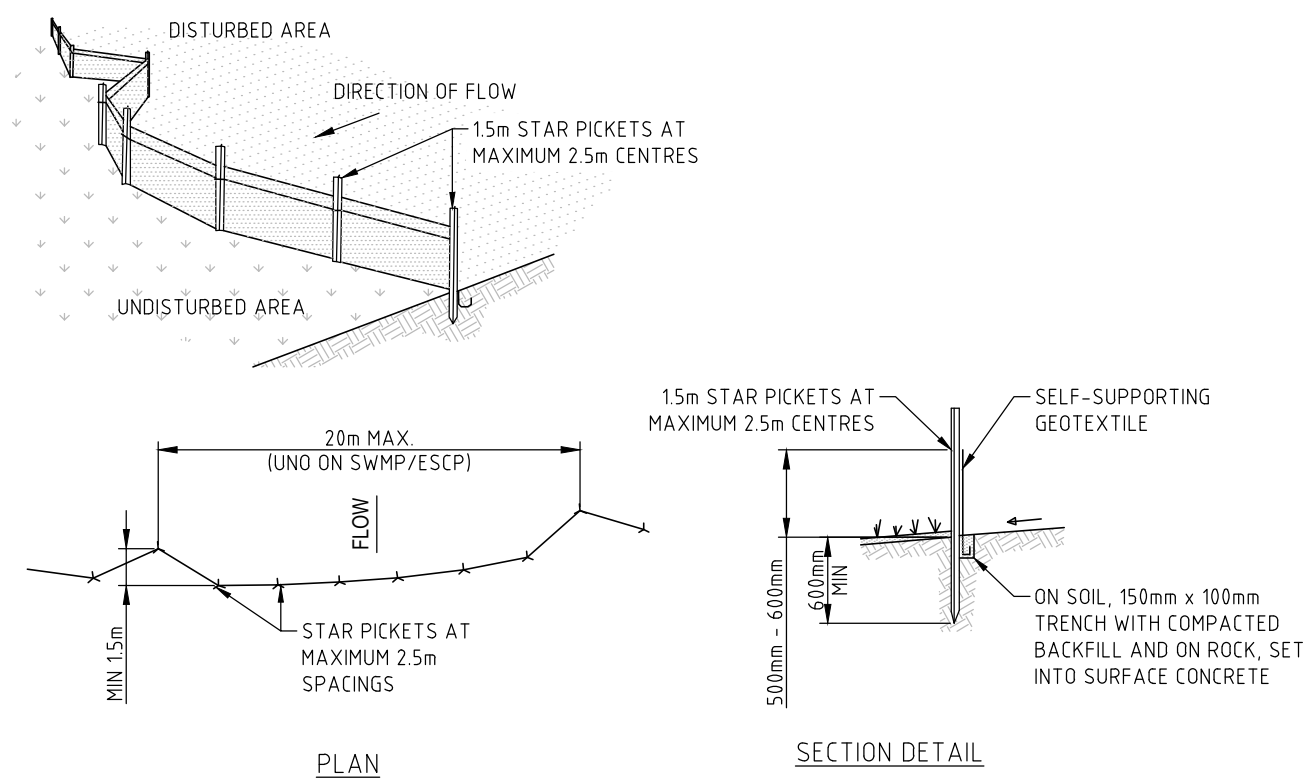


### SEDIMENT BASIN - EXCAVATION FOR BASEMENT

NOT TO SCALE

#### SEDIMENT BASIN NOTES

1. THE EXCAVATION BASEMENT TO ACT AS TEMPORARY SEDIMENT BASIN.
2. WORKS UP UNTIL BASEMENT SLAB HAS BEEN POURED
3. CONTRACTOR TO PROVIDE SAFE ACCESS TO AND FROM EXCAVATED BASEMENT
4. PORTABLE PUMP AND LAY FLAT HOSE TO BE ALLOWED FOR TO PUMP DETAINED WATER TO OSD OR OTHER OUTLET AREA WHEN WATER QUALITY IS ACCEPTABLE
5. FOLLOWING CONSTRUCTION OF BASEMENT AND EXTERNAL SLABS, LIMITED DISTURBED AREAS WILL BE MANAGED BY STRAW BALE MINI SEDIMENT BASINS, AS REQUIRED



PLAN

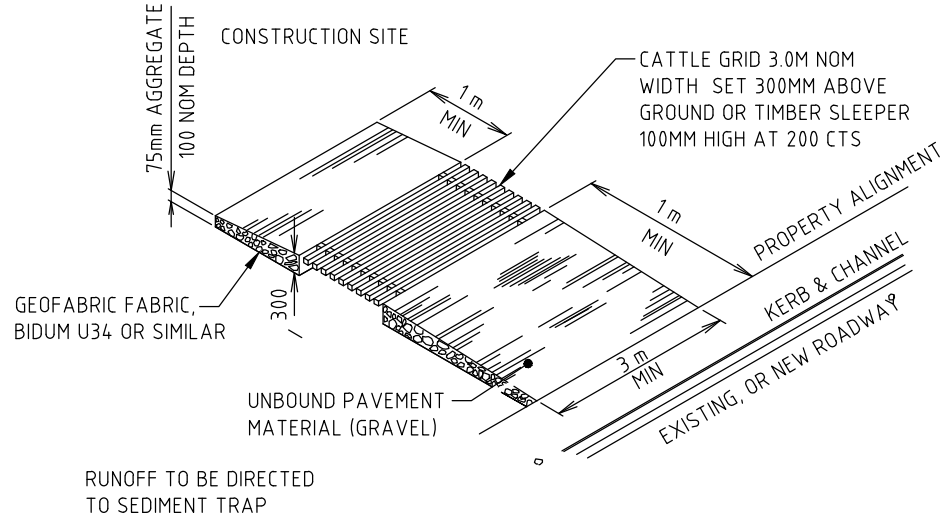
SECTION DETAIL

#### CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE
2. DRIVE 15m LONG STAR PICKETS INTO GROUND, 2.5 METRES APART (MAX). ENSURE STAR PICKETS ARE FITTED WITH SAFETY CAPS.
3. DIG A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
4. BACKFILL TRENCH OVER BASE OF FABRIC
5. FIX SELF-SUPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
6. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.

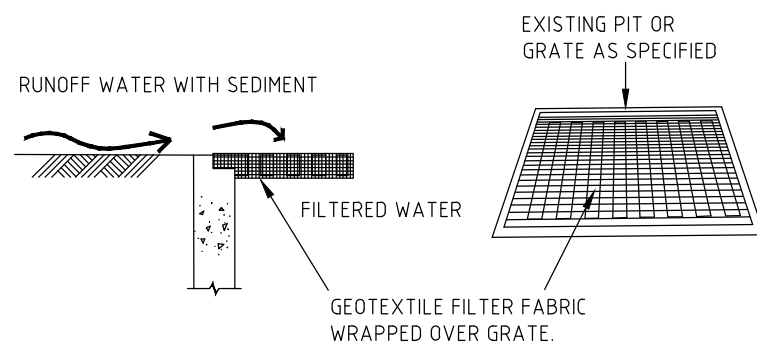
### SEDIMENT CONTROL FENCE

N.T.S.



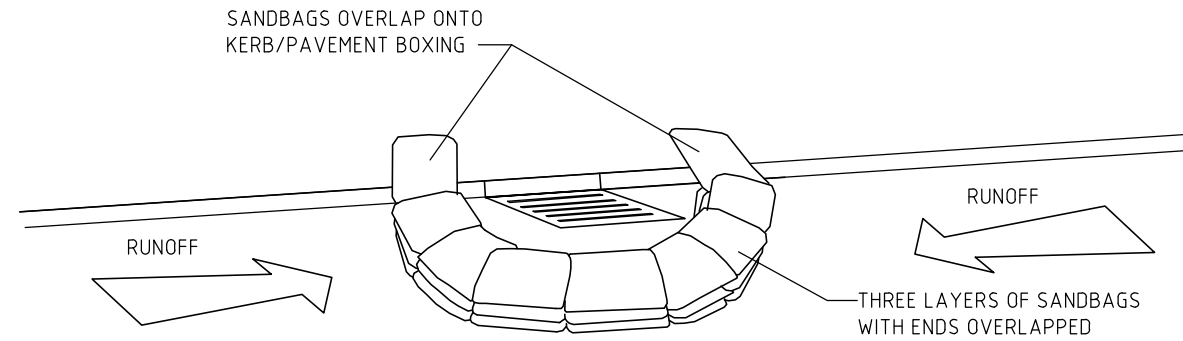
### TEMPORARY CONSTRUCTION VEHICLE ENTRY/EXIT SEDIMENT TRAP

NOT TO SCALE

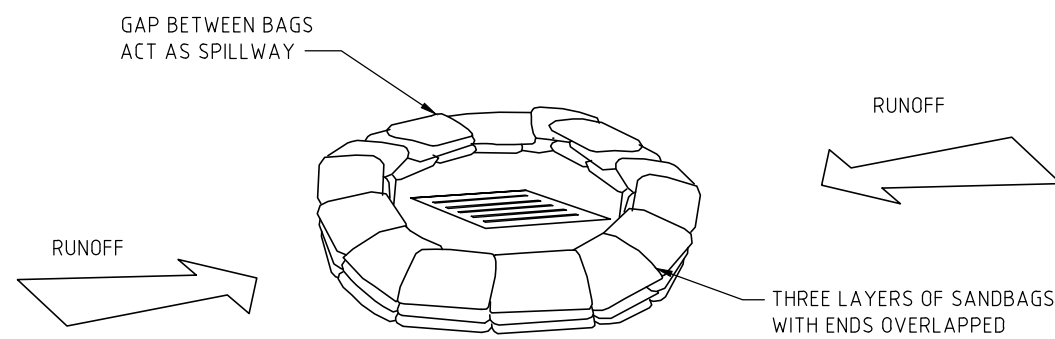


### GEOTEXTILE PIT FILTER 2

NOT TO SCALE



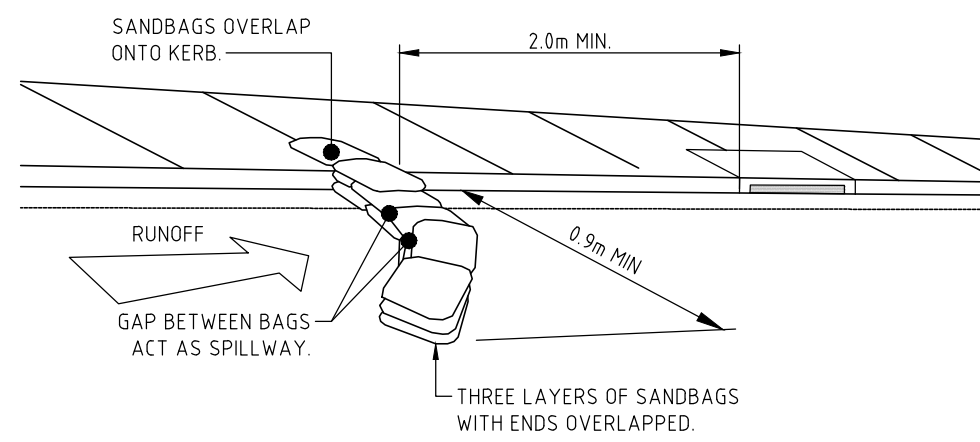
### SANDBAG SEDIMENT TRAP - AT KERB SAG PIT



### SANDBAG SEDIMENT TRAP - AT OTHER THAN KERB SAG PIT

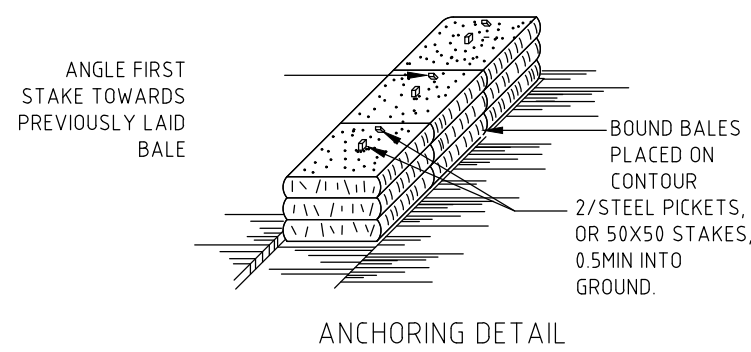
### SANDBAG SEDIMENT TRAP DETAILS

NTS



### SANDBAG KERB INLET SEDIMENT TRAP

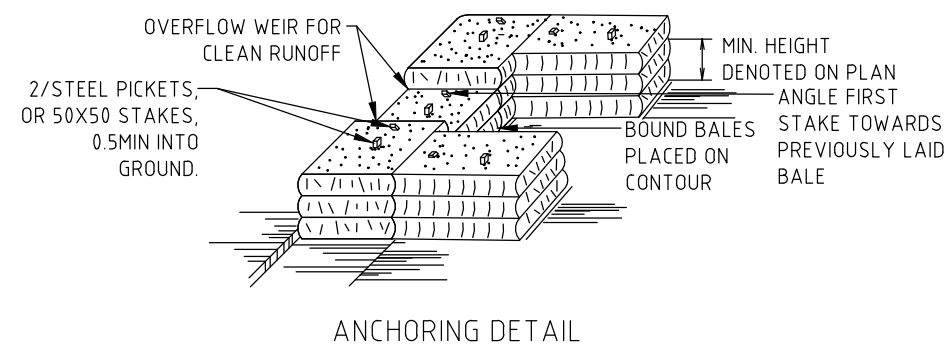
N.T.S.



ANCHORING DETAIL

100MM VERTICAL FACE

BEDDING DETAIL



ANCHORING DETAIL

100MM VERTICAL FACE

BEDDING DETAIL

### STRAW BALE MINI SEDIMENT CONTROL

NOT TO SCALE

Do not scale drawings. Verify all dimensions on site

issue	amendment	date
0	ISSUED FOR INFORMATION	28.11.2022
1	ISSUED FOR SUBMISSION	01.12.2022
2	90% CWC 1 DRAFT	15.12.2022
3	90% CWC 1 DRAFT	21.12.2022
4	90% CWC 1 DRAFT	03.03.2023
5	90% CWC 1 DRAFT	09.03.2023
6	90% CWC 1 DRAFT	22.03.2023
7	90% CWC 1 DRAFT	27.03.2023

Plenary  
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ABN 90 131 245 684

NSW  
GOVERNMENT  
Health  
Infrastructure

Project  
UNSW HEALTH TRANSITION HUB

Drawing  
SOIL AND ATER MANAGEMENT  
DETAILS

Scale  
AS SHOWN @B1

drawing no.

Drawn  
J. Eaton

B-ACO-CEC-0601

Checked  
S. Cai

issue

Project no  
NSW212828

7

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## Appendix B Calculations

### B.1 RUSLE Calculations

## SWMP Commentary, Detailed Calculations

Note: These "Detailed Calculation" spreadsheets relate only to high erosion hazard lands as identified in figure 4.6 or where the designer chooses to use the RUSLE to size sediment basins. The "Standard Calculation" spreadsheets should be used on low erosion hazard lands as identified by figure 4.6 and where the designer chooses not to run the RUSLE in calculations.

### 1. Site Data Sheet

**Site Name: UNSW Health Translation Hub (HTH)**

**Site Location: 49 Botany Street, Randwick NSW 2031**

**Precinct:**

**Description of Site:**

Site area	Site						Remarks
	1	2	3	4	5	6	
Total catchment area (ha)	0.9						
Disturbed catchment area (ha)	0.9						

#### Soil analysis

% sand (fraction 0.02 to 2.00 mm)	90						Soil texture should be assessed through mechanical dispersion only. Dispersing agents (e.g. Calgon) should not be used
% silt (fraction 0.002 to 0.02 mm)	5						
% clay (fraction finer than 0.002 mm)	5						
Dispersion percentage	10.0						E.g. enter 10 for dispersion of 10%
% of whole soil dispersible	0.75						See Section 6.3.3(e)
Soil Texture Group	C						See Section 6.3.3(c), (d) and (e)

#### Rainfall data

Design rainfall depth (days)	5						See Sections 6.3.4 (d) and (e)
Design rainfall depth (percentile)	75						See Sections 6.3.4 (f) and (g)
x-day, y-percentile rainfall event	25						See Section 6.3.4 (h)
Rainfall intensity: 2-year, 6-hour storm	12						See IFD chart for the site

#### RUSLE Factors

Rainfall erosivity ( <i>R</i> -factor)	3110						Automatic calculation from above data
Soil erodibility ( <i>K</i> -factor)	0.013						
Slope length (m)	60						RUSLE data can be obtained from Appendixes A, B and C
Slope gradient (%)	4						
Length/gradient ( <i>LS</i> -factor)	0.78						
Erosion control practice ( <i>P</i> -factor)	1.3						
Ground cover ( <i>C</i> -factor)	1	1	1	1	1	1	

#### Calculations

Soil loss (t/ha/yr)	41						
Soil Loss Class	1						See Section 4.4.2(b)
Soil loss (m <sup>3</sup> /ha/yr)	32						
Sediment basin storage volume, m <sup>3</sup>	5						See Sections 6.3.4(i) and 6.3.5 (e)



## 2. Storm Flow Calculations

Peak flow is given by the Rational Formula:

$$Q_y = 0.00278 \times C_{10} \times F_y \times I_{y,tc} \times A$$

where:

- $Q_y$  is peak flow rate ( $m^3/sec$ ) of average recurrence interval (ARI) of "Y" years
- $C_{10}$  is the runoff coefficient (dimensionless) for ARI of 10 years. Rural runoff coefficients are given in Volume 2, figure 5 of Pilgrim (1998), while urban runoff coefficients are given in Volume 1, Book VIII, figure 1.13 of Pilgrim (1998) and construction runoff coefficients are given in Appendix F
- $F_y$  is a frequency factor for "Y" years. Rural values are given in Volume 1, Book IV, Table 1.1 of Pilgrim (1998) while urban coefficients are given in Volume 1, Book VIII, Table 1.6 of Pilgrim (1998)
- $A$  is the catchment area in hectares (ha)
- $I_{y,tc}$  is the average rainfall intensity (mm/hr) for an ARI of "Y" years and a design duration of "tc" (minutes or hours)

Time of concentration ( $t_c$ ) =  $0.76 \times (A/100)^{0.38}$  hrs (Volume 1, Book IV of Pilgrim, 1998)

Note: For urban catchments the time of concentration should be determined by more precise calculations or reduced by a factor of 50 per cent.

### Peak flow calculations, 1

Site	A (ha)	tc (mins)	Rainfall intensity, I, mm/hr						$C_{10}$
			1 <sub>yr,tc</sub>	5 <sub>yr,tc</sub>	10 <sub>yr,tc</sub>	20 <sub>yr,tc</sub>	50 <sub>yr,tc</sub>	100 <sub>yr,tc</sub>	
1	0.9	8	87	132	152	174	202	224	0.76
2									
3									
4									
5									
6									

### Peak flow calculations, 2

ARI (yrs)	Frequency factor ( $F_y$ )	Peak flows						Comment
		1 ( $m^3/s$ )	2 ( $m^3/s$ )	3 ( $m^3/s$ )	4 ( $m^3/s$ )	5 ( $m^3/s$ )	6 ( $m^3/s$ )	
1 yr,tc	0.8	0.132						
5 yr,tc	0.95	0.238						
10 yr,tc	1	0.289						
20 yr,tc	1.05	0.347						
50 yr,tc	1.15	0.442						
100 yr,tc	1.2	0.511						

### 3. Volume of Sediment Basins: *Type C* Soils

Basin volume = settling zone volume + sediment storage volume

#### Settling Zone Volume

The settling zone volume for *Type C* soils is calculated to provide capacity to allow the design particle (e.g. 0.02 mm in diameter) to settle in the peak flow expected from the design storm (e.g. 0.25-year ARI). The volume of the basin's settling zone (V) can be determined as a function of the basin's surface area and depth to allow for particles to settle. Peak flow/discharge for the 0.25-year, ARI storm is given by the Rational Formula:

$$Q_{tc,0.25} = 0.5 \times [0.00278 \times C_{10} \times F_y \times I_{1yr,tc} \times A] \text{ (m}^3\text{/sec)}$$

where:

$Q_{tc,0.25}$  = flow rate (m<sup>3</sup>/sec) for the 0.25 ARI storm event

$C_{10}$  = runoff coefficient (dimensionless for ARI of 10 years)

$F_y$  = frequency factor for 1 year ARI storm

$I_{1yr,tc}$  = average rainfall intensity (mm/hr) for the 1-year ARI storm

A = area of catchment in hectares (ha)

Basin surface area (A) = area factor  $\times Q_{tc,0.25}$  m<sup>2</sup>

Particle settling velocities under ideal conditions (Section 6.3.5(e))

Particle Size	Area Factor
0.100	170
0.050	635
0.020	4100

Volume of settling zone = basin surface area  $\times$  depth (Section 6.3.5(e)(ii))

#### Sediment Storage Zone Volume

In the detailed calculation on Soil Loss Classes 1 to 4 lands, the sediment storage zone can be taken as 100 percent of the settling zone capacity. Alternately designers can design the zone to store the 2-month soil loss as calculated by the RUSLE (Section 6.3.5(e)(iv)). However, on Soil Loss Classes 5, 6 and 7 lands, the zone must contain the 2-month soil loss as calculated by the RUSLE (Section 6.3.5(e)(v)).

Place an "X" in the box below to show the sediment storage zone design parameters used here:

<input type="checkbox"/>	100% of settling zone capacity,
<input type="checkbox"/>	2 months soil loss calculated by RUSLE

#### Total Basin Volume

Site	$Q_{tc,0.25}$ (m <sup>3</sup> /s)	Area factor	Basin surface area (m <sup>2</sup> )	Depth of settling zone (m)	Settling zone volume (m <sup>3</sup> )	Sediment storage volume (m <sup>3</sup> )	Total basin volume (m <sup>3</sup> )	Basin shape		
								L:W Ratio	Length (m)	Width (m)
1	0.066	4100	271	0.6	163	5	168			
2		4100								
3		4100								
4		4100								
5		4100								
6		4100								

#### 4. Volume of Sediment Basins, *Type D* and *Type F* Soils

Basin volume = settling zone volume + sediment storage zone volume

##### Settling Zone Volume

The settling zone volume for *Type F* and *Type D* soils is calculated to provide capacity to contain all runoff expected from up to the y-percentile rainfall event. The volume of the basin's settling zone (V) can be determined as a function of the basin's surface area and depth to allow for particles to settle and can be determined by the following equation:

$$V = 10 \times C_v \times A \times R_{x\text{-day, } y\text{-}\%ile} \text{ (m}^3\text{)}$$

where:

10 = a unit conversion factor

$C_v$  = the volumetric runoff coefficient defined as that portion of rainfall that runs off as stormwater over the x-day period

$R_{x\text{-day, } y\text{-}\%ile}$  = is the x-day total rainfall depth (mm) that is not exceeded in y percent of rainfall events. (See Sections 6.3.4(d), (e), (f), (g) and (h)).

A = total catchment area (ha)

##### Sediment Storage Zone Volume

In the detailed calculation on Soil Loss Classes 1 to 4 lands, the sediment storage zone can be taken as 50 percent of the settling zone capacity. Alternately designers can design the zone to store the 2-month soil loss as calculated by the RUSLE (Section 6.3.4(i)(ii)). However, on Soil Loss Classes 5, 6 and 7 lands, the zone must contain the 2-month soil loss as calculated by the RUSLE (Section 6.3.4(i)(iii)).

Place an "X" in the box below to show the sediment storage zone design parameters used here:

<input type="checkbox"/>	50% of settling zone capacity,
<input type="checkbox"/>	2 months soil loss calculated by RUSLE

##### Total Basin Volume

Site	$C_v$	$R_{x\text{-day, } y\text{-}\%ile}$	Total catchment area (ha)	Settling zone volume (m <sup>3</sup> )	Sediment storage volume (m <sup>3</sup> )	Total basin volume (m <sup>3</sup> )
1	0.69	25	0.9	155.25	5	160.25
2	0.69					
3	0.69					
4	0.69					
5	0.69					
6	0.69					

## Appendix C Geotechnical Investigation - Borehole Logs

# BOREHOLE LOG

**CLIENT:** Hansen Yuncken Pty Ltd  
**PROJECT:** UNSW Health Translation Hub  
**LOCATION:** High and Botany Streets, Randwick

**SURFACE LEVEL:** 52.2 AHD  
**EASTING:** 337032  
**NORTHING:** 6245667  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 1004  
**PROJECT No:** 99852.02  
**DATE:** 8/3/2023  
**SHEET 1 OF 2**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
52.2	0.3	FILL/Gravelly SAND: fine to medium, pale grey, medium gravel, angular, dry		A	0.0				Gatic cover	
		SAND SP: fine, dark brown, trace silt, moist, aeolian		A	0.2					
	0.7	SAND SP: fine to medium, pale grey and mottled brown, moist, medium dense, aeolian		A	0.4		0.0-1.0m: Bulk Sample		Backfill 0.0-1.35m	
1				A	0.5					
				A	0.9					
	1.5			S	1.0		5,7,12 N = 19		Blank pipe 0.2-3.0m	
	1.75	SANDSTONE: medium grained, dark brown, apparently low to medium strength, Hawkesbury Sandstone			1.45				Bentonite 1.35-2.35m	
2		SANDSTONE: medium to coarse grained, brown then pale grey, trace carbonaceous laminations and clay seams, medium and medium to high strength, slightly weathered then fresh, slightly fractured and unbroken, Hawkesbury Sandstone			1.75		PL(A) = 0.7			
				C	1.97					
					2.62		PL(A) = 0.7			
3					3.05					
	3.28				3.36		PL(A) = 0.7			
4				C	4.7		PL(A) = 0.7		Gravel 2.35-6.0m	
					5.5		PL(A) = 0.4		Machine slotted PVC screen 3.0-6.0m	
5					6.0				End cap	
	6.45				6.25		PL(A) = 0.9		Bentonite 6.0-6.7m	
6					7.25		PL(A) = 1.3			
				C	8.55		PL(A) = 0.9			
7					9.0					
				C	9.45		PL(A) = 1.3			
8										
9										
10.0										

**RIG:** Comacchio GEO 305

**DRILLER:** Ground Test

**LOGGED:** SI

**CASING:** HW to 1.75m, HQ to 1.75m

**TYPE OF BORING:** Solid Flight Auger (TC-bit) to 1.5m, Rotary (water) to 1.75m, NMLC Coring to 14.97m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Location coordinates are in MGA94 Zone 56. Standpipe installed to 6.0m (Gravel Backfill 6.7m-14.97m, Bentonite 6.0m-6.7m, Screen 3.0m-6.0m, PVC 0.2m-3.0m, Gravel 2.35m-6.0m, Bentonite 1.35m-2.35m, Backfill 0.0 to 1.35m, gatic cover at surface)

## SAMPLING & IN SITU TESTING LEGEND

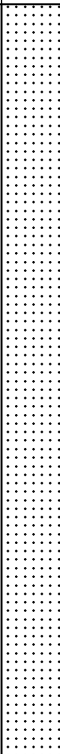


A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** Hansen Yuncken Pty Ltd  
**PROJECT:** UNSW Health Translation Hub  
**LOCATION:** High and Botany Streets, Randwick

**SURFACE LEVEL:** 52.2 AHD  
**EASTING:** 337032  
**NORTHING:** 6245667  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 1004  
**PROJECT No:** 99852.02  
**DATE:** 8/3/2023  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
42		SANDSTONE: medium to coarse grained, brown then pale grey, trace carbonaceous laminations and clay seams, medium and medium to high strength, slightly weathered then fresh, slightly fractured and unbroken, Hawkesbury Sandstone ( <i>continued</i> )			10.25		PL(A) = 1.1		Gravel Backfill 6.7-14.97m	
11				C	11.1		PL(A) = 0.9			
12					11.95					
40					12.25		PL(A) = 0.9			
13				C	13.0		PL(A) = 0.9			
14		Bore discontinued at 14.97m Target Depth Reached			14.0		PL(A) = 1.2			
15	14.97				14.97					
37										
16										
17										
18										
19										

**RIG:** Comacchio GEO 305

**DRILLER:** Ground Test

**LOGGED:** SI

**CASING:** HW to 1.75m, HQ to 1.75m

**TYPE OF BORING:** Solid Flight Auger (TC-bit) to 1.5m, Rotary (water) to 1.75m, NMLC Coring to 14.97m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Location coordinates are in MGA94 Zone 56. Standpipe installed to 6.0m (Gravel Backfill 6.7m-14.97m, Bentonite 6.0m-6.7m, Screen 3.0m-6.0m, PVC 0.2m-3.0m, Gravel 2.35m-6.0m, Bentonite 1.35m-2.35m, Backfill 0.0 to 1.35m, gatic cover at surface)

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** Hansen Yuncken Pty Ltd  
**PROJECT:** UNSW Health Translation Hub  
**LOCATION:** High and Botany Streets, Randwick

**SURFACE LEVEL:** 52.2 AHD  
**EASTING:** 337030  
**NORTHING:** 6245667  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 1005  
**PROJECT No:** 99852.02  
**DATE:** 9/3/2023  
**SHEET 1 OF 1**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
52.2	0.3	FILL/Gravelly SAND: medium to coarse, pale grey, medium to coarse gravel (igneous), angular, dry		A	0.0				Gatic cover	
					0.2					
	0.6	SAND SP: fine, dark brown, trace silt, moist, aeolian		A	0.4				Bentonite 0.1-0.5m	
					0.5				Blank pipe 0.1-1.1m	
		SAND SP: fine to medium, pale grey and brown, moist, aeolian			0.9					
	1.0			A	1.0				Gravel 0.5-2.1m	
	1.6									
	2.1	SANDSTONE: medium grained, brown, apparently low to medium strength, Hawkesbury Sandstone			2.0				Machine slotted PVC screen 1.1-2.1m	
				A	2.1				End cap	
		Bore discontinued at 2.1m Target Depth Reached								
	3									
	4									
	5									
	6									
	7									
	8									
	9									

**RIG:** Comacchio GEO 305

**DRILLER:** Ground Test

**LOGGED:** SI

**CASING:** Uncased

**TYPE OF BORING:** Solid Flight Auger (TC-it) to 2.1m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Location coordinates are in MGA94 Zone 56. Standpipe installed to 2.1m (Screen 1.1m-2.1m, PVC 0.1m-1.1m, Gravel 0.5m-2.1m, Bentonite 0.1m-0.5m, gatic cover at surface)

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PLD	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** Hansen Yuncken Pty Ltd  
**PROJECT:** UNSW Health Translation Hub  
**LOCATION:** High and Botany Streets, Randwick

**SURFACE LEVEL:** 54.6 AHD  
**EASTING:** 336989  
**NORTHING:** 6245651  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 1006  
**PROJECT No:** 99852.02  
**DATE:** 10/3/2023  
**SHEET 1 OF 2**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
54.4	0.2	FILL/Gravelly SAND: medium to coarse, pale grey, medium to coarse gravel (igneous), dry		A	0.0				Gatic cover
		FILL/SAND: fine to medium, brown, trace igneous gravel, moist		A	0.2				
1	1.0	FILL/RIPPED SANDSTONE and SAND: fine to medium, pale grey and brown, ripped sandstone gravel and boulders, moist, variably compacted		A	0.4				Backfill 0.2-3.0m
				A	0.5				
2				S	0.9		2,6,6 N = 12		Blank pipe 0.2-4.5m
				S	1.0				
3				S	1.45				Bentonite 3.0-4.0m
				S	2.5		2,1,2 N = 3		
4	4.0	SANDSTONE: medium to coarse grained, pale grey, apparently medium strength, Hawkesbury Sandstone		S	2.95				
				S	4.0		20/50 refusal		
5	4.45	SANDSTONE: medium grained, pale grey, grey-brown and red-brown, 5-10% clay seams, medium and low to medium strength, moderately to slightly weathered then fresh, slightly fractured, Hawkesbury Sandstone		C	4.05				
				C	4.45		PL(A) = 0.9		
6				C	4.7				Gravel 4.0-7.5m
				C	5.5		PL(A) = 1.1		
7				C	5.75				Machine slotted PVC screen 4.5-7.5m
				C	6.45		PL(A) = 0.6		
8				C	7.0		PL(A) = 0.3		End cap
				C	8.05		PL(A) = 0.7		
9	8.42			C	8.5				Bentonite 7.5-8.5m
				C	9.0		PL(A) = 0.7		
10.0									

**RIG:** Comacchio GEO 305

**DRILLER:** Ground Test

**LOGGED:** SI

**CASING:** HW to 4.45m

**TYPE OF BORING:** Solid Flight Auger (TC-bit) to 4.0m, Rotary (water) to 4.45m, NMLC Coring to 17.45m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Location coordinates are in MGA94 Zone 56. Standpipe installed to 7.5m (Gravel Backfill 8.5m-17.45m, Bentonite 7.5m-8.5m, Screen 4.5m-7.5m, PVC 0.2m-4.5m, Gravel 4.0m-7.5m, Bentonite 3.0m-4.0m, Backfill 0.2 to 3.0m, gatic cover at surface)

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



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# BOREHOLE LOG

**CLIENT:** Hansen Yuncken Pty Ltd  
**PROJECT:** UNSW Health Translation Hub  
**LOCATION:** High and Botany Streets, Randwick

**SURFACE LEVEL:** 54.6 AHD  
**EASTING:** 336989  
**NORTHING:** 6245651  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 1006  
**PROJECT No:** 99852.02  
**DATE:** 10/3/2023  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
44		SANDSTONE: medium grained, pale grey, grey-brown and red-brown, 5-10% clay seams, medium and low to medium strength, moderately to slightly weathered then fresh, slightly fractured, Hawkesbury Sandstone (continued)			10.35		PL(A) = 0.5			
11	11.0	SANDSTONE: medium grained, pale grey, high strength, fresh, slightly fractured and unbroken, Hawkesbury Sandstone		C	11.0		PL(A) = 1.2	11		
43					11.5					
12					12.0		PL(A) = 1.4	12		
42										
13				C	13.0		PL(A) = 1.2	13	Gravel Backfill 8.5-17.45m	
41										
14					14.0		PL(A) = 1.7	14		
40					14.5					
15					15.1		PL(A) = 1.1	15		
39										
16				C	16.0		PL(A) = 1.2	16		
38										
17					17.0		PL(A) = 1.5	17		
37	17.45	Bore discontinued at 17.45m Target Depth Reached			17.45					
18								18		
36										
19								19		
35										

**RIG:** Comacchio GEO 305

**DRILLER:** Ground Test

**LOGGED:** SI

**CASING:** HW to 4.45m

**TYPE OF BORING:** Solid Flight Auger (TC-bit) to 4.0m, Rotary (water) to 4.45m, NMLC Coring to 17.45m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Location coordinates are in MGA94 Zone 56. Standpipe installed to 7.5m (Gravel Backfill 8.5m-17.45m, Bentonite 7.5m-8.5m, Screen 4.5m-7.5m, PVC 0.2m-4.5m, Gravel 4.0m-7.5m, Bentonite 3.0m-4.0m, Backfill 0.2 to 3.0m, gatic cover at surface)

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** Hansen Yuncken Pty Ltd  
**PROJECT:** UNSW Health Translation Hub  
**LOCATION:** High and Botany Streets, Randwick

**SURFACE LEVEL:** 54.6 AHD  
**EASTING:** 336989  
**NORTHING:** 6245650  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 1007  
**PROJECT No:** 99852.02  
**DATE:** 16/3/2023  
**SHEET 1 OF 1**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
54.6	0.3	FILL/Gravelly SAND: medium to coarse, pale grey, igneous gravel, fine to medium, angular sand, dry		A	0.2					Gatic cover
		FILL/RIPPED SANDSTONE and SAND: fine to medium sand, pale grey-brown, ripped sandstone gravel and boulders, moist		A	0.5					
1				A	1.0					
				S	1.45					
2	2.0	FILL/SAND: fine to medium, brown, trace ripped sandstone gravel, moist		A	2.0				Blank pipe 0.1-1.6m	
				S	2.5					
3				A	2.95					
					3.0				Gravel 1.0-4.6m	
3.5		SAND SP: fine, grey-brown, trace gravel, moist, aeolian								
4	4.0	SANDSTONE: medium grained, brown, apparently very low and low to medium strength, Hawkesbury Sandstone								
									Machine slotted PVC screen 1.6-4.6m	
4.7		Bore discontinued at 4.7m Target Depth Reached								
5									End cap	
6										
7										
8										
9										

**RIG:** Comacchio GEO 305

**DRILLER:** Ground Test

**LOGGED:** SI

**CASING:** Uncased

**TYPE OF BORING:** Solid Flight Auger (TC-bit) to 4.7m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Location coordinates are in MGA94 Zone 56. Standpipe installed to 4.6m (Screen 1.6m-4.6m, PVC 0.1m-1.6m, Gravel 1.0m-4.6m, Bentonite 0.2m-1.0m, gatic cover at surface)

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



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# BOREHOLE LOG

**CLIENT:** Hansen Yuncken Pty Ltd  
**PROJECT:** UNSW Health Translation Hub  
**LOCATION:** High and Botany Streets, Randwick

**SURFACE LEVEL:** 52.0 AHD  
**EASTING:** 337031  
**NORTHING:** 6245622  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 1008  
**PROJECT No:** 99852.02  
**DATE:** 15/3/2023  
**SHEET 1 OF 2**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
52.0	0.3	FILL/Gravelly SAND: fine to medium, grey-brown, trace igneous and ripped sandstone gravel, moist, apparently loose		A	0.2					
	0.5			A	0.5					
	0.8	FILL/SAND: fine to medium, grey-brown, moist, apparently loose								
51.0	1.0	SAND SP: fine, pale grey then light brown, moist, loose to medium dense, aeolian		A	1.0					
	1.45			S	1.45		4,5,4 N = 9			
50.0	2.0			A	2.0					
	2.5	Below 2.5m: becoming wet		S	2.5		2,8/150 refusal			
49.0	2.85	SANDSTONE: medium grained, pale grey-brown, apparently very low strength, Hawkesbury Sandstone			2.8		PL(A) = 0.2			
	2.9	SANDSTONE: medium grained, pale grey and brown, indistinct bedding, low strength, highly to moderately weathered, slightly fractured, Hawkesbury Sandstone			2.85					
	3.65				3.65		PL(A) = 0.2			
48.0	4.0			C	4.0					
	4.6				4.6		PL(A) = 0.2			
47.0	5.0	SANDSTONE: medium grained, pale grey, thickly bedded and massive, medium to high strength, fresh, slightly fractured and unbroken, Hawkesbury Sandstone			5.05					
	5.6				5.6		PL(A) = 1.3			
46.0	6.0			C	6.0					
	6.8				6.8		PL(A) = 0.9			
45.0	7.0				7.0					
	7.35				7.35		PL(A) = 1.1			
44.0	8.0				8.0					
	8.65				8.65		PL(A) = 0.8			
43.0	9.0			C	9.0					
	9.2				9.2		PL(A) = 1			
42.0	9.6	SANDSTONE: (Refer to next page)			9.6					

**RIG:** Comacchio GEO 205

**DRILLER:** Ground Test

**LOGGED:** SI

**CASING:** HW to 2.85m

**TYPE OF BORING:** Solid Flight Auger (TC-bit) to 2.5m, Rotary Water to 2.85m, NMLC Coring to 15.63m

**WATER OBSERVATIONS:** Free groundwater observed at 2.8m whilst augering

**REMARKS:** Location coordinates are in MGA94 Zone 56. Standpipe installed to 7.0m (Screen 4.0m-7.0m, PVC stick up 0.7m above ground level and 0.0m-4.0m, Gravel 3.5m-7.0m, Bentonite 2.5m-3.5m, Backfill to Ground Level)

## SAMPLING & IN SITU TESTING LEGEND

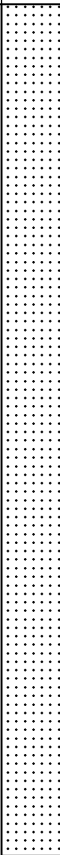
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** Hansen Yuncken Pty Ltd  
**PROJECT:** UNSW Health Translation Hub  
**LOCATION:** High and Botany Streets, Randwick

**SURFACE LEVEL:** 52.0 AHD  
**EASTING:** 337031  
**NORTHING:** 6245622  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 1008  
**PROJECT No:** 99852.02  
**DATE:** 15/3/2023  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		SANDSTONE: medium grained, pale grey and grey, thinly bedded and cross bedded, 5% clay seams, medium strength, fresh, slightly fractured and unbroken, Hawkesbury Sandstone ( <i>continued</i> )		C	10.25		PL(A) = 0.9			
	11				11.0 11.1		PL(A) = 1			
	12			C	12.15		PL(A) = 0.8			
	13				13.15		PL(A) = 1			
	14				14.0					
	15			C	14.6		PL(A) = 0.9			
	15.63	Bore discontinued at 15.63m Target Depth Reached			15.58 15.63		PL(A) = 1.7			
	16									
	17									
	18									
	19									

**RIG:** Comacchio GEO 205

**DRILLER:** Ground Test

**LOGGED:** SI

**CASING:** HW to 2.85m

**TYPE OF BORING:** Solid Flight Auger (TC-bit) to 2.5m, Rotary Water to 2.85m, NMLC Coring to 15.63m

**WATER OBSERVATIONS:** Free groundwater observed at 2.8m whilst augering

**REMARKS:** Location coordinates are in MGA94 Zone 56. Standpipe installed to 7.0m (Screen 4.0m-7.0m, PVC stick up 0.7m above ground level and 0.0m-4.0m, Gravel 3.5m-7.0m, Bentonite 2.5m-3.5m, Backfill to Ground Level)

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** Hansen Yuncken Pty Ltd  
**PROJECT:** UNSW Health Translation Hub  
**LOCATION:** High and Botany Streets, Randwick

**SURFACE LEVEL:** 52.1 AHD  
**EASTING:** 337031  
**NORTHING:** 6245623  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 1009  
**PROJECT No:** 99852.02  
**DATE:** 15/3/2023  
**SHEET 1 OF 1**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
52.3	0.3	FILL/Gravelly SAND: fine to coarse, grey-brown, ripped sandstone gravel and boulders, moist		A	0.2		0.0-1.0m: Bulk Sample			Bentonite 0.0-0.8m Blank pipe 1.2m stickup to 1.3m
		FILL/SAND: fine to medium, pale grey and brown, trace ripped sandstone gravel, moist		A	0.5					
51.5	1.0	SAND SP: fine to medium, pale grey then pale brown, moist to wet, aeolian		A	1.0					
50.5	2.0			A	2.0					
49.5	2.8	SANDSTONE: fine to medium grained, pale brown, apparently very low to low strength, Hawkesbury Sandstone		A	3.0					
48.5	3.3	Bore discontinued at 3.3m Target Depth Reached								
48.0	4.0									
47.5	5.0									
47.0	6.0									
46.5	7.0									
46.0	8.0									
45.5	9.0									

**RIG:** Comacchio GEO 305

**DRILLER:** Ground Test

**LOGGED:** SI

**CASING:** Uncased

**TYPE OF BORING:** Solid Flight Auger (TC-bit) to 3.3m

**WATER OBSERVATIONS:** Free groundwater observed at 2.8m

**REMARKS:** Location coordinates are in MGA94 Zone 56. Standpipe installed to 3.3m (Screen 1.3m-3.3m, PVC stick up 1.2m above ground surface level and 0.0m-1.3m, Gravel 0.8m-3.3m, Bentonite 0.0m-0.8m)

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

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## Appendix C

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Previous Borehole Logs

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 54.4 AHD  
**EASTING:** 337086  
**NORTHING:** 6245667  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 101  
**PROJECT No:** 72505.13  
**DATE:** 25/2/2019  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
54	0.15	FILLING: grey, fine to medium sand and gravel filling, damp (roadbase)																A			2.2,1 N = 3	
	0.6	FILLING: yellow-grey, fine to medium sand with sandstone cobbles and coarse sandstone gravel filing, moist																A				
	1	SAND: loose, brown, fine to medium sand, moist																A				
	53																	S				
52	1.8	SANDSTONE: extremely low to very low strength, extremely to highly weathered, red-brown, medium to coarse grained sandstone																			PL(A) = 0.6	
2	2.12	SANDSTONE: medium strength, moderately weathered, red-brown, medium to coarse grained sandstone with some very low strength bands																C	100	82		
3																						PL(A) = 0.7
51																						
4																						PL(A) = 0.4
50	4.27	SANDSTONE: medium and high strength, fresh, fractured and slightly fractured, pale grey, medium to coarse grained sandstone with some extremely low strength clay bands																C	100	99		
5																						PL(A) = 0.8
49																						
6																						PL(A) = 1.1
48																						
7																					PL(A) = 1	
47																						
8																					PL(A) = 0.7	
46																						
9																					PL(A) = 1.4	
45	9.24																	C	99	96		
10.0																						

**RIG:** Hanjin D8

**DRILLER:** BG Drilling

**LOGGED:** SLB

**CASING:** HW to 2.05m

**TYPE OF BORING:** Solid flight auger to 2.05m, NMLC-coring to 15.39m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:**

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



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# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 54.4 AHD  
**EASTING:** 337086  
**NORTHING:** 6245667  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 101  
**PROJECT No:** 72505.13  
**DATE:** 25/2/2019  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing								
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments		
44	11	SANDSTONE: medium and high strength, fresh, fractured and slightly fractured, pale grey, medium to coarse grained sandstone with some extremely low strength clay bands (continued)																C	99	96	PL(A) = 0.8					
43																										
42																										
41																										
40																										
39																										
38																										
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2																										
1																										
0																										
39	15.39	Bore discontinued at 15.39m Target depth reached																								
38																										
37																										
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33																										
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3																										
2																										
1																										
0																										

**RIG:** Hanjin D8

**DRILLER:** BG Drilling

**LOGGED:** SLB

**CASING:** HW to 2.05m

**TYPE OF BORING:** Solid flight auger to 2.05m, NMLC-coring to 15.39m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:**

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

BORE: 101

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 101  
Depth: 2.05 – 7.00m  
Core Box No.: 1/3



2.05 – 7.00 m

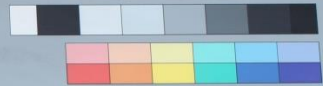
BORE: 101

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 101  
Depth: 7.00-12.00m  
Core Box No.: 2/3



7.00 – 12.00 m

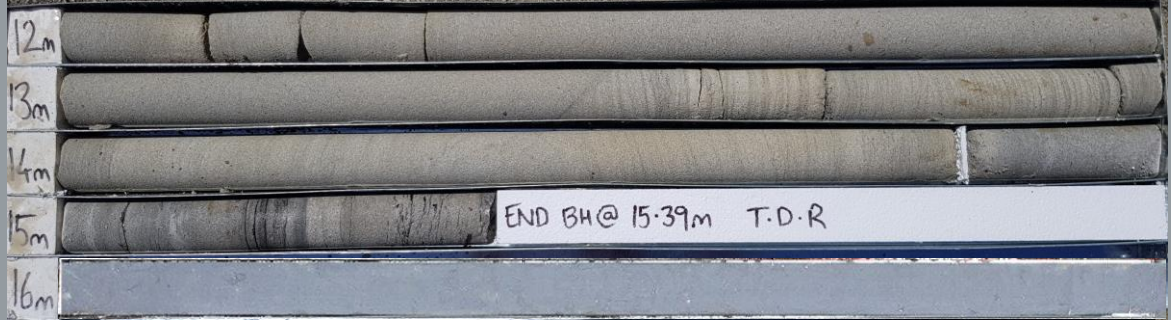
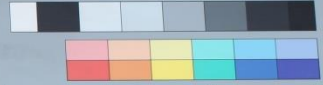
BORE: 101

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 101  
Depth: 12.00 – 15.39m  
Core Box No.: 3/3



12.00 – 15.39 m

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 53.7 AHD  
**EASTING:** 337065  
**NORTHING:** 6245669  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 102  
**PROJECT No:** 72505.13  
**DATE:** 26/2/2019  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FR		Ex Low	Very Low	Low	Medium	High			Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
53      52	0.1	ASPHALTIC CONCRETE																A			1,1,2 N = 3
	0.25	FILLING: grey, fine to medium sand and gravel filling, damp (roadbase)															A				
		SAND: loose, grey-brown, fine to medium sand with trace of fine sandstone gravel, damp (possibly filling)															A				
	1																S				
	1.4	SAND: medium dense, yellow-brown, medium to coarse sand with trace clay, moist																			
	2																				
51      50      49      48      47      46      45      44	2.15	SANDSTONE: medium strength, extremely then moderately weathered, fragmented and fractured, red-brown and yellow-brown medium to coarse grained sandstone with some extremely low strength clay bands															C	100	92	PL(A) = 0.4	
	2.96													2.82-2.86m: Cs 2.86m: CORE LOSS: 100mm 3.1m: B 0°, pl, ro, fe 3.20-3.28m: Cs 3.44-3.61m: Cs						PL(A) = 0.4	
														3.88-3.92m: Cs							
	4													4.14-4.18m: Cs			C	97	84	PL(A) = 0.5	
	4.29	SANDSTONE: medium and high strength, fresh, slightly fractured, pale grey, medium to coarse grained sandstone																			
	5	5.00-8.20m: some low and extremely low strength bands												4.98-5.03m: Cs						PL(A) = 0.8	
														5.38-5.41m: Cs							
	6																			PL(A) = 0.8	
	7													7.07m: B 0°, pl, ro, fg 10mm			C	100	100	PL(A) = 1.1	
	8													8.18m: B 0°, pl, ro, fg 10mm						PL(A) = 1.1	
	9																C	100	100		
														9.61m: B 0°, pl, ro, cly co						PL(A) = 1.2	

**Douglas Partners**  
Geotechnics / Environment / Groundwater

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 53.7 AHD  
**EASTING:** 337065  
**NORTHING:** 6245669  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 102  
**PROJECT No:** 72505.13  
**DATE:** 26/2/2019  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		SANDSTONE: medium and high strength, fresh, slightly fractured, pale grey, medium to coarse grained sandstone <i>(continued)</i>																				PL(A) = 1.1
	43																					
	11																	10.89m: B 5°, pl, ro, cly co	C	100	100	PL(A) = 1.3
	42																					
	12																					
	41																	12.63m: B 0°, pl, ro, cln				PL(A) = 0.7
	13																	13.16m: B 0°, pl, ro, fg	C	100	100	PL(A) = 1.1
	40																					
	14	13.90-14.10m: indistinct siltstone laminations																13.81m: J 30°, pl, ro, cln 13.92m: B 0°, pl, ro, cbs				
	39																	14.49m: B 5°, pl, ro, cly 5mm 14.79m: B 0°, pl, ro, cly 5mm 14.84m: B 0°, pl, ro, cly 8mm				PL(A) = 0.9
	14.85	14.85-15.30m: fine to medium grained sandstone with approximately 5% carbonaceous laminations																	C	100	63	
	15.3	Bore discontinued at 15.3m Target depth reached																				
	38																					
	16																					
	37																					
	17																					
	36																					
	18																					
	35																					
	19																					
	34																					

**RIG:** Hanjin D8

**DRILLER:** BG Drilling

**LOGGED:** SLB

**CASING:** HW to 2.15m

**TYPE OF BORING:** Solid flight auger to 2.15m, NMLC-coring to 15.30m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:**

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



BORE: 102

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 102  
Depth: 2.15 – 7.00m  
Core Box No.: 1/3



2.15 – 7.00 m

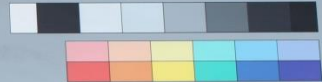
BORE: 102

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 102  
Depth: 7.00-12.00m  
Core Box No.: 2/3



7.00 – 12.00 m

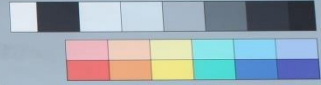
BORE: 102

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 102  
Depth: 12.00 – 15.30m  
Core Box No.: 3/3



12.00 – 15.30 m



# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 54.5 AHD  
**EASTING:** 336994  
**NORTHING:** 6245675  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 103  
**PROJECT No:** 72505.13  
**DATE:** 26/2/2019  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering EW HW MW SW FS FR	Graphic Log	Rock Strength Ex Low Very Low Low Medium High Very High Ex High	Water 0.01 0.05 0.10 0.50 1.00	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
								B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
	0.3	FILLING: pale grey, fine to medium sand filling with trace sandstone gravel and building rubble (terracotta, concrete, glass), humid								A			3,8,9 N = 17
										A			
	1	SAND: medium dense, red-brown mottled dark grey, medium to coarse sand, moist								A			
										S			
	2												
	2.30m	orange-brown											
	2.6									S			25/100 refusal
	2.7	SANDSTONE: extremely low strength, extremely weathered, yellow-brown, medium to coarse grained sandstone											
	3	SANDSTONE: low strength, extremely to highly weathered, medium to coarse grained sandstone with extremely low and very low strength bands											PL(A) = 0.3
	3.07												
	4	SANDSTONE: medium strength, moderately weathered, fractured and slightly fractured, red-brown, medium to coarse grained sandstone								C	100	93	PL(A) = 0.5
	4.38												
	5	SANDSTONE: medium and high strength, fresh, fractured and slightly fractured, pale grey, medium to coarse grained sandstone with some extremely and very low strength bands						4.79m: B 0°, pl, ro, cly vn					PL(A) = 1.3
	6							5.32-5.41m: J 70°, pl, ro, cln					
	7							6.17-6.24m: Cs					
								6.37-6.49m: J 70°, pl, ro, cln					PL(A) = 1.1
	8							6.96m: J 50°, pl, ro, fg		C	100	93	PL(A) = 2.3
								7.26-7.36m: J 45°-90°, cu, ro, cln					
								7.52-7.72m: B(x4) 5°-15°, pl, ro, fe					
	9	8.39-9.10m: low strength											PL(A) = 0.2
	10							9.15m: B 0°, pl, ro, cln		C	100	99	PL(A) = 0.8
								9.47-9.50m: Cs					
	10.0												

**RIG:** Hanjin D8

**DRILLER:** BG Drilling

**LOGGED:** SLB

**CASING:** HW to 2.6

**TYPE OF BORING:** Solid flight auger to 2.6m, NMLC-coring to 15.32m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:**

## SAMPLING & IN SITU TESTING LEGEND

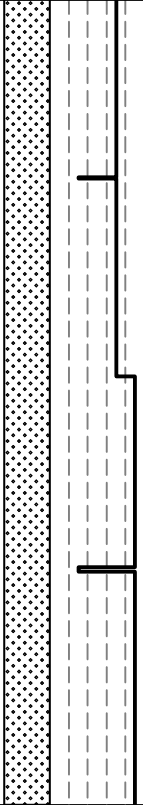
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 54.5 AHD  
**EASTING:** 336994  
**NORTHING:** 6245675  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 103  
**PROJECT No:** 72505.13  
**DATE:** 26/2/2019  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing								
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments		
44	11	SANDSTONE: medium and high strength, fresh, slightly fractured, pale grey, medium to coarse grained sandstone with some extremely and very low strength bands																C	100	99	PL(A) = 0.8					
43																									PL(A) = 0.7	
42	12																									
41	13																									
40	14																									
15.32	15	Bore discontinued at 15.32m Target depth reached																				PL(A) = 1				
39	16																									
38	17																									
37	18																									
36	19																									

**RIG:** Hanjin D8

**DRILLER:** BG Drilling

**LOGGED:** SLB

**CASING:** HW to 2.6

**TYPE OF BORING:** Solid flight auger to 2.6m, NMLC-coring to 15.32m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:**

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

BORE: 103

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 103  
Depth: 2.60 – 7.00m  
Core Box No.: 1/3



72505.13 26.02.19 START CORE @ 2.60m  
RANDWICK BH103



2.60 – 7.00 m

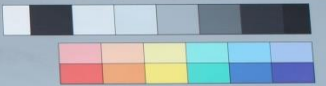
BORE: 103

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 103  
Depth: 7.00-12.00m  
Core Box No.: 2/3



7.00 – 12.00 m

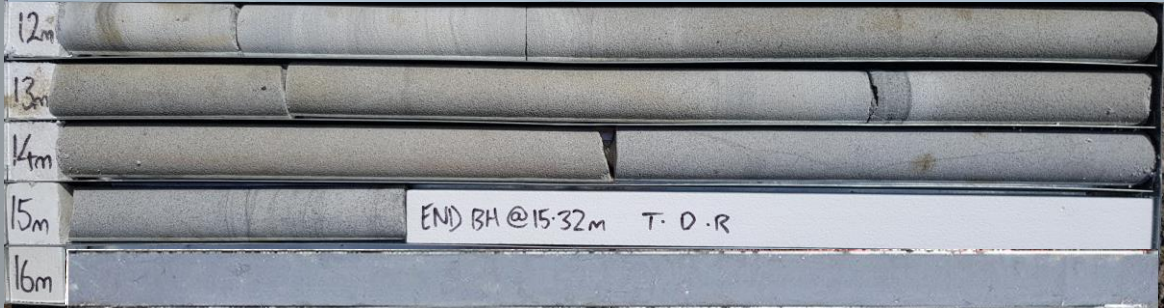
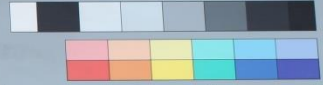
BORE: 103

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 103  
Depth: 12.00 – 15.32m  
Core Box No.: 3/3



12.00 – 15.32 m

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 54.4 AHD  
**EASTING:** 336981  
**NORTHING:** 6245609  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 104  
**PROJECT No:** 72505.13  
**DATE:** 27/2/2019  
**SHEET 1 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
54	0.2	FILLING: pale grey, fine to medium sand filling with building rubble (terracotta pipe, glass), damp							XX														A			2.5,7 N = 12
54	0.5	SAND: brown, fine to medium sand, damp (possibly filling)																				A				
53	1	SAND: medium dense, yellow-brown mottled white, medium to coarse sand, moist																				A				
53																						S				
52	2																									5.8,9 N = 17
52																										
51	3																					S				
51		3.40m: becoming yellow																				A				
50	4																									10/120 refusal Hammer bouncing PL(A) = 0.3
50																						S				
50	4.12	SANDSTONE: low to medium strength, highly, moderately and slightly weathered, fractured and slightly fractured, red-brown and pale grey, medium to coarse grained sandstone with some extremely to very low strength bands																								
50																										
49	5																						C	100	91	PL(A) = 0.6
49																										
49																										
49																										
48	6																									PL(A) = 0.7
48																										
48																										
48																										
47	7																									PL(A) = 0.8
47																										
47																										
47																										
46	8	8.12-9.10m: fine to medium grained																								PL(A) = 0.3
46		8.43-9.10m: high strength																								
46																										
46																										
45	9	SANDSTONE: medium and high strength, fresh, fractured and slightly fractured, pale grey, medium to coarse grained sandstone																					C	100	98	PL(A) = 1.2
45																										

**RIG:** Hanjin D8

**DRILLER:** BG Drilling

**LOGGED:** SLB

**CASING:** HW to 4.12m

**TYPE OF BORING:** Solid flight auger to 4.12m, NMLC-coring to 15.81m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:**

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 54.4 AHD  
**EASTING:** 336981  
**NORTHING:** 6245609  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 104  
**PROJECT No:** 72505.13  
**DATE:** 27/2/2019  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High			Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
44		SANDSTONE: medium and high strength, fresh, fractured and slightly fractured, pale grey, medium to coarse grained sandstone (continued)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										

**RIG:** Hanjin D8

**DRILLER:** BG Drilling

**LOGGED:** SLB

**CASING:** HW to 4.12m

**TYPE OF BORING:** Solid flight auger to 4.12m, NMLC-coring to 15.81m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:**

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

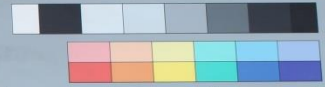
BORE: 104

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 104  
Depth: 4.12 – 9.00m  
Core Box No.: 1/3



72505.13 27-02-19 START  
RANDWICK BH104 @ 4.12m  
CORE



4.12 – 9.00 m

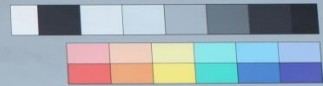
BORE: 104

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 104  
Depth: 9.00-14.00m  
Core Box No.: 2/3



9.00 – 14.00 m



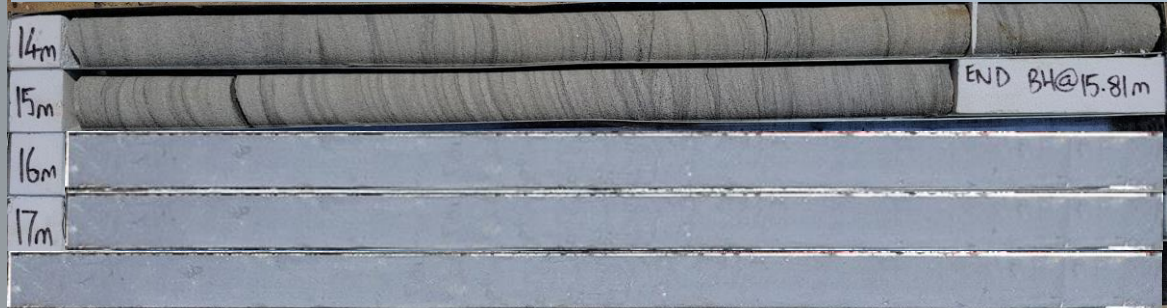
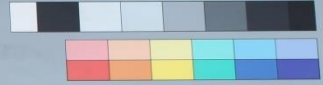
BORE: 104

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 104  
Depth: 14.00 – 15.81m  
Core Box No.: 3/3



14.00 – 15.81 m

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 51.6 AHD  
**EASTING:** 337006  
**NORTHING:** 6245565  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 105  
**PROJECT No:** 72505.13  
**DATE:** 27 - 28/2/2019  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
51	0.3	FILLING: grey-brown, fine to medium sand filling with some building rubble (concrete, terracotta fragments), humid  SAND: medium dense, yellow-brown, fine to medium sand, damp																A			3,5,6 N = 11
1																		A			
50																		A			
2	2.0	SAND: loose, yellow-brown mottled brown, medium to coarse sand with some clay, trace of decomposed wood and ironstone gravel, moist																S			
49																					2,2,2 N = 4
3																					
48	3.5	SAND: loose, dark brown, fine to medium sand with some silt, wet																			15/100 refusal Hammer bouncing PL(A) = 0.2
4	4.1	3.9m: becoming saturated																S			
47		SANDSTONE: low to medium strength, slightly weathered and fresh, fractured and slightly fractured, medium to coarse grained, red-brown and pale grey sandstone with some extremely low strength bands																			PL(A) = 0.7
5																		C	100	74	
46																					PL(A) = 0.4
6																					
45																					PL(A) = 0.7
7	7.23	SANDSTONE: medium and high strength, fresh, slightly fractured, pale grey, medium to coarse grained sandstone with some very low strength bands																C	100	97	
44																					PL(A) = 0.9
8																					
43																					PL(A) = 1.2
9																					
42																		C	100	93	

**RIG:** Hanjin D8

**DRILLER:** BG Drilling

**LOGGED:** SLB

**CASING:** HW to 4.1m

**TYPE OF BORING:** Solid flight auger to 4.1m, NMLC-coring to 15.50m

**WATER OBSERVATIONS:** Free groundwater observed at 3.9m whilst augering

**REMARKS:**

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 51.6 AHD  
**EASTING:** 337006  
**NORTHING:** 6245565  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 105  
**PROJECT No:** 72505.13  
**DATE:** 27 - 28/2/2019  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR	Ex Low	Very Low	Low	Medium	High	Very High	Ex High			Type	Core Rec. %	RQD %	Test Results & Comments
		SANDSTONE: medium and high strength, fresh, slightly fractured, pale grey, medium to coarse grained sandstone with some very low strength bands <i>(continued)</i>															B - Bedding J - Joint S - Shear F - Fault				PL(A) = 1
	11																	C	100	93	
	12																				PL(A) = 0.8
	13																	C	100	99	PL(A) = 1
	14	13.32-14.68m: indistinct and distinct carbonaceous laminations																			PL(A) = 0.6
	15																				PL(A) = 0.8
	15.5	15.40-15.50m: carbonaceous flecks Bore discontinued at 15.5m Target depth reached																C	100	95	PL(A) = 0.8
	16																				
	17																				
	18																				
	19																				

**RIG:** Hanjin D8 **DRILLER:** BG Drilling **LOGGED:** SLB **CASING:** HW to 4.1m  
**TYPE OF BORING:** Solid flight auger to 4.1m, NMLC-coring to 15.50m  
**WATER OBSERVATIONS:** Free groundwater observed at 3.9m whilst augering  
**REMARKS:**

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

BORE: 105

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 105  
Depth: 4.10 – 9.00m  
Core Box No.: 1/3



72505-13 28-02-19 START  
CORE  
RANDWICK BH105 @ 4.10m



4.10 – 9.00 m

BORE: 105

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 105  
Depth: 9.00-14.00m  
Core Box No.: 2/3



9.00 – 14.00 m

BORE: 105

PROJECT: Randwick

February 2019



Project No: 72505.13  
BH ID: 105  
Depth: 14.00 – 15.50m  
Core Box No.: 3/3



14.00 – 15.50 m



# BOREHOLE LOG

**CLIENT:** Health Infrastructure  
**PROJECT:** Site Infrastructure Investigation  
**LOCATION:** Prince of Wales Hospital, Randwick

**SURFACE LEVEL:** 56.3 AHD<sup>^</sup>  
**EASTING:** 337123.2  
**NORTHING:** 6245657.1  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 1  
**PROJECT No:** 85461.00  
**DATE:** 26/5/2016  
**SHEET** 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low			Medium	High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
96	0.31	CONCRETE SLAB																			
1		FILLING - apparently moderately compacted, orange-brown and grey, gravelly clayey sand filling with a trace of sandstone cobbles, damp																E			
55	1.05	SANDSTONE - extremely low and very low strength, orange-brown and purple, medium to coarse grained sandstone with some iron-cemented bands																E			
55	1.5																				
54	2	SANDSTONE - extremely low and very low strength, extremely then highly weathered, slightly fractured, red-brown, orange-brown and grey medium to coarse grained sandstone with some iron-cemented bands																C	100	76	PL(A) = 0.04
54	2.58																				
53	3	- very fine grained sandstone/siltstone below 2.3m																			
53	3.38	SANDSTONE - very low strength, moderately weathered, slightly fractured, pink-grey and pale grey fine to medium grained sandstone with up to 15% siltstone laminations																C	100	96	PL(A) = 0.08 PL(A) = 0.09 PL(A) = 0.08 PL(A) = 0.6
52	4	SANDSTONE - medium and high strength, slightly then moderately weathered, slightly fractured, pale grey, grey and purple-brown, medium to coarse grained sandstone with some extremely low strength, extremely weathered bands and some iron-cemented bands																			
51	5																				
51	5.91	SANDSTONE - medium strength, fresh, slightly fractured, pale grey, medium to coarse grained sandstone with some extremely low strength bands																C	100	89	PL(A) = 0.6
50	6																				
49	7																				
49	7.97	Bore discontinued at 7.97m - target depth reached																			
48	8																				
47	9																				

**RIG:** Bobcat **DRILLER:** GM **LOGGED:** MP **CASING:** HW to 1.5m

**TYPE OF BORING:** Diacore to 0.31m; NDD to 1.05m; Solid flight auger to 1.55m; NMLC-Coring to 7.97m

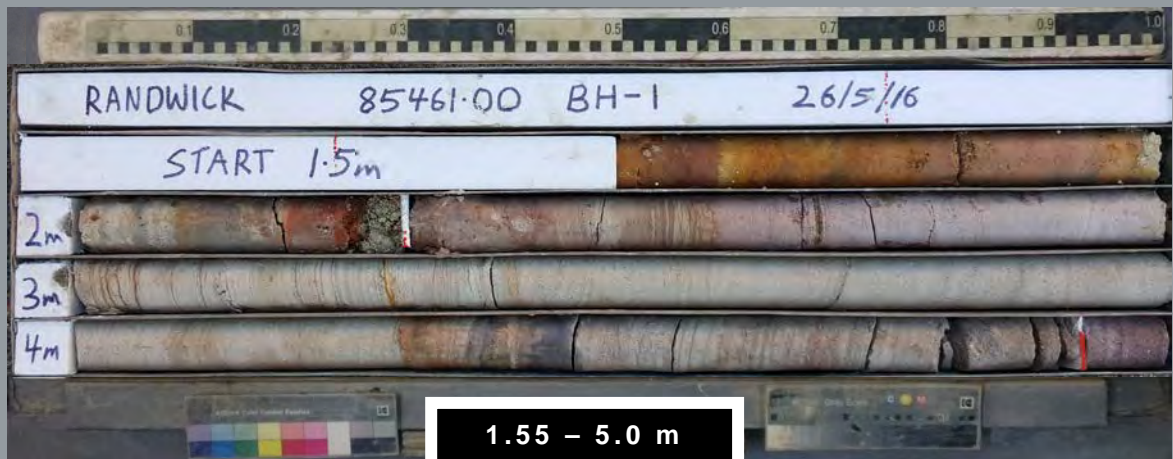
**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** NDD = Non destructive suction drilling. ^Surface level provided by LTS Lockley Pty Ltd

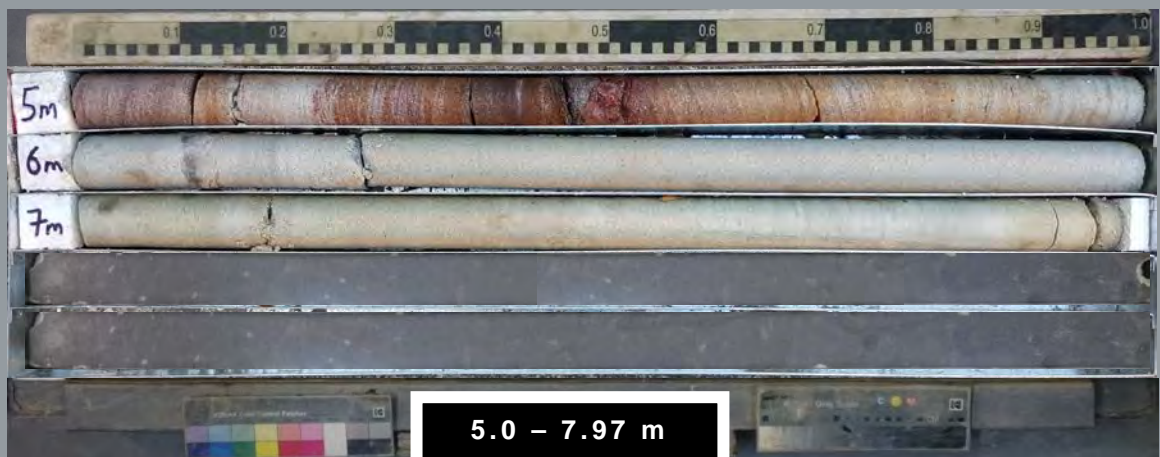
## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

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BORE 1 PROJECT 85461.00 MAY 2016



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SITE INFRASTRUCTURE INVESTIGATION - RANDWICK  
BORE 1 PROJECT 85461.00 MAY 2016



# BOREHOLE LOG

**CLIENT:** Bovis Lend Lease  
**PROJECT:** Wallace Wurth Redevelopment  
**LOCATION:** Cnr High & Botany St, UNSW, Kensington

**SURFACE LEVEL:** 55.8 AHD    **BORE No:** 2  
**EASTING:**                      **PROJECT No:** 71543  
**NORTHING:**                   **DATE:** 01 Feb 10  
**DIP/AZIMUTH:** 60°/0      **SHEET** 1 OF 2

[illegible]

**RIG:** Bobcat **DRILLER:** Steve S **LOGGED:** SI  
**TYPE OF BORING:** Solid flight auger to 2.5m; Rotary to 4.65m; NMLC-Coring to 14.4m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

REMARKS: Standpipe installed to 14.4m

SAMPLING & IN SITU TESTING LEGEND		
A	Auger sample	pp Pocket penetrometer (kPa)
D	Disturbed sample	PID Photo ionisation detector
B	Bulk sample	S Standard penetration test
U	Tube sample (x mm dia.)	PL Point load strength Is(50) MPa
W	Water sample	V Shear Vane (kPa)
C	Core drilling	▷ Water seep
		Water level

CHECKED
Initials: STE
Date: 17/3/10



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# BOREHOLE LOG

**CLIENT:** Bovis Lend Lease  
**PROJECT:** Wallace Wurth Redevelopment  
**LOCATION:** Cnr High & Botany St, UNSW, Kensington

**SURFACE LEVEL:** 55.8 AHD  
**EASTING:**  
**NORTHING:**  
**DIP/AZIMUTH:** 60°/0

**BORE No:** 2  
**PROJECT No:** 71543  
**DATE:** 01 Feb 10  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities	Sampling & In Situ Testing					
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low				Medium	High	Very High	Ex High	B - Bedding S - Shear	J - Joint D - Drill Break
65	10.0	IGNEOUS ROCK & SANDSTONE - extremely low and very low strength, extremely and highly weathered, grey and orange brown, medium to coarse grained sandstone with frequent igneous rock intrusions. Some high strength fractured bands (continued)														10m: CORE LOSS: 450mm	C	50	0	PL(A) = 1.7MPa	
66	10.9																				10.45-10.6m: fragmented to 0.01m intervals
67	12.0																10.9m: CORE LOSS: 1100mm				
68	13	SANDSTONE - alternate bands of very low and medium to high strength, highly and moderately to slightly weathered, fragmented to slightly fractured, light grey and brown, coarse grained sandstone with bands of igneous rock intrusions														12.0-12.25m: fragmented	C	88	0		
69	13.56																				12.3m: J80°, healed 12.37m: J20°, ironstained 12.43m: J15°, ironstained 12.47-12.6m: very low strength band 12.64m: J70°, healed 12.8m: J65°, ironstained 12.92m: B0°, very low strength band
70	14																				12.92m: B0°, very low strength band 13.13m: J80°, healed 13.29m: J65°, ironstained very low strength band
71	14.35																				13.4m: J30°, ironstained very low strength band 13.48-13.56m: fragmented in 0.02mm intervals
72	14.4																				13.56m: CORE LOSS: 200mm 13.76m: J60°, ironstained 13.76-13.92m: fragmented 14m: J85° 14.15m: J70°, ironstained, clay band 14.25m: J50°, ironstained 14.3-14.4m: fragmented 14.35m: CORE LOSS: 50mm
73	15	Bore discontinued at 14.4m																			
74	16																				
75	17																				
76	18																				
77	19																				
78																					
79																					

**RIG:** Bobcat

**DRILLER:** Steve S

**LOGGED:** SI

**CASING:** HW to 2.6m

**TYPE OF BORING:** Solid flight auger to 2.5m; Rotary to 4.65m; NMLC-Coring to 14.4m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Standpipe installed to 14.4m

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	Δ	Water seep
		W	Water level

## CHECKED

Initials: *STE*

Date: 17/3/10

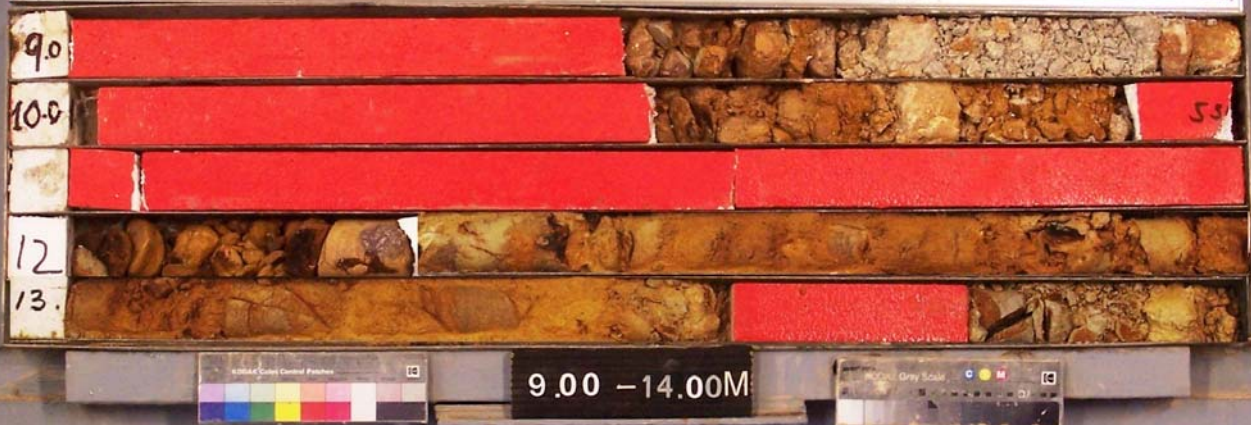


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BORE 2 PROJECT 71543 FEB 2010



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BORE 2 PROJECT 71543 FEB 2010





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WALLACE WURTH BUILDING UPGRADE, UNSW – KENSINGTON

BORE 2 PROJECT 71543 FEB 2010

L.N.S.W. KENSINGTON - 71543 B/H. 2. @ 60° START 12.25m.

14

END OF HOLE 14.4m



14.00 – 14.40M



# BOREHOLE LOG

**CLIENT:** Bovis Lend Lease  
**PROJECT:** Wallace Wurth Redevelopment  
**LOCATION:** Cnr High & Botany St, UNSW, Kensington

**SURFACE LEVEL:** 56.2 AHD  
**EASTING:**  
**NORTHING:**  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 3  
**PROJECT No:** 71543  
**DATE:** 3-8 Feb 2010  
**SHEET 1 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			Test Results & Comments
			EW	HW	MW	SW	FS		EX Low	Very Low	Low	Medium	High	EX High		B - Bedding S - Shear	J - Joint D - Drill Break	Type	Core Rec. %	RQD %	
58		FILLING - dark brown, sand filling																A			4,6,9 N = 15
0.7		SAND - medium dense, light brown, fine to medium grained sand																A			
1																					
2		- yellow below 2.2m																S			
3.2		IGNEOUS ROCK (DYKE) - extremely low to very low strength, extremely to highly weathered, light grey to red brown, igneous rock (dyke)																A			
4																					3,6,11 N = 17
4.86																					
5																					
5.8																					C 90 0
6																					
7		ROTARY DRILLING																			C 40 0
7.0																					
8																					
9																					R
9.5		IGNEOUS ROCK - description next page																			
																					C 83 0
																					PL(A) = 0.8MPa

**RIG:** Bobcat

**DRILLER:** Steve S

**LOGGED:** SI

**CASING:** HW to 3.6m

**TYPE OF BORING:** Solid flight auger to 3.6m; NMLC-Coring to 7.0m; Rotary to 9.5m; NMLC-Coring to 13.0m; Rotary to 14.5m; NMLC-Coring to 15.15m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Groundwater well installed to 18.0m. Water measured in well at 4.9m on 5/3/10

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	W	Water seep
		WL	Water level

CHECKED	
Initials:	STE
Date:	17/3/10



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# BOREHOLE LOG

**CLIENT:** Bovis Lend Lease  
**PROJECT:** Wallace Wurth Redevelopment  
**LOCATION:** Cnr High & Botany St, UNSW, Kensington

**SURFACE LEVEL:** 56.2 AHD  
**EASTING:**  
**NORTHING:**  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 3  
**PROJECT No:** 71543  
**DATE:** 3-8 Feb 2010  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding	J - Joint	Type	Core Rec. %
46	10.0	IGNEOUS ROCK (DYKE) - extremely low to very low and medium strength, extremely to highly weathered, fractured, light grey brown to red brown, igneous rock with medium strength sandstone bands																				
45	11																					
44	11.77																					
43	12																					
42	12.95																					
41	13.0	ROTARY DRILLING																				
40	14	SANDSTONE - high then medium strength, highly to moderately weathered, fractured, red brown, coarse grained sandstone (cooked sandstone)																				
39	14.15																					
38	14.73																					
37	15																					
36	15.15																					
35	16	IGNEOUS ROCK (DYKE) - extremely low to very low strength, extremely weathered, light grey brown, igneous rock (dyke)																				
34	17	ROTARY DRILLING																				
33	17.2	IGNEOUS ROCK (DYKE) - high to very high strength, fresh stained, fractured to slightly fractured, light greenish grey and brown, igneous rock (dyke). Some medium strength bands																				
32	18																					
31	18.3																					
30																						
29	19																					
28		Bore discontinued at 18.3m																				
27																						

**RIG:** Bobcat

**DRILLER:** Steve S

**LOGGED:** SI

**CASING:** HW to 3.6m

**TYPE OF BORING:** Solid flight auger to 3.6m; NMLC-Coring to 7.0m; Rotary to 9.5m; NMLC-Coring to 13.0m; Rotary to 14.5m; NMLC-Coring to 15.15m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Groundwater well installed to 18.0m. Water measured in well at 4.9m on 5/3/10

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U	Tube sample (x mm dia.)	PL	Point load strength ls(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	D	Water seep
			Water level

CHECKED	
Initials:	STE
Date:	17/3/10



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BORE 3 PROJECT 71543 FEB 2010

KENSINGTON, UNSW. SPART 3.6m  
B/H.3. 75341.

4

5

6

← ROTARY →

3.60 - 7.00M

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BORE 3 PROJECT 71543 FEB 2010

10

CORE  
LOSS

11

12

CORE — LOSS

← ROTARY →

9.50 - 13.00M



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BORE 3 PROJECT 71543 FEB 2010



14.15 – 18.30M



# BOREHOLE LOG

**CLIENT:** Bovis Lend Lease  
**PROJECT:** Wallace Wurth Redevelopment  
**LOCATION:** Cnr High & Botany St, UNSW, Kensington

**SURFACE LEVEL:** 55.9 AHD **BORE No:** 5  
**EASTING:** **PROJECT No:** 71543  
**NORTHING:** **DATE:** 01 Feb 10  
**DIP/AZIMUTH:** 90°/- **SHEET 1 OF 1**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength						Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint D - Drill Break	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
55	0.2	FILLING - dark grey brown, fine grained, silty sand filling (topsoil) with some organic matter and a trace of concrete cobble and crushed sandstone fragments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											</

**RIG:** Bobcat **DRILLER:** Steve S **LOGGED:** SI **CASING:** HW to 5.8m  
**TYPE OF BORING:** Solid flight auger to 5.5m; Rotary to 5.8m; NMLC-Coring to 8.8m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:**

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep
			Water level

CHECKED	
Initials:	STE
Date:	17/3/10



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BORE 5 PROJECT 71543 FEB 2010

50 KENSINGTON 71543  
BH 5 START: 5.8 M

60

70

80

BH END ④  
8.8 M



5.80 - 8.80M



# BOREHOLE LOG

**CLIENT:** Bovis Lend Lease  
**PROJECT:** Wallace Worth Redevelopment  
**LOCATION:** Cnr High & Botany St, UNSW, Kensington

**SURFACE LEVEL:** 55.8 AHD    **BORE No:** 7  
**EASTING:**                      **PROJECT No:** 71543  
**NORTHING:**                   **DATE:** 29 Jan 10  
**DIP/AZIMUTH:** 90°/--    **SHEET 1 OF 1**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint D - Drill Break	Type	Core Rec. %
56	0.1	FILLING - brown, fine grained, silty sand filling (topsoil) with some gravel and rootlets																							4,5,5 N = 10
55	0.4	FILLING - brown sand and crushed sandstone filling, humid																			A				
																					A				
1		FILLING - light to dark brown, fine to medium grained sand filling, with a trace of gravel, humid to moist																			A/E				
		1.3-1.45m: concrete fragments																							
	1.5																				A				
2		FILLING - light brown, fine to medium grained sand with some sandstone gravel (possible natural)																			A				
																					A				
																					S				
3	3.0	SAND - medium dense, orange brown, medium grained sand, moist																			A				
																					A				
4																									
																					S				
5	4.9	SANDSTONE - very low strength, light grey brown, medium grained sandstone																							
	5.2																								
		SANDSTONE - medium strength, moderately weathered, fractured to slightly fractured, red brown, medium grained sandstone																							
6	5.68																								
		SANDSTONE - medium then high strength, slightly weathered and fresh, unbroken, light grey and red brown, medium to coarse grained, massive sandstone																							
7																									
																					C	100	97		
8																									

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BORE 7 PROJECT 71543 FEB 2010

NSW KENSINGTON  
71543 - B/H-7. START. 5.2

START

6

7

8

FIN 8.3 m.



5.20 - 8.30M



# BOREHOLE LOG

**CLIENT:** The University of New South Wales  
**PROJECT:** Proposed Building Upgrade  
**LOCATION:** UNSW, Botany Road, Kensington

**SURFACE LEVEL:** 55.1 AHD<sup>^</sup>  
**EASTING:**  
**NORTHING:**  
**DIP/AZIMUTH:** 90°--

**BORE No:** 5  
**PROJECT No:** 73492  
**DATE:** 7/6/2013  
**SHEET** 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering EW HW MW SW FS FR	Graphic Log	Rock Strength					Water	Fracture Spacing (m) 0.01 0.05 0.10 0.50 1.00	Discontinuities B - Bedding J - Joint S - Shear F - Fault		Sampling & In Situ Testing			
					Ex Low	Very Low	Low	Medium	High	Very High				Type	Core Rec. %	RQD %	Test Results & Comments
55.1	0.1	CONCRETE															
	0.4	FILLING - yellow brown, sand and crushed sandstone filling, humid												A/E			
		FILLING - poorly compacted, brown, fine to medium grained sand filling with some sandstone gravel and a trace of organic matter, humid												E			
	1													E			
		- with some brick fragments at 1.5m												E			
	2													S			5,3,2 N = 5
														E			
	3													E			
	3.4	SAND - loose becoming medium dense, yellow brown, fine to medium grained sand, humid												S			2,2,4 N = 6
	4													E			
	5													S			5,10,15 N = 25
	6																
	6.2	SANDSTONE - extremely low then very low strength, light grey, fine to medium grained sandstone												S			10,35/150mm refusal
	6.47	SANDSTONE - high strength, slightly then moderately weathered, slightly fractured and unbroken, light grey and light purple brown, medium to coarse grained sandstone															PL(A) = 1.1
	7																PL(A) = 1.3
	8													C	100	100	PL(A) = 1.7
	9	9.05m to 9.58m: fresh															PL(A) = 1.8
	9.58	Bore discontinued at 9.58m															

**RIG:** Terrier

**DRILLER:** Tightsite

**LOGGED:** SI/AG

**CASING:** HQ to 6.3m

**TYPE OF BORING:** Diatube to 0.1m, hand auger to 1.5m, solid flight auger to 6.47m, NMLC-Coring to 9.58m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** ^Surface level interpolated from Dwg No K-FME-2013.0002, Rev A, 31.5.13.

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



**Douglas Partners**  
 Geotechnics | Environment | Groundwater



DOUGLAS PARTNERS PTY LTD  
PROPOSED BUILDING UPGRADE, UNSW - KENSINGTON  
BORE 5 PROJECT 73492 JUNE 2013



# BOREHOLE LOG

**CLIENT:** The University of New South Wales  
**PROJECT:** Proposed Building Upgrade  
**LOCATION:** UNSW, Botany Road, Kensington

**SURFACE LEVEL:** 52.8 AHD<sup>^</sup>  
**EASTING:**  
**NORTHING:**  
**DIP/AZIMUTH:** 90°--

**BORE No:** 6  
**PROJECT No:** 73492  
**DATE:** 6/6/2013  
**SHEET 1 OF 1**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities	Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium				High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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**RIG:** Terrier

**DRILLER:** Tightsite

**LOGGED:** SI/AG

**CASING:** HQ to 4.9m

**TYPE OF BORING:** Vacuum excavation to 1.4m, solid flight auger to 4.9m, NMLC-Coring to 8.0m

**WATER OBSERVATIONS:** Free groundwater observed at 4.0m whilst augering

**REMARKS:** \*Environmental sample duplicate BD2/050613, ^surface level interpolated from Dwg No K-FME-2013.0002, Rev A, 31.5.13.

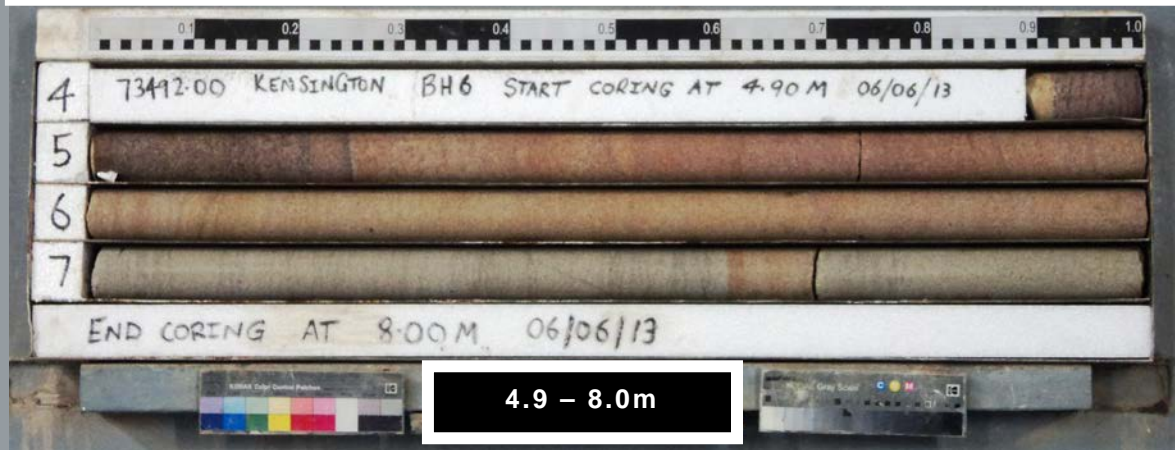
## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



**Douglas Partners**  
 Geotechnics | Environment | Groundwater

DOUGLAS PARTNERS PTY LTD  
PROPOSED BUILDING UPGRADE, UNSW - KENSINGTON  
BORE 6 PROJECT 73492 JUNE 2013



# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 55.2 AHD  
**EASTING:** 337086  
**NORTHING:** 6245508.3  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 2  
**PROJECT No:** 72505.11  
**DATE:** 18 - 20/9/2017  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
55.05	0.05	ASPHALTIC CONCRETE																				A				
55.3	0.3	ROADBASE - dark grey, sandy fine to medium grained igneous gravel roadbase (possibly recycled road surface)																				A*				
55.6	0.6																					A				
54.1		FILLING - grey-brown, fine to medium sand filling with trace fine gravel and glass fragments, damp																								
54.54		SAND - medium dense, yellow-brown, medium grained sand, damp																				A				
53.2		- with some dark brown silty sand bands to 2.0m																					S			4,7,7 N = 14
53.53																										
52.3																										
52.52																										
51.4																										
51.51																						S				6,11,13 N = 24
50.5	5.0	SANDSTONE - very low strength, light yellow-brown, medium grained sandstone																								
50.51	5.1	SANDSTONE - medium strength, slightly weathered, slightly fractured then unbroken, light yellow-brown medium grained sandstone. Typically indistinctly bedded with some distinct ironstained beds																								
49.6																						C	100	92		PL(A) = 0.43  PL(A) = 0.62  PL(A) = 0.71
49.49																										
48.7																										
48.48																										PL(A) = 0.67
47.8																										
47.47																										
46.9																						C	100	100		PL(A) = 0.94
46.46																										
		9.47-9.7m: ironstained cross bedding at 70°- 45°																								PL(A) = 0.91

**RIG:** DT100

**DRILLER:** SS

**LOGGED:** ARM/RMM

**CASING:** HW to 2.5

**TYPE OF BORING:** Diatube to 0.05m; Non-destructive drilling to 1.9m; Solid flight auger (TC-bit) to 2.0m; Rotary to 5.1m; NMLC-Coring to 19.0m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** \*BD1/20170918 taken at 0.3m to 0.4m

## SAMPLING & IN SITU TESTING LEGEND

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≧	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 55.2 AHD  
**EASTING:** 337086  
**NORTHING:** 6245508.3  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 2  
**PROJECT No:** 72505.11  
**DATE:** 18 - 20/9/2017  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities	Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
45		SANDSTONE <i>(continued)</i>																			
10.66		SANDSTONE - medium strength, fresh, slightly fractured, light grey medium and fine grained sandstone. Typically indistinctly bedded														10.63m: Ds, 30mm					PL(A) = 0.71
11																					
11.68		SILTSTONE - low strength, slightly weathered, dark grey siltstone with approximately 30% sandstone beds														11.46m: B5°, ro, pl, cly vn	C	100	97		PL(A) = 0.17
11.88		SANDSTONE - high strength, fresh, unbroken, light grey to grey, medium and coarse grained sandstone. Typically indistinctly bedded and massive														11.69m: Ds, 10mm 11.87m: Ds, 10mm					PL(A) = 1.24
13																					
13.42																13.48m: Ds, 30mm 13.68m: Ds, 20mm					PL(A) = 0.9
14																	C	100	94		PL(A) = 1.22
15		15.34-15.8m: some distinct siltstone beds														15.09-15.28m: B (x4) 10°, pl, cly, 5mm					PL(A) = 1.29
16																15.72m: B10°, pl, he 15.76m: Ds, 20mm					PL(A) = 1.31
17																	C	100	99		PL(A) = 1.52
18																17.63m: Ds, 10mm					PL(A) = 1.25
19	19.0	Bore discontinued at 19.0m - target depth reached																			

**RIG:** DT100

**DRILLER:** SS

**LOGGED:** ARM/RMM

**CASING:** HW to 2.5

**TYPE OF BORING:** Diatube to 0.05m; Non-destructive drilling to 1.9m; Solid flight auger (TC-bit) to 2.0m; Rotary to 5.1m; NMLC-Coring to 19.0m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** \*BD1/20170918 taken at 0.3m to 0.4m

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

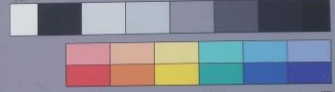
BORE: 2

PROJECT: RANDWICK

SEPTEMBER 2017



Project No: 72505-11  
BH ID: BH2  
Depth: 5.1m - 9m  
Core Box No.: 1/3



72505-11 RANDWICK BH2 start at 5.1m



5.1m - 9.0m

BORE: 2

PROJECT: RANDWICK

SEPTEMBER 2017



Project No: 72505-11  
BH ID: BH2  
Depth: 9m - 14m  
Core Box No.: 2/3



9.0m - 14.0m



BORE: 2

PROJECT: RANDWICK

SEPTEMBER 2017



Project No: 72505-11  
BH ID: BH 2  
Depth: 14m - 19m  
Core Box No.: 3/3



14.0m - 19.0m

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 54.6 AHD  
**EASTING:** 337098.7  
**NORTHING:** 6245586  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 3  
**PROJECT No:** 72505.11  
**DATE:** 21-9-2017  
**SHEET 1 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
54	0.03	ASPHALTIC CONCRETE - typically <10mm diameter																A/E			
	0.4	ROADBASE - dark grey, sandy gravel, igneous, angular, up to 30mm diameter, damp																A/E			
	1.0	FILLING - light brown to brown, fine to medium grained sand filling with traces of fine gravel, damp																A/E			
	1.5	- grey-brown with trace of earthenware fragments from 0.7m																A/E			
53	1.6	SAND - apparently medium dense, yellow-brown medium grained sand, damp																			
	2.0	SANDSTONE - very low strength, light yellow-brown, medium grained sandstone																			PL(A) = 0.32
	3.0	SANDSTONE - medium strength, slightly weathered, slightly fractured, light grey, medium grained sandstone with some ironstaining. Typically indistinctly bedded																C	100	81	PL(A) = 0.48
	4.0	SANDSTONE - low and very low strength, moderately then slightly weathered, light grey and grey, fine and medium grained sandstone																			PL(A) = 0.12
52	4.0	SANDSTONE - low strength, slightly weathered, slightly fractured, light grey, medium grained sandstone. Typically indistinctly bedded																			PL(A) = 0.14
	5.0																				
	5.31	SANDSTONE - high strength, slightly weathered then fresh, slightly fractured, light grey medium and coarse grained sandstone. Typically indistinctly bedded																C	100	85	PL(A) = 0.26 PL(A) = 1.42
	6.0																				
48	6.42m-6.52m	very low strength band																			PL(A) = 0.08
	7.0	- distinctly bedded from 6.54m																			PL(A) = 1.85
	7.7	- medium strength from 7.5m																C	100	24	PL(A) = 1.33
	8.0	SANDSTONE - medium then medium to high strength, fresh, slightly fractured to unbroken, light grey to grey, medium grained sandstone with some carbonaceous flecks. Typically massive																			PL(A) = 0.62 PL(A) = 0.52
46	8.55m																	C	100	99	
	9.0																				
	9.32m																				PL(A) = 1.16
	9.45																				

**RIG:** DT100

**DRILLER:** SS

**LOGGED:** RMM

**CASING:** HW to 1.6m

**TYPE OF BORING:** Solid flight auger (TC-bit) to 0.03m; Non-destructive drilling to 1.5m; Solid flight auger (TC-bit) to 1.6m; NMLC-Coring to 16.0m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:**

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 54.6 AHD  
**EASTING:** 337098.7  
**NORTHING:** 6245586  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 3  
**PROJECT No:** 72505.11  
**DATE:** 21-9-2017  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High			Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
	44	SANDSTONE - medium then medium to high strength, fresh, slightly fractured to unbroken, light grey to grey, medium grained sandstone with some carbonaceous flecks. Typically massive (continued) 10.36-10.5m: low strength band																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

**RIG:** DT100

**DRILLER:** SS

**LOGGED:** RMM

**CASING:** HW to 1.6m

**TYPE OF BORING:** Solid flight auger (TC-bit) to 0.03m; Non-destructive drilling to 1.5m; Solid flight auger (TC-bit) to 1.6m; NMLC-Coring to 16.0m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:**

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BORE: 3

PROJECT: RANDWICK

SEPTEMBER 2017



Project No: 72505-11  
BH ID: BH3  
Depth: 1.6m - 6m  
Core Box No.: 1/3



1.6m - 6.0m

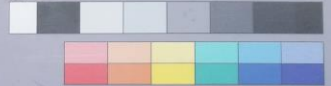
BORE: 3

PROJECT: RANDWICK

SEPTEMBER 2017



Project No: 72505-11  
BH ID: BH3  
Depth: 6m - 11m  
Core Box No.: 2/3



6.0m - 11.0m



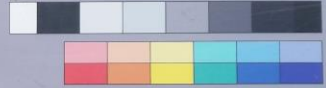
BORE: 3

PROJECT: RANDWICK

SEPTEMBER 2017



Project No: 72 505-11  
BH ID: 0H3  
Depth: 11m - 16m  
Core Box No.: 3/3



11.0m - 16.0m

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 51.9 AHD  
**EASTING:** 337044.9  
**NORTHING:** 6245563  
**DIP/AZIMUTH:** 90°/--

**BORE No: 4**  
**PROJECT No: 72505.11**  
**DATE: 19 - 21/9/2017**  
**SHEET 1 OF 2**

[illegible]

**Douglas Partners**  
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# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 51.9 AHD  
**EASTING:** 337044.9  
**NORTHING:** 6245563  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 4  
**PROJECT No:** 72505.11  
**DATE:** 19 - 21/9/2017  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
41	11	SANDSTONE - medium strength, fresh, slightly fractured and unbroken, pale grey, medium to coarse grained sandstone, massive, trace carbonaceous flecks (continued)																					C	100	95	PL(A) = 0.61	
40	12	SANDSTONE - medium to high strength, fresh, slightly fractured to unbroken, pale grey, medium to coarse grained sandstone, indistinct bedding typically dipping 10°- 20°																								PL(A) = 0.69	
39	13																						C	100	98	PL(A) = 1.1	
38	14	SANDSTONE - high then medium strength, fresh, unbroken, pale grey, fine to medium grained sandstone, occasional carbonaceous laminations and flecks																								PL(A) = 0.91	
37	15																										PL(A) = 1.33
36	16	16.78-16.97m: siltstone clasts and laminations, slightly fractured																					C	100	94	PL(A) = 0.59	
35	17																										PL(A) = 0.76
34	17.31	Bore discontinued at 17.31m - target depth reached																									
33	18																										
32	19																										

**RIG:** Bobcat

**DRILLER:** GM

**LOGGED:** ARM

**CASING:** HW to 3.65m

**TYPE OF BORING:** Diatube to 0.08m; NDD to 1.7m; Solid flight auger (TC-bit) to 3.65m; NMLC-Coring to 17.31m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Well installed, blank to 4.0 m, screen to 7.0 m, gatic cover at surface, asphalt to 0.2 m, sand & cement to 3.0 m, bentonite to 3.8 m, sand to 7.0 m, bentonite to 8.0 m, NDD = Non-destructive drilling

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



**Douglas Partners**  
 Geotechnics | Environment | Groundwater

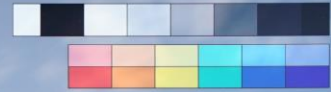
BORE: 4

PROJECT: RANDWICK

SEPTEMBER 2017



Project No: 72505.11  
BH ID: BH4  
Depth: 3.65 - 8.00m  
Core Box No.: 1



3.65m - 8.0m

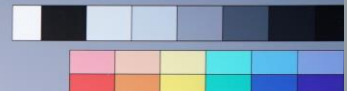
BORE: 4

PROJECT: RANDWICK

SEPTEMBER 2017



Project No: 72505.11  
BH ID: BH4  
Depth: 8.00 - 13.00m  
Core Box No.: 2



8.0m - 13.0m

BORE: 4

PROJECT: RANDWICK

SEPTEMBER 2017

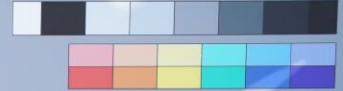


Project No: 72505.11

BH ID: B44

Depth: 13.00 - 17.31m

Core Box No.: 3



13.0m - 17.31m

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 54.6 AHD  
**EASTING:** 336990.5  
**NORTHING:** 6245617.7  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 7  
**PROJECT No:** 72505.11  
**DATE:** 6-10-2017  
**SHEET** 1 OF 3

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	0.2	FILLING - brown, fine to medium grained sand filling with traces of rootlets, humid																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

**RIG:** DT100

**DRILLER:** RKE

**LOGGED:** RMM

**CASING:** HW to 4.0m; HQ to 4.1m

**TYPE OF BORING:** Solid flight auger (TC-bit) to 4.0m; Rotary to 4.1m; NMLC-Coring to 20.47m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Groundwater monitoring well installed (screen 4.0-20.47m; gravel 5.0-20.47m; bentonite 3.5-5.0m; backfill surface to 3.5m with concrete set gatic cover). Groundwater well purged >3 well volumes following installation

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 54.6 AHD  
**EASTING:** 336990.5  
**NORTHING:** 6245617.7  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 7  
**PROJECT No:** 72505.11  
**DATE:** 6-10-2017  
**SHEET 2 OF 3**

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High			Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
44	11.12	SANDSTONE - medium strength, slightly weathered to fresh, slightly fractured to unbroken, light grey medium to coarse grained sandstone. Massive with some siltstone flecking to indistinctly bedded with approximately 5% siltstone bands <i>(continued)</i>																C	100	99	PL(A) = 0.84		
43		SANDSTONE - high strength slightly weathered to fresh, slightly fractured to unbroken, light grey medium to coarse grained sandstone with some low and very high strength bands. Massive with some siltstone flecking, to indistinctly bedded with approximately 10% siltstone bands																C	100	99	PL(A) = 0.62 PL(A) = 3.2		
42	13	13.33-13.6m: fine grained band																			PL(A) = 1.37		
41																						PL(A) = 3.56	
40	14																				PL(A) = 1.9 PL(A) = 0.12		
39																						PL(A) = 1.86	
38	16	16.95-18.05m: fine grained band with some carbonaceous laminations																			PL(A) = 1.13		
37																						PL(A) = 0.74 PL(A) = 1.26	
36	17																				PL(A) = 0.16 PL(A) = 1.22		
35																						PL(A) = 1.46 PL(A) = 1.39	

**RIG:** DT100

**DRILLER:** RKE

**LOGGED:** RMM

**CASING:** HW to 4.0m; HQ to 4.1m

**TYPE OF BORING:** Solid flight auger (TC-bit) to 4.0m; Rotary to 4.1m; NMLC-Coring to 20.47m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Groundwater monitoring well installed (screen 4.0-20.47m; gravel 5.0-20.47m; bentonite 3.5-5.0m; backfill surface to 3.5m with concrete set gatic cover). Groundwater well purged >3 well volumes following installation

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

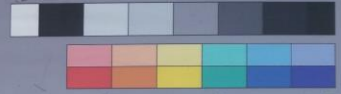
BORE: 7

PROJECT: RANDWICK

OCTOBER 2017



Project No: 72505-11  
BH ID: BH7  
Depth: 4.1m - 8m  
Core Box No.: 1/4



72505-11 RANDWICK BH7 Start at 4.1m

6/10/17



4.1m - 8.0m

BORE: 7

PROJECT: RANDWICK

OCTOBER 2017



Project No: 72505-11  
BH ID: BH7  
Depth: 8m - 13m  
Core Box No.: 2/4



8.0m - 13.0m



BORE: 7

PROJECT: RANDWICK

OCTOBER 2017



Project No: 72505-11  
BH ID: 847  
Depth: 13m - 18m  
Core Box No.: 3/4



13.0m - 18.0m

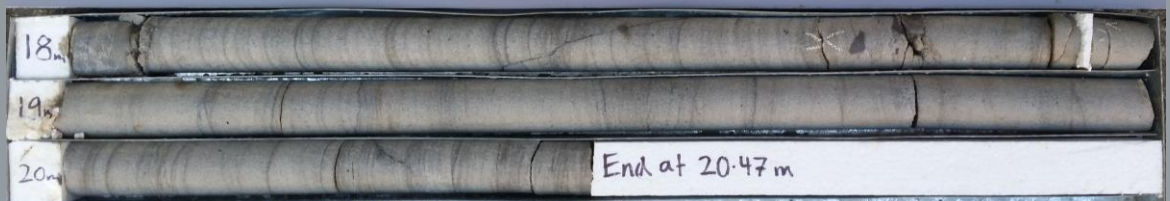
BORE: 7

PROJECT: RANDWICK

OCTOBER 2017



Project No: 72505-11  
BH ID: 847  
Depth: 18m - 20.47m (Eoh)  
Core Box No.: 4/4



18.0m - 20.47m

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 54.6 AHD  
**EASTING:** 336990.5  
**NORTHING:** 6245617.7  
**DIP/AZIMUTH:** 90°/--

**BORE No: 7**  
**PROJECT No: 72505.11**  
**DATE: 6-10-2017**  
**SHEET 3 OF 3**

[illegible]

**RIG:** DT100

**DRILLER: RKE**

**LOGGED:** RMM

**CASING:** HW to 4.0m; HQ to 4.1m

**TYPE OF BORING:** Solid flight auger (TC-bit) to 4.0m; Rotary to 4.1m; NMLC-Coring to 20.47m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Groundwater monitoring well installed (screen 4.0-20.47m; gravel 5.0-20.47m; bentonite 3.5-5.0m; backfill surface to 3.5m with concrete set gatic cover). Groundwater well purged >3 well volumes following installation

### SAMPLING & IN SITU TESTING LEGEND

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



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# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 50.5 AHD  
**EASTING:** 337038.1  
**NORTHING:** 6245507  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 8  
**PROJECT No:** 72505.11  
**DATE:** 23 - 24/1/2018  
**SHEET 1 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
	0.1	ASPHALTIC CONCRETE (typically <10mm diameter)																									
	0.25	ROADBASE - dark grey, angular, igneous gravel typically 40-80mm diameter																									
	0.6																										
	1																										
	49	FILLING - pale grey and brown sandstone gravel and cobbles up to 100mm diameter (ripped sandstone)																									
	2	SAND - pale brown, medium grained sand with a trace of fine gravel, damp																									
	2.6	SANDSTONE - extremely low strength, orange-brown sandstone																									
	2.77																										
	3	SANDSTONE - low to medium strength, slightly weathered, fractured to slightly fractured, orange and grey, medium to coarse grained sandstone																									
	4																										
	5																										
	5.45	SANDSTONE - high then medium strength, fresh, slightly fractured to unbroken, pale grey, medium to coarse grained sandstone with a trace of carbonaceous flecks																									
	6																										
	6.4-6.9m	red-brown iron staining																									
	7																										
	8	8.1-8.55m: low strength band																									
	9																										

**RIG:** Bobcat

**DRILLER:** GM

**LOGGED:** ARM

**CASING:** HW to 2.5m; HQ to 2.7m

**TYPE OF BORING:** Diatube to 0.10m; Non-destructive drilling to 1.7m; Solid flight auger (TC-bit) to 2.77m; NMLC-Coring to 17.39m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Well installed, blank to 2.0 m, screen to 3.0 m, gatic cover at surface, asphalt to 0.2 m, sand & cement to 0.8 m, bentonite to 1.5 m, sand to 3.0 m, bentonite to 3.5 m, \*BD1/20180123 replicate taken at 0.4m to 0.5m

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	sp	Standard penetration test
E	Environmental sample	≡	Water level	S	Shear vane (kPa)

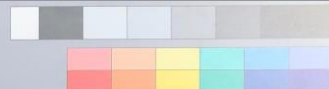
BORE: 8

PROJECT: RANDWICK

JANUARY 2018



Project No: 72505.11  
BH ID: BH8  
Depth: 2.77-7.00m  
Core Box No.: 1



72505.11 RANDWICK BH8 24/1/18 START 2.77m



2.77m - 7.0m

BORE: 8

PROJECT: RANDWICK

JANUARY 2018



Project No: 72505.11  
BH ID: BH8  
Depth: 7.00-12.00m  
Core Box No.: 2



7.0m - 12.0m



BORE: 8

PROJECT: RANDWICK

JANUARY 2018



Project No: 72505.11  
BH ID: 8H8  
Depth: 12.00 - 12.60m  
Core Box No.: 3



12.0m – 17.0m

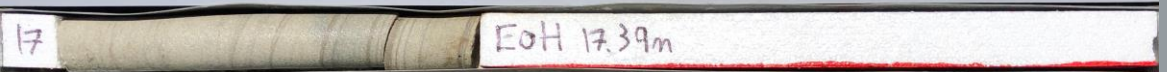
BORE: 8

PROJECT: RANDWICK

JANUARY 2018



Project No: 72505.11  
BH ID: 8H8  
Depth: 12.00 - 12.60m  
Core Box No.: 3



17.0m – 17.39m



# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 50.5 AHD  
**EASTING:** 337038.1  
**NORTHING:** 6245507  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 8  
**PROJECT No:** 72505.11  
**DATE:** 23 - 24/1/2018  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
	40	10.2-10.41m: with 25% siltstone clasts up to 20mm diameter, fragmented (possibly drilling induced)																C	100	88	PL(A) = 0.18
	11	LAMINITE - low strength, fresh, slightly fractured, dark grey siltstone interlaminated and interbedded with 40% pale grey, fine grained sandstone																			
	39	11.45																C	100	88	
	12	SANDSTONE - high strength, fresh, slightly fractured to unbroken, pale grey, medium to coarse grained sandstone, massive																			PL(A) = 2.23
	38																				PL(A) = 1.54
	13	12.84-13.03m: with 50% carbonaceous laminations																			PL(A) = 1.19
	37	13.03-13.21: fine to medium grained																			
	14	13.21m: medium to coarse grained, irregular bedding dipping 10-20°																			PL(A) = 1.27
	36																				
	15	14.8m: massive																			PL(A) = 1.36
	35																				
	16																				PL(A) = 1.57
	34	16.44m: irregular bedding dipping 10-20°																			
	17																				PL(A) = 1.57
	33	17.39																			
	18	Bore discontinued at 17.39m - target depth reached																			
	32																				
	19																				
	31																				

**RIG:** Bobcat

**DRILLER:** GM

**LOGGED:** ARM

**CASING:** HW to 2.5m; HQ to 2.7m

**TYPE OF BORING:** Diatube to 0.10m; Non-destructive drilling to 1.7m; Solid flight auger (TC-bit) to 2.77m; NMLC-Coring to 17.39m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Well installed, blank to 2.0 m, screen to 3.0 m, gatic cover at surface, asphalt to 0.2 m, sand & cement to 0.8 m, bentonite to 1.5 m, sand to 3.0 m, bentonite to 3.5 m, \*BD1/20180123 replicate taken at 0.4m to 0.5m

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 55.7 AHD  
**EASTING:** 337090  
**NORTHING:** 6245535  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 12  
**PROJECT No:** 72505.13  
**DATE:** 30-4-2018  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
	0.09	ASPHALTIC CONCRETE																										
	0.6	ROADBASE: dark grey, sandy fine to coarse grain igneous gravel, damp																										
	1.2	FILLING: brown, medium to coarse sand filling, with some silt, damp 0.8-1.2m: with some roots.																										
	1.2	SAND: medium dense, yellow brown, medium sand with trace of silt, damp																										
	2																											
	3																											
	4																											
	5																											
	6																											
	6.1	SANDSTONE: high strength, slightly weathered becoming fresh, slightly fractured to unbroken, pale grey, medium to coarse grained sandstone, some iron staining																										
	7																											
	8																											
	8.8	SANDSTONE: high strength, fresh, unbroken, pale grey, medium grained sandstone																										
	9																											

**RIG:** Han Jin 8D **DRILLER:** BG Drilling **LOGGED:** JAP **CASING:** HW to 5.5 m

**TYPE OF BORING:** Diatube to 0.09 m, NDD to 1.5 m, Solid flight auger (TC-bit) to 4.0 m, Rotary to 6.1 m, HQ-Coring to 14.15 m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Well installed, blank to 3.8 m, screen to 6.8 m, gatic cover at surface, concrete to 0.2 m, sand & cement to 2.0 m, bentonite to 3.0 m, sand to 6.8 m, bentonite to 7.8 m, sand to 14.15 m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 55.7 AHD  
**EASTING:** 337090  
**NORTHING:** 6245535  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 12  
**PROJECT No:** 72505.13  
**DATE:** 30-4-2018  
**SHEET** 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
	45	SANDSTONE: high strength, fresh, unbroken, pale grey, medium grained sandstone <i>(continued)</i>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

**RIG:** Han Jin 8D

**DRILLER:** BG Drilling

**LOGGED:** JAP

**CASING:** HW to 5.5 m

**TYPE OF BORING:** Diatube to 0.09 m, NDD to 1.5 m, Solid flight auger (TC-bit) to 4.0 m, Rotary to 6.1 m, HQ-Coring to 14.15 m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Well installed, blank to 3.8 m, screen to 6.8 m, gatic cover at surface, concrete to 0.2 m, sand & cement to 2.0 m, bentonite to 3.0 m, sand to 6.8 m, bentonite to 7.8 m, sand to 14.15 m

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BORE: 12

PROJECT: RANDWICK

APRIL 2018



6.10 – 9.00 m

BORE: 12

PROJECT: RANDWICK

APRIL 2018



9.00 – 13.00 m

BORE: 12

PROJECT: RANDWICK

APRIL 2018



13.00 – 14.15 m



# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 52.0 AHD  
**EASTING:** 337045  
**NORTHING:** 6245565  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 13  
**PROJECT No:** 72505.13  
**DATE:** 3-5-2018  
**SHEET 1 OF 1**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
52	0.05	ASPHALT: (typically <10 mm diameter)  ASPHALT: (typically <20 mm diameter)  ROADBASE: dark grey, angular igneous gravels (30-80 mm)  FILLING: grey-brown, ripped sandstone filling, (40-80mm)  FILLING: orange brown, medium sandy gravel filling with some coarse sandstone gravel, damp  SAND: medium dense, pale yellow, medium sand, damp																									
51	0.11																										
	0.4																										
	0.6																										
	0.9																										
50	2																					S				2,6,9 N = 15	
49	2.5	SAND: medium dense to dense, brown orange, fine to medium sand with some silt, damp																									
48	3																					D					
	3.2	SANDSTONE: extremely low to very low strength, orange brown sandstone																				S				14,8/80 refusal	
47	3.8	Bore discontinued at 3.8m Limit of investigation																									
46	4																										
45	5																										
44	6																										
43	7																										
	8																										
	9																										

**RIG:** Han Jin 8D

**DRILLER:** BG Drilling

**LOGGED:** JAP

**CASING:** Uncased

**TYPE OF BORING:** Diatube to 0.15 m, Non-destructive drilling to 1.6 m, solid flight auger (TC-bit) to 3.8 m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Well installed, blank to 1.3 m, screen to 3.8 m, gatic cover at surface, asphalt to 0.2 m, sand & cement to 0.4 m, bentonite to 1.0 m, sand to 3.8 m

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 55.2 AHD  
**EASTING:** 336986  
**NORTHING:** 6245643  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 16  
**PROJECT No:** 72505.13  
**DATE:** 8-5-2018  
**SHEET** 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
55	0.12	CONCRETE SLAB																									
	0.55	FILLING: brown, fine to medium sand filling with some silt and trace of igneous gravel, humid																									
1		SAND: yellow, fine to medium sand, damp																									
54																											
2	2.0	SAND: medium dense, yellow, fine to medium sand, damp																				S					4,9,11 N = 20
53																											
3																											
52	3.2	SAND: medium dense, brown, fine to medium sand with trace of clay, damp																				S					7,9,20 N = 29
4																											
51	4.1	SANDSTONE: very low strength, orange-brown and light grey, medium to coarse grained sandstone																				S					6/30, Bouncing
47	4.7	Bore discontinued at 4.7m Limit of investigation																									
5																											
50																											
6																											
49																											
7																											
48																											
8																											
47																											
9																											
46																											

**RIG:** Han Jin 8D

**DRILLER:** BG Drilling

**LOGGED:** JAP

**CASING:** HW to 4.0 m

**TYPE OF BORING:** Diatube to 0.12 m, Non-destructive drilling to 1.8 m, solid flight auger (TC-bit) to 2.0 m, Rotary to 4.7 m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Well installed, blank to 2.1 m, screen to 4.7 m, gatic cover at surface, concrete to 0.2 m, sand & cement to 1.2 m, bentonite to 2.0 m, sand to 4.7 m

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 55.2 AHD  
**EASTING:** 336983  
**NORTHING:** 6245644  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 17  
**PROJECT No:** 72505.13  
**DATE:** 8-5-2018  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FR		Ex Low	Very Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
55	0.11	CONCRETE SLAB																							
	0.6	FILLING: brown, fine to medium sand filling with some silt and trace of igneous and sandstone gravel, humid																							
54	1	SAND: yellow-brown, fine to medium sand, damp																							
53	2.0	SAND: medium dense yellow-brown fine to medium sand, damp																			S			4,6,9 N = 15	
52	3																								
51	3.3	SAND: medium dense, brown, fine to medium sand with trace of clay, damp																			S			9,10,14 N = 24	
50	4																								
49	4.4	SANDSTONE: very low to low strength, orange-brown and light grey, medium to coarse grained sandstone																							
48	5.08	SANDSTONE: medium strength, slightly weathered, slightly fractured, light grey and red-brown, medium to coarse grained sandstone																							
47	6																				C	90	83	PL(A) = 0.6	
46	7																								PL(A) = 0.8
45	8																				C	100	100	PL(A) = 1.1	
44	9																								PL(A) = 0.5
43	9.5	SANDSTONE (see over page)																			C	100	90	PL(A) = 0.5	

**RIG:** Han Jin 8D

**DRILLER:** BG Drilling

**LOGGED: JAP**

**CASING:** HW to 4.5 m

**TYPE OF BORING:** Diatube to 0.11 m, Non-destructive drilling to 1.8 m, Auger to 2.0 m, Rotary to 5.0 m, NMLC Coring to 14.80 m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Well installed, blank to 5.1 m, screen to 9.6 m, gatic cover at surface, concrete to 0.2 m, sand & cement to 1.5 m, sand to 4.0 m, bentonite to 5.0 m, sand to 10.0 m, bentonite to 11.0 m, sand to 15.0 m

### SAMPLING & IN SITU TESTING LEGEND

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	≧	Water seep
E	Environmental sample	≧	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



**Douglas Partners**  
Geotechnics | Environment | Groundwater

# BOREHOLE LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 55.2 AHD  
**EASTING:** 336983  
**NORTHING:** 6245644  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 17  
**PROJECT No:** 72505.13  
**DATE:** 8-5-2018  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High		Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
45		SANDSTONE: medium strength, fresh, slightly fractured to unbroken, light grey, fine to medium grained sandstone with some low strength bands, cross bedding at 10-15° (continued)																								PL(A) = 0.8
11																						C	100	90		PL(A) = 0.12
12																										PL(A) = 0.39
43	12.24	SANDSTONE: medium and high strength, fresh, unbroken, light grey, medium grained sandstone																								PL(A) = 1.38
13																						C	100	100		PL(A) = 0.69
14																										
14.8		Bore discontinued at 14.8m Target depth reached																								PL(A) = 1.16
15																										
16																										
17																										
18																										
19																										

**RIG:** Han Jin 8D

**DRILLER:** BG Drilling

**LOGGED:** JAP

**CASING:** HW to 4.5 m

**TYPE OF BORING:** Diatube to 0.11 m, Non-destructive drilling to 1.8 m, Auger to 2.0 m, Rotary to 5.0 m, NMLC Coring to 14.80 m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Well installed, blank to 5.1 m, screen to 9.6 m, gatic cover at surface, concrete to 0.2 m, sand & cement to 1.5 m, sand to 4.0 m, bentonite to 5.0 m, sand to 10.0 m, bentonite to 11.0 m, sand to 15.0 m

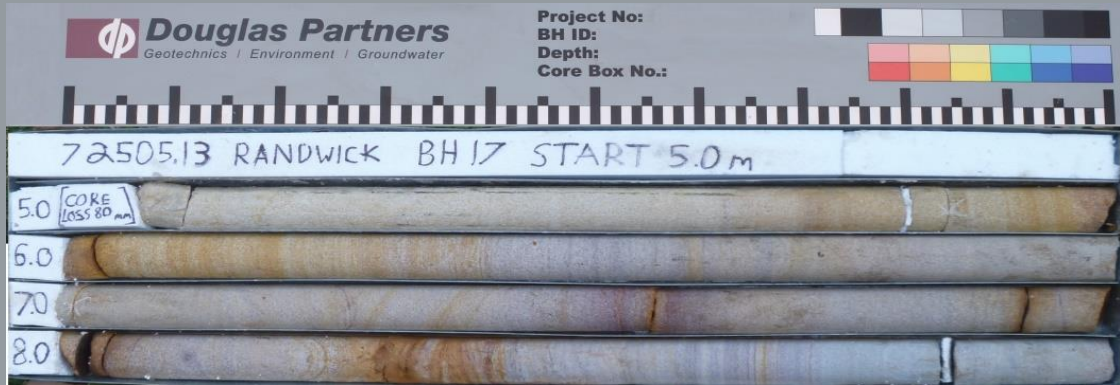
## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BORE: 17

PROJECT: RANDWICK

MAY 2018



5.00 – 9.00 m

BORE: 17

PROJECT: RANDWICK

MAY 2018



9.00 – 14.00 m



BORE: 17

PROJECT: RANDWICK

MAY 2018



14.00 – 14.80 m

# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 55.7 AHD  
**EASTING:** 337095  
**NORTHING:** 6245556.4  
**DIP/AZIMUTH:** 90°/-

**BORE No:** BH601  
**PROJECT No:** 72505.18  
**DATE:** 19 & 27/08/2020  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			XW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High			Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
	0.09	ASPHALTIC CONCRETE																				
	0.3	FILL/ROADBASE: Sandy GRAVEL, sub-angular, fine igneous gravel, grey, medium sand, moist																E				
56	0.6	FILL/Gravelly SAND: medium, brown, fine igneous subangular and subrounded, fine sandstone gravel, moist																E				
1		SAND SP: fine to medium, pale grey, moist, loose, aeolian																E/D				
54	1.8	SAND SP: fine to medium, yellow-brown, trace silt, moist, medium dense, aeolian																				
2																		S				4,5,6 N = 11
53		Below 3.0m: dark red-brown, apparently dense																				
3																						
52		Below 4.0m: wet																D				
4																						
4.05																		S				18/50 refusal
4.11		SANDSTONE: medium to coarse grained, pale grey and yellow brown, with 10% decomposed seams, very low then low and medium strength, highly and slightly weathered, slightly fractured, Hawkesbury Sandstone																				PL(A) = 0.04
51																						PL(A) = 0.4
5																						PL(A) = 0.28
50																		C	98	77		PL(A) = 0.85
6	6.0	SANDSTONE: medium to coarse grained, pale grey, cross bedded at 10-20°, medium strength, slightly weathered then fresh, slightly fractured, Hawkesbury Sandstone																				PL(A) = 0.72
49																						
7																						
7.5		SANDSTONE: medium grained, pale grey, medium to high strength, fresh, unbroken, Hawkesbury Sandstone																				PL(A) = 0.88
48																						
8																		C	100	99		PL(A) = 1.2
47																						
9																						
46																						

**RIG:** Vac Truck, Hand Tools & Bobcat **DRILLER:** VAC Group **LOGGED:** KR/JJH/TM **CASING:** HW to 4.0m, HQ to 4.0m  
**TYPE OF BORING:** Diatube to 0.1m, Non-Destructive-Drilling (NDD) and Hand-Auger to 1.5m, Solid flight auger to 4.0m, NMLC Coring to 16.02m  
**WATER OBSERVATIONS:** Water seepage at 3.95m, 20% water loss below 8.0m  
**REMARKS:** Bulk samples taken 0.5-1.5m, 1.5-2.0m & 2.0-3.8m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 55.7 AHD  
**EASTING:** 337095  
**NORTHING:** 6245556.4  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH601  
**PROJECT No:** 72505.18  
**DATE:** 19 & 27/08/2020  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			XW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
		SANDSTONE: medium grained, pale grey, medium to high strength, fresh, unbroken, Hawkesbury Sandstone <i>(continued)</i>																			PL(A) = 1.3
	45																				
	11																				
	44																	C	100	98	PL(A) = 0.96
	12																				PL(A) = 1.3
	43																				
	13																				PL(A) = 0.97
	42																				
	14	Between 14.2-15.85m: cross bedded at 5-15°																			PL(A) = 1
	41																	C	100	97	
	15																				PL(A) = 0.98
	40																				
	16	Bore discontinued at 16.02m Target depth reached																			PL(A) = 0.68
	16.02																				
	39																				
	17																				
	38																				
	18																				
	37																				
	19																				
	36																				

**RIG:** Vac Truck, Hand Tools & Bobcat **DRILLER:** VAC Group **LOGGED:** KR/JJH/TM **CASING:** HW to 4.0m, HQ to 4.0m  
**TYPE OF BORING:** Diatube to 0.1m, Non-Destructive-Drilling (NDD) and Hand-Auger to 1.5m, Solid flight auger to 4.0m, NMLC Coring to 16.02m  
**WATER OBSERVATIONS:** Water seepage at 3.95m, 20% water loss below 8.0m  
**REMARKS:** Bulk samples taken 0.5-1.5m, 1.5-2.0m & 2.0-3.8m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BORE: 601 PROJECT: RANDWICK AUGUST 2020



Project No: 72505.18  
BH ID: BH 601  
Depth: 4.05-8.0m  
Core Box No.: 1/3



72505.18 Randwick BH 601 START 4.05m



4.05-8.00m

BORE: 601 PROJECT: RANDWICK AUGUST 2020



Project No: 72505.18  
BH ID: BH 601  
Depth: 8.0-13.0m  
Core Box No.: 2/3



8.00-13.00m

BORE: 601

PROJECT: RANDWICK

AUGUST 2020



Project No: 72505.18  
BH ID: 8H601  
Depth: 13.0-16.02 m  
Core Box No.: 3/3



13.00-16.02m



# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 55 AHD  
**EASTING:** 337097.5  
**NORTHING:** 6245571.8  
**DIP/AZIMUTH:** 90°/-

**BORE No:** BH602  
**PROJECT No:** 72505.18  
**DATE:** 19 & 24/08/2020  
**SHEET** 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing			
			XW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High		Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
55	0.09	ASPHALTIC CONCRETE																								
	0.28	FILL/ROADBASE: Sandy GRAVEL, sub-angular, fine igneous gravel, grey, medium, moist																				E				
	0.7	FILL/SAND: fine to medium, dark brown, with silt, moist																				E/D				
54	1	SAND SP: fine to medium, pale grey, moist, aeolian																				E/D				
	2.2	SAND SP: fine to medium, orange-brown, apparently cemented, iron indurated, ("coffee rock"), aeolian																				S				4,3,5 N = 8
53	2.6	SAND SP: fine to medium, yellow-brown, moist, aeolian																				D				
52	3	Below 3.1m: becoming wet																				D				
	3.2																					S				5,25/125 refusal
	3.35	SANDSTONE: medium grained, pale yellow-brown, apparently very low to low strength, Hawkesbury Sandstone																								
	4	Bore discontinued at 3.35m Target depth reached																								
51	5																									
50	6																									
49	7																									
48	8																									
47	9																									
46	10																									

**RIG:** Vac Truck, Hand Tools & Bobcat **DRILLER:** VAC Group **LOGGED:** KR/JJH **CASING:** None  
**TYPE OF BORING:** Diatube to 0.1m, Non-Destructive-Drilling (NDD) and Hand-Auger to 1.5m, Solid flight auger to 3.35m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:** Bulk sample taken at 0.7-1.5m, Groundwater well installed, refer to Well Log for construction details, Data logger 2121809 installed in well

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PLD	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 54.2 AHD  
**EASTING:** 337102.9  
**NORTHING:** 6245608  
**DIP/AZIMUTH:** 90°/-

**BORE No:** BH603  
**PROJECT No:** 72505.18  
**DATE:** 19 & 26/08/2020  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			XW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
54	0.04	ASPHALTIC CONCRETE																E			
	0.45	FILL/ROADBASE: Sandy GRAVEL, sub-angular, fine igneous gravel, grey, medium, moist																E/D			
1	0.8	FILL/Gravelly SAND: medium, brown, subangular, fine igneous and subrounded, fine sandstone gravel, moist																E/D			
53	1.3	FILL/Silty SAND: fine to medium, dark brown, non-plastic fines, with subangular, fine sandstone gravel, moist																E/D			
	1.7																	D			
2		Clayey SAND SC: fine to medium, orange-brown, low plasticity, moist, residual below 1.5m: pale orange-brown																			PL(A) = 0.28
52		SANDSTONE: medium to coarse grained, orange-brown and pale grey, low and medium strength with extremely low strength bands, highly weathered, slightly fractured, Hawkesbury Sandstone																C	96	76	PL(A) = 0.62
3																					PL(A) = 0.33
51																					
4	3.91																				PL(A) = 0.26
50	4.2	SANDSTONE: medium to coarse grained, pale grey with some yellow-brown, cross bedded at 20°, medium then high strength, slightly weathered,																			
5																					PL(A) = 0.55
49																		C	100	88	
6																					PL(A) = 1.8
48																					
7	7.04																				PL(A) = 1
47	7.25	SANDSTONE: medium grained, pale grey, medium then high strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone																			
8																					PL(A) = 0.92
46																		C	97	97	
9																					PL(A) = 0.46
45																					

**RIG:** Vac Truck, Hand Tools & Bobcat **DRILLER:** VAC Group **LOGGED:** KR/JJH/TM **CASING:** HW to 1.8m, HQ to 1.8m  
**TYPE OF BORING:** Diatube to 0.1m, Non-Destructive-Drilling (NDD) and Hand-Auger to 1.7m, Solid flight auger to 1.8m, NMLC Coring to 16.00m  
**WATER OBSERVATIONS:** Water seepage at 1.8m  
**REMARKS:** Bulk sample taken 0.45-0.8m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 54.2 AHD  
**EASTING:** 337102.9  
**NORTHING:** 6245608  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH603  
**PROJECT No:** 72505.18  
**DATE:** 19 & 26/08/2020  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
			XW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High			Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
44	10.09	SANDSTONE: medium grained, pale grey, medium then high strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone (continued)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

**RIG:** Vac Truck, Hand Tools & Bobcat **DRILLER:** VAC Group **LOGGED:** KR/JJH/TM **CASING:** HW to 1.8m, HQ to 1.8m  
**TYPE OF BORING:** Diatube to 0.1m, Non-Destructive-Drilling (NDD) and Hand-Auger to 1.7m, Solid flight auger to 1.8m, NMLC Coring to 16.00m  
**WATER OBSERVATIONS:** Water seepage at 1.8m  
**REMARKS:** Bulk sample taken 0.45-0.8m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BORE: 603 PROJECT: RANDWICK AUGUST 2020



Project No: 72505.18  
BH ID: BH 603  
Depth: 1.8-6.0 m  
Core Box No.: 1/3



1.80-6.00m

BORE: 603 PROJECT: RANDWICK AUGUST 2020



Project No: 72505.18  
BH ID: BH 603  
Depth: 6.0-11.0 m  
Core Box No.: 2/3



6.00-11.00m

BORE: 603

PROJECT: RANDWICK

AUGUST 2020



Project No: 72505.18

BH ID: BH 603

Depth: 11.0-16.0 m

Core Box No.: 3/3



11.00-16.00m



# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 54.9 AHD  
**EASTING:** 337107  
**NORTHING:** 6245631.8  
**DIP/AZIMUTH:** 90°/-

**BORE No:** BH604  
**PROJECT No:** 72505.18  
**DATE:** 19 & 24/08/2020  
**SHEET** 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			XW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
	0.075	ASPHALTIC CONCRETE																								
	0.24	FILL/ROADBASE: Sandy GRAVEL, sub-angular, fine igneous gravel, grey, medium, moist																				E				
	0.4																					E				
54	1	FILL/Gravelly SAND: medium, brown, subangular, fine igneous gravel, moist																				E				
	1.6	FILL/SAND: fine to medium, brown, trace subrounded, fine to coarse sandstone gravel, moist																								
63	2	Between 1.0-1.2m: large brick fragment, dark brown silty sand, with charcoal																				E/D				
	1.9	Clayey SAND SC: fine to medium, orange-brown, low plasticity, moist, residual																				D				
																						S				3,2,3 N = 5
		SAND: fine to medium, orange-brown, with clay, moist, loose, residual																								
52	3	Below 2.7m: wet																								
		Below 2.95m: with pale grey sand, medium dense																				S				10,11,17 N = 28
3.4		SANDSTONE: medium grained, pale grey, very low to low strength, Hawkesbury Sandstone																								
3.45																										
51	4	Bore discontinued at 3.45m Target depth reached																								
50	5																									
49	6																									
48	7																									
47	8																									
46	9																									
45																										

**RIG:** Vac Truck, Hand Tools & Bobcat **DRILLER:** VAC Group **LOGGED:** KR/JJH **CASING:** None  
**TYPE OF BORING:** Diatube to 0.1m, Non-Destructive-Drilling (NDD) and Hand-Auger to 1.9m, Solid flight auger to 3.45m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:** Bulk samples taken 0.4-1.6m & 1.7-1.9m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 55.3 AHD  
**EASTING:** 337109.8  
**NORTHING:** 6245649.5  
**DIP/AZIMUTH:** 90°/-

**BORE No:** BH605  
**PROJECT No:** 72505.18  
**DATE:** 19 & 25/08/2020  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			XW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
55	0.11	ASPHALTIC CONCRETE																										
	0.24	FILL/ROADBASE: Sandy GRAVEL, sub-angular, fine igneous gravel, grey, medium, moist																				E/D						
	0.6	FILL/Gravelly SAND: medium, brown, subangular, fine igneous gravel, moist																				E*/D						
1		Between 0.4-0.55m: large brick fragment																				E/D						
54	1.35																					E						
	1.5	FILL/SAND: fine to medium, brown, trace subrounded, fine to coarse sandstone gravel, silt, and glass fragment, moist																				D						
2		SAND SP: fine to medium, pale grey, moist, aeolian																				S						1,3,2 N = 5
53	2.5	Clayey SAND SC: fine to medium, orange-brown, low plasticity, moist, loose, residual																				D						
3		Below 2.2m: with ironstone bands																										7,25/30 refusal
52	3.18	Sandy CLAY CI: low to medium plasticity, pale grey, w~PL, residual (Extremely weathered sandstone)																				S						PL(A) = 0.23
		SANDSTONE: medium to coarse grained, pale grey and red-brown, low to high strength, moderately and highly weathered, slightly fractured to unbroken, Hawkesbury Sandstone																					C	98	96			PL(A) = 0.94
4																												
51																												
	4.94																											PL(A) = 1.3
50																												
	5.75	SANDSTONE: medium grained, pale grey, medium strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone																										PL(A) = 0.76
6																												
49																												
7																												PL(A) = 0.84
48																												
8																												PL(A) = 0.84
47																												
9	9.0	SANDSTONE: medium grained, pale grey, high strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone																										PL(A) = 1.3
46																												

**RIG:** Vac Truck, Hand Tools & Bobcat **DRILLER:** VAC Group **LOGGED:** KR/JJH/TM **CASING:** HQ to 3.1m  
**TYPE OF BORING:** Diatube to 0.1m, Non-Destructive-Drilling (NDD) and Hand-Auger to 1.8m, Solid flight auger to 3.18m, NMLC Coring to 16.28m  
**WATER OBSERVATIONS:** Water seepage at 3.1m  
**REMARKS:** \*Field replicate sample BD1/20200819, Bulk samples taken 0.4-1.0m & 1.5-1.8m, Groundwater well installed, refer to Well Log for construction details, Data logger 2119606 installed in well

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 55.3 AHD  
**EASTING:** 337109.8  
**NORTHING:** 6245649.5  
**DIP/AZIMUTH:** 90°/-

**BORE No:** BH605  
**PROJECT No:** 72505.18  
**DATE:** 19 & 25/08/2020  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing							
			XW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High			Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments		
45		SANDSTONE: medium grained, pale grey, high strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone <i>(continued)</i>																							PL(A) = 1.3	
11		Between 10.7-12.17: cross bedded at 0-10°																				C	100	100		PL(A) = 1.6
44																										
12																										PL(A) = 2
43																										
13																										PL(A) = 1.4
42																										
14		Between 13.9-15.4m: cross bedded at 0-10°																								PL(A) = 1.4
41																										
15																										PL(A) = 2
40																										
16																										PL(A) = 2.2
39	16.28	Bore discontinued at 16.28m Target depth reached																								
17																										
38																										
18																										
37																										
19																										
36																										

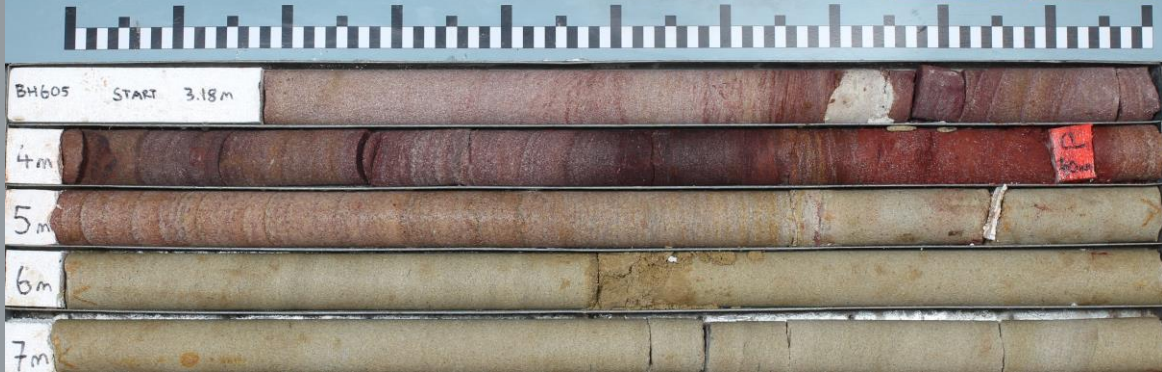
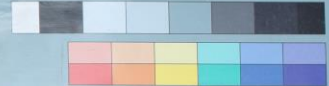
**RIG:** Vac Truck, Hand Tools & Bobcat **DRILLER:** VAC Group **LOGGED:** KR/JJH/TM **CASING:** HQ to 3.1m  
**TYPE OF BORING:** Diatube to 0.1m, Non-Destructive-Drilling (NDD) and Hand-Auger to 1.8m, Solid flight auger to 3.18m, NMLC Coring to 16.28m  
**WATER OBSERVATIONS:** Water seepage at 3.1m  
**REMARKS:** \*Field replicate sample BD1/20200819, Bulk samples taken 0.4-1.0m & 1.5-1.8m, Groundwater well installed, refer to Well Log for construction details, Data logger 2119606 installed in well

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BORE: 605 PROJECT: RANDWICK AUGUST 2020



Project No: 72505.18  
BH ID: BH605  
Depth: 3.18-8.0m  
Core Box No.: 1/3



3.18-8.00m

BORE: 605 PROJECT: RANDWICK AUGUST 2020



Project No: 72505.18  
BH ID: BH605  
Depth: 8.0-13.0m  
Core Box No.: 2/3

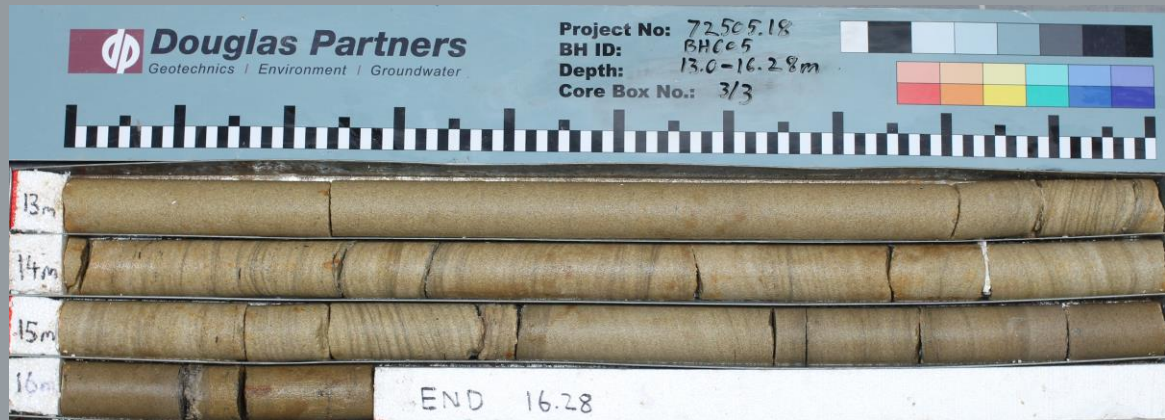


8.00-13.00m

BORE: 605

PROJECT: RANDWICK

AUGUST 2020



13.00-16.28m



# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 52.1 AHD  
**EASTING:** 337045.4  
**NORTHING:** 6245584.9  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH606  
**PROJECT No:** 72505.18  
**DATE:** 28 - 31/8/2020  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing				
			XW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
52	0.06	ASPHALTIC CONCRETE																								
	0.2	FILL/ROADBASE: GRAVEL, coarse, dark grey, igneous, subangular-subrounded, dry, roadbase																				D				
	0.6	FILL/ GRAVEL: medium, yellow-brown, sandstone, with clay, sand, crushed sandstone, dry																				E/D*				
51	1	FILL/ SAND: fine to medium, pale grey, dry																				E/D				
	1.4	SAND SP: fine to medium, brown, dry, loose, aeolian																				S				3,4,4 N = 8
	2	Below 1.8m: moist																				E/D				
50		Below 2.5m: medium dense																								
	3																					S				5,7,9 N = 16
49	3.1	SANDSTONE: medium to coarse grained, yellow-brown, very low to low strength, Hawkesbury Sandstone																								
	3.6																									PL(A) = 0.14
48	4	SANDSTONE: medium to coarse grained, pale grey with some pale orange staining, low then medium strength, slightly weathered, slightly fractured, Hawkesbury Sandstone																				C	100	99		PL(A) = 0.23
	5																									PL(A) = 0.61
47	5																									
	6																									PL(A) = 0.68
46	6.25	SANDSTONE: medium grained, pale grey, medium strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone																								
	7																					C	100	98		PL(A) = 0.46
45	7																									
	8																									PL(A) = 0.76
44	8																									
	9																									
43	9																					C	100	96		PL(A) = 0.68

**RIG:** Bobcat

**DRILLER: JE**

**LOGGED: TM**

**CASING:** HW to 3.2m, HQ to 3.6m

**TYPE OF BORING:** Diacore to 0.06m, Solid flight auger to 3.2m, Rotary to 3.6m, NMLC Coring to 16.19m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** \*Field replicate sampleBD03/20200828, Bulk samples taken 0.6-1.0m & 1.5-3.0m, Groundwater well installed, refer to Well Log for construction details. Data logger 2121808 installed in well

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 52.1 AHD  
**EASTING:** 337045.4  
**NORTHING:** 6245584.9  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH606  
**PROJECT No:** 72505.18  
**DATE:** 28 - 31/8/2020  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing						
			XW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low			Medium	High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
42		SANDSTONE: medium grained, pale grey, medium strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone <i>(continued)</i>																				PL(A) = 0.52	
41	11																						PL(A) = 0.45
40	12																						PL(A) = 0.88
39	13																						PL(A) = 1
38	14																						PL(A) = 0.72
37	15																					PL(A) = 0.64	
36	16																					PL(A) = 0.08	
16.19		Bore discontinued at 16.19m Target depth reached																					
35	17																						
34	18																						
33	19																						

**RIG:** Bobcat

**DRILLER:** JE

**LOGGED:** TM

**CASING:** HW to 3.2m, HQ to 3.6m

**TYPE OF BORING:** Diacore to 0.06m, Solid flight auger to 3.2m, Rotary to 3.6m, NMLC Coring to 16.19m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** \*Field replicate sampleBD03/20200828, Bulk samples taken 0.6-1.0m & 1.5-3.0m, Groundwater well installed, refer to Well Log for construction details, Data logger 2121808 installed in well

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BORE: 606 PROJECT: RANDWICK AUGUST 2020



Project No: 72505.18  
BH ID: BH 606  
Depth: 3.60m - 8.0m  
Core Box No.: 1/3



72505.18 Randwick BH606 START 3.60m



3.60-8.00m

BORE: 606 PROJECT: RANDWICK AUGUST 2020



Project No: 72505.18  
BH ID: BH 606  
Depth: 8.0 - 13.0 m  
Core Box No.: 2/3



8.00-13.00m

BORE: 606

PROJECT: RANDWICK

AUGUST 2020



Project No: 72505.18  
BH ID: BH 606  
Depth: 13.0-16.19 m  
Core Box No.: 3/3



13.00-16.19 m

# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 52.6 AHD  
**EASTING:** 337035.3  
**NORTHING:** 6245607.6  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH607  
**PROJECT No:** 72505.18  
**DATE:** 31/8/2020  
**SHEET 1 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			XW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High			Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
	0.06	ASPHALTIC CONCRETE																					
	0.25	FILL/ROADBASE: GRAVEL, coarse, dark grey, igneous, subangular-subrounded, dry, roadbase																	E/D				
52	0.55	FILL/SAND: fine to medium, pale grey, trace brick and tile fragments, dry, loose																	E/D				
1																			E/D				
	1.4	SAND SP: fine to medium, yellow-brown, moist, loose, aeolian																	S				7,8,6 N = 14
51		SAND SC: fine to medium, dark brown, with clay, loose, moist, aeolian																					
2																			E/D*				
50																							
3																			S				1,3,3 N = 6
49																							
	3.89	SANDSTONE: medium to coarse grained, pale grey and pale orange, low strength, slightly weathered, slightly fractured, Hawkesbury Sandstone																					
4	3.92																						PL(A) = 0.14
48																							
5	4.9	SANDSTONE: medium grained, pale grey, low strength, fresh, unbroken, Hawkesbury Sandstone																	C	98	98		PL(A) = 0.29
47																							
6																							PL(A) = 0.22
	6.35	SANDSTONE: medium grained, pale grey, medium strength with high strength bands, fresh, unbroken, Hawkesbury Sandstone																					
46																							
7																			C	98	98		PL(A) = 0.66
45																							
8																							PL(A) = 0.84
44																							
9																							PL(A) = 0.76
43																			C	100	98		

**RIG:** Bobcat **DRILLER:** JE **LOGGED:** TM **CASING:** HQ to 3.89m  
**TYPE OF BORING:** Solid flight auger to 3.8m, Rotary to 3.89m, NMLC Coring to 17.59m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:** \*Field replicate sampleBD04/20200831, Bulk samples taken 0.6-1.4m, 1.5-3.8m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	



# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 52.6 AHD  
**EASTING:** 337035.3  
**NORTHING:** 6245607.6  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH607  
**PROJECT No:** 72505.18  
**DATE:** 31/8/2020  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities	Sampling & In Situ Testing				
			XW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
		SANDSTONE: medium grained, pale grey, medium strength with high strength bands, fresh, unbroken, Hawkesbury Sandstone (continued)																			PL(A) = 0.81
	42																	C	100	98	PL(A) = 0.87
	11																				
	41	11.64																			
	12																				PL(A) = 1.3
	40																				
	13																	C	98	95	PL(A) = 0.5
	39																				
	14																				PL(A) = 1.7
	38																				
	15																				PL(A) = 0.3
	37																				
	16																	C	100	100	PL(A) = 0.94
	36																				
	17	Between 16.85-17.57: with siltstone clasts																			PL(A) = 1.1
	35	17.59																			
	18	Bore discontinued at 17.59m Target depth reached																			
	34																				
	19																				
	33																				

**RIG:** Bobcat **DRILLER:** JE **LOGGED:** TM **CASING:** HQ to 3.89m  
**TYPE OF BORING:** Solid flight auger to 3.8m, Rotary to 3.89m, NMLC Coring to 17.59m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:** \*Field replicate sampleBD04/20200831, Bulk samples taken 0.6-1.4m, 1.5-3.8m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BORE: 607 PROJECT: RANDWICK AUGUST 2020



Project No: 72505.18  
BH ID: BH 607  
Depth: 3.89 - 8.00m  
Core Box No.: 1/3



3.89-8.00m

BORE: 607 PROJECT: RANDWICK AUGUST 2020



Project No: 72505.18  
BH ID: BH 607  
Depth: 8.00 - 13.00m  
Core Box No.: 2/3



8.00-13.00m

BORE: 607

PROJECT: RANDWICK

AUGUST 2020



Project No: 72505.18  
BH ID: BH 607  
Depth: 13-17.57 m  
Core Box No.: 3/3



13.00-17.57 m

# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 52.9 AHD  
**EASTING:** 337054.9  
**NORTHING:** 6245642.4  
**DIP/AZIMUTH:** 90°/-

**BORE No:** BH608  
**PROJECT No:** 72505.18  
**DATE:** 27 - 28/8/2020  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			XW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
52 51 50 49 48 47 46 45 44 43	0.05	ASPHALTIC CONCRETE																E/D			1,1,1 N = 2
	0.2	FILL/ROADBASE: GRAVEL, coarse, dark grey, igneous, subangular-subrounded, dry																E/D			
	0.5	FILL/ GRAVEL: medium, yellow-brown, sandstone, with clay, sand, crushed sandstone, dry																E/D*			
	1	FILL/SAND: fine to medium, brown, trace silt, and fine subangular igneous gravel, dry																S			
	1.5	SAND SP: fine to medium, yellow-brown, with clay, moist, loose, aeolian																E/D			
	2.5	SANDSTONE: medium to coarse grained, pale yellow and red, very low then low strength, highly weathered, slightly fractured, Hawkesbury Sandstone																S			25/90 refusal
	3																				PL(A) = 0.07
	4																	C	97	72	PL(A) = 0.08
	4.83																				
	5.02	SANDSTONE: medium grained, pale grey, low then medium to high strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone																			PL(A) = 0.19
6																				PL(A) = 0.91	
7																				PL(A) = 1	
8																		C	99	99	PL(A) = 0.81
9																					PL(A) = 0.97

**RIG:** Bobcat **DRILLER:** JE **LOGGED:** TM **CASING:** HW to 2.6m, HQ to 2.75m

**TYPE OF BORING:** Diacore to 0.05m, Solid flight auger to 2.5m, Rotary to 2.75m, NMLC Coring to 16.0m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** \*Field replicate sample BD02/20200827, Bulk samples taken 0.5-1.5m & 1.5-2.5m, Groundwater well installed, refer to Well Log for construction details, Data logger 2119607 installed in well

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 52.9 AHD  
**EASTING:** 337054.9  
**NORTHING:** 6245642.4  
**DIP/AZIMUTH:** 90°/-

**BORE No:** BH608  
**PROJECT No:** 72505.18  
**DATE:** 27 - 28/8/2020  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			XW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High			Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		SANDSTONE: medium grained, pale grey, low then medium to high strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone (continued)																				PL(A) = 1
	42 11																	C	99	99		PL(A) = 1.1
	41 12	11.89																				PL(A) = 1.2
	40 13																	C	98	98		PL(A) = 0.83
	39 14																					PL(A) = 0.75
	38 15																					PL(A) = 1.1 PL(A) = 0.15
	37 16																	C	100	98		PL(A) = 1.2
	16.33	Bore discontinued at 16.33m Target depth reached																				
	36 17																					
	35 18																					
	34 19																					
	33																					

**RIG:** Bobcat

**DRILLER:** JE

**LOGGED:** TM

**CASING:** HW to 2.6m, HQ to 2.75m

**TYPE OF BORING:** Diacore to 0.05m, Solid flight auger to 2.5m, Rotary to 2.75m, NMLC Coring to 16.0m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** \*Field replicate sample BD02/20200827, Bulk samples taken 0.5-1.5m & 1.5-2.5m, Groundwater well installed, refer to Well Log for construction details, Data logger 2119607 installed in well

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



BORE: 608

PROJECT: RANDWICK

AUGUST 2020



**Douglas Partners**  
Geotechnics | Environment | Groundwater

Project No: 72505.18

BH ID: BH608

Depth: 2.75-7.0m

Core Box No.: 2/3



2.75-7.00m

BORE: 608

PROJECT: RANDWICK

AUGUST 2020



**Douglas Partners**  
Geotechnics | Environment | Groundwater

Project No: 72505.18

BH ID: BH608

Depth: 7.0-12.0m

Core Box No.: 2/3



7.00-12.00m

BORE: 608

PROJECT: RANDWICK

AUGUST 2020



Project No: 72505.18  
BH ID: BH608  
Depth: 12.0-16.33m  
Core Box No.: 3/3



12.00-16.33m

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## **Appendix C (Continued)**

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Previous Groundwater Well Logs

# WELL LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 51.9 AHD  
**EASTING:** 337044.9  
**NORTHING:** 6245563  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 4 (72505.11)  
**PROJECT No:** 72505.13  
**DATE:** 19 - 21/9/2017  
**SHEET** 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample			
51	0.04	ASPHALTIC CONCRETE (typically <10mm diameter)		A	0.07				Gatic Cover
	0.07	ASPHALTIC CONCRETE (typically <20mm diameter)		A	0.15				
1	0.2	ROADBASE - dark grey, angular, igneous gravel typically 40-80mm diameter, slight hydrocarbon odour		A	0.5				
	0.8			A	0.6				
2		FILLING - orange-brown, medium grained sand filling with some sandstone gravel and a trace of clay (ripped sandstone)		A	0.9				1
				A	1.0				
				A	1.4				Backfill
				A	1.6				
				A	1.9				2
					2.0				
3	2.6	SAND - pale yellow-brown, fine to medium grained sand, damp 2.2m: brown		S	2.5	8,14,17 N = 31			3
					2.95				
4	3.5	SAND - medium dense to dense, orange, fine to medium sand with some clay, damp			3.65	PL(A) = 0.22			Bentonite
	3.65				3.9				
5	4.15	SANDSTONE - extremely low to very low strength sandstone		C		PL(A) = 0.76			4
					4.95				
6		SANDSTONE - low strength, slightly weathered, fractured to slightly fractured, pale brown, medium to coarse grained sandstone			5.29	PL(A) = 0.71			5
7		SANDSTONE - medium strength, slightly weathered then fresh, slightly fractured and fractured, medium to coarse grained sandstone - limonite staining to 4.40m		C		PL(A) = 0.71			6
	6.91				6.95				
8		5.5m: distinct irregular bedding dipping 15° - 20° 6.4m: indistinct irregular bedding dipping 0° - 20°				PL(A) = 0.66			7
					7.95				
9		SANDSTONE - medium strength, fresh, slightly fractured and unbroken, pale grey, medium to coarse grained sandstone, massive, trace carbonaceous flecks			8.38	PL(A) = 0.95			8
					8.95				
10				C	9.95	PL(A) = 0.73			9
11					11.39	PL(A) = 0.61			10
12	12.0	SANDSTONE - medium to high strength, fresh, slightly fractured to unbroken, pale grey, medium to coarse grained sandstone, indistinct bedding typically dipping 10° - 20°		C		PL(A) = 0.69			11
					12.95				
13						PL(A) = 1.1			12
14					14.37	PL(A) = 0.91			13
15	14.6	SANDSTONE - high then medium strength, fresh, unbroken, pale grey, fine to medium grained sandstone, occasional carbonaceous laminations and flecks				PL(A) = 1.33			14
16				C		PL(A) = 0.59			15
17		16.78-16.97m: siltstone clasts and laminations, slightly fractured				PL(A) = 0.76			16
	17.31				17.31				
18		Bore discontinued at 17.31m - target depth reached							17
									18

**RIG:** Bobcat

**DRILLER:** GM

LOGGED: ARM

**CASING:** HW to 3.65m

**TYPE OF BORING:** Diatube to 0.08m; NDD to 1.7m; Solid flight auger (TC-bit) to 3.65m; NMLC-Coring to 17.31m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)
























# WELL LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 50.5 AHD  
**EASTING:** 337038.1  
**NORTHING:** 6245507  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 8 (72505.11)  
**PROJECT No:** 72505.13  
**DATE:** 23 - 24/1/2018  
**SHEET** 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details		
				Type	Depth	Sample				Results & Comments
50	0.1	ASPHALTIC CONCRETE (typically <10mm diameter)							Gatic Cover	
	0.25			A	0.4					
	0.6	ROADBASE - dark grey, angular, igneous gravel typically 40-80mm diameter		A*	0.5				Backfill	
1					0.6					
		FILLING - pale grey and brown sandstone gravel and cobbles up to 100mm diameter (ripped sandstone)			0.7					
2				A	1.6					
		SAND - pale brown, medium grained sand with a trace of fine gravel, damp			1.7					
	2.6				2.5		7,10/10mm refusal			
	2.77	SANDSTONE - extremely low strength, orange-brown sandstone		S	2.66		PL(A) = 0.26			
3					2.77					
		SANDSTONE - low to medium strength, slightly weathered, fractured to slightly fractured, orange and grey, medium to coarse grained sandstone		C	2.95					
4					3.88		PL(A) = 0.43			
					3.91					
5					4.95		PL(A) = 0.6			
	5.45			C						
6		SANDSTONE - high then medium strength, fresh, slightly fractured to unbroken, pale grey, medium to coarse grained sandstone with a trace of carbonaceous flecks			5.95		PL(A) = 1.12			
		6.4-6.9m: red-brown iron staining								
7					6.89		PL(A) = 0.69			
					6.95					
8					7.95		PL(A) = 0.63			
		8.1-8.55m: low strength band		C	8.41		PL(A) = 0.22			
9					8.95		PL(A) = 0.63			
10					9.93		PL(A) = 1.03			
	10.41	10.2-10.41m: with 25% siltstone clasts up to 20mm diameter, fragmented (possibly drilling induced)			9.95				Backfill	
11		LAMINITE - low strength, fresh, slightly fractured, dark grey siltstone interlaminated and interbedded with 40% pale grey, fine grained sandstone			10.95		PL(A) = 0.18			
	11.45			C						
12		SANDSTONE - high strength, fresh, slightly fractured to unbroken, pale grey, medium to coarse grained sandstone, massive			11.95		PL(A) = 2.23			
13					12.75		PL(A) = 1.54			
		12.84-13.03m: with 50% carbonaceous laminations			12.92					
		13.03-13.21: fine to medium grained								
14		13.21m: medium to coarse grained, irregular bedding dipping 10-20°			13.85		PL(A) = 1.19			
				C						
15		14.8m: massive			14.95		PL(A) = 1.27			
16					15.89		PL(A) = 1.36			
					15.95					
17		16.44m: irregular bedding dipping 10-20°		C	16.95		PL(A) = 1.57			
18	17.39	Bore discontinued at 17.39m - target depth reached			17.39					

**RIG:** Bobcat

**DRILLER:** GM

LOGGED: ARM

**CASING:** HW to 2.5m: HQ to 2.7m

**TYPE OF BORING:** Diatube to 0.10m: Non-destructive drilling to 1.7m: Solid flight auger (TC-bit) to 2.77m: NMLC-Coring to 17.39m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)





# WELL LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 55.7 AHD  
**EASTING:** 337090  
**NORTHING:** 6245535  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 12  
**PROJECT No:** 72505.13  
**DATE:** 30-4-2018  
**SHEET 1 OF 1**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
	0.09	ASPHALTIC CONCRETE		D	0.1				Gatic Cover
	0.6	ROADBASE: dark grey, sandy fine to coarse grain igneous gravel, damp		D	0.2				
	1.2	FILLING: brown, medium to coarse sand filling, with some silt, damp		D	0.8				Backfill
		0.8-1.2 m: with some roots.			0.9				
		SAND: medium dense, yellow brown, medium sand, damp		S	1.6		2,7,9 N = 16		Bentonite
					2.05				
				S	3.0		5,10,13 N = 23		
					3.45				
				S	4.5		6,11,13 N = 24		Gravel
					4.95				Screen 3.8-6.8m
	6.1	SANDSTONE: high strength, slightly weathered becoming fresh, slightly fractured, pale grey, medium to coarse grained sandstone, some iron stained bedding		S	6.0		11/110 refusal		
					6.1				
					6.11				
				C	7.0		PL(A) = 2.42		Bentonite
							PL(A) = 2.29		
	8.8	SANDSTONE: high strength, fresh, unbroken, pale grey, medium grained sandstone			8.79		PL(A) = 1.24		
		9.40-9.45 m: bedding typically 10-20°			8.8				
				C	9.81		PL(A) = 1.9		
					10.72		PL(A) = 2.54		
					11.48		PL(A) = 0.93		Backfill
				C	11.81				
					12.06		PL(A) = 1.33		
				C	12.27				
					12.55				
				C					
		13.57-14.15 m: becoming slightly fractured			13.71		PL(A) = 1.2		
		13.66-13.76 m: bedding typically 5 - 10°			14.0		PL(A) = 1.04		
	14.15	Bore discontinued at 14.15m			14.15				
		Target depth reached							

**RIG:** Han Jin 8D **DRILLER:** BG Drilling **LOGGED:** JAP **CASING:** HW to 5.5 m  
**TYPE OF BORING:** Diatube to 0.09 m, NDD to 1.5 m, Solid flight auger (TC-bit) to 4.0 m, Rotary to 6.1 m, HQ Coring to 14.15 m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:**

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

# WELL LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 52.0 AHD  
**EASTING:** 337045  
**NORTHING:** 6245565  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 13  
**PROJECT No:** 72505.13  
**DATE:** 3-5-2018  
**SHEET 1 OF 1**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
52.0	0.05	ASPHALTIC CONCRETE: (typically <10 mm diameter)							Gatic Cover	
51.9	0.11	ASPHALTIC CONCRETE: (typically <20 mm diameter)								
51.8	0.4	ROADBASE: dark grey, angular igneous gravels, (typically 30-80 mm diameter)							Backfill	
51.7	0.6	FILLING: grey-brown, ripped sandstone filling, (typically 40-80mm diameter)							Bentonite	
51.6	0.9	FILLING: orange brown, medium sandy gravel filling with some coarse sandstone gravel, damp								
51.5	1.0	SAND: medium dense, pale yellow, medium sand, damp								
51.4	1.8			S	1.8		2.6.9 N = 15			
51.3	2.25				2.25					
51.2	2.5	SAND: medium dense to dense, brown orange, fine to medium sand with some silt, damp							Gravel	
51.1	2.8			D	2.8				Screen 1.3-3.8m	
51.0	3.0			S	3.0		14.8/80 refusal			
50.9	3.2	SANDSTONE: extremely low to very low strength, orange brown sandstone			3.2					
50.8	3.8	Bore discontinued at 3.8m Limit of investigation								
50.7	4.0									
50.6	4.5									
50.5	5.0									

**RIG:** Han Jin 8D

**DRILLER:** BG Drilling

**LOGGED:** JAP

**CASING:** Uncased

**TYPE OF BORING:** Diatube to 0.15 m, Non-destructive drilling to 1.6 m, solid flight auger (TC-bit) to 3.8 m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:**

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PLD	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

# WELL LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 55.2 AHD  
**EASTING:** 336986  
**NORTHING:** 6245643  
**DIP/AZIMUTH:** 90°/--

**BORE No:** 16  
**PROJECT No:** 72505.13  
**DATE:** 8-5-2018  
**SHEET 1 OF 1**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
55.0	0.12	CONCRETE SLAB							Gatic Cover	
		FILLING: brown, fine to medium sand filling with some silt and trace of igneous gravel, humid								
54.0	0.55	SAND: yellow, fine to medium sand, damp							Backfill	
53.0	2.0	SAND: medium dense, yellow, fine to medium sand, damp		S	2.0		4,9,11 N = 20			
					2.45					
52.0	3.2	SAND: medium dense, brown, fine to medium sand with trace of clay, damp		S	3.5		7,9,20 N = 29			
					3.95					
51.0	4.1	SANDSTONE: very low strength, orange-brown and light grey, medium to coarse grained sandstone		S	4.1		6/30, Bouncing			
					4.15					
50.0	4.7	Bore discontinued at 4.7m Limit of investigation								
49.0										
48.0										
47.0										
46.0										
45.0										
44.0										
43.0										
42.0										
41.0										
40.0										
39.0										
38.0										
37.0										
36.0										
35.0										
34.0										
33.0										
32.0										
31.0										
30.0										
29.0										
28.0										
27.0										
26.0										
25.0										
24.0										
23.0										
22.0										
21.0										
20.0										
19.0										
18.0										
17.0										
16.0										
15.0										
14.0										
13.0										
12.0										
11.0										
10.0										
9.0										
8.0										
7.0										
6.0										
5.0										
4.0										
3.0										
2.0										
1.0										
0.0										

**RIG:** Han Jin 8D **DRILLER:** BG Drilling **LOGGED:** JAP **CASING:** HW to 4.0 m  
**TYPE OF BORING:** Diatube to 0.12 m, Non-destructive drilling to 1.8 m, solid flight auger (TC-bit) to 2.0 m, Rotary to 4.7 m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:**

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PLD	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

# WELL LOG

**CLIENT:** LendLease Building Pty Ltd  
**PROJECT:** Randwick Campus Redevelopment  
**LOCATION:** Hospital Road and High, Magill and Botany Streets, Randwick

**SURFACE LEVEL:** 55.2 AHD  
**EASTING:** 336983  
**NORTHING:** 6245644  
**DIP/AZIMUTH:** 90°/-

**BORE No:** 17  
**PROJECT No:** 72505.13  
**DATE:** 8-5-2018  
**SHEET 1 OF 1**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
55.0	0.11	CONCRETE SLAB							Gatic Cover
54.5	0.6	FILLING: brown, fine to medium sand filling with some silt and trace of igneous and sandstone gravel, humid							
54.0	1	SAND: yellow-brown, fine to medium sand, damp							
53.5	2.0	SAND: medium dense yellow-brown fine to medium sand, damp		S	2.0		4.6.9 N = 15		Backfill
53.0	2.45				2.45				
52.5	3.3	SAND: medium dense, brown, fine to medium sand with trace of clay, damp		S	3.5		9,10,14 N = 24		
52.0	3.95				3.95				
51.5	4.4	SANDSTONE: very low to low strength, orange-brown and light grey, medium to coarse grained sandstone							Bentonite
51.0	5.08	SANDSTONE: medium strength, slightly weathered, slightly fractured, light grey and red-brown, medium to coarse grained sandstone, bedding typically 0-10°		C	5.0				
50.5	5.79				5.79		PL(A) = 0.6		
50.0	5.8				5.8				
49.5	6.71			C	6.71		PL(A) = 0.8		
49.0	7.86				7.86		PL(A) = 1.1		Gravel Screen 5.1-9.6m
48.5	8.8				8.8		PL(A) = 0.5		
48.0	8.88				8.88				
47.5	9.34				9.34		PL(A) = 0.5		
47.0	9.5	SANDSTONE: medium strength, fresh, slightly fractured to unbroken, light grey sandstone with some low strength bands, bedding typically 10-15° with some cross bedding		C	10.0		PL(A) = 0.8		
46.5	10	SANDSTONE (see over page)							Bentonite
46.0	11.0				11.0		PL(A) = 0.12		
45.5	11.85				11.85		PL(A) = 0.39		
45.0	11.95				11.95				
44.5	12.24	SANDSTONE: medium and high strength, fresh, unbroken, light grey and grey sandstone			12.24		PL(A) = 1.38		
44.0	13								Backfill
43.5	13.4-13.8	Bedding typically 5-10°		C	13.44		PL(A) = 0.69		
43.0	14.8	Bore discontinued at 14.8m Target depth reached			14.76		PL(A) = 1.16		
42.5	14.8				14.8				

**RIG:** Han Jin 8D **DRILLER:** BG Drilling **LOGGED:** JAP **CASING:** HW to 4.5 m  
**TYPE OF BORING:** Diatube to 0.11 m, Non-destructive drilling to 1.8 m, Auger to 2.0 m, Rotary to 5.0 m, NMLC Coring to 14.80 m  
**WATER OBSERVATIONS:** No free groundwater observed whilst augering  
**REMARKS:**

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 55 AHD  
**EASTING:** 337097.5  
**NORTHING:** 6245571.8  
**DIP/AZIMUTH:** 90°/-

**BORE No:** BH602  
**PROJECT No:** 72505.18  
**DATE:** 19 & 24/08/2020  
**SHEET 1 OF 1**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
58	0.09	ASPHALTIC CONCRETE		E	0.1				Gatic cover	
	0.28	FILL/ROADBASE: Sandy GRAVEL, sub-angular, fine igneous gravel, grey, medium, moist		E/D	0.3				Grout 0.0-1.0m	
	0.7	FILL/SAND: fine to medium, dark brown, with silt, moist		E/D	0.4					
		SAND SP: fine to medium, pale grey, moist, aeolian		E/D	0.6					
57	1				0.8				Bentonite 1.0-1.5m	
					1.0				Blank pipe 0.1-3.8m	
56	2				2.0		4,3,5 N = 8			
	2.2	SAND SP: fine to medium, orange-brown, apparently cemented, iron indurated, ("coffee rock"), aeolian		S	2.45				Slotted PVC screen 1.5-3.34m	
	2.6	SAND SP: fine to medium, yellow-brown, moist, aeolian		D	2.5				Gravel 1.5-3.35m	
				D	2.6					
				D	2.8					
55	3			S	3.0		5,25/125 refusal			
	3.2	Below 3.1m: becoming wet			3.27				End cap	
	3.35	SANDSTONE: medium grained, pale yellow-brown, apparently very low to low strength, Hawkesbury Sandstone								
54	4	Bore discontinued at 3.35m Target depth reached								
53	5									
52	6									
51	7									
50	8									
49	9									

**RIG:** Vac Truck, Hand Tools & Bobcat **DRILLER:** VAC Group

**LOGGED:** KR/JJH

**CASING:** None

**TYPE OF BORING:** Diatube to 0.1m, Non-Destructive-Drilling (NDD) and Hand-Augur to 1.5m, Solid flight auger to 3.35m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** Bulk sample taken at 0.7-1.5m, Groundwater well installed, refer to Well Log for construction details, Data logger 2121809 installed in well

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PLD	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 55.3 AHD  
**EASTING:** 337109.8  
**NORTHING:** 6245649.5  
**DIP/AZIMUTH:** 90°/-

**BORE No:** BH605  
**PROJECT No:** 72505.18  
**DATE:** 19 & 25/08/2020  
**SHEET** 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample		
	0.11	ASPHALTIC CONCRETE		E/D	0.1			Gatic cover
	0.24	FILL/ROADBASE: Sandy GRAVEL, sub-angular, fine igneous gravel, grey, medium, moist		E*/D	0.3			
	0.6	FILL/Gravelly SAND: medium, brown, subangular, fine igneous gravel, moist			0.4			
		Between 0.4-0.55m: large brick fragment			0.5			
	1	FILL/SAND: fine to medium, brown, trace subrounded, fine to coarse sandstone gravel, silt, and glass fragment, moist		E/D	0.9			
	1.35				1.1			Backfill 0.0-2.3m
	1.5	SAND SP: fine to medium, pale grey, moist, aeolian		E	1.4			
		Clayey SAND SC: fine to medium, orange-brown, low plasticity, moist, loose, residual		D	1.5			
		Below 2.2m: with ironstone bands			1.6			
	2.5	Sandy CLAY CI: low to medium plasticity, pale grey, w~PL, residual (Extremely weathered sandstone)		S	2.0		1.3,2 N = 5	
				D	2.45			
					2.5			Bentonite 2.3-3.3m
					2.6			
	3.18	SANDSTONE: medium to coarse grained, pale grey and red-brown, low to high strength, moderately and highly weathered, slightly fractured to unbroken, Hawkesbury Sandstone		S	3.0		7,25/30 refusal PL(A) = 0.23	
					3.18			Blank pipe 0.1-3.8m
					3.3			
	4			C	4.2		PL(A) = 0.94	
	4.94				5.0		PL(A) = 1.3	
	5.75	SANDSTONE: medium grained, pale grey, medium strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone			5.84		PL(A) = 0.76	
					6.0			
	7			C	7.0		PL(A) = 0.84	
	8				8.0		PL(A) = 0.84	
					8.85			
	9			C	9.0		PL(A) = 1.3	
					10.0		PL(A) = 1.3	Gravel 3.3-3.8m

**RIG:** Vac Truck, Hand Tools & Bobcat **DRILLER:** VAC Group

**LOGGED:** KR/JJH/TM

**CASING:** HQ to 3.1m

**TYPE OF BORING:** Diatube to 0.1m, Non-Destructive-Drilling (NDD) and Hand-Auger to 1.8m, Solid flight auger to 3.18m, NMLC Coring to 16.28m

**WATER OBSERVATIONS:** Water seepage at 3.1m

**REMARKS:** \*Field replicate sampleBD1/20200819, Bulk samples taken 0.4-1.0m & 1.5-1.8m, Groundwater well installed, refer to Well Log for construction details, Data logger 2119606 installed in well

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
BB	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



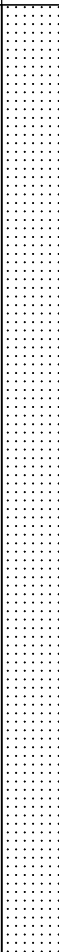
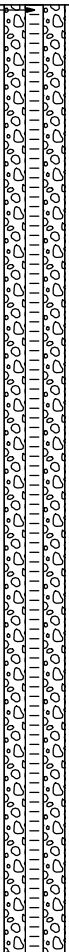
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# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 55.3 AHD  
**EASTING:** 337109.8  
**NORTHING:** 6245649.5  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH605  
**PROJECT No:** 72505.18  
**DATE:** 19 & 25/08/2020  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
45		SANDSTONE: medium grained, pale grey, medium strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone ( <i>continued</i> )		C						Slotted PVC screen 3.8-16.27m
11		SANDSTONE: medium grained, pale grey, high strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone			11.0		PL(A) = 1.6	11		
44		SANDSTONE: medium grained, pale grey, high strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone ( <i>continued</i> )			11.81					
12		Between 10.7-12.17: cross bedded at 0-10°			12.0		PL(A) = 2	12		
43				C	13.0		PL(A) = 1.4	13		
13					14.0		PL(A) = 1.4	14		
42		Between 13.9-15.4m: cross bedded at 0-10°			14.83					
15				C	15.0		PL(A) = 2	15		
41					16.0		PL(A) = 2.2	16		
16					16.28			16		
39	16.28	Bore discontinued at 16.28m Target depth reached							End cap	
17										
38										
18										
37										
19										
36										

**RIG:** Vac Truck, Hand Tools & Bobcat **DRILLER:** VAC Group

**LOGGED:** KR/JJH/TM

**CASING:** HQ to 3.1m

**TYPE OF BORING:** Diatube to 0.1m, Non-Destructive-Drilling (NDD) and Hand-Augur to 1.8m, Solid flight auger to 3.18m, NMLC Coring to 16.28m

**WATER OBSERVATIONS:** Water seepage at 3.1m

**REMARKS:** \*Field replicate sample BD1/20200819, Bulk samples taken 0.4-1.0m & 1.5-1.8m, Groundwater well installed, refer to Well Log for construction details, Data logger 2119606 installed in well

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 52.1 AHD  
**EASTING:** 337045.4  
**NORTHING:** 6245584.9  
**DIP/AZIMUTH:** 90°/-

**BORE No:** BH606  
**PROJECT No:** 72505.18  
**DATE:** 28 - 31/8/2020  
**SHEET 1 OF 2**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample		
52.06	0.06	ASPHALTIC CONCRETE		D	0.1			Gatic cover
52.02	0.2	FILL/ROADBASE: GRAVEL, coarse, dark grey, igneous, subangular-subrounded, dry, roadbase		E/D*	0.2			Grout 0.0-1.0m
51.98	0.4				0.4			Bentonite 0.15-0.35m
51.94	0.6	FILL/ GRAVEL: medium, yellow-brown, sandstone, with clay, sand, crushed sandstone, dry		E/D	0.6			Blank pipe 0.15-0.5m
51.90	0.8				0.8			
51.86	1.0	FILL/ SAND: fine to medium, pale grey, dry		S	1.0			
51.82	1.4	SAND SP: fine to medium, brown, dry, loose, aeolian			1.45		3.4,4 N = 8	
51.78	1.8	Below 1.8m: moist		E/D	1.9			Slotted PVC screen 0.5-3.0m
51.74	2.0				2.0			Gravel 0.5-3.0m
51.70	2.5	Below 2.5m: medium dense		S	2.5		5.7,9 N = 16	
51.66	2.95				2.95			End cap
51.62	3.1	SANDSTONE: medium to coarse grained, yellow-brown, very low to low strength, Hawkesbury Sandstone						
51.58	3.6	SANDSTONE: medium to coarse grained, pale grey with some pale orange staining, low then medium strength, slightly weathered, slightly fractured, Hawkesbury Sandstone			3.6		PL(A) = 0.14	Bentonite 3.0-4.0m
51.54	4.0				4.0		PL(A) = 0.23	
51.50	5.1			C	5.1		PL(A) = 0.61	
51.46	5.8				5.8			
51.42	6.0				6.0		PL(A) = 0.68	
51.38	6.25	SANDSTONE: medium grained, pale grey, medium strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone						
51.34	7.0			C	7.0		PL(A) = 0.46	
51.30	8.0				8.0		PL(A) = 0.76	
51.26	8.8				8.8			
51.22	9.0			C	9.0		PL(A) = 0.68	
51.18	10.0				10.0		PL(A) = 0.52	

**RIG:** Bobcat

**DRILLER:** JE

**LOGGED:** TM

**CASING:** HW to 3.2m, HQ to 3.6m

**TYPE OF BORING:** Diacore to 0.06m, Solid flight auger to 3.2m, Rotary to 3.6m, NMLC Coring to 16.19m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** \*Field replicate sample BD03/20200828, Bulk samples taken 0.6-1.0m & 1.5-3.0m, Groundwater well installed, refer to Well Log for construction details, Data logger 2121808 installed in well

## SAMPLING & IN SITU TESTING LEGEND

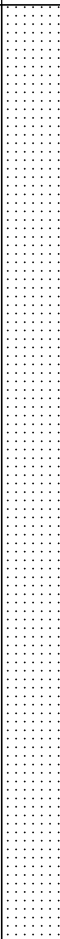


A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	WL	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 52.1 AHD  
**EASTING:** 337045.4  
**NORTHING:** 6245584.9  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH606  
**PROJECT No:** 72505.18  
**DATE:** 28 - 31/8/2020  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
32		SANDSTONE: medium grained, pale grey, medium strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone ( <i>continued</i> )		C	11.0		PL(A) = 0.45		Backfill 4.0-16.19m	
11					11.8					
12					12.0		PL(A) = 0.88			
13					13.0		PL(A) = 1			
14				C	14.0		PL(A) = 0.72			
15					14.8					
16		Bore discontinued at 16.19m Target depth reached		C	15.0		PL(A) = 0.64			
16.19					16.05		PL(A) = 0.08			
16.19					16.19					
17										
18										
19										

**RIG:** Bobcat

**DRILLER:** JE

**LOGGED:** TM

**CASING:** HW to 3.2m, HQ to 3.6m

**TYPE OF BORING:** Diacore to 0.06m, Solid flight auger to 3.2m, Rotary to 3.6m, NMLC Coring to 16.19m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** \*Field replicate sample BD03/20200828, Bulk samples taken 0.6-1.0m & 1.5-3.0m, Groundwater well installed, refer to Well Log for construction details, Data logger 2121808 installed in well

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test $ls(50)$ (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test $ls(50)$ (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 52.9 AHD  
**EASTING:** 337054.9  
**NORTHING:** 6245642.4  
**DIP/AZIMUTH:** 90°/-

**BORE No:** BH608  
**PROJECT No:** 72505.18  
**DATE:** 27 - 28/8/2020  
**SHEET 1 OF 2**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample		
	0.05	ASPHALTIC CONCRETE		E/D	0.1			Gatic cover
	0.2	FILL/ROADBASE: GRAVEL, coarse, dark grey, igneous, subangular-subrounded, dry		E/D	0.2			Grout 0.0-1.0m
	0.5	FILL/ GRAVEL: medium, yellow-brown, sandstone, with clay, sand, crushed sandstone, dry		E/D*	0.4			
	1	FILL/SAND: fine to medium, brown, trace silt, and fine subangular igneous gravel, dry		S	0.8			
	1.5	SAND SP: fine to medium, yellow-brown, with clay, moist, loose, aeolian			1.0	1,1,1 N = 2		Backfill 0.1-1.75m
	2			E/D	1.45			
	2.5	SANDSTONE: medium to coarse grained, pale yellow and red, very low then low strength, highly weathered, slightly fractured, Hawkesbury Sandstone		S	1.8	25/90 refusal PL(A) = 0.07		Bentonite 0.15-0.35m
	3				2.0			
	4			C	2.5			Blank pipe 0.1-2.75m
	4.83				2.59			
	5	SANDSTONE: medium grained, pale grey, low then medium to high strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone			2.75			
	5.02				2.8			
	6			C	4.0	PL(A) = 0.08		
	7				5.3	PL(A) = 0.19		
	8				5.76			
	9			C	6.0	PL(A) = 0.91		
	10				7.0	PL(A) = 1		
	11				8.0	PL(A) = 0.81		
	12				8.85			
	13			C	9.0	PL(A) = 0.97		
	14				10.0	PL(A) = 1		Gravel 0.5-3.0m Slotted PVC screen 0.5-3.0m

**RIG:** Bobcat

**DRILLER:** JE

**LOGGED:** TM

**CASING:** HW to 2.6m, HQ to 2.75m

**TYPE OF BORING:** Diacore to 0.05m, Solid flight auger to 2.5m, Rotary to 2.75m, NMLC Coring to 16.0m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** \*Field replicate sample BD02/20200827, Bulk samples taken 0.5-1.5m & 1.5-2.5m, Groundwater well installed, refer to Well Log for construction details, Data logger 2119607 installed in well

## SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



# BOREHOLE LOG

**CLIENT:** Lendlease Building Pty Ltd  
**PROJECT:** SCH Stage 1 / CCCC Project  
**LOCATION:** High Street and Hospital Road, Randwick

**SURFACE LEVEL:** 52.9 AHD  
**EASTING:** 337054.9  
**NORTHING:** 6245642.4  
**DIP/AZIMUTH:** 90°/--

**BORE No:** BH608  
**PROJECT No:** 72505.18  
**DATE:** 27 - 28/8/2020  
**SHEET 2 OF 2**

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		SANDSTONE: medium grained, pale grey, low then medium to high strength, fresh, slightly fractured to unbroken, Hawkesbury Sandstone ( <i>continued</i> )								
42	11			C	11.1		PL(A) = 1.1	11		
41	11.89				11.83					
41	12				12.0		PL(A) = 1.2	12		
40	13			C	13.0		PL(A) = 0.83	13		
39	14				14.0		PL(A) = 0.75	14		
38	15				14.65					
38	15				15.0		PL(A) = 1.1	15		
37	16			C	15.2		PL(A) = 0.15			
37	16				16.0		PL(A) = 1.2	16		
16.33	16.33	Bore discontinued at 16.33m Target depth reached			16.33			End cap		
36	17							17		
35	18							18		
34	19							19		
33										

**RIG:** Bobcat

**DRILLER:** JE

**LOGGED:** TM

**CASING:** HW to 2.6m, HQ to 2.75m

**TYPE OF BORING:** Diacore to 0.05m, Solid flight auger to 2.5m, Rotary to 2.75m, NMLC Coring to 16.0m

**WATER OBSERVATIONS:** No free groundwater observed whilst augering

**REMARKS:** \*Field replicate sample BD02/20200827, Bulk samples taken 0.5-1.5m & 1.5-2.5m, Groundwater well installed, refer to Well Log for construction details, Data logger 2119607 installed in well

## SAMPLING & IN SITU TESTING LEGEND

A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test $ls(50)$ (MPa)
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test $ls(50)$ (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	W Water seep	S Standard penetration test
E Environmental sample	W Water level	V Shear vane (kPa)