Attachment A19

Report on Footing Investigation

Douglas PARTNERS | GROUNDED EXPERTISE

Report on Footing Investigation

Park Royal Hotel Redevelopment

150 Day Street, Sydney, NSW

Prepared for UOL Group Limited

Project 231572.00

19 March 2025

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GROUNDED EXPERTISE

Document History

Details

Project No.	231572.00
Document Title	Report on Footing Investigation
Site Address	150 Day Street, Sydney, NSW
Report Prepared For	UOL Group Limited
Filename	231572.00.R.002.Rev1

Status and Review

Status	Prepared by	Reviewed by	Date issued
Revision 0	James Connaughton	Luke James-Hall	2 December 2024
Revision 1	Alex Gibson	Scott Easton	19 March 2025

Distribution of Copies

Status	Issued to
Revision 0	Lim Sheng Yang, UOL Group Limited
Revision 1	Lim Sheng Yang, UOL Group Limited

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

Signature	Date
Author	19 March 2025
Reviewer	19 March 2025

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Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

Table of Contents

Report on Footing Investigation
Park Royal Hotel Redevelopment
150 Day Street, Sydney, NSW

1. Introduction

This report prepared by Douglas Partners Pty Ltd (Douglas) presents the results of a footing investigation undertaken for the proposed Park Royal Hotel redevelopment at 150 Day Street, Sydney, NSW (the site). The assessment was undertaken in accordance with Douglas' proposal 231572.00.P.001.Rev0 dated 2 September 2024.

It is understood that the proposed redevelopment includes extending the existing 11-storey building with an additional 11 storeys plus plant, whilst maintaining similar setbacks to the existing structure. The proposed redevelopment aims to retain as much of the existing structure as possible. As part of the redevelopment, loads on existing footings will increase and may double at some locations.

The aim of the investigation is to provide an assessment of the foundation conditions below the existing building footings and to provide information for the design of the proposed redevelopment to support the submission of a Planning Proposal.

A geotechnical desktop report (231572.00.R.001.Rev1 , dated 19/03/2025) has been prepared for this project, it is recommended that this is read in conjunction with this report.

This report must be read with all appendices including the notes provided in Appendix A.

2. Site Description

The site at 150 Day Street is located within the City of Sydney local government area and consists of a single lot, Lot 20 in DP 1046870. The property spans approximately 2,250 m² and is irregularly shaped. It is bounded by Day Street to the west, Bathurst Street to the south, and Sands Street to the east, with the Druitt Street Western Distributor on-ramp and the westbound Cross City Tunnel exit to the north. The southern part of the site is also adjacent to the eastbound Cross City Tunnel under Bathurst Street.

The existing development on the site is a 10-storey hotel with a two-level basement. The building has frontages of about 70 meters to Day Street and 18 meters to Bathurst Street. The site is relatively flat, with a slight fall of about 3 meters from the south-east corner towards the north-west, leading toward Darling Harbour. The site elevation is approximately 5 meters AHD (Australian Height Datum).

3. Geology

Reference to the Sydney 1:100 000 Geological Map Sheet indicates that the site is underlain by Hawkesbury Sandstone, a Triassic age medium to coarse grained quartz sandstone unit with minor shale and laminite bands or lenses. Rock is anticipated to be at a shallow depth.

In its fresh condition, Hawkesbury Sandstone is typically light to mid grey in colour, has massive and cross-bedded facies and strength properties typically in the medium and high strength range. The formation normally has near-horizontal bedding partings spaced from less than 1 m to well over 3 m in places, and is typically cut by the following two sets of steeply dipping joints:

- Set 1 (NNE): Strike 020° - 035° / Dip 70° - 90° E and W; and
- Set 2 (ESE): Strike 110° - 130° / Dip 70° - 90° N and S

Reference to Sydney CBD fault zones map (Pells, Braybrooke & Och, 2004), indicates that the site is located within the G.P.O Fault zone. The fault zone extends from the north-east of the subject site to the south-west. Weaker rock and a higher degree of fracturing within the rock mass is expected in the fault zone. An extract from the geological map overlain by 2 m (AHD) contours is shown in Figure 1.

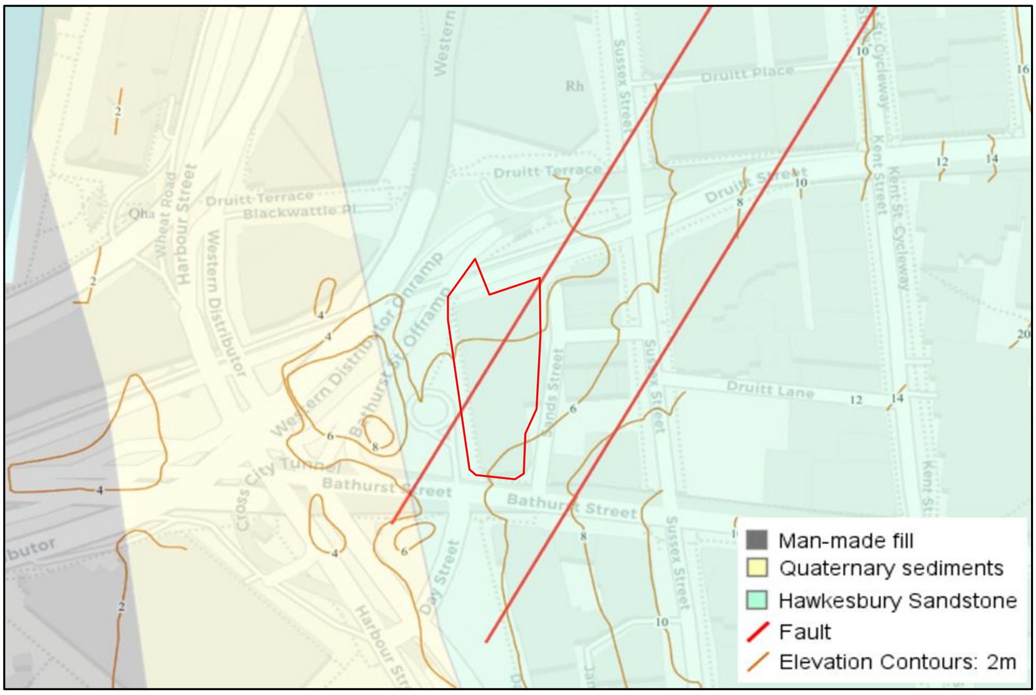

Figure 1: Subject site geology detailing GPO fault zone

4. Field work

4.1 Field work methods

The footing investigation involved the drilling of boreholes numbered BH101 to BH106 within basement level 1 (BH101 and BH102) and basement level 2 (BH103-BH106) of the existing building. The borehole locations are shown in Drawing 1 in Appendix B.

Before drilling, the borehole locations were checked for underground services using an electromagnetic scanner and ground-penetrating radar. Drilling took place over three days: 18 and 19 October, and 26 October 2024. The work was supervised by a geotechnical engineer, who was responsible for logging, photographing, sampling, and conducting strength tests on the recovered rock core at regular intervals using a point load strength index (Is(50)) testing machine.

Each borehole was initially drilled through the floor slab using a single tube, 125 mm diameter core barrel (concrete diatube) to depths of between 0.2 m – 0.43 m. Upon encountering the underlying inferred footing, the borehole was extended through the footing and into the underlying bedrock using a single tube, 64 mm diameter core barrel (concrete diatube) to recover 54 mm diameter core samples. All boreholes were drilled to target depths ranging from 3.88 m to 4.94 m below the floor slabs. It is noted that the use of a single tube core barrel can result in the recovered core being more fractured and eroded as a result of the sample spinning (as opposed to a triple tube core barrel whereby the drilled core is retained in a split and not allowed to rotate).

Following the drilling, spoon testing was undertaken which involves 'feeling' the sidewalls of the open core holes in an attempt to identify defects. The depth to and thickness of defects is recorded. These results then are compared against the borehole log and core photo to assess whether defects were drilling induced (as discussed above relating to single tube core barrels) and whether actual defects are tight or open.

Further, a camera was inserted down each of the open holes with the main purpose to inspect and assess the interface between the footing base and the top of rock.

At completion, the boreholes were reinstated with high-strength concrete through the rock and footing interface. At the slab level, all boreholes were repaired with quick-set concrete.

4.2 **Fieldwork Results**

Detailed descriptions of the conditions encountered within each borehole are provided within the borehole logs presented within Appendix C.

A summary of the soil and rock encountered is provided below:

Concrete 160 mm to 430 mm thick concrete slab from surface level. At some locations (BH101, BH103 and BH105) a thin layer of gravel, sand or clay fill separated the concrete slab from the possible footing.

Possible Footings Possible concrete footings were encountered below the concrete slab at the following depths below the slab surface:

- BH101 - 0.43 m to 1.4 m
- BH102 – 0.43 m to 1.48 m
- BH103 – 0.2 m to 1.52 m
- BH104 – 0.25 m to 1.33 mBH105 – 0.22 m to 1.43 m
- BH106 – 0.28 m to 1.65 m

Hawkesbury Sandstone

Generally ranging from medium to high strength, moderately weathered to fresh rock, fractured to slightly fractured sandstone encountered below the concrete footings at depths of between 1.33 m to 1.65 m to the maximum investigation depth of 4.94 m.

BH105 and BH106 was drilled within or in close proximity to the expected alignment of the fault zone crossing through the site. BH106 encountered low strength, with very low, medium and high strength band, highly to moderately weathered, highly fractured to fragmented sandstone. BH105 encountered sandstone comparable to other areas of the site with a zone of distinctly weathered low to medium strength sandstone at 3.4 m depth.

5. Laboratory testing

5.1 Point Load Strength Testing

Samples of the rock core recovered from boreholes BH101 to BH106 were tested to determine the Point Load Strength Index ($Is_{(50)}$) values. The results of the testing are shown on the borehole logs at the appropriate depths.

The measured $Is_{(50)}$ values for the rock below the footings ranged from 0.08 MPa to 2.3 MPa, corresponding to a range of strength classifications between borehole locations from very low to high strength.

5.2 Unconfined Compressive Strength Testing (UCS)

Six sample selected from each of the core recovered below footings were taken for UCS testing, including measurement of Yong's modulus and Poisson's ratio. The laboratory test reports are provided in Appendix D and are summarised in Table 1 below.

Table 1: Summary of UCS Test Results

Borehole	Depth (m)	Unconfined Compressive Strength (UCS) (MPa)	Modulus (GPa)		Poisson's Ratio		Moisture Content (%)
			Secant	Tangent	Secant	Tangent	
BH101	2.30 – 2.44	21	2.7	6.4	0.14	0.17	7.4
BH102	4.27 – 4.50	27	3.8	8.4	0.11	0.13	7.1
BH103	3.00 – 3.48	31	6.9	12	0.10	0.12	7.0
BH104	1.39 – 1.59	27	4.2	8.9	0.11	0.12	6.3
BH105	1.59 – 2.00	34	7.7	15	0.35[2]	0.38[2]	6.4
BH106	4.29 – 4.46	16	2.3[1]	3.5[1]	0.4[2]	0.47[2]	6.1

Notes: [1] Values noted to be higher than typical for rock of this strength and should be used with caution

[2] Values outside the expected range and should be disregarded

6. Comments

6.1 Foundations

6.1.1 Existing Footings

The footings were not directly exposed during the investigation, therefore the depth and thickness of the footings has been interpreted based upon the examination of cold-joints within the concrete core. Within boreholes BH101, BH103 & BH105 the footings are inferred to begin below a thin fill layer. The footing plan dimensions were not confirmed during investigation, and they have been referenced from the provided footing plan (Drawing Ref: S2001, S2001, dated May 1989) which is included in Appendix E.

Footing thicknesses measured at the test locations ranged between 0.97 m and 1.37 m. footing dimensions have been inferred from the provided as being square pads with of equal lengths and widths of either 1.5 m, 2.0 m or 2.5 m.

Based on the provided drawings, it is understood that the existing footings were designed to bear upon material suitable for 3,500 kPa across the site, with footings founded within the indicated position of the fault zone, designed for a reduced bearing capacity of 1,500 kPa. Reference to a previous inspection report (Douglas Report: 10878/2, dated November 1989) indicates that the footings were inspected during construction and achieved their design bearing pressure. The details of the previous investigation and inspection at the site are described within the Desktop Geotechnical report for the project (Douglas Report: 231572.00.R.001.Rev0, dated November 2024)

6.1.2 Bearing Capacity

Based on a review of the borehole logs and the laboratory results, the allowable bearing capacity of the founding rock below the investigated footings has been assessed using a combination of the rock strength and the defects present, the results of which are given in Table 2 below.

1324

Table 2: Bearing Capacity Assessment of Investigated Foundations

Borehole	Footing Thickness (mm)	Depth to Footing Base Below Slab Level (mm)	Footing Dimension from provided drawing (m)	Founding Material	Allowable Bearing Capacity (kPa)
BH101	970	1070	1.5 x 1.5	Medium to high strength sandstone over medium strength sandstone	5000
BH102	1050	1050	2.0 x 2.0	Medium and high strength sandstone	5000
BH103	1320	1360	1.5 x 1.5	High strength sandstone	5000
BH104	1080	1080	1.5 x 1.5	Medium to high strength sandstone over high strength sandstone	5000
BH105	1210	1230	1.5 x 1.5	Medium and high strength sandstone with some low strength bands at depth	5000
BH106	1370	1370	2.5 x 2.5	Low strength sandstone with very low medium and high strength bands	1500

Notes: The additional settlement that may occur under increased loading should be considered by the designers. The allowable bearing pressures given above assume settlement of up to 1% of the footing width may occur under the applied pressures. Some settlement will have already occurred under the existing loading. It is also noted that for footings bearing upon material of differing strengths, there is potential for differential settlement between footings. Douglas can provide further review and advice on settlements if required.

The bearing stratum encountered beneath the boreholes was checked with spoon testing and in boreholes BH101, BH103 to BH106, downhole camera footage was taken to investigate footing contact with rock. Overall, good contact between the footings and rock was observed. In areas where shallow core loss occurred beneath the footing, spoon testing or visual inspection generally indicated variation in rock conditions (i.e. fractured rock and possible lower strength rock bands), however, weathered soil strength seams were not detected. These areas have been taken into consideration for the assessment of bearing capacity.

Boreholes BH101 to BH105 all encountered material assessed to have a higher bearing capacity than considered in the original design, whilst BH106 observed conditions consistent with the design allowable bearing capacity adopted within the fault zone.

6.2 General

Given the potential for variability in the foundation conditions it is recommended that any footings that are to be subject to increased loading are individually investigated to confirm the bearing capacity of the foundation material. Assessment of foundation conditions of the existing footings on an individual basis may also provide opportunities to adopt higher bearing capacities which could reduce the need for footing strengthening, subject to the existing and proposed increased loading conditions.

Within proximity of the G.P.O fault zone a higher degree of variability, weathering and weaker material is anticipated, in line with the conditions considered within the original design. The presence of this material should be carefully considered in the design with regard to settlement and differential settlement of footings under increased load where footings are potentially bearing on material of differing strengths.

It is recommended that a detailed monitoring plan be developed for the redevelopment works, prior to any additional loading of the existing columns. The plan should include detailed survey monitoring of any columns where load increases of more than 10% are proposed and / or locations where settlement is considered a higher risk due to either expected foundation conditions or residual uncertainty around foundation conditions.

7. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report (or services) for this project at 150 Day Street, Sydney, NSW in line with Douglas' proposal dated 2 September 2024 and acceptance received from Lim Sheng Yang of UOL Group Limited dated 18/09/2024. The work was carried out under Douglas' Engagement Terms. This report is provided for the exclusive use of UOL Group Limited for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other sites, or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and / or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and / or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after Douglas' field testing has been completed.

Douglas' advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by Douglas in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and / or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

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

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by Douglas. This is because this report has been written as advice and opinion rather than instructions for construction.

This report provides specialist advice only and no part of it is considered a Regulated Design under the Design and Building Practitioner Act 2020 (NSW).

Appendix A

About This Report

Appendix B

Drawings

Appendix C

Fieldwork

Appendix D

Laboratory Testing

Appendix E

Provided Drawings