Douglas PARTNERS | GROUNDED EXPERTISE

Frasers Property Ivanhoe Pty Ltd
Level 2/1C Homebush Bay Drive
Rhodes, NSW 2138

Attention: Robert Cauchi
Email: Robert.Cauchi@fraserspropery.com.au

Project 86043.29
7/11/2025
R.002.Rev0
SCP

Groundwater Comment - Proposed Modifications
Stage 2 - Midtown
Midtown, Macquarie Park NSW

1. Introduction

This letter has been prepared by Douglas Partners Pty Ltd (Douglas) in response to proposed modifications to the Ivanhoe Estate Redevelopment – Stage 2 (SSD-15822622). It includes comments in relation to groundwater inflow and impacts (arising from the modification) and in relation to the removal of existing condition C35.

Reference is made to the following documents that formed part of the submissions for the original SSDA:

- Report on Geotechnical Investigation of C4 Site (Douglas Report 86043.06.R.003) – Appendix F of EIS, referred to as "Geotechnical report" within this letter;
- Dewatering management plan (Douglas Report 86043.06.R.008) – Additional information responses, referred to as "DMP" within this letter.

The SSDA proposed Stage 2 works relate to three sites within the Ivanhoe Estate Redevelopment area – sites C2, C3 and C4. This letter arises largely in relation to changes to the C4 basement levels and basement footprint, based on drawings prepared by the architects (Cox Architecture, dated 5/11/2025).

2. Proposed Changes to C4 Basement

It is understood that the proposed SSD modification will include changes to the proposed basement. Notably, the proposed modification includes:

- The original C4 basement floor level of RL37.9 (3-level basement) has now been raised to RL 40.8 (ie 2-level basement); and,
- The proposed basement footprint has been extended such that the footprint is slightly closer to Shrimpton's Creek (by approximately 3m, at its closest point), with a basement plan area increased by approximately 10% (6012 m^2, increased from 5555 m^2). The site is separated from Shrimpton's Creek by the approximately 20m wide Public Reserve.

The proposed C4 basement area is shown in Drawing 1, attached, together with the location of cored boreholes drilled and wells installed as part of geotechnical investigations for the C4 basement and neighbouring sites. Drawing 1 also shows the original basement footprint considered in the DMP.

3. Groundwater Impact Assessment

3.1 Summary of Geotechnical Investigation and DMP

The groundwater impact assessment for the original basement was included in the DMP. For the Stage 2 works, only buildings C3 and C4 were expected to have significant groundwater take.

The Geotechnical Report for the C4 site indicated that:

- Ground conditions at the C4 site generally consist of fill underlain by residual soils to depths of up to approximately 3 m at test locations, underlain by sandstone;
- Groundwater levels were within bedrock, including a transient 'stacked' groundwater level within the upper sandstone, with long term groundwater levels within the deeper sandstone, based on the results of measurements and monitoring at standpipe piezometers ("wells") within the site – which included nine (9) deep wells at Bores 10, 12, 13, 107, 109, 111, 113, 114, 115, and three (3) shallower, nested wells at Bores 109A, 111A, 114A. Limited follow-up measurements generally showed that the elevated 'stacked' groundwater levels in nested wells fell to similar standing levels to those obtained in the deeper wells;
- Groundwater levels generally appear to fall towards Shrimpton's Creek; and
- Long-term groundwater levels of between RL 39.7 to RL 42.0 were indicated by the deeper wells at the C4 site, though more typically between RL 40.0 and RL 41.0 *Note: RL 40.8, the proposed basement FFL was within the range (or above the range) of measured/monitored groundwater levels at all deep wells, except for at Bores 107, 114 and 13., where measurements indicated slightly higher groundwater levels.*

The interpreted geotechnical sections for the C4 site, based on the geotechnical model given in the Geotechnical Report, have been updated to reflect the proposed development, and are shown in Drawings 2 to 5, attached – together with groundwater measurements, and interpreted groundwater levels for the transient shallow, and deeper, longer-term levels.

The DMP for the broader Stage 2 site (including the C4 site) indicated that:

- Modelling of estimated inflows was based on water levels at RL 41.2 at Shrimpton's Creek;
- The modelling was undertaken based on a simplified C4 basement geometry, 20 m from Shrimpton's Creek. *Note: this is similar to the currently proposed distance for the updated basement scheme;*
- An average basement width of 70 m and bulk excavation level of RL 37.4 m AHD was adopted for inflow assessment to the C4 basement; *Note: compared to the updated proposed basement level of RL 40.8 and width of approximately 80 m;*
- For the base-case analysis, inflows of less than 3ML/year were indicated for the C3 basement, and 4.5 ML/year for the C4 basement. Sensitivity cases increased these inflows to up to 17 ML/year for the combined basements;

- Assessment of inflows and impacts were undertaken based on long-term, drained basements, and both the construction stage drawdown, and the steady state groundwater conditions expected;
- The proposed works were considered to comply with the Level 1 minimal impact considerations of the NSW Aquifer Interference Policy (AIP), subject to appropriate management; and
- Appropriate management measures are requirement to ensure that groundwater 'take' and impacts remain consistent with those estimated by the DMP, including:
    - Appropriate selection and design of shoring around the basement, including consideration of potential flooding at Shrimpton's Creek; and
    - Appropriate monitoring and reporting during the construction works, and the adoption of remedial measures (eg rock mass grouting) if required.

3.2 Additional Information

Subsequent investigation was undertaken to the north of the site, for the Stage 3 Ivanhoe project (see Bores 201 to 208 in Drawing 1, and refer SSD-30530150). Groundwater monitoring at that site in 2022, prior to any Stage 2 dewatering works, indicated groundwater levels were generally below RL 40.0 – this is considered to be slightly lower than expected, based on the more limited, earlier monitoring at the Stage 2-C4 site.

Excavation of the C3 basement (part of the Stage 2 works) has already been completed. Groundwater inflows measured to date are understood to be consistent with those estimated by the DMP.

3.3 Comment on Groundwater Inflow and Impacts

As per the original inflow assessment in the DMP, inflows to the proposed 2-level C4 basement are expected to occur through defects within the bedrock during typical groundwater and creek conditions. Significant flows through upper strata may occur in the short-term during flood events and may require additional measures to manage inflow into the basement during such events in the long-term – as per the original basement, and as noted in the existing DMP.

Existing groundwater data at the C4 site suggests that the proposed (two-level) C4 basement floor level is at the approximate level of long-term groundwater. Inflows from the modified, 2-level basement are expected to be significantly less than those of the original, deeper, 3-level basement assessed in the DMP, due to the reduced hydraulic gradient and excavation volume.

Accordingly, the proposed basement changes are expected to have no increased groundwater impacts or inflows, relative to the original DMP, provided that appropriate management is undertaken during the works, as per the existing DMP.

4. Modification of Conditions

Existing condition C35 is considered ambiguous, and it is requested that the condition be removed. The condition states that:

- C35. Groundwater shall not be pumped or extracted for any purpose other than temporary dewatering during the period of construction.

In requesting this modification, it is noted that:

- Drained basements are proposed, as outlined in the initial DMP.
- The proposed changes to C4 are considered to significantly reduce risks associated with groundwater impacts, as noted above. Dewatering management is still proposed to ensure that groundwater 'take' and impacts remain within those outlined in the initial DMP.
- Other conditions that could be interpreted as requiring tanking have already been removed. It is noted that the condition has not been applied in relation to the comparable, nearby basement B3 (SSD-30530150).
- Existing conditions B41 and B67 remain in relation to the management of groundwater impacts and take, both during construction-stage and on an ongoing basis.

5. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this letter for this project at Midtown, Macquarie Park NSW in line with Douglas' proposal dated 28/08/2025 and acceptance received from Robert Cauchi of Frasers Property Ivanhoe Pty Ltd. The work was carried out as a variation to Consultancy Agreement PO 4400025696. The limitations of the associated DMP (Douglas Report 86043.06.R.008) also apply to this letter report. 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).

Please contact the undersigned if you have any questions on this matter.

Yours faithfully
Douglas Partners Pty Ltd

Sally Peacock
Geotechnical Engineer/Senior Associate

Reviewed by

Bruce McPherson
Principal

Joel Huang
Principal

Attachments: About this Report
Drawings 1 to 5

About this Report

October 2024

Introduction

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

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

Copyright

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

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REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	For Information	23.10.2025	MN

SCALE: 0 10 20 30 40 m — 1:1000 @A3

Douglas PARTNERS
OFFICE: SYDNEY
96-98 Hermitage Rd, West Ryde NSW 2114
(02)9809 0666

CLIENT: **Frasers Property Ivanhoe Pty Ltd**

NOTE:
1: Basemap from Metromap (Dated 04.09.2025)

COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 56

PROJECT NAME: **Proposed Residential Development - C4**

PROJECT ADRESS: **Midtown, Macquarie Park**

DRAWING TITLE: **Test Location Plan**

PROJECT NO: **86043.29**

DRAWING NO: **1**

REVISION: **0**

P:\86043.29 - MACQUARIE PARK, Midtown, Stage 2 Consult\7.0 Drawings\7.3 QGIS\86043.29.Q.001.DftA.SKETCH.qgz

A

A'

ELEVATION (AHD)

52
50
48
46
44
42
40
38
36
34

106
Offset - 1.9m
Rock Strength
Bottom Depth 13.8 m

118
Offset - 6.2m
Rock Strength
Bottom Depth 14.17 m

108
Offset 9.5m
Rock Strength
Bottom Depth 14 m

109
Offset 0.2m
Rock Strength
Bottom Depth 13.8 m

10
Offset 13.0m
Rock Strength

110
Offset - 4.5m
Rock Strength
Bottom Depth 8.97 m

111
Offset - 16.8m
Rock Strength
Bottom Depth 12.87 m

1 - FILL

2b - Residual Soil

3a - Sandstone (Variable)

3b

3a

3b - Sandstone (Low & Medium Strength)

3c - Sandstone (Medium & High Strength)

3d - Sandstone (High Strength)

APPROXIMATE GROUND LEVEL

BASEMENT 2
RL 40.8 m

118A

109A

109

111A

111

N=23

N=10

N=8

(refusal)

-20
0
20
40
60
80
100

DISTANCE ALONG PROFILE (m)

LEGEND

- Core Loss
- Bricks
- Clayey Sand
- Filling
- Sandstone
- Sandstone coarse grained
- Sandstone fine grained
- Sandy Clay
- Silty Sand

NOTES:

1. Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.
4. Greyed out bore have not been included in the interpreted boundaries, but are near the section and included for comparison.

ROCK STRENGTH

- EL - Extremely Low
- VL - Very Low
- L - Low
- M - Medium
- H - High
- VH - Very High

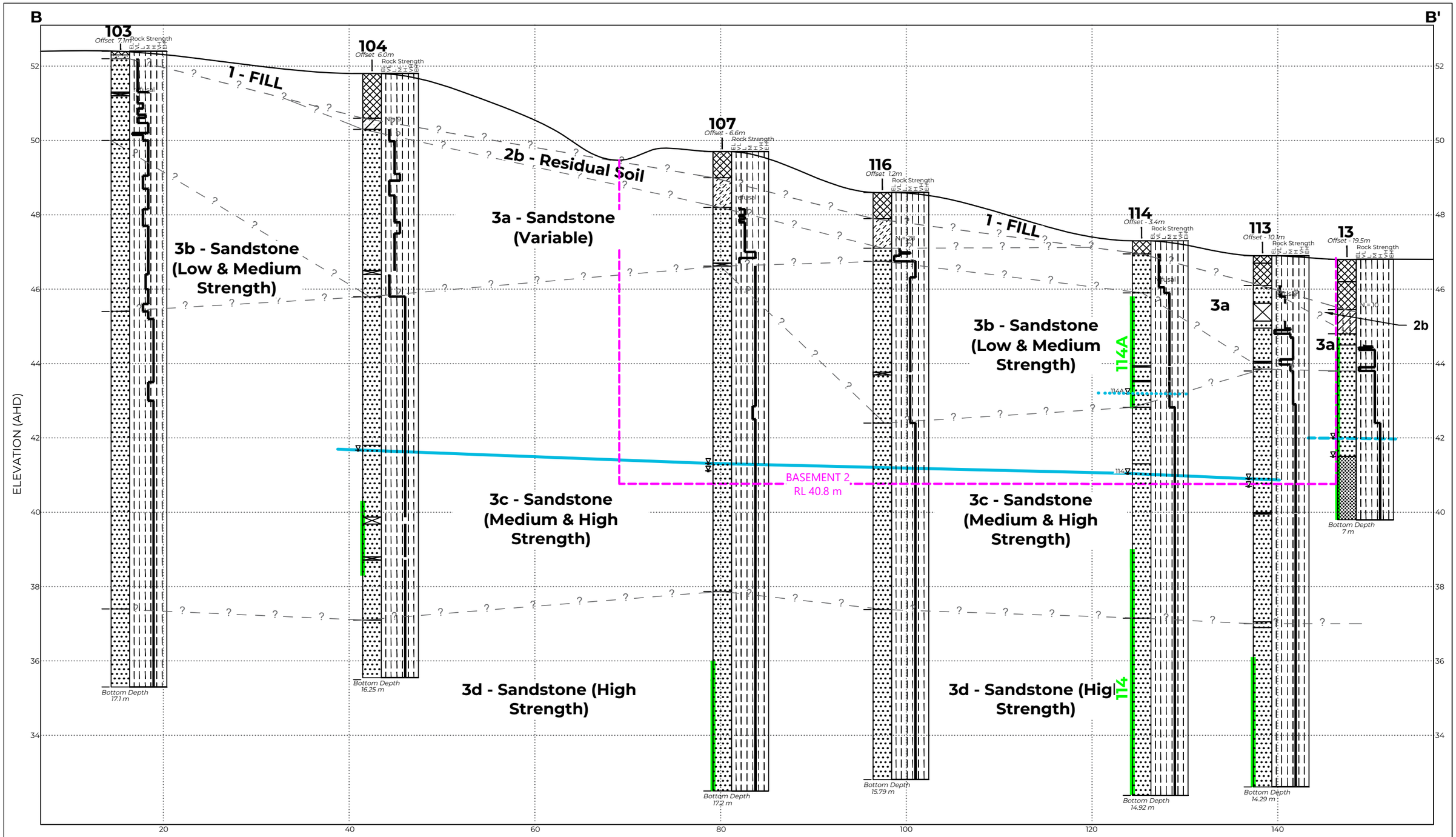
TESTS / OTHER

- N - Standard penetration test value
- — ? — - Interpreted geotechnical boundary
- - Water level
- - Interpreted deep water table (2021)
- - Interpreted transient water table (2021)
- - Standpipe Screen Length

0 8
Horizontal Scale (metres)
Vertical Exaggeration = 4.0

Douglas PARTNERS

CLIENT: Frasers Property Ivanhoe Pty Ltd		TITLE: **Interpreted Geotechnical Cross-Section A-A'**	PROJECT No: 86043.29
OFFICE: Sydney	DRAWN BY: MN	**Proposed Stage 2 Development - C4 Site**	DRAWING No: 2
SCALE: 1:400 (H) 1:100 (V) @ A3	DATE: 24.10.2025	**Midtown, Maquarie Park**	REVISION: 0



LEGEND

- Core Loss
- Clayey Sand
- Concrete
- Filling
- Sandstone
- Sandstone coarse grained
- Sandstone fine grained
- Sandy Clay
- Silty Clay

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DISTANCE ALONG PROFILE (m)

ROCK STRENGTH

- EL - Extremely Low
- VL - Very Low
- L - Low
- M - Medium
- H - High
- VH - Very High

TESTS / OTHER

- N - Standard penetration test value
- Interpreted geotechnical boundary
- Water level
- Interpreted deep water table (2021)
- Interpreted transient water table (2021)
- Standpipe Screen Length
- Interpreted deep water table (2017-2018)

0 8

Horizontal Scale (metres)
Vertical Exaggeration = 4.0

Douglas PARTNERS

CLIENT: Frasers Property Ivanhoe Pty Ltd		TITLE: **Interpreted Geotechnical Cross-Section B-B'**	PROJECT No: 86043.29
OFFICE: Sydney	DRAWN BY: MN	**Proposed Stage 2 Development - C4 Site**	DRAWING No: 3
SCALE: 1:400 (H) 1:100 (V) @ A3	DATE: 24.10.2025	**Midtown, Maquarie Park**	REVISION: 0

C

C'

ELEVATION (AHD)

52
50
48
46
44
42
40
38
36
34

13
Offset 0.9m
Rock Strength
EL VL L M H VH EH
Bottom Depth 7 m

113
Offset 8.1m
Rock Strength
EL VL L M H VH EH
Bottom Depth 14.29 m

114
Offset 19.6m
Rock Strength
EL VL L M H VH EH
Bottom Depth 14.92 m

12
Offset - 10.9m
Rock Strength
EL VL L M H VH EH
Bottom Depth 6.93 m

112
Offset 2.7m
Rock Strength
EL VL L M H VH EH
Bottom Depth 13 m

115
Offset 21.6m
Rock Strength
EL VL L M H VH EH
Bottom Depth 14.27 m

111
Offset 4.6m
Rock Strength
EL VL L M H VH EH
Bottom Depth 12.87 m

110
Offset 14.5m
Rock Strength
EL VL L M H VH EH
Bottom Depth 12.96 m

10
Rock Strength
EL VL L M H VH EH
Bottom Depth 8.97 m

APPROXIMATE GROUND LEVEL

BASEMENT 2
RL 40.8 m

114A
111A
114
111

1
2a
2b
3a
3b
3c
3d

N=7
N=2
N=10
N=8
N=22
refusal

-20
0
20
40
60
80
100
120

DISTANCE ALONG PROFILE (m)

1 - FILL
2a - Alluvial Soil
2b - Residual Soil
3a - Sandstone (variable)
3b - Sandstone (Low & Medium Strength)
3c - Sandstone (Medium & High Strength)
3d - Sandstone (High Strength)

LEGEND

- Core Loss
- Clayey Sand
- Filling
- Sandstone
- Sandstone coarse grained
- Sandstone fine grained
- Sandy Clay
- Silty Clay
- Topsoil

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TESTS / OTHER

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- — ? — — - Interpreted geotechnical boundary
- - Water level
- - Interpreted deep water table (2021)
- - Interpreted transient water table (2021)
- - Standpipe Screen Length
- - Interpreted deep water table (2017-2018)

0 8
Horizontal Scale (metres)
Vertical Exaggeration = 4.0

Douglas PARTNERS

CLIENT: Frasers Property Ivanhoe Pty Ltd		TITLE: **Interpreted Geotechnical Cross-Section C-C'**	PROJECT No: 86043.29
OFFICE: Sydney	DRAWN BY: MN	**Proposed Stage 2 Development - C4 Site**	DRAWING No: 4
SCALE: 1:400 (H) 1:100 (V) @ A3	DATE: 24.10.2025	**Midtown, Maquarie Park**	REVISION: 0

D

D'

ELEVATION (AHD)

52
50
48
46
44
42
40
38
36
34

-20
0
20
40
60
80
100
120

DISTANCE ALONG PROFILE (m)

104
Offset 25.2m
Rock Strength
EL VL L M H VH EH
N=3
Bottom Depth 16.25 m

107
Offset - 12.7m
Rock Strength
EL VL L M H VH EH
refusal
Bottom Depth 17.2 m

105
Offset 13.0m
Rock Strength
EL VL L M H VH EH
N=15
refusal
Bottom Depth 15.9 m

118
Offset 17.2m
Rock Strength
EL VL L M H VH EH
N=10
refusal
Bottom Depth 14.17 m

108
Offset - 9.1m
Rock Strength
EL VL L M H VH EH
refusal
Bottom Depth 14 m

APPROXIMATE GROUND LEVEL

1 - FILL

2b - Residual Soil

3a - Sandstone (Variable)

3c - Sandstone (Medium & High Strength)

3d - Sandstone (High Strength)

3b - Sandstone (Low & Medium Strength)

118A

BASEMENT 2
RL 40.8 m

LEGEND

- Core Loss
- Bricks
- Clayey Sand
- Filling
- Sandstone
- Sandy Clay

NOTES:

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- Water level
- Interpreted deep water table (2021)
- Interpreted transient water table (2021)
- Standpipe Screen Length

0 8
Horizontal Scale (metres)
Vertical Exaggeration = 4.0

Douglas PARTNERS

CLIENT: Frasers Property Ivanhoe Pty Ltd		TITLE: **Interpreted Geotechnical Cross-Section D-D'**	PROJECT No: 86043.29
OFFICE: Sydney	DRAWN BY: MN	**Proposed Stage 2 Development - C4 Site**	DRAWING No: 5
SCALE: 1:400 (H) 1:100 (V) @ A3	DATE: 24.10.2025	**Ivanhoe Place, Maquarie Park**	REVISION: 0