

Level 1 Supervision & Inspection Report

Merrifield Estate - Stage 24

Ref: 14874/P/621

Prepared for
BMD Urban Pty Ltd

31 October 2017

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Document Information

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Project Name

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Site Location Plan

- Stage 24 Site Plan

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Testing Results

- Hilf Density Locations
- Hilf Density Ratio (%)

1 INTRODUCTION

Construction Sciences was commissioned by BMD Urban Pty Ltd to provide Level 1 supervision and testing services for the Merrifield Estate Development – Stage 24 project located at Mickleham, Victoria.

This report represents the results of inspection activities, compaction and moisture control, and laboratory testing carried out for the placement of fill material for the proposed Merrifield Estate Development – Stage 24 as shown in the attached site location plans in Appendix A.

All works were carried out in accordance with:

- AS 1289 “*Methods of Testing Soils for Engineering Purposes*”.
- AS3798-2007 “*Guidelines on earthworks for commercial & residential developments*”

Material used in the earthworks for level 1 areas was mainly sourced from the existing on site materials.

A total of approximately 2667m³ of fill above 300mm thick has been placed on Stage 24 of the Merrifield Estate Development over the duration of Level 1 supervision. The fill volume has been determined from site records and supported information provided by the client.

2 EARTHWORK SPECIFICATIONS

The earthworks are to be carried out in general accordance with AS3798-2007 ‘*Guidelines on earthworks for commercial & residential developments*’.

The specification requirements were that fill materials are to be placed and compacted to a density ratio of not less than 95% standard compaction as determined by AS 1289 “*Methods of Testing Soils for Engineering Purposes*”.

3 SITE INSPECTION & TESTING

3.1 Existing Surface Assessments

Prior to commencement of filling, Construction Sciences confirmed that all unsuitable and weaker material such as top soil, silt, uncontrolled or loose soil, organic effected material and other wet areas had been appropriately stripped in accordance with AS 3798-2007. The exposed surface after removal of unsuitable material was compacted and checked for soft areas by proof rolling.

Where no movement or vertical deflection was detected, the stripped surface was assessed to be suitable for the placement of fill.

The site was found to be a relatively flat plane after the stripping took place, with no significant fill zones or slope stability issues.

3.2 Fill Placement

All fill material on site was thoroughly inspected by Construction Sciences site representative to ensure it meets the “**suitable material**” requirements outlined in AS3798-2007. The fill was in-situ material sourced on-site and checked to ensure it was a “**suitable material**”.

The fill material typically comprised of:

- Insitu, Silty CLAY, medium - high plasticity, Light Brown, some traces of gravel.

Placement of fill was carried out using the following plants:

- 1* Excavator
- 1* Sheep-foot compactor.
- 1* Grader
- 1* Water Cart

The fill material was spread in near-horizontal layers, and compacted in successive layers, using a sheep-foot compactor.

3.3 Compaction Control Testing

Compaction control tests were carried out at regular intervals throughout the placement of fill in accordance with the minimum test frequency recommendations included in AS3798-2007 ‘*Guidelines on Earthworks for commercial and residential developments*’.

The in-situ density tests were conducted using a nuclear density/moisture meter in accordance with AS 1289 5.8.1 “Determination of field density and field moisture content of a soil a nuclear surface moisture-density gauge”.

Disturbed samples taken from each density test site were tested at Construction Sciences’ NATA accredited soil laboratory, using the Hilf rapid compaction method, in accordance with AS 1289.5.7.1.

A total six (6) field density tests were carried out throughout the earthworks as below Table 3-1. These six (6) tests equates to one test to approximately every 444.5m³ of fill.

Table 3-1 Summary of Field Density Test Results

Stage	Successful Test Numbers	Mean Density (%)	Standard Deviation (%)
24	6	97.0	0.548

All density test results carried out in the engineered fill material are included in Appendix B. A summary of test results is presented in below in Table 3-2.

Table 3-2 Summary of Density Testing – Stage 24

No	Sample Number	Report Number	Date	Density Ratio (%)
1	14874/S/115675	14874/R/48800-1	19/10/2017	97.5
2	14874/S/115676	14874/R/48800-1	19/10/2017	97.0
3	14874/S/115677	14874/R/48800-1	19/10/2017	96.0
4	14874/S/115678	14874/R/48800-1	19/10/2017	97.0
5	14874/S/115679	14874/R/48800-1	19/10/2017	97.5
6	14874/S/115680	14874/R/48800-1	19/10/2017	97.0
Results	Mean Density (%)	Standard Deviation (%)	Lowest Result	Highest Result
6	97.0	0.548	96.0	97.5

4 GENERAL STATEMENT OF COMPLIANCE

It is considered that the placement of fill material at the Merrifield Estate Development – Stage 24 was carried out in accordance with AS3798-2007 “Guidelines on earthworks for commercial and residential developments”. It is concluded that the fill was compacted to a density ratio not less than the specified requirement.

5 LIMIT OF LIABILITY

This report has been produced for, and is the property of our client BMD Urban Pty Ltd.

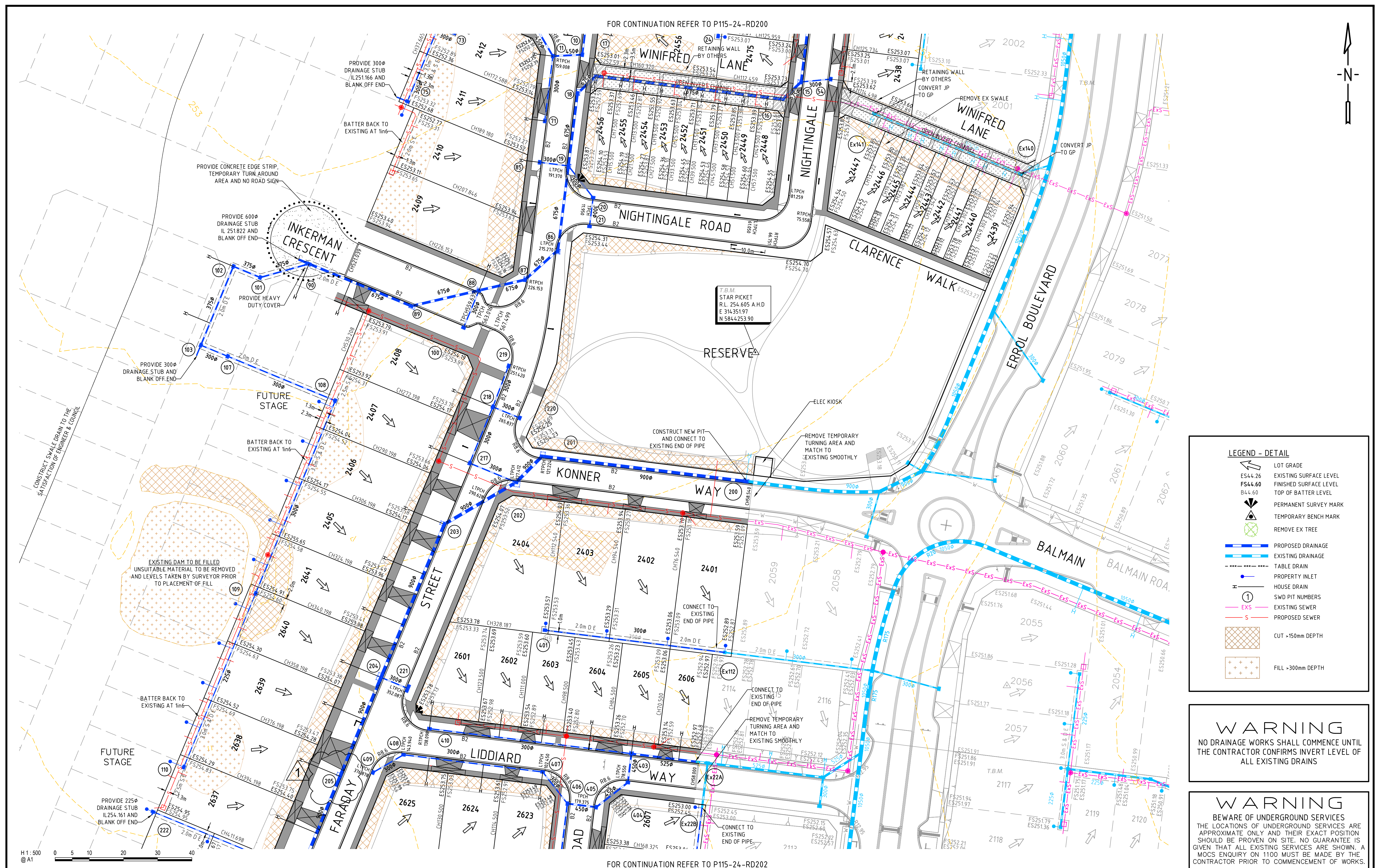
Construction Sciences accepts no liability to any third party, and will not enter into any communication with a third party regarding this report.

Appendix A

3 Pages

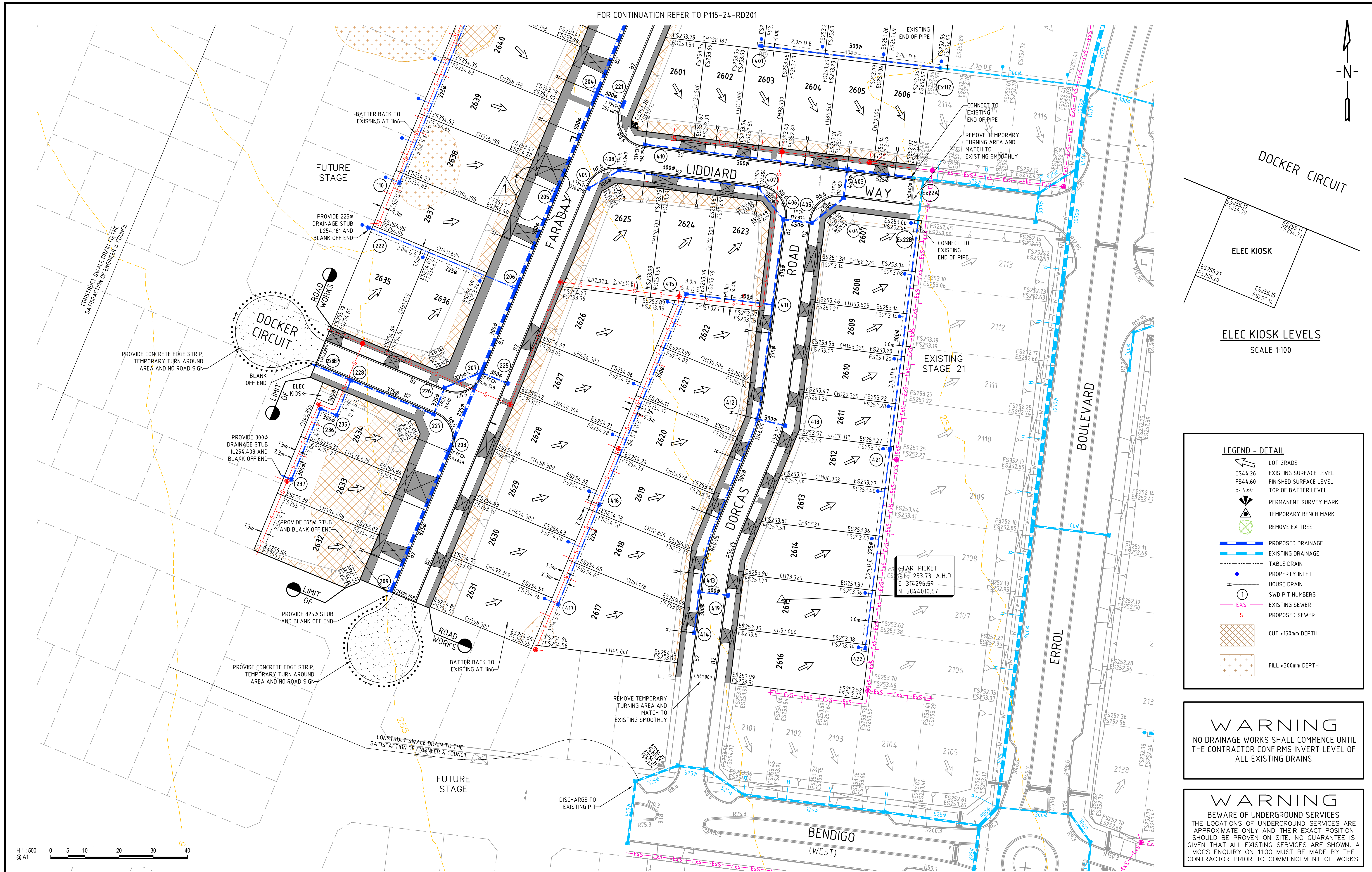
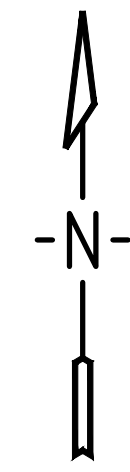
Site Location Plan

- Stage 24



				DRAWN: C.GLEESON		CLIENT: merrifield MAB gpc verve Verve Projects Pty Ltd Level 1 173 Burke Road Glen Iris VIC 3146 T 03 8573 1500 verveprojects.com	Project No: 115-24 Quality ISO 9001 Site No: 366 D3/E4 Drawn: C. Gleeson Designed: C. Santos Approved: G. Romancz Checked: J. Santos Reviewed: J. Santos Drawn: J. Santos Draw
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FOR CONTINUATION REFER TO P115-24-RD201



ELEC KIOSK LEVELS
SCALE 1:100

LEGEND - DETAIL

- LOT GRADE
- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- TOP OF BATTER LEVEL
- PERMANENT SURVEY MARK
- TEMPORARY BENCH MARK
- REMOVE EX TREE
- PROPOSED DRAINAGE
- EXISTING DRAINAGE
- TABLE DRAIN
- PROPERTY INLET
- HOUSE DRAIN
- SWD PIT NUMBERS
- EXISTING SEWER
- PROPOSED SEWER
- CUT >150mm DEPTH
- FILL >300mm DEPTH

WARNING
NO DRAINAGE WORKS SHALL COMMENCE UNTIL THE CONTRACTOR CONFIRMS INVERT LEVEL OF ALL EXISTING DRAINS

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN. A MOCS ENQUIRY ON 1100 MUST BE MADE BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS.

REV	DESCRIPTION	APPROVED	DATE
1	PIT 205 RELOCATED	GR	30.03.17
0	CONSTRUCTION ISSUE	GR	14.02.17
C	COUNCIL COMMENTS	GR	08.02.17
B	COUNCIL COMMENTS	GR	23.12.16
A	PRELIMINARY ISSUE	GR	12.10.16
REV	DESCRIPTION	APPROVED	DATE

DRAWN: C.GLEESON	DESIGNED: C.J.SANTOS	APPROVED: G.ROMANCZ
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CLIENT: merrifield MAB GPC	Verve Projects Pty Ltd Level 11 173 Burke Road Glen Iris VIC 3146 T 03 8573 1500 verveprojects.com
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COUNCIL: HUME CITY COUNCIL	PROJECT: MERRIFIELD LIVINGS - SECTION B STAGE 24 MICKLEHAM	TITLE: DETAIL PLAN - 3
ISSUE: CONSTRUCTION	MELWAY REF: 366 D3/E4	PROJECT No: P115-24
	DWG No: RD202	REVISION: 1

Appendix B

6 Pages

Testing Results

- Hilf Density Locations
- Hilf Density Ratio (%)

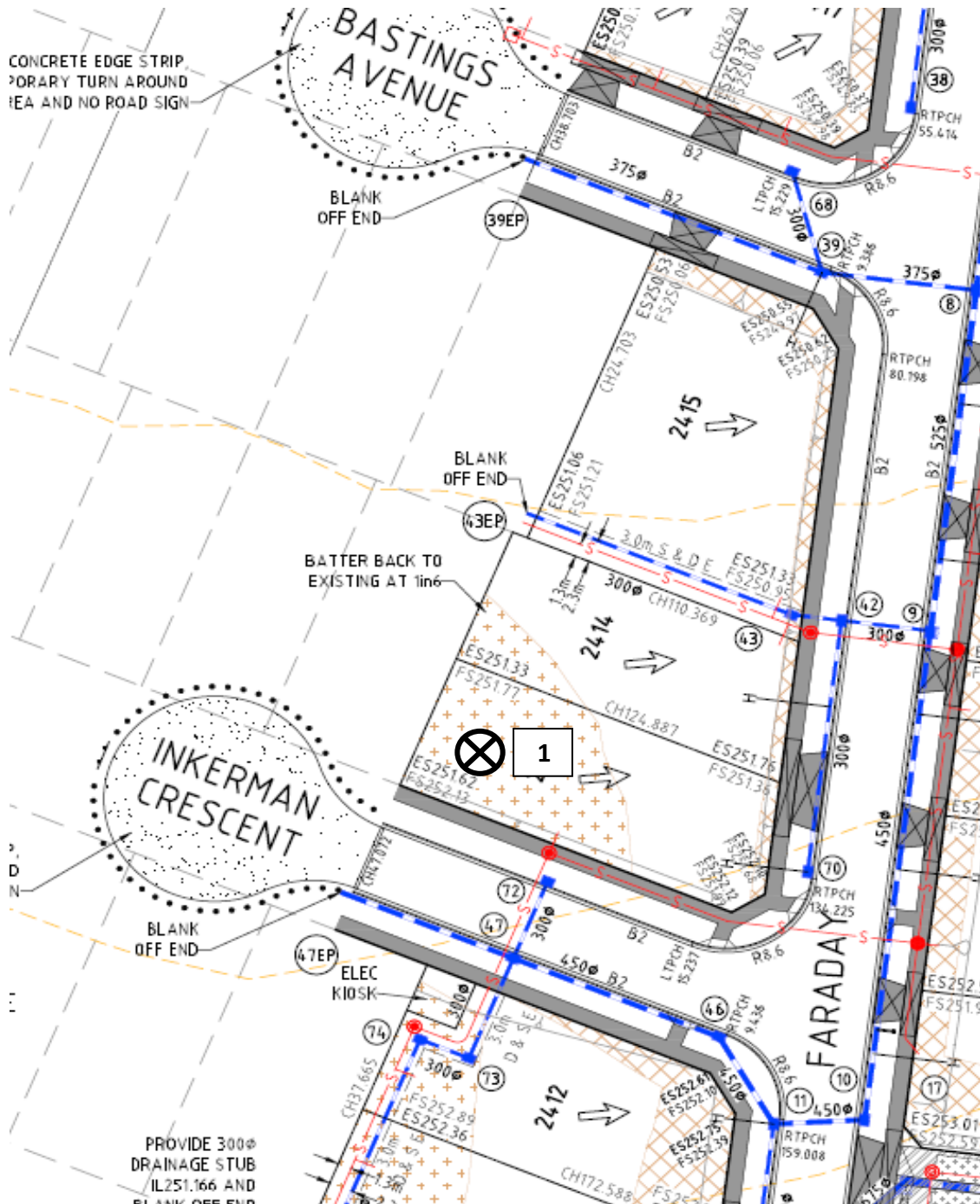
Site Location Sketch

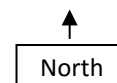
MELBOURNE

Test site locations only
NOT TO SCALE

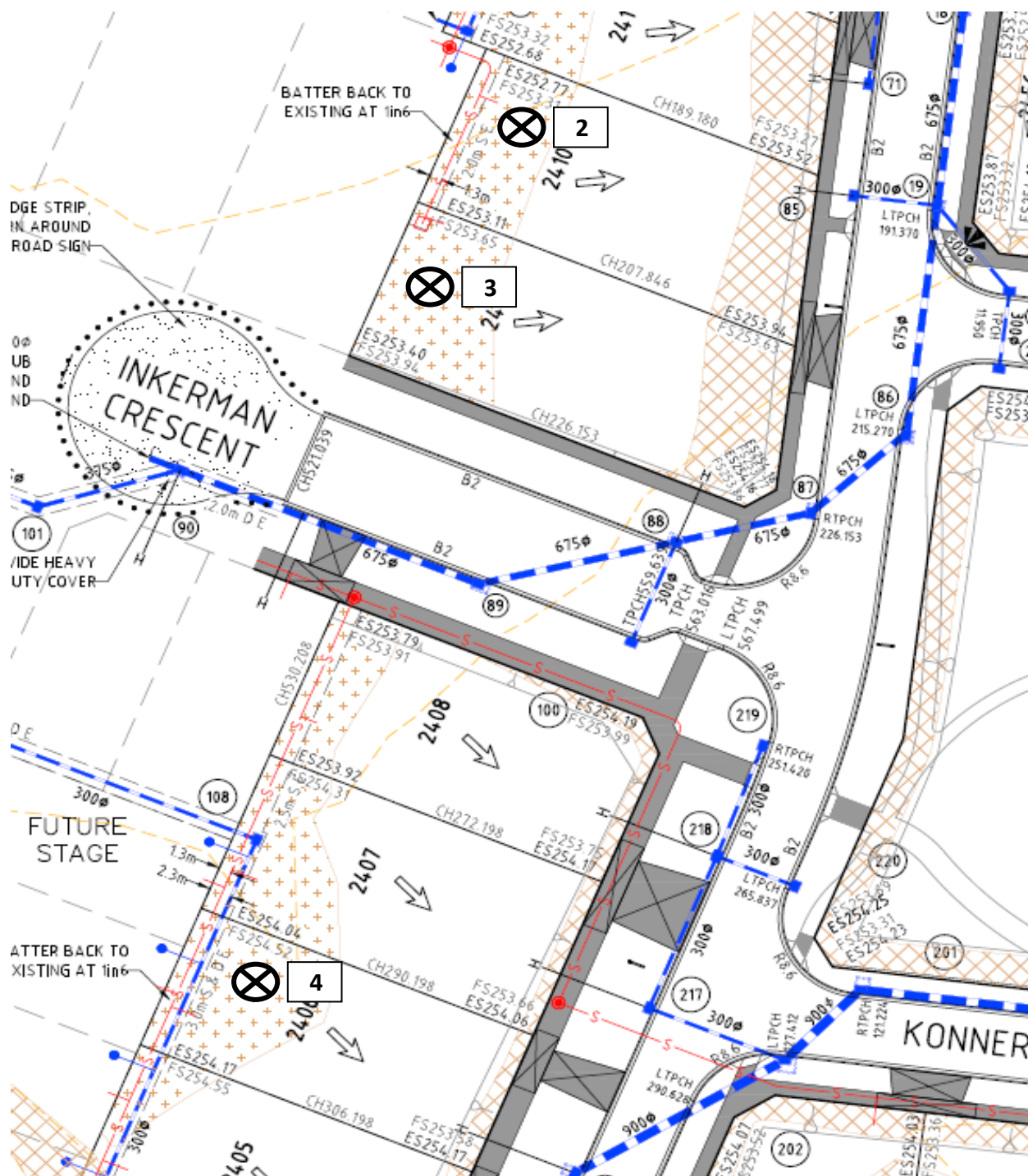


Client: BMD Urban Pty Ltd
Job No. 14874/P/621
Test Request No. T-28402
Date Tested: 19/10/2017





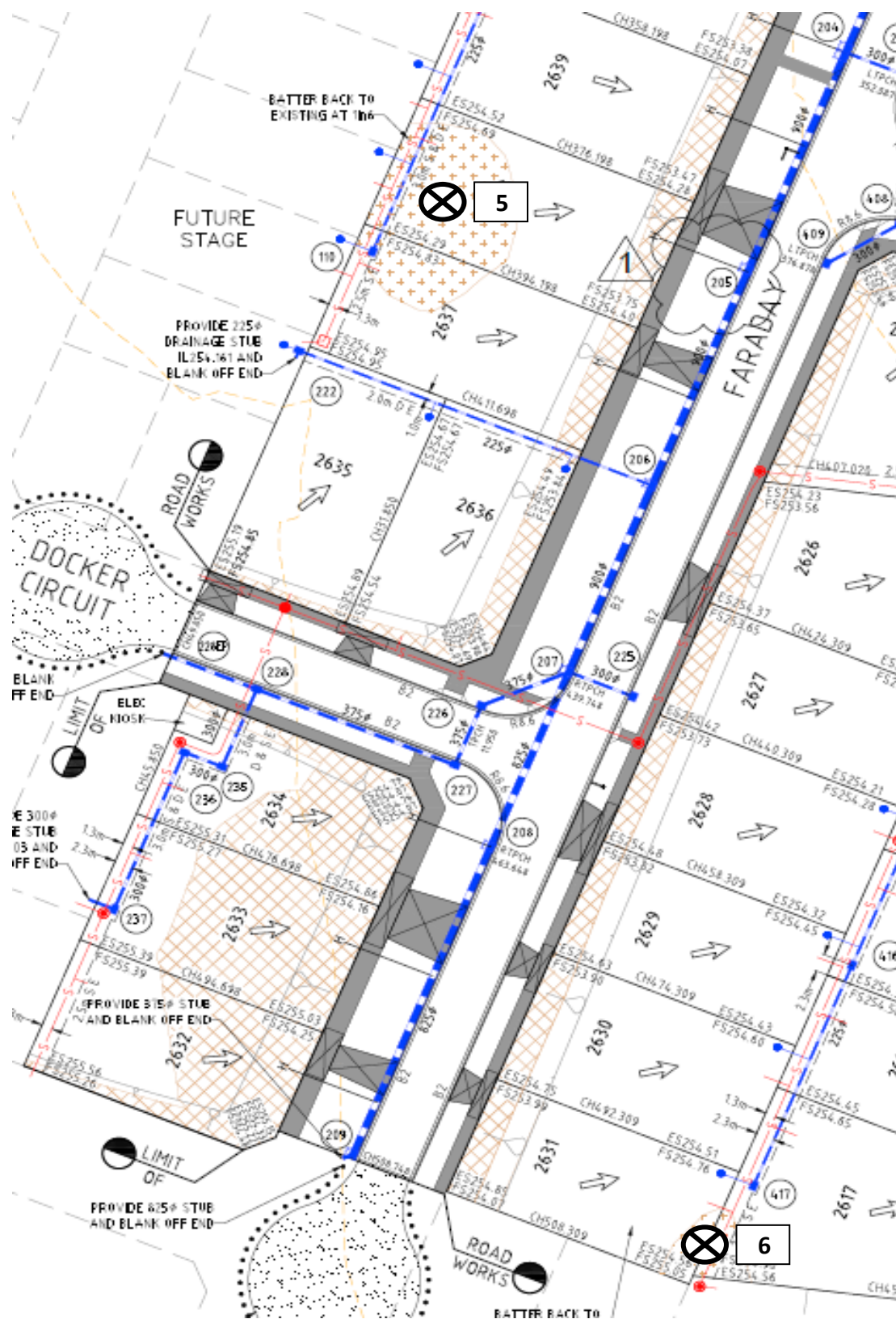
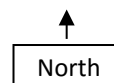
Date Tested: 19/10/2017



MELBOURNE

Test site locations only
NOT TO SCALE

<i>Client:</i>	BMD Urban Pty Ltd
<i>Job No.</i>	14874/P/621
<i>Test Request No.</i>	T-28402
<i>Date Tested:</i>	19/10/2017



LOT REPORT - WET DENSITY RATIO

Client:	BMD Urban Pty Ltd	Report Number:	14874/R/48800-1
Client Address:	PO BOX 1128, CAMBERWELL	Project Number:	14874/P/621
Project:	Merrfield Estate - Stage 24	Lot Number:	
Location:	Merrfield	Internal Test Request:	14874/T/28402
Component:		Client Reference/s:	Level 1 STG 24 19/10
Area Description:	Stage 24	Report Date / Page:	25/10/2017 Page 1 of 3

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
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Sample Number	14874/S/115675	14874/S/115676	14874/S/115677	14874/S/115678
ID / Client ID	Refer to Map	Refer to Map	Refer to Map	Refer to Map
Lot Number	-	-	-	-
Date / Time Tested	19/10/2017	19/10/2017	19/10/2017	19/10/2017
Material Source	Onsite	Onsite	Onsite	Onsite
Material Type	Clay	Clay	Clay	Clay
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b
Depths: Test / Nom / Actual (mm)	175 / 200 / 200	175 / 200 / -	175 / 200 / -	175 / 200 / -
Standard or Modified	Standard	Standard	Standard	Standard
Layer Number	1	2	2	1
Location Number	1	2	3	4
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	0	0	0	0
Density of Oversize (t/m ³)	-	-	-	-
Compaction Sample Number	14874/S/115675	14874/S/115676	14874/S/115677	14874/S/115678
Sample Description	Clay	Clay	Clay	Clay
Moisture Test Results:				
Field Moisture Content (%)	14.8	14.5	14.2	14.5
Adjusted / Moisture Variation (%)	2.5	0.0	0.0	0.5
Optimum Moisture Content (%)	17.5	14.5	14.5	15.0
Moisture Variation from OMC	(Drier than OMC)	(Drier than OMC)	(Drier than OMC)	(Drier than OMC)
Moisture Ratio (%)	85.5	98.5	99.5	98.0
Density Test Results:				
Field Wet Density (t/m ³)	2.03	2.04	2.03	2.04
Adj/Peak Conv Wet Density (t/m ³)	2.08	2.10	2.11	2.10
Density Ratio Required (%)	95	95	95	95
Hilf Density Ratio (%)	97.5	97.0	96.0	97.0

Remarks

	The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025 - Testing		
	Accreditation Number:	1986	
	Corporate Site Number:	14874	
	Approved Signatory: Daniel Boyd		Form ID: W5ASRepSum Rev 4

LOT REPORT - WET DENSITY RATIO

Client:	BMD Urban Pty Ltd	Report Number:	14874/R/48800-1
Client Address:	PO BOX 1128, CAMBERWELL	Project Number:	14874/P/621
Project:	Merrfield Estate - Stage 24	Lot Number:	
Location:	Merrfield	Internal Test Request:	14874/T/28402
Component:		Client Reference/s:	Level 1 STG 24 19/10
Area Description:	Stage 24	Report Date / Page:	25/10/2017 Page 2 of 3

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
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Sample Number	14874/S/115679	14874/S/115680		
ID / Client ID	Refer to Map	Refer to Map		
Lot Number	-	-		
Date / Time Tested	19/10/2017	19/10/2017		
Material Source	Onsite	Onsite		
Material Type	Clay	Clay		
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b		
Depths: Test / Nom / Actual (mm)	175 / 200 / -	175 / 200 / -		
Standard or Modified	Standard	Standard		
Layer Number	2	1		
Location Number	5	6		
Test Fraction (mm)	< 19.0 mm	< 19.0 mm		
Sample Oversize (%)	0	0		
Density of Oversize (t/m ³)	-	-		
Compaction Sample Number	14874/S/115679	14874/S/115680		
Sample Description	Clay	Clay		
Moisture Test Results:				
Field Moisture Content (%)	13.9	14.0		
Adjusted / Moisture Variation (%)	0.0	0.5		
Optimum Moisture Content (%)	14.0	14.5		
Moisture Variation from OMC	(Drier than OMC)	(Drier than OMC)		
Moisture Ratio (%)	99.5	98.0		
Density Test Results:				
Field Wet Density (t/m ³)	2.04	2.04		
Adj/Peak Conv Wet Density (t/m ³)	2.10	2.10		
Density Ratio Required (%)	95	95		
Hilf Density Ratio (%)	97.5	97.0		

Remarks

	The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025 - Testing		
	Accreditation Number:	1986	
	Corporate Site Number:	14874	
	Approved Signatory: Daniel Boyd		
	Form ID: W5ASRepSum Rev 4		

LOT REPORT - WET DENSITY RATIO

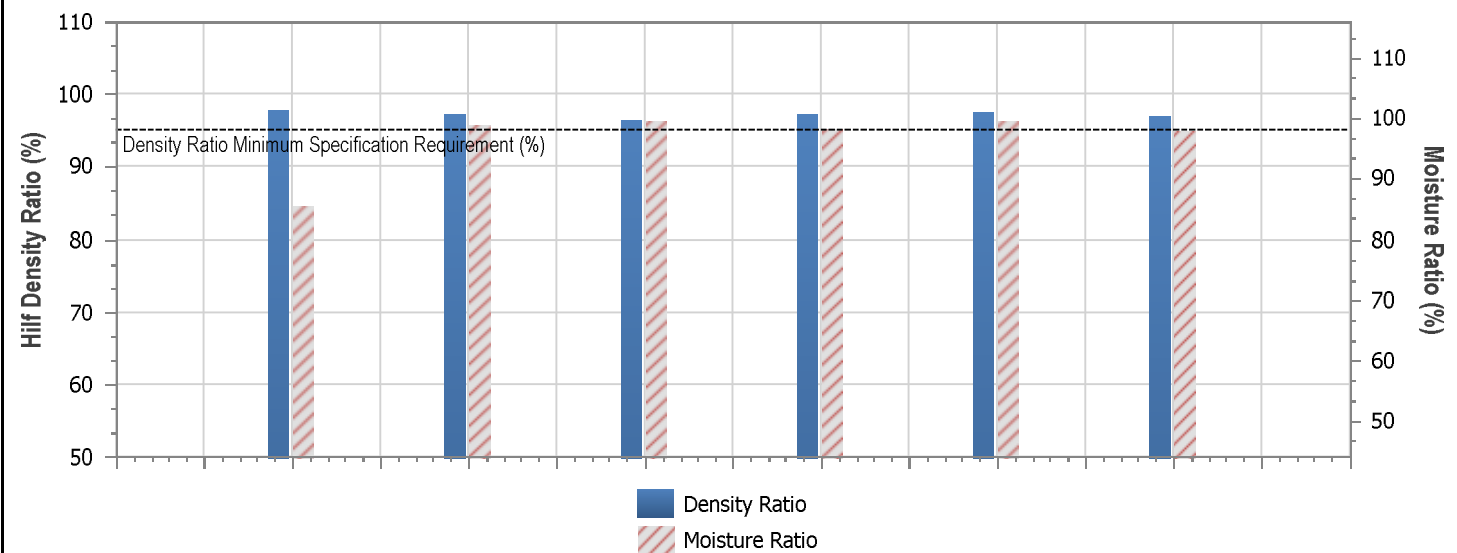
Client:	BMD Urban Pty Ltd	Report Number:	14874/R/48800-1
Client Address:	PO BOX 1128, CAMBERWELL	Project Number:	14874/P/621
Project:	Merrfield Estate - Stage 24	Lot Number:	
Location:	Merrfield	Internal Test Request:	14874/T/28402
Component:		Client Reference/s:	Level 1 STG 24 19/10
Area Description:	Stage 24	Report Date / Page:	25/10/2017 Page 3 of 3

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
Statistical Analysis Test Method:	Lot Average (Lot average calculations are not covered by NATA endorsement)

Nuclear Gauge Calibration Details

Calibration Number	-	Material Source	-
Calibration Last Updated	-	Material Type	-
Nominated Calibration Layer Depth (mm)	-		

LOT TEST RESULT SUMMARY



Tests in Lot = 6	Lot Minimum	Lot Maximum	Lot Mean	Standard Deviation
Moisture Ratio (%)	85.5	99.3	96.4	5.390
Half Density Ratio (%)	96.1	97.5	96.9	0.486

Lot Number: -

Mean Density Ratio (%): 96.9

Mean Moisture Ratio (%): 96.4

Remarks



The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
Accredited for compliance with ISO/IEC 17025 - Testing

Accreditation Number: 1986
Corporate Site Number: 14874



Approved Signatory: Daniel Boyd
Form ID: W5ASRepSum Rev 4