

Level 1 Supervision & Inspection Report

Merrifield Development – Stage 21

Ref: 14874/P/621

Prepared for
BMD Urban

10 January 2017

Contact Information

Cardno Construction Sciences Pty Ltd
ABN 74128806735

60-64 Vella Drive
Sunshine West, Victoria 3020 Australia

Telephone: 03 9364 9301
Facsimile: +61 3 5444 4812
International: +61 3 9364 9301

Constructionsociences_vic@cardno.com.au
www.cardno.com.au

Document Information

Prepared for	BMD Urban
Project Name	Merrifield Development – Stage 21
Job Reference	Document : Version 1
File Reference	14874/P/621
Date	10 January 2017

Document Control

Version	Date	Prepared By	Prepared (Signature)	Reviewed By	Reviewed (Signature)
1	10/01/17	Aidin Ghalehsari		Aidin Ghalehsari	

© Cardno 2014. Copyright in the whole and every part of this document belongs to Cardno and may not be used, sold, transferred, copied or reproduced in whole or in part in any manner or form or in or on any media to any person other than by agreement with Cardno.

This document is produced by Cardno solely for the benefit and use by the client in accordance with the terms of the engagement. Cardno does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by any third party on the content of this document.

Table of Contents

1	INTRODUCTION	4
2	EARTHWORK SPECIFICATIONS	4
3	SITE INSPECTION & TESTING	4
3.1	Existing Surface Assessments	4
3.2	Fill Placement	4
3.3	Compaction Control Testing	5
4	GENERAL STATEMENT OF COMPLIANCE	5
5	LIMIT OF LIABILITY	5

Tables

Table 3-1	Summary of Field Density Test Results.....	5
-----------	--	---

Appendices

Appendix A.....	1 Page
Site Location Plan	

Appendix B.....	3 Pages
Density Testing Results	

1 INTRODUCTION

Cardno was commissioned by BMD Urban to provide Level 1 supervision & testing services for the proposed Merrifield Development – Stage 21 project located at Donnybrook Rd, 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 Development – Stage 21 as shown in the attached site location plan in Appendix A.

The level 1 supervision and testing areas was limited to;

- Residential Lots No. 2117, 2118, 2119, 2120, 2121, 2122

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.

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, Cardno 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.

3.2 Fill Placement

All fill material on site was thoroughly inspected by Cardno site representative to ensure it meets the “**suitable material**” requirements outlined in AS3798-2007.

The fill material typically comprised of:

- Gravely Silty Clay, medium to high plastic, brown.

Placement of fill was carried out using the following plants:

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

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 Cardno's NATA accredited soil laboratory, using the Hilf rapid compaction method, in accordance with AS 1289.5.7.1.

A total three (3) field density tests were carried out throughout the earthworks as below Table 3-1.

Table 3-1 Summary of Field Density Test Results

Successful Test Numbers	Mean Density (%)	Standard Deviation (%)
3	96.6	1.267

All density test results carried out in the engineered fill material are included in Appendix B.

4 GENERAL STATEMENT OF COMPLIANCE

It is considered that the placement of fill material at the Merrifield Development – Stage 21 project 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.

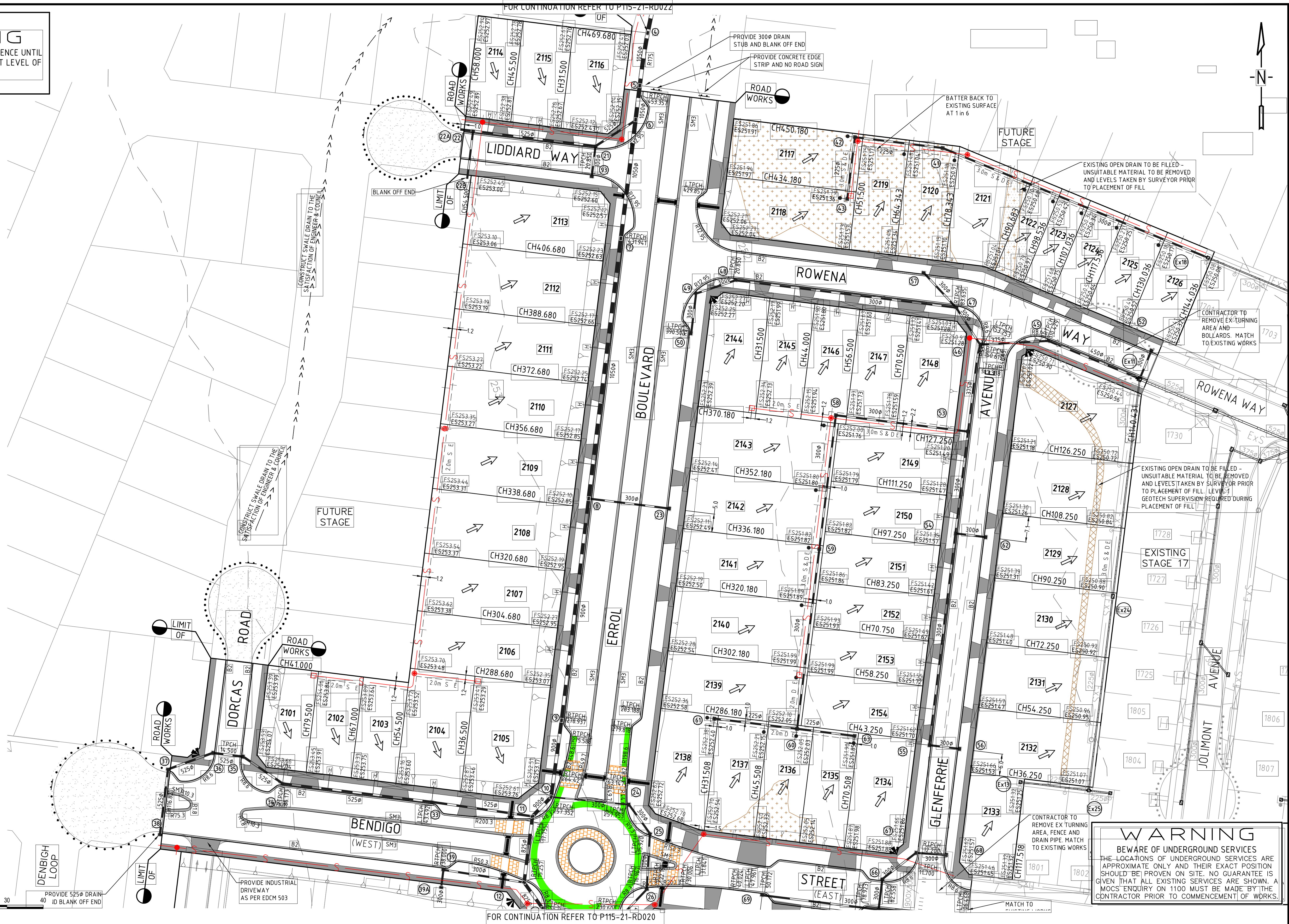
Cardno accepts no liability to any third party, and will not enter into any communication with a third party regarding this report.

Merrifield Estate - Stage 21

APPENDIX A

SITE LOCATION PLAN

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



REV	DESCRIPTION	APPROVED	DATE
0	ISSUED FOR CONSTRUCTION	[Signature]	27/09/16
D	COUNCIL COMMENTS	[Signature]	20/09/16
C	COUNCIL COMMENTS	[Signature]	03/08/16
B	COUNCIL COMMENTS	[Signature]	10/06/16
A	PRELIMINARY ISSUE	[Signature]	04/03/16

DRAWN:	C.GLEESON
DESIGNED:	C.J.SANTOS
APPROVED:	B.GLEESON

LEGEND

	LOT GRADE		PROPOSED DRAINAGE
	EXISTING SURFACE LEVEL		EXISTING DRAINAGE
	TOP OF BATTER LEVEL		TABLE DRAIN
	PERMANENT SURVEY MARK		PROPERTY INLET
	TEMPORARY BENCH MARK		HOUSE DRAIN
	REMOVE EX TREE		SWD PIT NUMBERS
			EXISTING SEWER
			PROPOSED SEWER

CLIENT:

merrifield

MAB gpc

vervePROJECTS
DELIVERING EXCEPTIONAL RESULTS

Level 1, 173 Burke Road, Glen Iris VIC 3146
Tel: 03 8573 1500 Fax: 03 8573 1555

COUNCIL: HUME CITY COUNCIL

PROJECT: MERRIFIELD LIVING - SECTION B
STAGE 21
MICKLEHAM

ISSUE: **CONSTRUCTION**

MELWAY REF: 366 D3/E4

PROJECT No: P115-21

DWG No: RD021

REVISION: 0

DETAIL PLAN - 2

Merrifield Estate - Stage 21

APPENDIX B

DENSITY TESTING RESULTS

Site Location Sketch

Figure No. 100

Client: BMD

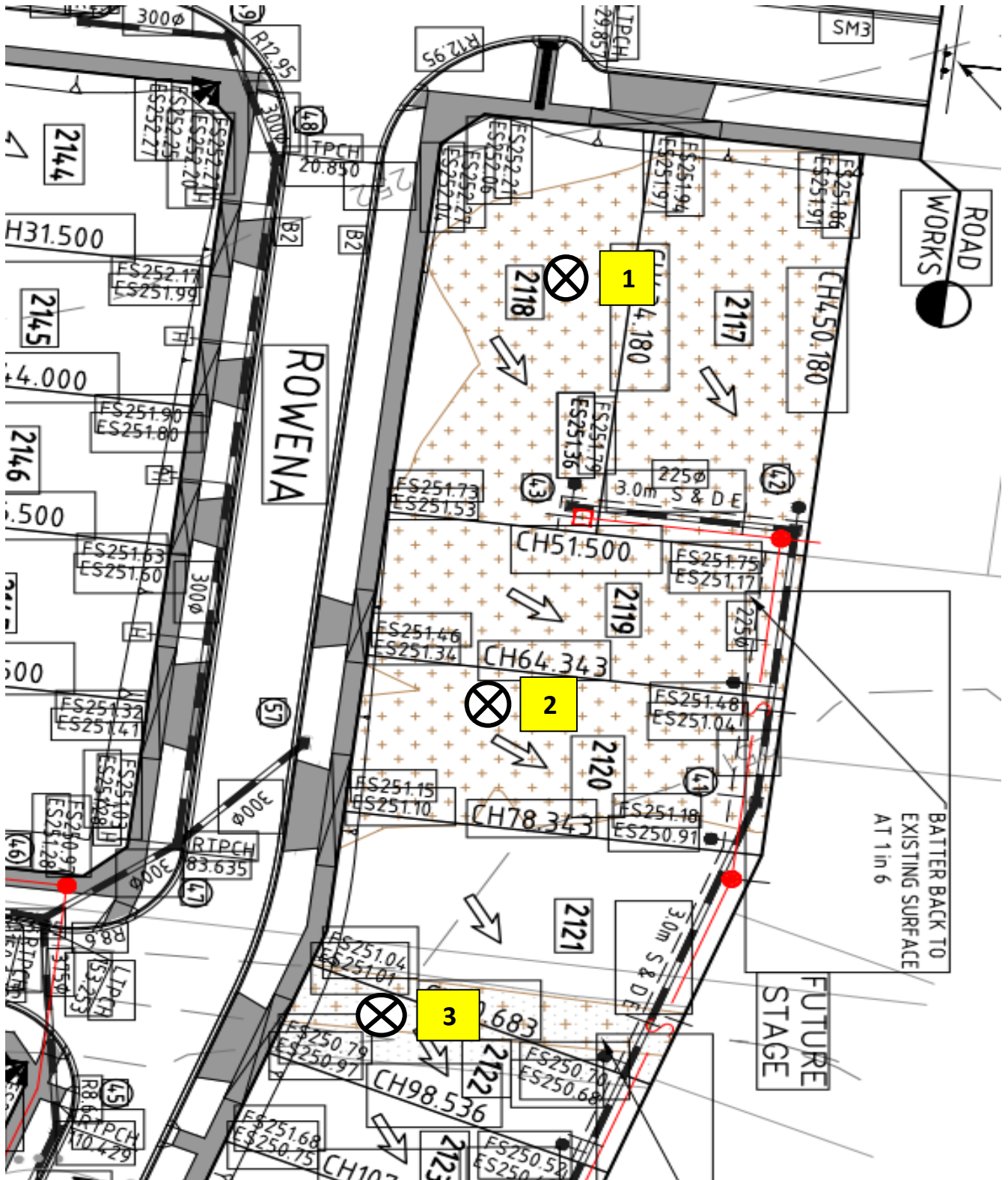
Job No. 14874/P/621

Test Request No. T/19429

Date Tested: 6/12/2016

Test site locations only

NOT TO SCALE



LOT REPORT - WET DENSITY RATIO

Client:	BMD Urban Pty Ltd	Report Number:	14874/R/32373-1
Client Address:	PO BOX 1128, CAMBERWELL	Project Number:	14874/P/621
Project:	Merrifield Estate - Stage 21	Lot Number:	
Location:	Merrifield	Internal Test Request:	14874/T/19429
Component:	Stage 21	Client Reference/s:	Stage 21 Testing
Area Description:	Refer to Map	Report Date / Page:	5/01/2017 Page 1 of 2

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
------------------	--

Sample Number	14874/S/68906	14874/S/68907	14874/S/68908	
ID / Client ID	Stage 21	Stage 21	Stage 21	
Lot Number	-	-	-	
Date / Time Tested	6/12/2016	6/12/2016	6/12/2016	
Material Source	Onsite	Onsite	Onsite	
Material Type	Insitu	Insitu	Insitu	
Sampling Method	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 / 200	175 / 200 / 200	
Standard or Modified	Standard	Standard	Standard	
Layer Number	Layer 2	Layer 2	Layer 2	
Location Number	1	2	3	
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	
Sample Oversize (%)	0	0	0	
Density of Oversize (t/m ³)	-	-	-	
Compaction Sample Number	14874/S/68906	14874/S/68907	14874/S/68908	
Sample Description	Insitu	Insitu	Insitu	
Moisture Test Results:				
Field Moisture Content (%)	22.9	23.0	22.7	
Adjusted / Moisture Variation (%)	1.5	2.0	0.5	
Optimum Moisture Content (%)	24.5	25.5	23.0	
Moisture Variation from OMC	(Drier than OMC)	(Drier than OMC)	(Drier than OMC)	
Moisture Ratio (%)	93.5	91.0	98.0	
Density Test Results:				
Field Wet Density (t/m ³)	1.93	1.91	1.89	
Adj/Peak Conv Wet Density (t/m ³)	1.97	2.00	1.96	
Density Ratio Required (%)	95	95	95	
Hilf Density Ratio (%)	98.0	95.5	96.5	

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		
	Accreditation Number:	1986	
	Corporate Site Number:	14874	
	Approved Signatory: Daniel Boyd		
	Form ID: W5ASRepSum Rev 2		

LOT REPORT - WET DENSITY RATIO

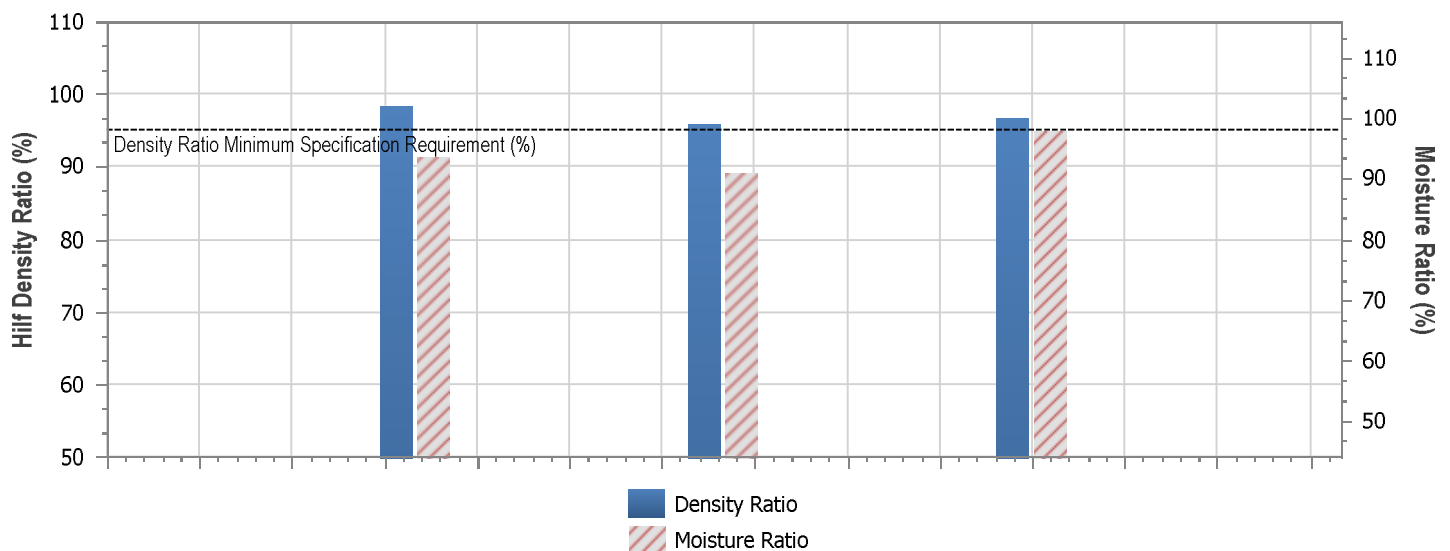
Client:	BMD Urban Pty Ltd	Report Number:	14874/R/32373-1
Client Address:	PO BOX 1128, CAMBERWELL	Project Number:	14874/P/621
Project:	Merrifield Estate - Stage 21	Lot Number:	
Location:	Merrifield	Internal Test Request:	14874/T/19429
Component:	Stage 21	Client Reference/s:	Stage 21 Testing
Area Description:	Refer to Map	Report Date / Page:	5/01/2017 Page 2 of 2

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 = 3	Lot Minimum	Lot Maximum	Lot Mean	Standard Deviation
Moisture Ratio (%)	90.9	97.8	94.1	3.485
Half Density Ratio (%)	95.5	98.0	96.6	1.267

Lot Number: -
 Mean Density Ratio (%): 96.6
 Mean Moisture Ratio (%): 94.1

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

Accreditation Number: 1986
 Corporate Site Number: 14874



Approved Signatory: Daniel Boyd
 Form ID: W5ASRepSum Rev 2