



**CIVIL GEOTECHNICAL SERVICES**  
**ABN 26 474 013 724**  
**PO Box 678 Croydon Vic 3136**  
**Telephone: 9723 0744 Facsimile: 9723 0799**

23<sup>rd</sup> July 2013

Our Reference: 13173:JHF711

Winslow Constructors Pty Ltd  
50 Barry Road  
CAMPBELLFIELD VIC 3061

Dear Sirs,

**RE: LEVEL 1 EARTHWORKS INSPECTION AND TESTING  
ARMSTRONG – MT DUNEED (STAGE 1) – GROVEDALE**

Please find attached our Report Nos 13173/R001 to 13173/R005 that relate to the field density testing that was conducted within the filled allotments at the above subdivision. The level 1 inspections and associated field density testing commenced in early May 2013 and was completed in early July 2013.

The inspections and testing of the earthworks was undertaken in general accordance with the Level 1 requirements of AS 3798 - Guidelines on Earthworks for Commercial and Residential Developments.

The site inspections and testing was performed by an experienced geotechnician from this office. Any areas that were deemed unsatisfactory were reworked and retested under their supervision. The testing was performed to the relevant Australian Standards and the accompanying test reports carry NATA endorsement. The attached compaction results, which were located randomly throughout the fill profile, are considered to be representative of the bulk fill materials that were placed across the reported allotments by Winslow Constructors during the aforementioned period. The approximate locations of the field density tests can be seen on the attached plan (Figure 1).

We are of the view that the bulk fill materials that have been placed across the reported allotments by Winslow Constructors during the aforementioned period can be considered as having been placed in a controlled manner to a minimum density ratio of 95% (standard compactive effort).

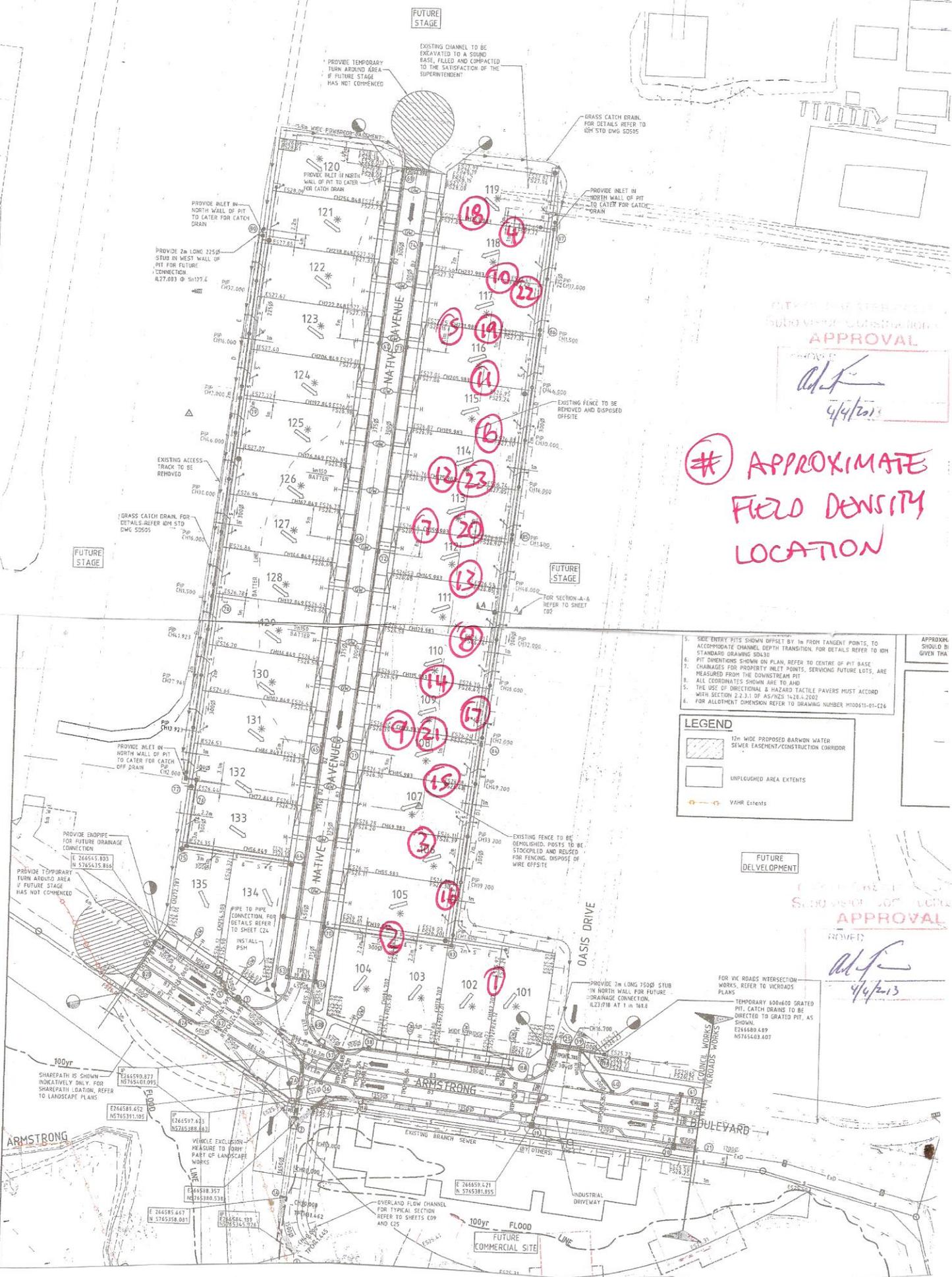
Please contact the undersigned if you require any additional information.

Civil Geotechnical Services

A handwritten signature in black ink, appearing to read 'Justin Fry', written in a cursive style.

Justin Fry

# 13173 FIGURE 1



APPROVAL  
*Adf*  
 4/4/2013

# APPROXIMATE  
 FIELD DENSITY  
 LOCATION

5. SIDE ENTRY PITS SHOWN OFFSET BY 1m FROM TANGENT POINTS, TO ACCOMMODATE CHANNEL DEPTH TRANSITION. FOR DETAILS REFER TO ION STANDARD DRAWING 5035
6. PIT DIMENSIONS SHOWN ON PLAN REFER TO CENTRE OF PIT BASE
7. CHANGES FOR PROPERTY INLET POINTS, SERVING FUTURE LOTS, ARE MEASURED FROM THE DOWNSTREAM PIT
8. ALL COORDINATES SHOWN ARE TO AHD
9. THE USE OF DIRECTIONAL & HAZARD TACTILE PAVERS MUST ACCORD WITH SECTION 2.2.3.1 OF AS/NZS 1428.2:2002
4. FOR ALLOTMENT DIMENSION REFER TO DRAWING NUMBER M100511-01-026

**LEGEND**

- 1m wide proposed barrow water sewer excavation/construction corridor
- UNPLUGHED AREA EXTENTS
- YARR Extents

APPROXIM SHOULD BE GIVEN THA

FUTURE DEVELOPMENT

APPROVAL  
*Adf*  
 4/4/2013

100yr FLOOD

SHARPEATH IS SHOWN INDICATIVELY ONLY. FOR SHARPEATH LOCATION, REFER TO LANDSCAPE PLANS

VEHICLE EXCLUSION MEASURE TO 100YR PART OF LANDSCAPE WORKS

OVERLAND FLOW CHANNEL FOR TYPICAL SECTION REFER TO SHEETS C09 AND C25

100yr FLOOD LINE

FUTURE COMMERCIAL SITE

OASIS DRIVE

ARMSTRONG BOULEVARD

INDUSTRIAL DRIVEWAY

TEMPORARY ORANGE GRATED PIT, CATCH BASINS TO BE DIRECTED TO GRATED PIT, AS SHOWN. E264680.489 N5765403.407

FOR VIC ROADS INTERSECTION WORKS, REFER TO VICROADS PLANS

PROVIDE 7m LONG 1500 STUB IN NORTH WALL FOR FUTURE DRAINAGE CONNECTION. IL237018 AT 1 IN 161.8

FUTURE STAGE

EXISTING CHANNEL TO BE EXCAVATED TO A SOUND BASE, FILLED AND COMPACTED TO THE SATISFACTION OF THE SUPERINTENDENT

PROVIDE TEMPORARY TURN AROUND AREA IF FUTURE STAGE HAS NOT COMMENCED

BRASS CATCH GRAB, FOR DETAILS REFER TO ION STD DWG 50595

PROVIDE INLET IN NORTH WALL OF PIT TO CATER FOR CATCH GRAB

PROVIDE INLET IN NORTH WALL OF PIT TO CATER FOR CATCH GRAB

PROVIDE 2m LONG 2250 STUB IN WEST WALL OF PIT FOR FUTURE CONNECTION. IL27.083 @ 5m117.6

EXISTING ACCESS TRACK TO BE REMOVED

GRASS CATCH DRAIN, FOR DETAILS REFER ION STD DWG 50505

FUTURE STAGE

EXISTING FENCE TO BE REMOVED AND DISPOSED OFFSITE

EXISTING FENCE TO BE DEMOLISHED, POSTS TO BE STOCKPILED AND BELIEVED FOR FENCING, DISPOSE OF WIRE OFFSITE

FOR SECTION A-A REFER TO SHEET C02



## COMPACTION ASSESSMENT

Job No 13173  
 Report No 13173/R001  
 Date Issued 24/05/13

**CIVIL GEOTECHNICAL SERVICES**

6 - 8 Rose Avenue, Croydon 3136

Client	WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD)	Tested by	JWM
Project	ARMSTRONG - MT DUNEED - STAGE 1	Date tested	06/05/13
Location	GROVEDALE	Checked by	JHF

<b>Feature</b>	EARTHWORKS	Layer thickness	200 mm	Time: 12:00
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*Test procedure AS 1289.2.1.1 & 5.8.1*

Test No	1	2	3	-	-	-
Location	REFER TO FIGURE 1	REFER TO FIGURE 1	REFER TO FIGURE 1			
Approximate depth below FSL	-	-	-	-	-	-
Measurement depth <i>mm</i>	175	175	175	-	-	-
Field wet density <i>t/m<sup>3</sup></i>	1.75	1.79	1.89	-	-	-
Field moisture content <i>%</i>	14.7	10.4	8.1	-	-	-

*Test procedure AS 1289.5.7.1*

Test No	1	2	3	-	-	-
Compactive effort	Standard					
Oversize rock retained on sieve <i>mm</i>	19.0	19.0	19.0	-	-	-
Percent of oversize material <i>wet</i>	0	0	0	-	-	-
Peak Converted Wet Density <i>t/m<sup>3</sup></i>	1.79	1.81	1.79	-	-	-
Adjusted Peak Converted Wet Density <i>t/m<sup>3</sup></i>	-	-	-	-	-	-
Optimum Moisture Content <i>%</i>	22.5	17.0	15.5	-	-	-

Moisture Variation From Optimum Moisture Content	7.5% dry	6.5% dry	8.0% dry	-	-	-
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<b>Density Ratio ( R<sub>HD</sub> )</b>	<b>97.5</b>	<b>99.0</b>	<b>105.5</b>	-	-	-
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*Material description*

No 1 - 3 Clay Fill



The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/National standards. Accredited for compliance to ISO/IEC 17025. Accreditation No 9909

Approved Signatory : Justin Fry



## COMPACTION ASSESSMENT

Job No 13173  
 Report No 13173/R002  
 Date Issued 31/05/13

### CIVIL GEOTECHNICAL SERVICES

6 - 8 Rose Avenue, Croydon 3136

Client	WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD)	Tested by	JWM
Project	ARMSTRONG - MT DUNEED - STAGE 1	Date tested	07/05/13
Location	GROVEDALE	Checked by	JHF

<b>Feature</b>	EARTHWORKS	Layer thickness	200 mm	Time: 11:58
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#### Test procedure AS 1289.2.1.1 & 5.8.1

Test No	4	5	6	7	8	9
Location	REFER TO FIGURE 1					
Approximate depth below FSL	-	-	-	-	-	-
Measurement depth <i>mm</i>	175	175	175	175	175	175
Field wet density <i>t/m<sup>3</sup></i>	1.72	1.74	1.80	1.75	1.76	1.66
Field moisture content %	12.2	15.3	11.6	13.1	13.4	13.4

#### Test procedure AS 1289.5.7.1

Test No	4	5	6	7	8	9
Compactive effort	Standard					
Oversize rock retained on sieve <i>mm</i>	19.0	19.0	19.0	19.0	19.0	19.0
Percent of oversize material <i>wet</i>	0	0	0	0	0	0
Peak Converted Wet Density <i>t/m<sup>3</sup></i>	1.86	1.89	1.90	1.91	1.85	1.87
Adjusted Peak Converted Wet Density <i>t/m<sup>3</sup></i>	-	-	-	-	-	-
Optimum Moisture Content %	18.0	20.0	17.0	18.0	20.0	19.5

Moisture Variation From Optimum Moisture Content	6.0% dry	4.5% dry	5.5% dry	5.0% dry	6.5% dry	6.0% dry
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<b>Density Ratio ( <math>R_{HD}</math> )</b>	<b>%</b>	<b>92.5</b>	<b>92.0</b>	<b>95.0</b>	<b>92.0</b>	<b>95.0</b>	<b>89.0</b>
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#### Material description

No 4 - 9 Clay Fill
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AVRLOT HILF V1.10 MAR 13



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## COMPACTION ASSESSMENT

Job No 13173  
 Report No 13173/R003  
 Date Issued 31/05/13

### CIVIL GEOTECHNICAL SERVICES

6 - 8 Rose Avenue, Croydon 3136

Client	WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD)	Tested by	JWM
Project	ARMSTRONG - MT DUNED - STAGE 1	Date tested	08/05/13
Location	GROVEDALE	Checked by	JHF

<b>Feature</b>	EARTHWORKS	Layer thickness	200 mm	Time: 08:46
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#### Test procedure AS 1289.2.1.1 & 5.8.1

Test No	10	11	12	13	14	15
Location	REFER TO FIGURE 1					
Approximate depth below FSL	-	-	-	-	-	-
Measurement depth <i>mm</i>	175	175	175	175	175	175
Field wet density <i>t/m<sup>3</sup></i>	1.70	1.81	1.68	1.88	1.83	1.83
Field moisture content %	18.0	16.9	13.0	23.5	14.0	14.3

#### Test procedure AS 1289.5.7.1

Test No	10	11	12	13	14	15
Compactive effort	Standard					
Oversize rock retained on sieve <i>mm</i>	19.0	19.0	19.0	19.0	19.0	19.0
Percent of oversize material <i>wet</i>	0	0	0	0	0	0
Peak Converted Wet Density <i>t/m<sup>3</sup></i>	1.94	1.89	1.89	1.98	1.91	1.89
Adjusted Peak Converted Wet Density <i>t/m<sup>3</sup></i>	-	-	-	-	-	-
Optimum Moisture Content %	19.0	20.0	17.5	22.5	18.5	19.0

Moisture Variation From Optimum Moisture Content	1.0% dry	3.0% dry	4.5% dry	1.0% wet	4.5% dry	4.5% dry
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<b>Density Ratio ( <math>R_{HD}</math> )</b>	<b>%</b>	<b>87.5</b>	<b>95.5</b>	<b>89.0</b>	<b>95.0</b>	<b>96.5</b>	<b>96.5</b>
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#### Material description

No 10 - 15 Clay Fill

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## COMPACTION ASSESSMENT

Job No 13173  
 Report No 13173/R004  
 Date Issued 11/07/13

### CIVIL GEOTECHNICAL SERVICES

6 - 8 Rose Avenue, Croydon 3136

Client	WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD)	Tested by	JWM
Project	ARMSTRONG - MT DUNED - STAGE 1	Date tested	01/07/13
Location	GROVEDALE	Checked by	JHF

<b>Feature</b>	EARTHWORKS	Layer thickness	200 mm	Time: 12:00
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*Test procedure AS 1289.2.1.1 & 5.8.1*

Test No	16	17	-	-	-	-
Location	REFER TO FIGURE 1	REFER TO FIGURE 1				
Approximate depth below FSL	-	-	-	-	-	-
Measurement depth <i>mm</i>	175	175	-	-	-	-
Field wet density <i>t/m<sup>3</sup></i>	1.95	1.92	-	-	-	-
Field moisture content <i>%</i>	23.4	22.0	-	-	-	-

*Test procedure AS 1289.5.7.1*

Test No	16	17	-	-	-	-
Compactive effort	Standard					
Oversize rock retained on sieve <i>mm</i>	19.0	19.0	-	-	-	-
Percent of oversize material <i>wet</i>	0	0	-	-	-	-
Peak Converted Wet Density <i>t/m<sup>3</sup></i>	1.94	1.99	-	-	-	-
Adjusted Peak Converted Wet Density <i>t/m<sup>3</sup></i>	-	-	-	-	-	-
Optimum Moisture Content <i>%</i>	23.5	22.0	-	-	-	-

Moisture Variation From Optimum Moisture Content	0.0%	0.0%	-	-	-	-
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<b>Density Ratio ( R<sub>HD</sub> )</b>	<b>%</b>	<b>100.0</b>	<b>96.5</b>	-	-	-
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*Material description*

No 16 - 17 Clay Fill



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Approved Signatory : Justin Fry



# COMPACTION ASSESSMENT

Job No 13173  
 Report No 13173/R005  
 Date Issued 22/07/13

## CIVIL GEOTECHNICAL SERVICES

6 - 8 Rose Avenue, Croydon 3136

Client	WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD)	Tested by	JWM
Project	ARMSTRONG - MT DUNED - STAGE 1	Date tested	05/07/13
Location	GROVEDALE	Checked by	JHF

Feature	EARTHWORKS	Layer thickness	200 mm	Time:	11:50
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### Test procedure AS 1289.2.1.1 & 5.8.1

Test No		18	19	20	21	22	23
Location		REFER TO FIGURE 1					
		RETEST FD#4	RETEST FD#5	RETEST FD#7	RETEST FD#9	RETEST FD#10	RETEST FD#12
Approximate depth below FSL		-	-	-	-	-	-
Measurement depth	mm	175	175	175	175	175	175
Field wet density	t/m <sup>3</sup>	2.00	1.90	2.02	2.03	1.97	1.81
Field moisture content	%	28.2	26.7	20.5	19.2	17.2	16.9

### Test procedure AS 1289.5.7.1

Test No		18	19	20	21	22	23
Compactive effort		Standard					
Oversize rock retained on sieve	mm	19.0	19.0	19.0	19.0	19.0	19.0
Percent of oversize material	wet	0	0	0	0	0	0
Peak Converted Wet Density	t/m <sup>3</sup>	2.04	1.98	2.05	2.04	2.03	1.89
Adjusted Peak Converted Wet Density	t/m <sup>3</sup>	-	-	-	-	-	-
Optimum Moisture Content	%	22.5	24.5	19.5	19.0	19.0	20.0

Moisture Variation From Optimum Moisture Content	5.5% wet	2.0% wet	0.5% wet	0.0%	1.5% dry	3.0% dry
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Density Ratio ( R <sub>HD</sub> )	%	98.0	96.5	99.0	99.5	97.5	95.5
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### Material description

No 18 - 23 Clay Fill

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