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


9th December 2015

Our Reference: 15448:DK102

Winslow Constructors Pty Ltd
50 Barry Road
CAMPBELLFIELD VIC 3061

Dear Sirs,

RE: LEVEL 1 EARTHWORKS INSPECTION AND TESTING
ARMSTRONG (STAGE 19) – MOUNT DUNEED

Please find attached our Report Nos 15448/R002. R004, R006 and R007 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 October 2015 and was completed in mid October 2015.

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 filled 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 filled 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

Dino Kondzic

# FIGURE 1

**NOTES:**
1. ALL VEHICLE AND PRAM CROSSING LAYBACKS TO BE MINIMUM OF 1.0m FROM PITS.
2. ALL PRAM CROSSINGS TO BE A MINIMUM 2.0m FROM VEHICLE CROSSINGS.
3. ALL PRAM CROSSINGS TO BE DDA COMPLIANT.
4. VEHICLE EXCLUSION MEASURES BETWEEN ROAD RESERVE AND RESERVE TO FORM PART OF LANDSCAPE WORKS.
5. SIDE ENTRY PITS SHOWN OFFSET BY 1m FROM TANGENT POINTS, TO ACCOMMODATE CHANNEL DEPTH TRANSITION. FOR DETAILS REFER TO IDM STANDARD DRAWING SD430
6. ALL COORDINATES SHOWN ARE TO AHD
7. THE USE OF DIRECTIONAL AND HAZARD TACTILE PAVERS MUST ACCORD WITH SECTION 2.2.3.1 OF AS/NZS 1428.4:2002
8. EASTING AND NORTHING PROVIDED FOR DRAINAGE PIT SETOUT REFERS TO CENTRE OF PIT BASE
9. PIT DIMENTIONS SHOWN ON PLAN, REFER TO CENTRE OF PIT BASE
10. CONTRACTOR TO CONFIRM WITH CALIBRE CONSULTING REPRESENTATIVE, PRIOR TO THE REMOVAL OF ANY TREES
11. SEWER MAINTENANCE HOLE CONVERTER SLAB OR CONE TO BE ROTATED TO ENSURE COVER POSITION IS CENTRALLY LOCATED WITHIN FOOTPATH

**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.

**NOTE:**
ADDITIONAL WIDTH OF CONCRETE DRIVEWAYS, SERVICING LOTS 1937 AND 1938, SHALL BE CONSTRUCTED TO ACCOMODATE SERVICE VEHICLE MANOUVRE

FUTURE DEVELOPMENT

FUTURE DEVELOPMENT

GROUND COORDINATES
E 265337.489
N 5766010.990
RL 38.465
STAR PICKET

611119
GROUND COORDINATES
E 265 455.076
N 5 766 010.018
RL 37.400
STAR PICKET

611122
GROUND COORDINATES
E 265 460.100
N 5 765 913.684
RL 36.969
STAR PICKET

611124
GROUND COORDINATES
E 265 596.459
N 5 765 929.605
RL 36.096
STAR PICKET

GRASS CATCH DRAIN. FOR DETAILS REFER TO IDM STD DWG 500

ENDPIPE FOR FUTURE CONNECTION. ENDPIPE TO BE CAPPED PRIOR TO BACKFILLING

FOR TYPICAL SECTION A-A, REFER TO SHEET C22

PROVIDE INLET IN WEST WALL OF PIT TO CATER FOR PROPOSED GRASS CATCH DRAIN. PROVIDE 2m LONG 225 DIA. STUB IN WEST WALL FOR FUTURE CONNECTION. IL36.778 AT 1 IN 28.32. PROVIDE 2m LONG 225 DIA. STUB IN EAST WALL FOR FUTURE CONNECTION. IL36.778 AT 1 IN 127.389. STUBS TO BE CAPPED PRIOR TO BACKFILLING

PROPOSED GRASS CATCH DRAIN, TO MATCH NEATLY TO EXISTING GRASS CATCH DRAIN

EXISTING CATCH DRAIN TO BE EXCAVATED TO A SOUND BASE, FILLED AND COMPACTED TO THE SATISFACTION OF THE SUPERVISING ENGINEER

INSTALL PSM 6.9m

CONNECT TO EXISTING ENDPIPE

EXISTING STAGE 18

3No. 1.5x1.5m GARBAGE COLLECTION AREAS TO SERVICE LOTS 1912 TO 1914

EXISTING TREES SHOWN THUS TO BE REMOVED AND DISPOSED OFFSITE

REMOVE EXISTING TEMPORARY TURN AROUND AREA, CONCRETE EDGE STRIP, "NO ROAD" SIGN & BARRIER AND MATCH NEATLY INTO EXISTING CONSTRUCTION

CONNECT TO EXISTING STUB

EXISTING CATCH DRAIN TO BE EXCAVATED TO A SOUND BASE, FILLED AND COMPACTED TO THE SATISFACTION OF THE SUPERVISING ENGINEER

REMOVE EXISTING TEMPORARY TURN AROUND AREA, CONCRETE EDGE STRIP, "NO ROAD" SIGN & BARRIER AND MATCH NEATLY INTO EXISTING CONSTRUCTION

CONNECT TO EXISTING STUB

CONNECT TO EXISTING ENDPIPE

REMOVE EXISTING TEMPORARY TURN AROUND AREA, CONCRETE EDGE STRIP, "NO ROAD" SIGN & BARRIER AND MATCH NEATLY INTO EXISTING CONSTRUCTION

CONNECT TO EXISTING ENDPIPE

EXISTING SINGLE STOREY BRICK DWELLING AND ASSOCIATED STRUCTURES TO BE REMOVED AND DISPOSED OFFSITE (BY OTHERS)

EXISTING FENCE LINE TO BE REMOVED AND DISPOSED OFFSITE

EXISTING STRUCTURE TO BE REMOVED AND DISPOSED OFFSITE (BY OTHERS)

EXISTING FENCE LINE TO BE REMOVED AND DISPOSED OFFSITE

EXISTING FENCE LINE TO BE REMOVED AND DISPOSED OFFSITE

PROVIDE 2m LONG, 300 DIA. STUB IN NORTH WALL FOR FUTURE CONNECTION. IL36.586 AT 1 IN 187. STUB TO BE CAPPED PRIOR TO BACKFILLING

PROVIDE 2m LONG 225 DIA. STUB IN WEST WALL FOR FUTURE CONNECTION. IL 36.611 AT 1 IN 30.4. STUB TO BE CAPPED PRIOR TO BACKFILLING

ENDPIPE FOR FUTURE CONNECTION. ENDPIPE TO BE CAPPED PRIOR TO BACKFILLING

PROVIDE TEMPORARY TURN AROUND AREA IF FUTURE STAGE HAS NOT COMMENCED

CONCRETE MAKE UP JOINT (BANDAGE JOINT). FOR DETAILS REFER TO MELBOURNE WATER STANDARD DRAWING 7251/8/308

ENDPIPE FOR FUTURE CONNECTION. ENDPIPE TO BE CAPPED PRIOR TO BACKFILLING

E265355.31
N5765832.682

E265366.155
N5765832.789

E265406.306
N5765832.349

E265443.733
N5765826

E265468.203
N5765821.373

# APPROXIMATE FIELD DENSITY LOCATION

AIRPORT (GREEN STREET) ROAD

CELESTIAL WAY

SOLSTICE STREET

GALACTIC STREET

NEON AVENUE

BOSE STREET

GREEK CORRIDOR

EXISTING STAGE 18

## LEGEND

- Electricity (Underground)
- Gas
- Telstra
- Water
- Stormwater Drain, Pit and Property Inlet
- Swale Drain
- Sewer, Maintenance Structures and Property Connection
- House Drain
- Gas & Water Conduits
- Tactile Paver - Directional
- Tactile Paver - Hazard
- Existing Electricity (Underground)
- Existing Electricity (Overhead)
- Existing Gas
- Existing Telstra
- Existing Water
- Existing Stormwater Drain
- Existing Sewer
- Existing House Drain
- Existing Tree to Remain
- Existing Tree to be Removed
- Existing Swale Drain
- Existing Surface Level
- Finished Building Line Level
- Finished Ridge Line Level
- Top of Retaining Wall
- Bottom of Retaining Wall
- Retaining Wall
- Intersection Threshold Treatment
- Structural Fill > 200mm Deep
- Ex. Structural Fill > 200mm Deep
- Proposed Driveway
- Allotment to be graded evenly in direction of fall to levels indicated
- Direction of Fall
- Overland Flow
- Permanent Survey Mark
- Temporary Bench Mark
- Concrete Edge Strip with Subsoil Drain underneath "No Road " sign and Barrier
- Building Envelope
- Limit of Works

**SERVICES OFFSET SCHEDULE**

| ROAD NAME | GAS | | RECYCLED WATER | | WATER | | ELECTRICITY | | COMMUNICATION | |
|---|---|---|---|---|---|---|---|---|---|---|
| | SIDE | OFFSET (m) | SIDE | OFFSET (m) | SIDE | OFFSET (m) | SIDE | OFFSET (m) | SIDE | OFFSET (m) |
| CELESTIAL WAY | SOUTH | 2.10 | SOUTH | 2.60 | SOUTH | 3.10 | NORTH | 2.60 | NORTH | 1.775 |
| NEON AVENUE | NORTH | 2.10 | NORTH | 2.60 | NORTH | 3.10 | SOUTH | 2.70 | SOUTH | 1.775 |
| GALACTIC STREET | WEST | 2.10 | WEST | 2.60 | WEST | 3.10 | EAST | 2.60 | EAST | 1.775 |
| SOLSTICE STREET | WEST | 2.10 | WEST | 2.60 | WEST | 3.10 | EAST | 2.60 | EAST | 1.775 |
| BOSE STREET | NORTH | 2.10 | NORTH | 2.60 | NORTH | 3.10 | NORTH | 4.70 | NORTH | 4.100 |

**ROAD LAYOUT TABLE**

| ROAD NAME | ROAD CLASSIFICATION | RESERVE WIDTH (m) | ROAD WIDTH (m) | | | KERB TYPE | | VERGE WIDTH (m) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | LIP to LIP | INV to INV | BACK to BACK | NTH/WEST | STH/EAST | NTH/WEST | STH/EAST |
| CELESTIAL WAY | ACCESS | 16.00 | 6.70 | 7.30 | 7.60 | B2 | B2 | 4.20 | 4.20 |
| NEON AVENUE | ACCESS | 16.00 | 6.70 | 7.30 | 7.60 | B2 | B2 | 4.20 | 4.20 |
| GALACTIC STREET | ACCESS | 18.00 | 6.70 | 7.30 | 7.60 | B2 | B2 | 5.20 | 5.20 |
| SOLSTICE STREET | ACCESS | 16.00 | 6.70 | 7.30 | 7.60 | B2 | B2 | 4.20 | 4.20 |
| BOSE STREET | ACCESS | 14.50 | 4.90 | 5.50 | 5.80 | B2 | B2 | 2.50 | 6.20 |

| REV | DATE | COMMENTS |
|---|---|---|
| D | 18/08/15 | STAGE LIMIT AMENDED |
| C | 19/06/15 | ADDITIONAL COUNCIL COMMENTS, DATED 17/06/15 |
| B | | COUNCIL COMMENTS DATED 26/05/15 |
| A | | ISSUED FOR APPROVAL |

CLIENT

villawood properties
COMMUNITIES DESIGNED FOR LIVING

PROJECT

ARMSTRONG MT DUNEED
STAGE 19

calibre CONSULTING


www.calibreconsulting.co

CALIBRE CONSULTING (MELB) PTY LTD
Level 2, 55 Southbank Boulevard
Southbank VIC 3006
T 03 9203 9000

TITLE

LAYOUT PLAN

1:500 10 5 0 10 20 A1
1:1000 A3

| SCALE @ A1 | DRAWN | DESIGNED |
|---|---|---|
| 1:500 | R.KOZUL | R.KOZUL |
| PROJECT ENGINEER | PROJECT MANAGER | DATE FIRST ISSUE |
| J.CONSIGLIO | T.PALIOS | MARCH 2015 |

ISSUED FOR APPROVAL

| SIGNED | DATE |
|---|---|
| | |

DRAWING NUMBER M100611.19-C02

REVISION D

CONSULT AUSTRALIA

A.C.N. 109 448 982

N:\M10\M100611.19\CIVIL\ACAD\M100611.19-C02.DWG

# COMPACTION ASSESSMENT


***CIVIL GEOTECHNICAL SERVICES***

*6 - 8 Rose Avenue, Croydon 3136*


| | | | |
|---|---|---|---|
| | | *Job No* | 15448 |
| | | *Report No* | 15448/R002 |
| | | *Date Issued* | 09/12/15 |
| *Client* | WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD) | *Tested by* | NB |
| *Project* | ARMSTRONG, MT DUNEED - STAGE 19 | *Date tested* | 08/10/15 |
| *Location* | MOUNT DUNEED | *Checked by* | JHF |

***Feature*** **EARTHWORKS** *Layer thickness* 200 mm *Time:* 08:08

*Test procedure AS 1289.2.1.1 & 5.8.1*

| ***Test No*** | | **5** | **6** | **7** | **8** | **-** | **-** |
|---|---|---|---|---|---|---|---|
| | | REFER TO FIGURE 1 | REFER TO FIGURE 1 | REFER TO FIGURE 1 | REFER TO FIGURE 1 | | |
| *Approximate depth below FSL* | | | | | | | |
| *Measurement depth* | *mm* | 175 | 175 | 175 | 175 | - | - |
| *Field wet density* | *t/m³* | 2.01 | 2.10 | 2.07 | 2.06 | - | - |
| *Field moisture content* | *%* | 20.3 | 21.0 | 14.8 | 18.3 | - | - |

*Test procedure AS 1289.5.7.1*

| *Test No* | | 5 | 6 | 7 | 8 | - | - |
|---|---|---|---|---|---|---|---|
| *Compactive effort* | | Standard | | | | | |
| *Oversize rock retained on sieve* | *mm* | 19.0 | 19.0 | 19.0 | 19.0 | - | - |
| *Percent of oversize material* | *wet* | 0 | 8 | 5 | 2 | - | - |
| *Peak Converted Wet Density* | *t/m³* | 2.12 | 2.07 | 2.17 | 2.15 | - | - |
| *Adjusted Peak Converted Wet Density* | *t/m³* | - | 2.10 | 2.19 | 2.15 | - | - |
| *Optimum Moisture Content* | *%* | 18.5 | 20.0 | 15.5 | 18.0 | - | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Moisture Variation From Optimum Moisture Content* | | 2.0% wet | 1.0% wet | 0.5% dry | 0.5% wet | - | - |

| ***Density Ratio ( $R_{HD}$ )*** | ***%*** | **95.0** | **100.5** | **95.0** | **95.5** | **-** | **-** |
|---|---|---|---|---|---|---|---|

*Material description*

No 5 - 8 Clay Fill



Approved Signatory : Justin Fry

# COMPACTION ASSESSMENT


***CIVIL GEOTECHNICAL SERVICES***

*6 - 8 Rose Avenue, Croydon 3136*


| | | | |
|---|---|---|---|
| | | *Job No* | 15448 |
| | | *Report No* | 15448/R004 |
| | | *Date Issued* | 09/12/15 |
| *Client* | WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD) | *Tested by* | DK |
| *Project* | ARMSTRONG, MT DUNEED - STAGE 19 | *Date tested* | 09/10/15 |
| *Location* | MOUNT DUNEED | *Checked by* | JHF |

***Feature*** **EARTHWORKS** *Layer thickness* 200 mm *Time:* 09:30

*Test procedure AS 1289.2.1.1 & 5.8.1*

| ***Test No*** | | **12** | **13** | **14** | **-** | **-** | **-** |
|---|---|---|---|---|---|---|---|
| | | REFER TO FIGURE 1 | REFER TO FIGURE 1 | REFER TO FIGURE 1 | | | |
| *Approximate depth below FSL* | | | | | | | |
| *Measurement depth* | *mm* | 175 | 175 | 175 | - | - | - |
| *Field wet density* | *t/m³* | 1.99 | 2.04 | 2.08 | - | - | - |
| *Field moisture content* | *%* | 18.9 | 18.2 | 18.6 | - | - | - |

*Test procedure AS 1289.5.7.1*

| *Test No* | | 12 | 13 | 14 | - | - | - |
|---|---|---|---|---|---|---|---|
| *Compactive effort* | | Standard | | | | | |
| *Oversize rock retained on sieve* | *mm* | 19.0 | 19.0 | 19.0 | - | - | - |
| *Percent of oversize material* | *wet* | 8 | 7 | 2 | - | - | - |
| *Peak Converted Wet Density* | *t/m³* | 2.06 | 2.12 | 2.13 | - | - | - |
| *Adjusted Peak Converted Wet Density* | *t/m³* | 2.08 | 2.13 | 2.17 | - | - | - |
| *Optimum Moisture Content* | *%* | 19.5 | 18.5 | 17.5 | - | - | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Moisture Variation From Optimum Moisture Content* | 0.5% dry | 0.0% | 1.0% wet | - | - | - |

| ***Density Ratio ( $R_{HD}$ )*** | *%* | **95.5** | **95.5** | **96.0** | **-** | **-** | **-** |
|---|---|---|---|---|---|---|---|

*Material description*

No 12 - 14 Clay Fill



Approved Signatory : Justin Fry

# COMPACTION ASSESSMENT


***CIVIL GEOTECHNICAL SERVICES***

*6 - 8 Rose Avenue, Croydon 3136*


| | | | |
|---|---|---|---|
| | | *Job No* | 15448 |
| | | *Report No* | 15448/R006 |
| | | *Date Issued* | 09/12/15 |
| *Client* | WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD) | *Tested by* | NB |
| *Project* | ARMSTRONG, MT DUNEED - STAGE 19 | *Date tested* | 12/10/15 |
| *Location* | MOUNT DUNEED | *Checked by* | JHF |

***Feature*** **EARTHWORKS** *Layer thickness* 200 mm *Time:* 10:44

*Test procedure AS 1289.2.1.1 & 5.8.1*

| ***Test No*** | | **18** | **19** | **20** | **-** | **-** | **-** |
|---|---|---|---|---|---|---|---|
| | | REFER TO FIGURE 1 | REFER TO FIGURE 1 | REFER TO FIGURE 1 | | | |
| *Approximate depth below FSL* | | | | | | | |
| *Measurement depth* | *mm* | 175 | 175 | 175 | - | - | - |
| *Field wet density* | *t/m³* | 1.99 | 2.08 | 2.02 | - | - | - |
| *Field moisture content* | *%* | 21.5 | 19.1 | 19.8 | - | - | - |

*Test procedure AS 1289.5.7.1*

| *Test No* | | 18 | 19 | 20 | - | - | - |
|---|---|---|---|---|---|---|---|
| *Compactive effort* | | Standard | | | | | |
| *Oversize rock retained on sieve* | *mm* | 19.0 | 19.0 | 19.0 | - | - | - |
| *Percent of oversize material* | *wet* | 4 | 2 | 1 | - | - | - |
| *Peak Converted Wet Density* | *t/m³* | 2.00 | 2.08 | 2.05 | - | - | - |
| *Adjusted Peak Converted Wet Density* | *t/m³* | 2.01 | 2.11 | 2.07 | - | - | - |
| *Optimum Moisture Content* | *%* | 22.5 | 19.0 | 20.0 | - | - | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Moisture Variation From Optimum Moisture Content* | | 1.0% dry | 0.0% | 0.0% | - | - | - |

| ***Density Ratio ( $R_{HD}$ )*** | *%* | **99.0** | **98.0** | **97.5** | **-** | **-** | **-** |
|---|---|---|---|---|---|---|---|

*Material description*

No 18 - 20 Clay Fill

# COMPACTION ASSESSMENT


**CIVIL GEOTECHNICAL SERVICES**
6 - 8 Rose Avenue, Croydon 3136


| | | | |
|---|---|---|---|
| | | *Job No* | 15448 |
| | | *Report No* | 15448/R007 |
| | | *Date Issued* | 09/12/15 |
| *Client* | WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD) | *Tested by* | NB |
| *Project* | ARMSTRONG, MT DUNEED - STAGE 19 | *Date tested* | 13/10/15 |
| *Location* | MOUNT DUNEED | *Checked by* | JHF |

***Feature*** **EARTHWORKS** *Layer thickness* 200 mm *Time:* 09:01

*Test procedure AS 1289.2.1.1 & 5.8.1*

| ***Test No*** | | **21** | **22** | **23** | **24** | **25** | **26** |
|---|---|---|---|---|---|---|---|
| | | REFER TO FIGURE 1 | REFER TO FIGURE 1 | REFER TO FIGURE 1 | REFER TO FIGURE 1 | REFER TO FIGURE 1 | REFER TO FIGURE 1 |
| *Approximate depth below FSL* | | | | | | | |
| *Measurement depth* | *mm* | 175 | 175 | 175 | 175 | 175 | 175 |
| *Field wet density* | *t/m³* | 2.04 | 2.10 | 2.05 | 2.04 | 2.00 | 2.00 |
| *Field moisture content* | *%* | 19.9 | 15.7 | 20.3 | 20.7 | 21.6 | 21.7 |

*Test procedure AS 1289.5.7.1*

| *Test No* | | 21 | 22 | 23 | 24 | 25 | 26 |
|---|---|---|---|---|---|---|---|
| *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* | 3 | 5 | 2 | 1 | 3 | 0 |
| *Peak Converted Wet Density* | *t/m³* | 2.06 | 2.08 | 2.04 | 2.01 | 2.07 | 2.08 |
| *Adjusted Peak Converted Wet Density* | *t/m³* | 2.07 | 2.10 | 2.05 | 2.01 | 2.08 | - |
| *Optimum Moisture Content* | *%* | 20.0 | 17.5 | 21.0 | 21.5 | 21.0 | 20.5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Moisture Variation From Optimum Moisture Content* | 0.0% | 1.5% dry | 0.5% dry | 1.0% dry | 0.5% wet | 1.5% wet |

| ***Density Ratio ( $R_{HD}$ )*** | *%* | **98.5** | **100.5** | **100.5** | **101.0** | **96.0** | **96.0** |
|---|---|---|---|---|---|---|---|

*Material description*

No 21 - 26 Clay Fill