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


2nd October 2020

Our Reference: 19352:NB820

Winslow Constructors Pty Ltd
50 Barry Road
CAMPBELLFIELD VIC 3061

Dear Sirs/Madams,

RE: LEVEL 1 EARTHWORKS INSPECTION AND TESTING
ARMSTRONG – STAGE 45 (MOUNT DUNEED)

Please find attached our Report No's 19352/R001 to 19352/R004 which relates 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 May 2019 and was completed in August 2019.

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 inspection and testing was performed by experienced geotechnicians 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).

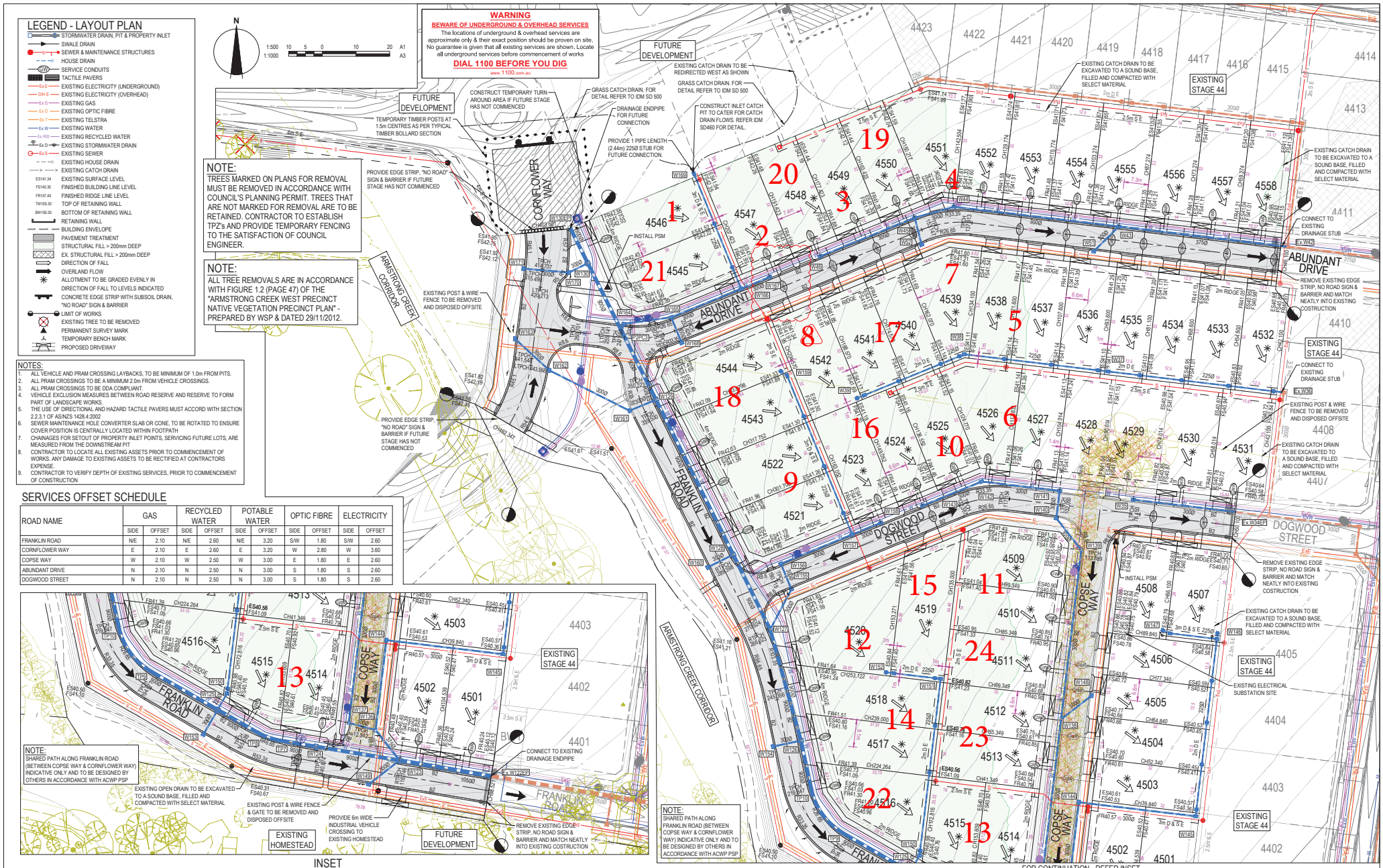
We are of the view that the bulk fill materials that have been placed across the reported allotments by Winslow Constructors during the aforementioned period can be considered as having been placed in a controlled manner to a minimum density ratio of 95% (standard compactive effort).

Please contact the undersigned if you require any additional information.

Civil Geotechnical Services

Nick Brock

# FIGURE 1




| REVISION | DATE | ISSUE DESCRIPTION | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| 1 | 06/12/19 | LOT 4547 CROSSOVER & LOT 4542 GWR CONDUIT RELOCATED | M.T. | M.T. | T.P. |
| 0 | 27/06/19 | CONSTRUCTION ISSUE | M.T. | M.T. | T.P. |
| B | 19/06/19 | COUNCIL COMMENTS DATED 27/05/19 | M.T. | M.T. | T.P. |
| A | 29/03/19 | ISSUED TO COUNCIL FOR APPROVAL | M.T. | M.T. | T.P. |

CLIENT: villawood properties — Communities Designed for Living

creo CONSULTANTS
Level 7, 176 Wellington Parade
East Melbourne, VIC, Australia 3002

PROJECT: ARMSTRONG — MT DUNEED

DRAWING TITLE: ARMSTRONG - STAGE 45 LAYOUT PLAN

STATUS: ISSUED FOR CONSTRUCTION

| SCALE AT A1 | DRAWN | DESIGNED |
|---|---|---|
| 1:500 @ A1 | M.TROUNCE | M.TROUNCE |
| PROJECT ENGINEER | PROJECT MANAGER | DATE FIRST ISSUE |
| T.PALIOS | T.PALIOS | MARCH 2019 |
| PROJECT No. | DRAWING No. | REVISION |
| 180016.45 | R200 | 1 |

# COMPACTION ASSESSMENT


***CIVIL GEOTECHNICAL SERVICES***

*6 - 8 Rose Avenue, Croydon 3136*


| | | | |
|---|---|---|---|
| | | *Job No* | 19352 |
| | | *Report No* | 19352/R001 |
| | | *Date Issued* | 27/08/2019 |
| *Client* | WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD) | *Tested by* | BGG |
| *Project* | ARMSTRONG - STAGE 45 | *Date tested* | 24/07/19 |
| *Location* | MOUNT DUNEED | *Checked by* | JHF |

| | | | | | |
|---|---|---|---|---|---|
| ***Feature*** | **EARTHWORKS** | *Layer thickness* | 200 mm | *Time:* | 10:30 |

*Test procedure AS 1289.2.1.1 & 5.8.1*

| ***Test No*** | | **1** | **2** | **3** | **4** | **5** | **6** |
|---|---|---|---|---|---|---|---|
| *Location* | | 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* | 1.83 | 1.92 | 1.86 | 1.86 | 1.83 | 1.81 |
| *Field moisture content* | *%* | 22.4 | 27.3 | 25.9 | 27.0 | 25.2 | 21.5 |

*Test procedure AS 1289.5.7.1*

| *Test No* | | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| *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/m³* | 1.91 | 1.93 | 1.94 | 1.88 | 1.88 | 1.88 |
| *Adjusted Peak Converted Wet Density* | *t/m³* | - | - | - | - | - | - |
| *Optimum Moisture Content* | *%* | 22.5 | 24.5 | 23.5 | 24.5 | 23.0 | 19.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Moisture Variation From Optimum Moisture Content* | | 0.0% | 2.5% wet | 2.5% wet | 2.5% wet | 2.0% wet | 2.5% wet |
| ***Density Ratio ( $R_{HD}$ )*** | *%* | **96.0** | **99.5** | **96.0** | **99.5** | **97.5** | **96.0** |

*Material description*

No 1 - 6 Clay Fill

*AVRLOT HILF V1.10 MAR 13*



Approved Signatory : Justin Fry

# COMPACTION ASSESSMENT


***CIVIL GEOTECHNICAL SERVICES***

*6 - 8 Rose Avenue, Croydon 3136*


| | | | |
|---|---|---|---|
| | | *Job No* | 19352 |
| | | *Report No* | 19352/R002 |
| | | *Date Issued* | 25/10/2019 |
| *Client* | WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD) | *Tested by* | BGG |
| *Project* | ARMSTRONG - STAGE 45 | *Date tested* | 25/07/19 |
| *Location* | MOUNT DUNEED | *Checked by* | JHF |

***Feature*** **EARTHWORKS** *Layer thickness* 200 mm *Time:* 13:26

*Test procedure AS 1289.2.1.1 & 5.8.1*

| ***Test No*** | | **7** | **8** | **9** | **10** | **11** | **12** |
|---|---|---|---|---|---|---|---|
| *Location* | | 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* | 2.05 | 2.01 | 2.04 | 1.98 | 2.05 | 2.05 |
| *Field moisture content* | *%* | 25.7 | 25.0 | 23.3 | 22.8 | 23.6 | 23.4 |

*Test procedure AS 1289.5.7.1*

| *Test No* | | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|
| *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/m³* | 2.10 | 2.09 | 2.07 | 2.08 | 2.09 | 2.10 |
| *Adjusted Peak Converted Wet Density* | *t/m³* | - | - | - | - | - | - |
| *Optimum Moisture Content* | *%* | 23.5 | 22.5 | 21.0 | 20.5 | 21.5 | 21.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Moisture Variation From Optimum Moisture Content* | | 2.0% wet | 2.5% wet | 2.5% wet | 2.5% wet | 2.0% wet | 2.5% wet |
| ***Density Ratio ( $R_{HD}$ )*** | *%* | **98.0** | **96.5** | **98.5** | **95.5** | **98.5** | **97.5** |

*Material description*

No 7 - 12 Clay Fill

# COMPACTION ASSESSMENT


***CIVIL GEOTECHNICAL SERVICES***

*6 - 8 Rose Avenue, Croydon 3136*


| | | | |
|---|---|---|---|
| | | *Job No* | 19352 |
| | | *Report No* | 19352/R003 |
| | | *Date Issued* | 02/10/2020 |
| *Client* | WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD) | *Tested by* | BGG |
| *Project* | ARMSTRONG - STAGE 45 | *Date tested* | 26/07/19 |
| *Location* | MOUNT DUNEED | *Checked by* | JHF |

| | | | | | |
|---|---|---|---|---|---|
| ***Feature*** | **EARTHWORKS** | *Layer thickness* | 200 mm | *Time:* | 15:27 |

*Test procedure AS 1289.2.1.1 & 5.8.1*

| ***Test No*** | | **13** | **14** | **15** | **16** | **17** | **18** |
|---|---|---|---|---|---|---|---|
| *Location* | | 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* | 1.99 | 2.03 | 1.82 | 1.93 | 2.05 | 2.01 |
| *Field moisture content* | *%* | 22.5 | 23.0 | 20.4 | 21.6 | 25.7 | 21.4 |

*Test procedure AS 1289.5.7.1*

| *Test No* | | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|
| *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/m³* | 2.07 | 2.07 | 1.90 | 2.00 | 2.07 | 2.08 |
| *Adjusted Peak Converted Wet Density* | *t/m³* | - | - | - | - | - | - |
| *Optimum Moisture Content* | *%* | 20.0 | 20.5 | 18.0 | 19.5 | 23.0 | 19.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Moisture Variation From Optimum Moisture Content* | | 2.5% wet | 2.0% wet | 2.5% wet | 2.5% wet | 2.5% wet | 2.5% wet |
| ***Density Ratio ( $R_{HD}$ )*** | *%* | **96.0** | **98.5** | **96.0** | **96.5** | **99.0** | **96.5** |

*Material description*

No 13 - 18 Clay Fill

*AVRLOT HILF V1.10 MAR 13*



Approved Signatory : Justin Fry

# COMPACTION ASSESSMENT


***CIVIL GEOTECHNICAL SERVICES***

*6 - 8 Rose Avenue, Croydon 3136*


| | | | |
|---|---|---|---|
| | | *Job No* | 19352 |
| | | *Report No* | 19352/R004 |
| | | *Date Issued* | 02/09/2019 |
| *Client* | WINSLOW CONSTRUCTORS PTY LTD (CAMPBELLFIELD) | *Tested by* | BGG |
| *Project* | ARMSTRONG - STAGE 45 | *Date tested* | 13/08/19 |
| *Location* | MOUNT DUNEED | *Checked by* | JHF |

***Feature*** **EARTHWORKS** *Layer thickness* 200 mm *Time:* 11:06

*Test procedure AS 1289.2.1.1 & 5.8.1*

| ***Test No*** | | **19** | **20** | **21** | **22** | **23** | **24** |
|---|---|---|---|---|---|---|---|
| *Location* | | 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* | 1.99 | 1.98 | 2.00 | 1.90 | 1.96 | 1.96 |
| *Field moisture content* | *%* | 21.7 | 23.1 | 25.1 | 25.4 | 27.2 | 25.0 |

*Test procedure AS 1289.5.7.1*

| *Test No* | | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|
| *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/m³* | 2.01 | 2.00 | 2.01 | 1.96 | 2.04 | 2.02 |
| *Adjusted Peak Converted Wet Density* | *t/m³* | - | - | - | - | - | - |
| *Optimum Moisture Content* | *%* | 24.5 | 25.5 | 28.0 | 27.5 | 29.0 | 27.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Moisture Variation From Optimum Moisture Content* | | 2.5% dry | 2.5% dry | 2.5% dry | 2.0% dry | 2.5% dry | 2.0% dry |

| ***Density Ratio ( $R_{HD}$ )*** | *%* | **98.5** | **99.0** | **99.5** | **97.0** | **96.0** | **97.0** |
|---|---|---|---|---|---|---|---|

*Material description*

No 19 - 24 Clay Fill