

Shadforths Civil Pty Ltd
99 Sandalwood Lane
Forest Glen QLD 4556

Project 677069.00
31 May 2019
R.002.docx
SDH:BWE

Attention: Ed Wilkinson

Email: Ed.Wilkinson@shadcivil.com.au

Dear Ed Wilkinson

Geotechnical Inspections and Testing
Proposed Subdivision
Harmony Estate - Display Village Stage 2, Palmview

1. Introduction

This report presents the results of the inspection and testing of bulk earthworks for the Stage 2 Display Village as part of the Harmony Subdivision at Palmview. The work was undertaken at the request of Shadforths Civil Pty Ltd.

The scope of testing and inspections provided by Douglas Partners Pty Ltd (DP) comprised 'Level 1' geotechnical inspection and testing of bulk earthworks in general accordance with AS3798-2007 "Guidelines on Earthworks for Commercial and Residential Developments". No other earthworks specification was provided for the work.

This report must be read in conjunction with the attached notes entitled 'About this Inspection Report' along with any other explanatory notes and should be kept in its entirety without separation of individual pages or sections.

2. Bulk Filling

The extent of filling placed at the development over the period 21 March 2019 to 30 May 2019, as covered by this report is shown by the test locations (including elevation) noted on the test report sheets and test location plan attached to this report. This report covers filling placed on Lots 69, 70, 358 to 368, 399 to 406, 414 to 428 and 436 to 442. Any other part of the site is not covered by this report unless stated otherwise.

In general, the bulk earthworks operations comprised stripping of the existing surface, then placement and compaction of filling material sourced from onsite to bring the ground level up to design surface level required for the works. Surficial filling (ie. less than 0.5 m) was required in areas across the site.

2.1 Stripping Inspections and Proof Rolling

Geotechnical personnel from DP inspected the stripped subgrade area prior to the placement of bulk filling. All subgrade areas were stripped of vegetation or other significantly organically contaminated materials exposing the subgrade, typically comprising controlled filling previously placed under Level 1 inspection and testing by others. The subgrade was test rolled using on site construction equipment (ie. vibrating pad foot compactor, loaded truck) and was considered suitable to accept the placement of filling. Any identified 'weak' or problem subgrade areas were rectified prior to the placement of filling.

2.2 Fill Materials

Fill material typically comprised clayey sand sourced from onsite.

2.3 Placement and Testing of Fill

Fill materials were placed on site by conventional earthmoving equipment, spread out in uniform layers and then compacted using a vibrating roller.

Observations were made on site by the supervising geotechnical personnel from DP who were present on site during the placement of filling over the period 21 March 2019 to 30 May 2019.

Following the completion of compaction, where possible, the layer was tested using the nuclear gauge method (AS1289.5.8.1 "Methods of Testing Soils for Engineering Purposes") at the testing frequency nominated in AS3798-2007 and the project requirements. The relative compaction was determined using the Hilf method of AS1289.5.7.1. Where density testing was not carried out, filling was test rolled under the observation of the supervising geotechnical personnel from Douglas Partners.

The compaction requirements for the earthworks included a minimum density ratio of 95% Standard compaction. No moisture range was specified.

Where a layer was considered to have failed based on the wet density values measured by the nuclear gauge, these test values were not recorded and the contractor was advised that the layer required further rolling and testing prior to the placement of any further fill. At times when fill material was too wet or dry, the contractor was advised to add moisture or dry back the fill, in order to bring the field moisture content back closer to the optimum moisture content.

A total of six density tests were recorded by DP on filling placed over the period 21 March 2019 to 30 May 2019. A summary of the testing is presented in Table 1.

Table 1: Summary of Density Testing

| | Compaction | Moisture |
|------------------------------------|-------------------|------------------------|
| Specification | 95% std. | - |
| No. of Tests | 6 | 6 |
| Range | 99.0% to 105.0% | OMC to 1.5% dry of OMC |
| Mean Average | 101.9% | 0.5% dry of OMC |
| No. of Tests Outside Specification | 0 | - |

Note: std. –Standard compaction

3. Comments

DP undertook inspection and earthworks testing in general accordance with a Level 1 standard as defined in AS3798-2007 “Guidelines on Earthworks for Commercial and Residential Developments”.

It is considered that the placement and compaction of the bulk filling over the period 21 March 2019 to 30 May 2019 for the Stage 2 Display Village as part of the Harmony Subdivision at Palmview has been carried out in general accordance with the requirements of the specification. DP does not undertake to guarantee the work of the contractors nor relieve their responsibility to produce a completed product conforming to the requirements of the specification.

For building on controlled filled areas, consideration should be given by the user to the following:

- possible disruption of the compacted fill by the installation of services;
- the possibility that additional fill has been placed before and after the dates of field density tests or at times when DP has not been notified that fill operations are in progress;
- adequate containment of the filled areas;
- the suitability of the filled land to support structures of various types without excessive deflection, in particular, the shrink-swell properties of the fill and natural soils must be considered in foundation/footing slab design and in detailing future structures; and
- the potential for differential settlements due to differential thicknesses of filling.

Based on the inspection and test results, it is considered the filling referred to in this report may be considered as ‘controlled filling’ as defined in AS2870-2011 “Residential slabs and footings” for site classification purposes.

4. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for the Stage 2 Display Village as part of the Harmony Subdivision at Palmview. This report is provided for the exclusive use of Shadforth's Civil Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the subsurface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Subsurface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

Please contact the undersigned if you have any questions on this matter.

Yours faithfully

Douglas Partners Pty Ltd



Shae Harry
Laboratory Manager

Reviewed by



Brett Egen (RPEQ 8597)
Senior Associate

Attachments: About this Inspection Report
 Laboratory Test Results
 Test Location Plan

About this Inspection Report

Douglas Partners



Introduction

These notes are provided to amplify DP's inspection report in regard to the limitations of carrying out inspection work. Not all notes are necessarily relevant to this report.

Standards

This inspection report has been prepared by qualified personnel to current engineering standards of interpretation and analysis.

Copyright and Limits of Use

This inspection report is the property of DP and is provided for the exclusive use of the client for the specific project and purpose as described in the report. It should not be used by a third party for any purpose other than to confirm that the construction works addressed in the report have been inspected as described. Use of the inspection report is limited in accordance with the Conditions of Engagement for the commission.

DP does not undertake to guarantee the works of the contractors or relieve them of their responsibility to produce a completed product conforming to the design.

Reports

This inspection report may include advice or opinion that is based on engineering and/or geological interpretation, information provided by the client or the client's agent, and information gained from:

- an investigation report for the project (if available to DP);
- inspection of the work, exposed ground conditions, excavation spoil and performance of excavating equipment while DP was on site;
- investigation and testing that was carried out during the site inspection;
- anecdotal information provided by authoritative site personnel; and

- DP's experience and knowledge of local geology.

Such information may be limited by the frequency of any inspection or testing that was able to be practically carried out, including possible site or cost constraints imposed by the client/contractor(s). For these reasons, the reliability of this inspection report is limited by the scope of information on which it relies.

Every care is taken with the inspection report as it relates to interpretation of subsurface conditions and any recommendations or suggestions for construction or design. However, DP cannot anticipate or assume responsibility for:

- unexpected variations in subsurface conditions that are not evident from the inspection; and
- the actions of contractors responding to commercial pressures.

Should these issues occur, then additional advice should be sought from DP and, if required, amendments made.

This inspection report must be read in conjunction with any attached information. This inspection report should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions from review by others of this inspection report or test data, which are not otherwise supported by an expressed statement, interpretation, outcome or conclusion stated in this inspection report.

Material Test Report



Geotechnics | Environment | Groundwater

Douglas Partners Pty Ltd

Sunshine Coast Laboratory

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Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Martin Cook

NATA Accredited Laboratory Number: 828

Report Number: 677069.00-16
Issue Number: 1
Date Issued: 31/05/2019
Client: Shadforths Civil Pty Ltd
 99 Sandalwood Lane, Forest Glen QLD 4556
Contact: Ed Wilkinson
Project Number: 677069.00
Project Name: Proposed Subdivision
Project Location: Harmony Estate - Display Village 2, Palmview
Work Request: 6055
Date Sampled: 29/05/2019
Dates Tested: 29/05/2019 - 30/05/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: Minimum 95% Standard Hilf Density Ratio
Material Source: Onsite

| Compaction Control AS 1289 5.7.1 & 5.8.1 | | | | | |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|
| Sample Number | 19-6055A | 19-6055B | 19-6055C | 19-6055D | 19-6055E |
| Date Tested | 29/05/2019 | 29/05/2019 | 29/05/2019 | 29/05/2019 | 29/05/2019 |
| Time Tested | 13:00 | 13:10 | 13:15 | 13:25 | 13:35 |
| Test Request #/Location | Bulk Earthworks | Bulk Earthworks | Bulk Earthworks | Bulk Earthworks | Bulk Earthworks |
| Easting | 506106 | 506061 | 506031 | 506059 | 506107 |
| Northing | 7042524 | 7042531 | 7042538 | 7042646 | 7042635 |
| Elevation (m) | F.L. | F.L. | F.L. | F.L. | F.L. |
| Soil Description | Clayey Sand | Clayey Sand | Clayey Sand | Clayey Sand | Clayey Sand |
| Test Depth (mm) | 150 | 150 | 150 | 150 | 150 |
| Sieve used to determine oversize (mm) | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 |
| Percentage of Wet Oversize (%) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Field Wet Density (FWD) t/m ³ | 2.19 | 2.13 | 2.19 | 2.13 | 2.08 |
| Field Dry Density (FDD) t/m ³ | ** | ** | ** | ** | ** |
| Peak Converted Wet Density t/m ³ | 2.13 | 2.12 | 2.12 | 2.13 | 2.10 |
| Adjusted Peak Converted Wet Density t/m ³ | ** | ** | ** | ** | ** |
| Moisture Variation (Wv) % | 0.5 | 0.0 | 0.5 | 0.0 | 0.5 |
| Adjusted Moisture Variation % | ** | ** | ** | ** | ** |
| Hilf Density Ratio (%) | 103.0 | 100.5 | 103.5 | 100.0 | 99.0 |
| Compaction Method | Standard | Standard | Standard | Standard | Standard |

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Material Test Report



Geotechnics | Environment | Groundwater

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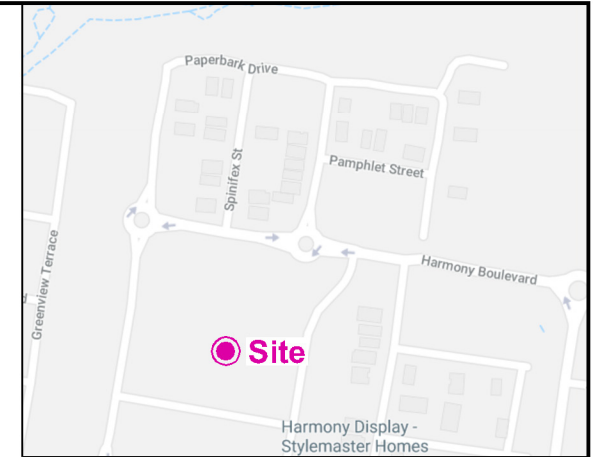
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99 Sandalwood Lane, Forest Glen QLD 4556
Contact: Ed Wilkinson
Project Number: 677069.00
Project Name: Proposed Subdivision
Project Location: Harmony Estate - Display Village 2, Palmview
Work Request: 6055
Date Sampled: 29/05/2019
Dates Tested: 29/05/2019 - 30/05/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: Minimum 95% Standard Hilf Density Ratio
Material Source: Onsite

| Compaction Control AS 1289 5.7.1 & 5.8.1 | |
|--|-----------------|
| Sample Number | 19-6055F |
| Date Tested | 29/05/2019 |
| Time Tested | 13:45 |
| Test Request #/Location | Bulk Earthworks |
| Easting | 506159 |
| Northing | 7042596 |
| Elevation (m) | F.L. |
| Soil Description | Clayey Sand |
| Test Depth (mm) | 150 |
| Sieve used to determine oversize (mm) | 19.0 |
| Percentage of Wet Oversize (%) | 0.0 |
| Field Wet Density (FWD) t/m ³ | 2.13 |
| Field Dry Density (FDD) t/m ³ | ** |
| Peak Converted Wet Density t/m ³ | 2.02 |
| Adjusted Peak Converted Wet Density t/m ³ | ** |
| Moisture Variation (Wv) % | 1.5 |
| Adjusted Moisture Variation % | ** |
| Hilf Density Ratio (%) | 105.5 |
| Compaction Method | Standard |

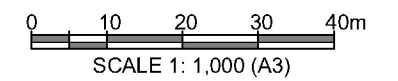
Moisture Variation Note:

Positive values = test is dry of OMC


Negative values = test is wet of OMC



Location Plan



LEGEND:-

 Test Location and Number

NOTE:-

1. Test locations are approximate only and are shown with reference to existing site features.
2. Image obtained from Google Earth Pro. and Near Map. Date of imagery 24-03-2019.