

Gary Deane Constructions Pty Ltd
Unit 2, 3972 Pacific Highway
Loganholme QLD 4129

Project 672648
30 October 2014
SB/BWE

Attention: Denham Raveendrakumar

Email: Denham.Raveendrakumar@gdc.com.au

Dear Sirs,

Level 1 Earthworks Quality Report **250 – 292 Spring Mountain Drive, Greenbank**

1. Introduction

This report presents the results of inspection and testing of the bulk earthworks for Lot 7, Spring Mountain Drive, Greenbank.

The scope of testing and inspections provided by Douglas Partners Pty Ltd (DP) comprised 'Level 1' geotechnical inspection and testing as defined in AS3798-2007 "Guidelines on Earthworks for Commercial and Residential Developments", and as required by the project specification.

This report must be read in conjunction with the attached notes entitled 'About This Inspection Report'.

2. Earthworks Activities

2.1 Extent of Works

The extent of tests taken within the filling placed within Lot 7 at the development, as covered by this report, is shown within the test locations noted in the Insitu Density Reports, attached to this report.

In general, the bulk earthworks operations comprised the removal and replacement of any "soft" or otherwise unsuitable material that was present following stripping of the existing surface, then placement and compaction of filling material, majority of which was won onsite with some general import filling material needed to bring the ground level up to the design surface level for the proposed development. The extent of filling across the site was up to approximately 0.7m deep in some areas.

2.2 Subgrade Preparation

The filling area was initially stripped of vegetation and topsoil that was present. The exposed subgrade generally comprised very stiff sandy gravelly clay. Prior to the placement of any new filling, test rolling of the exposed subgrade was performed using a fully loaded 10,000 litre water truck. Any areas identified as “soft spots” were excavated to a suitable subgrade, showing no signs of movement before backfilling commenced.

2.3 Filling Material

The filling materials comprised silty sandy gravelly clay, won from onsite cut operations.

2.4 Placement and Testing of Filling

The specification for the bulk filling was for compaction to a minimum of 95% Standard density ratio with moisture contents maintained within 2% of optimum moisture content for Standard compaction, in accordance with the requirements of AS3798-2007 “*Guidelines on Earthworks for Commercial and Residential Developments*”.

Filling materials were placed and spread by a 815 Compactor and 22.5 tonne excavator. Compaction of each layer was achieved using the 815 compactor, with loose layer thicknesses typically ranging from approximately 200 mm to 250 mm.

Observations were made by a senior geotechnician from DP, who was present on-site full-time during the placement of filling. Following compaction of each layer, the layer was tested to assess if the specified minimum dry density ratio had been achieved.

Testing was carried out using the nuclear gauge method outlined in test method AS1289 5.8.1. The relative compaction was determined using the maximum dry density method (Standard compaction) outlined in test method AS1289 5.1.1. A total of 1 density tests were carried out during the placement of filling. A summary of the test results is presented in Table 1 below.

Table 1: Summary of Density Testing

Item	Compaction	Moisture Variation
Specification	95% Std	± 2.0% of OMC
No. of tests	1	1
Range	103.5% Std	1.0% Dry of OMC
No of tests outside specification	0	0

Note: OMC – optimum moisture content for Standard compaction



Figure 1: Subgrade preparation across building platform, facing south

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 placed by Gary Deane Constructions Pty Ltd over the period 2 October 2014 to 4 October 2014, 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 the controlled filled areas, consideration should be given by the user to the following:

- possible disruption of the compacted filling by the installation of services;
- the possibility that additional filling has been placed after the date of the last field density test or at times when DP has not been notified that filling 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 filling and natural soils must be considered in foundation/footing slab design and in detailing future structures; and
- variation in filling depth.

4. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for the residential development at 250 – 292 Spring Mountain Road, Greenbank. This report is provided for the exclusive use of Gary Deane Constructions Pty Ltd. 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. 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 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.

Actual ground conditions and materials behaviour observed or inferred at the test locations may differ from those which may be encountered elsewhere on the site. Should variations in subsurface conditions be encountered, then additional advice should be sought from DP and, if required, amendments made.

This report must be read in conjunction with all of the attached notes 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 given in this report.

We trust that the above information is suitable for your present requirements. Should you have any queries, please do not hesitate to contact the undersigned.

Yours faithfully
Douglas Partners Pty Ltd

Reviewed by

Samuel Bamford
Laboratory Manager

Brett Egen
Associate

Attachments: About this Inspection Report
 Field Density Test Results

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.

Insitu Density Test Results

Client : Gary Deane Constructions Pty Ltd	Project No. : 672648
Project : 250 - 292 Spring Mountain Road, Greenbank	Report No. : GC14_001
Location : 250 - 292 Spring Mountain Road, Greenbank	Report Date : 13/10/2014
	Date of Test: 3/10/2014
	Page: 1 of 1

Test No.	1				
Retest of Test No.	-				
Time Tested	1500				
Test Location/Chainage	Lot 7 E: 0492297 N: 6932107				
Level	RL: 78.70				
Test Depth (mm)	150				
Thickness of Soil Layer (mm)	200				
Sieve size used to determine oversize material (mm)	19.0				
Percentage of Oversize Material (wet/dry)	0 / 0				
Description of Material	Silty Clay				
Moisture Content (%)	17.4				
Compactive Effort used (Standard/Modified)	Standard				
OMC/MDD determined on material sampled prior to compaction (Yes/No)	NO				
Date assigned value established	-				
Field Dry Density (t/m ³)	1.75				
Maximum Dry Density (t/m ³)	1.69				
MDD adjusted for Oversize Material (t/m ³)	-				
Optimum Moisture Content (%)	18.2				
OMC adjusted for Oversize Material (%)	-				
Moisture Variation from OMC (%)	1.0 Dry				
Moisture Ratio (%)	95.5				
Density Ratio (%)	103.5				

Legend:

MDD = Maximum Dry Density

OMC = Optimum Moisture Content

Test Methods:

Field Density AS 1289.5.8.1
Standard Compaction AS 1289.5.1.1

Dry Density Ratio, Moisture Variation & Moisture Ratio
Moisture Content

AS 1289.5.4.1
AS 1289.2.1.1

Sampling Methods: AS 1289.1.2.1(6.4), AS 1289.1.1

Remarks:



NATA Accredited Brisbane Base Laboratory Number: 828
Gold Coast Branch Site Number: 22133

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

Tested	BR
Checked	SB



Samuel Bamford
Laboratory Manager