

Botania Estate Stage 2A

GITA Inspection Verification Report

Prepared For: Beveridge Williams

Report Number D20397A V1

Version Release Date 28 August 2020

Report Released By C Caulfield

Title Project Manager

Signature



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1 Introduction

Terra Firma Laboratories was engaged by *Beveridge Williams* as the Geotechnical Inspection and Testing Authority (GITA) to provide Level 1 supervision and testing works on the earthworks component for Botania Estate Stage 2A. This work was conducted over the period of 5/08/2020 to 10/08/2020.

This report presents that the allotment earthworks was carried out in accordance with AS3798-2007 *Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2 Scope of Work

2.1 Area of Work

The areas of work included lots 202, 203 and 234 through to 249. The site will be a residential development.

The area on which fill was placed is shown on site plan (Appendix 1: *Test Location Plan*) based on drawings prepared by Beveridge Williams, drawing reference 010 P2 and provided by Beveridge Williams.

The supervision work by the GITA involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2 Specification

The technical specification (Reference from Drawings) for compaction control requirements was provided by Beveridge Williams and established that:

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

Section 5.2 of AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289 5.1.1 and AS1289 5.2.1.

In accordance with Table 8.1 (AS3798), for large scale operations, (greater than 1500m²), the minimum testing frequency is 1 test per layer per material type per 2500m² or 1 test per 500m³ distributed reasonable evenly throughout full depth and area or 3 tests per lot. AS3798 defines a lot as “an area of work that is essentially homogenous in relation to material type and moisture condition, rolling response and compaction technique, and which has been used for the assessment of the relative compaction of an area of work”. All three of these test frequencies must be achieved and this is typically confirmed to have been achieved when 3 tests per visit (day) have been completed.

2.3 Limitations

Terra Firma Laboratories cannot verify any works completed by others outside of the time period specified in the introduction. Uncontrolled works may include, but are not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes unless specified in section 2.1 of this report.

Terra Firma Laboratories cannot verify that the material used as a filling medium is free from chemical or other contamination. The scope and the period of Terra Firma Laboratories as described in the introduction are subject to restrictions and limitations. Terra Firma Laboratories did not perform a complete assessment of all possible conditions and circumstances that may exist at the site. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Terra Firma Laboratories.

Verification of finished surface level to design levels is outside of the scope of the GITA report.

Any drawings or marked locations presented in this report should be considered only as pictorial evidence of our work. Therefore, unless otherwise stated, any dimensions should not be used for accurate calculations or dimensioning.

Where data has been supplied by the client or a third party, it is assumed that the information is correct unless otherwise stated. No responsibility is accepted by Terra Firma Laboratories for incomplete or inaccurate data supplied by others.

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3 Construction Method

3.1 Subgrade Preparation

At the time of subgrade inspection the following was observed:

- Subgrade preparation involved stripping the site of topsoil, vegetation and organic matter to a depth of approximately 200mm below existing levels.
- The site was cleared of all trees and stumps to the extent necessary for the fill placement to proceed
- The roots of all trees and any debris was removed from site prior to any fill placement

Some large boulders were found sticking out of the subgrade on lot 202. The tops of the boulders were broken down using an excavator with a jack-hammer until below subgrade level.

The sub-grade area was then proof-rolled to confirm it was capable of withstanding test rolling without visible deformation or springing and any areas observed to be soft or otherwise unsuitable were rectified. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2 Fill Placement

The contractor was observed to have suitable construction equipment and plant available on-site during the construction period for use in the fill placement.

All fill was placed in layers of thicknesses not exceeding 300mm. At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made. It should be noted that the compaction tests are representative samples of the fill placed and support the visual assessment of the works completed. Each house lot does not necessarily require a compaction test to have been conducted within the house allotment but may have been verified by testing conducted within up to a 2500m² area of the house lot.

Final fill placement levels were verified against design level by others. For the purposes of this report, it was observed that finished levels were in accordance with levels marked on site by survey markers.

The final 300mm of fill placed across the site was placed as a topsoil layer or growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications and placement of the final 300mm of fill was not observed by the GITA.

4 Construction Verification

Compaction Verification testing is summarized in a detailed test register with test certificates attached provided in Appendix 2: *Compaction Test Register and Test Certificates*. A test location plan (D20397 D1, Appendix 1) providing a schematic of test locations across the extent of scope of works for every placed layer of fill is also documented.

A total of 13 density tests (Hilf method in accordance with 1289 5.7.1) were undertaken with 0 failed results. The results summarised in the compaction test register (Appendix 2) confirm that for every layer of fill placed in a specific work area, satisfactory testing was completed.

5 Statement of Compliance

The intention of this report is to provide a description of the earthworks construction for Stage 2A at Botania Estate. For completed fill areas of greater than 300mm, and for works completed between 5/08/2020 and 10/08/2020, earthworks construction activities were conducted under the full time supervision of the Geotechnical Inspection and Testing Authority. Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification. The earthworks construction for Stage 2A of Botania Estate was observed to be constructed in compliance with the requirements of the Technical Specification.



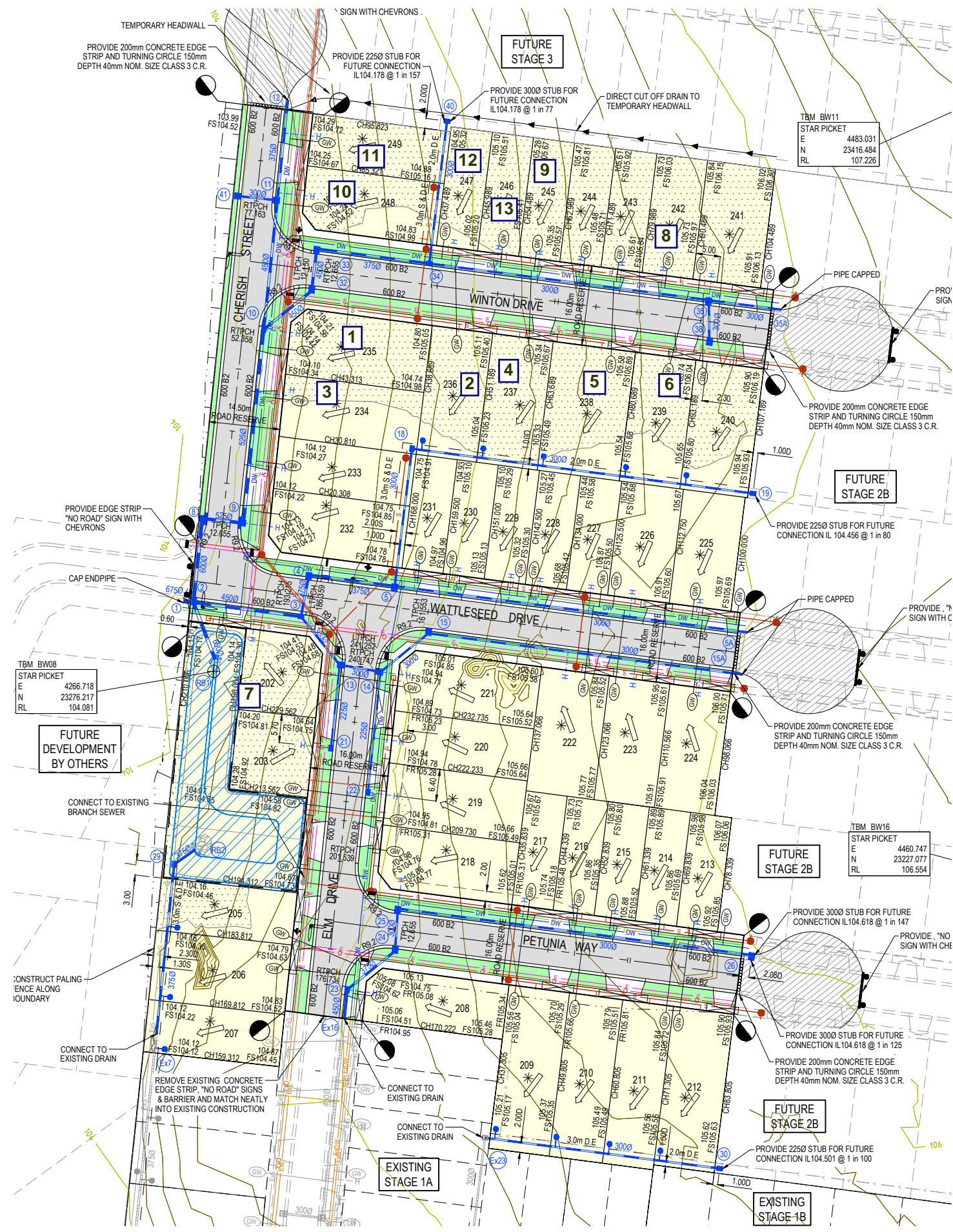
Your Worksite is Our Laboratory.

Appendix 1: Test Location Plan

Our Head Office
47 National Ave
Pakenham, VIC 3810

Our Laboratories
Pakenham 03 9769 5799
Deer Park 03 8348 5596
Bibra Lake 08 9395 7220

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Our Head Office
47 National Ave
Pakenham, VIC 3860

Our Laboratories
Pakenham 03 9769 5799
Deer Park 03 8348 5596
Bibra Lake 08 9395 7220

Test Location Plan

not to scale

Client:	Beveridge Williams
Project:	Botania Estate Stage 2A
Reference:	D20397 DX



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Appendix 2: Compaction Test Register and Test Certificates



Compaction Test Register

Client: Beveridge Williams **Project No:** D20397
Project: Botania Estate Stage 2A **Specification:** 95%

Date:	Test No:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
05/08/2020	1	Layer 1		101.0	Pass	Lot 235	D20397-1
05/08/2020	2	Layer 1		100.0	Pass	Lot 236	D20397-1
05/08/2020	3	Layer 1		99.0	Pass	Lot 234	D20397-1
06/08/2020	4	Layer 1		100.5	Pass	LOT 237	D20397-2
06/08/2020	5	Layer 1		100.0	Pass	LOT 238	D20397-2
06/08/2020	6	Layer 1		99.0	Pass	LOT 239	D20397-2
07/08/2020	7	FSL		99.0	Pass	Lot 202	D20397-3
07/08/2020	8	Layer 1		98.0	Pass	LOT 242	D20397-5
07/08/2020	9	Layer 1		99.0	Pass	LOT 245	D20397-5
07/08/2020	10	Layer 1		98.0	Pass	LOT 248	D20397-5
10/08/2020	11	Layer 1		98.0	Pass	LOT 249	D20397-4
10/08/2020	12	Layer 1		100.5	Pass	LOT 247	D20397-4
10/08/2020	13	Layer 1		99.0	Pass	LOT 246	D20397-4

Material Test Report



Report Number: D20397-1
Issue Number: 1
Date Issued: 13/08/2020
Client: Civilworx Constructions
 28 Lucknow Crescent, Thomastown vic 3074
Contact: JO
Project Number: D20397
Project Name: Botania Estate Stage 2A - Level one
Project Location: Plumpton
Work Request: 2048
Date Sampled: 05/08/2020 15:00
Dates Tested: 05/08/2020 - 06/08/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On site

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 Factory 1 80-82 Rebecca Drive Ravenhall VIC 3023
 Phone: 0435 751 756
 Email: jsomaradne@terrafirmalabs.com.au

Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Janaka Somaratne
 Lab Manager
 NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-2048A	D20-2048B	D20-2048C
Test Number	1	2	3
Date Tested	05/08/2020	05/08/2020	05/08/2020
Time Tested	**	**	**
Test Request #/Location	1 Lot 235	2 Lot 236	3 Lot 234
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0
Field Wet Density (FWD) t/m ³	1.98	1.96	1.92
Field Moisture Content %	29.2	29.7	40.7
Field Dry Density (FDD) t/m ³	1.53	1.51	1.37
Peak Converted Wet Density t/m ³	1.96	1.96	1.94
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	111.0	110.5	108.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-3.0	-2.5	-3.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	101.0	100.0	99.0
Compaction Method	Standard	Standard	Standard

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC

Material Test Report



Report Number: D20397-2
Issue Number: 1
Date Issued: 13/08/2020
Client: Civilworx Constructions
 28 Lucknow Crescent, Thomastown vic 3074
Contact: JO
Project Number: D20397
Project Name: Botania Estate Stage 2A - Level one
Project Location: Plumpton
Work Request: 2056
Date Sampled: 06/08/2020 14:30
Dates Tested: 06/08/2020 - 07/08/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On Site

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 NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-2056A	D20-2056B	D20-2056C
Test Number	4	5	6
Date Tested	06/08/2020	06/08/2020	06/08/2020
Time Tested	14:30	14:30	14:30
Test Request #/Location	LOT 237	LOT 238	LOT 239
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0
Field Wet Density (FWD) t/m ³	1.97	1.95	1.91
Field Moisture Content %	25.4	25.2	25.2
Field Dry Density (FDD) t/m ³	1.57	1.55	1.53
Peak Converted Wet Density t/m ³	1.95	1.95	1.94
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	111.5	101.0	101.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-2.5	-0.5	0.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	100.5	100.0	99.0
Compaction Method	Standard	Standard	Standard

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC

Material Test Report

Report Number: D20397-3
Issue Number: 1
Date Issued: 14/08/2020
Client: Civilworx Constructions
 28 Lucknow Crescent, Thomastown vic 3074
Contact: JOE
Project Number: D20397
Project Name: Botania Estate Stage 2A - Level one
Project Location: Plumpton
Work Request: 2060
Date Sampled: 07/08/2020 9:34
Dates Tested: 07/08/2020 - 13/08/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Remarks: Site foreman requested to do the field testing between lot No 202 and 203.
Specification: 95% STD
Material: Clay
Material Source: On site



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Approved Signatory: Janaka Somaratne
Lab Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	D20-2060A		
Test Number	7		
Date Tested	07/08/2020		
Time Tested	**		
Test Request #/Location	1 Lot 202		
Layer / Reduced Level	FSL		
Thickness of Layer (mm)	300		
Soil Description	Clay		
Test Depth (mm)	275		
Sieve used to determine oversize (mm)	19.0		
Percentage of Wet Oversize (%)	0.0		
Field Wet Density (FWD) t/m ³	1.96		
Field Moisture Content %	24.6		
Field Dry Density (FDD) t/m ³	1.57		
Peak Converted Wet Density t/m ³	1.97		
Adjusted Peak Converted Wet Density t/m ³	**		
Moisture Ratio % (AS 1289.5.4.1)	101.0		
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**		
Moisture Variation (Wv) %	0.0		
Adjusted Moisture Variation %	**		
Hilf Density Ratio (%)	99.0		
Compaction Method	Standard		

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Material Test Report



Report Number: D20397-4
Issue Number: 1
Date Issued: 14/08/2020
Client: Civilworx Constructions
 28 Lucknow Crescent, Thomastown vic 3074
Contact: JO
Project Number: D20397
Project Name: Botania Estate Stage 2A - Level one
Project Location: Plumpton
Work Request: 2073
Date Sampled: 10/08/2020 14:00
Dates Tested: 10/08/2020 - 13/08/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On Site

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Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-2073A	D20-2073B	D20-2073C
Test Number	11	12	13
Date Tested	10/08/2020	10/08/2020	10/08/2020
Time Tested	14:30	14:30	14:30
Test Request #/Location	LOT 249	LOT 247	LOT 246
Layer / Reduced Level	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0
Field Wet Density (FWD) t/m ³	1.94	1.96	1.94
Field Moisture Content %	23.2	22.5	22.6
Field Dry Density (FDD) t/m ³	1.58	1.60	1.58
Peak Converted Wet Density t/m ³	1.98	1.95	1.96
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	102.0	102.5	101.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-0.5	-0.5	-0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	98.0	100.5	99.0
Compaction Method	Standard	Standard	Standard

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC

Material Test Report

Report Number: D20397-5
Issue Number: 1
Date Issued: 18/08/2020
Client: Civilworx Constructions
 28 Lucknow Crescent, Thomastown vic 3074
Contact: JO
Project Number: D20397
Project Name: Botania Estate Stage 2A - Level one
Project Location: Plumpton
Work Request: 2061
Date Sampled: 07/08/2020 14:30
Dates Tested: 07/08/2020 - 14/08/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On Site



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Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

	D20-2061A	D20-2061B	D20-2061C
Sample Number			
Test Number	8	9	10
Date Tested	07/08/2020	07/08/2020	07/08/2020
Time Tested	14:30	14:30	14:30
Test Request #/Location	LOT 242	LOT 245	LOT 248
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0
Field Wet Density (FWD) t/m ³	1.92	1.94	1.93
Field Moisture Content %	27.5	26.8	25.5
Field Dry Density (FDD) t/m ³	1.51	1.53	1.54
Peak Converted Wet Density t/m ³	1.97	1.96	1.97
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	100.5	100.5	100.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	0.0	0.0	0.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	98.0	99.0	98.0
Compaction Method	Standard	Standard	Standard

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC