

Riverwalk Stage 36

GITA Inspection Verification Report

Prepared For: Excell Gray Bruni

Report Number D23996A V1

Version Release Date 5 Jul 2023

Report Released By C Caulfield

Title Project Manager

Signature



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1 Introduction

Terra Firma Laboratories was engaged by Excell Gray Bruni as the Geotechnical Inspection and Testing Authority (GITA) to provide Level 1 supervision and testing works on the earthworks component for Riverwalk Stage 36. This work was conducted over the period of 10/05/2023 to 13/06/2023.

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 3606 to 3610, 3618 to 3620 and Superlot, bounded by streets Farm Road, Tulsi Avenue, Powlett Street, Nesting Way and Aberfeldy Road. 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 Dalton Consulting Engineers (Drawing Reference: 10936FP01 C) and provided by Excell Gray Bruni.

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 Excell Gray Bruni 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

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 material 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 material 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 (D23996D1, 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 19 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 36 at Riverwalk. For completed fill areas of greater than 300mm, and for works completed between 10/05/2023 and 13/06/2023, 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 36 of Riverwalk was observed to be constructed in compliance with the requirements of the Technical Specification.



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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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Page 1 of 2

SPORTS
PRECINCT
(EXISTING
CONSTRUCTION)

SPORTS
PRECINCT
(EXISTING
CONSTRUCTION)

FARM ROAD

FARM ROAD

INSET

POWLETT STREET

FARM ROAD

STAGE 11
(EXISTING CONSTRUCTION)

NESTING WAY

PERMIT 10
(FUTURE
CONSTRUCTION)

STAGE 33
(EXISTING CONSTRUCTION)

STAGE 35
(EXISTING
CONSTRUCTION)

PERMIT 10
(FUTURE
CONSTRUCTION)

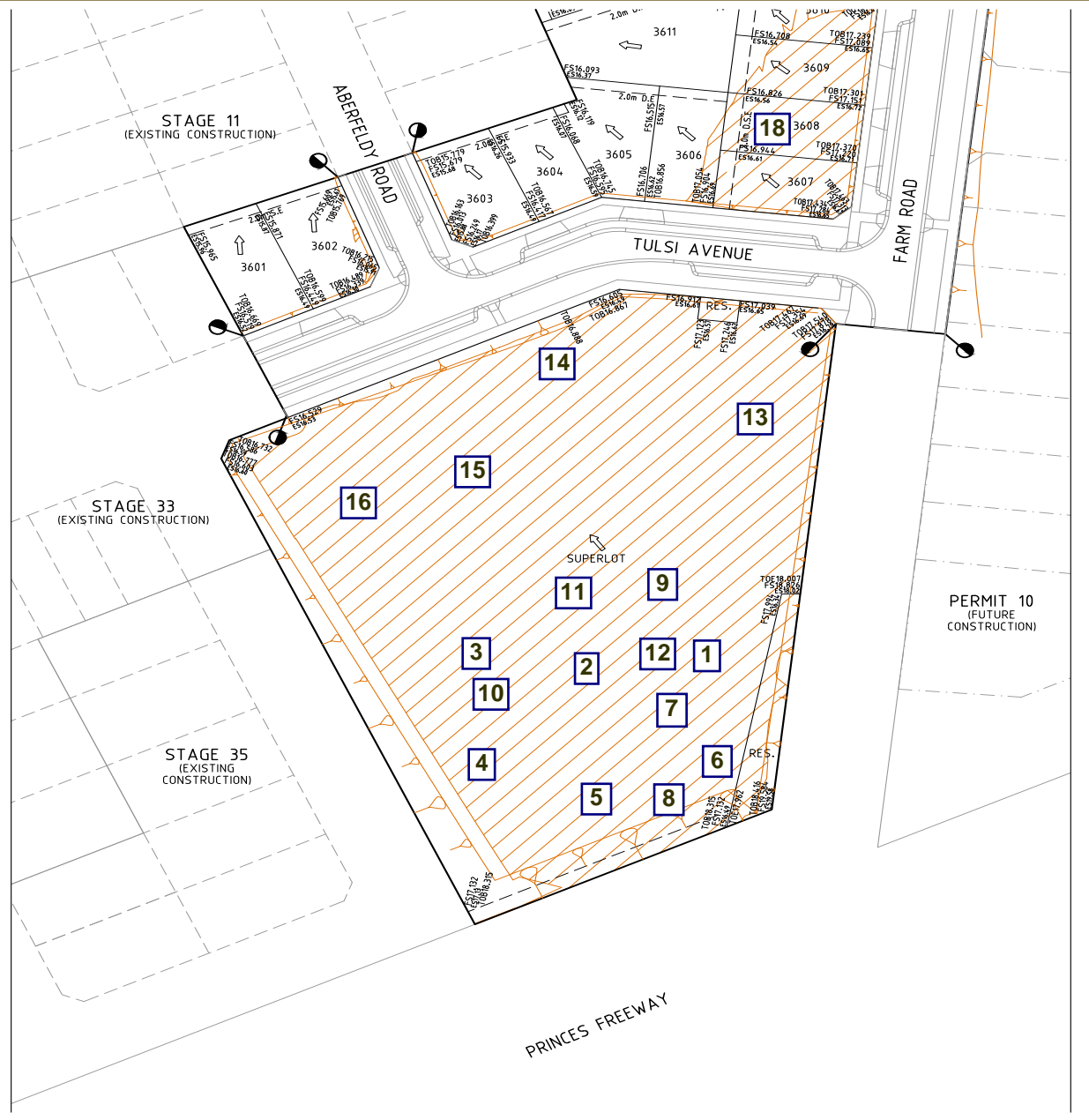
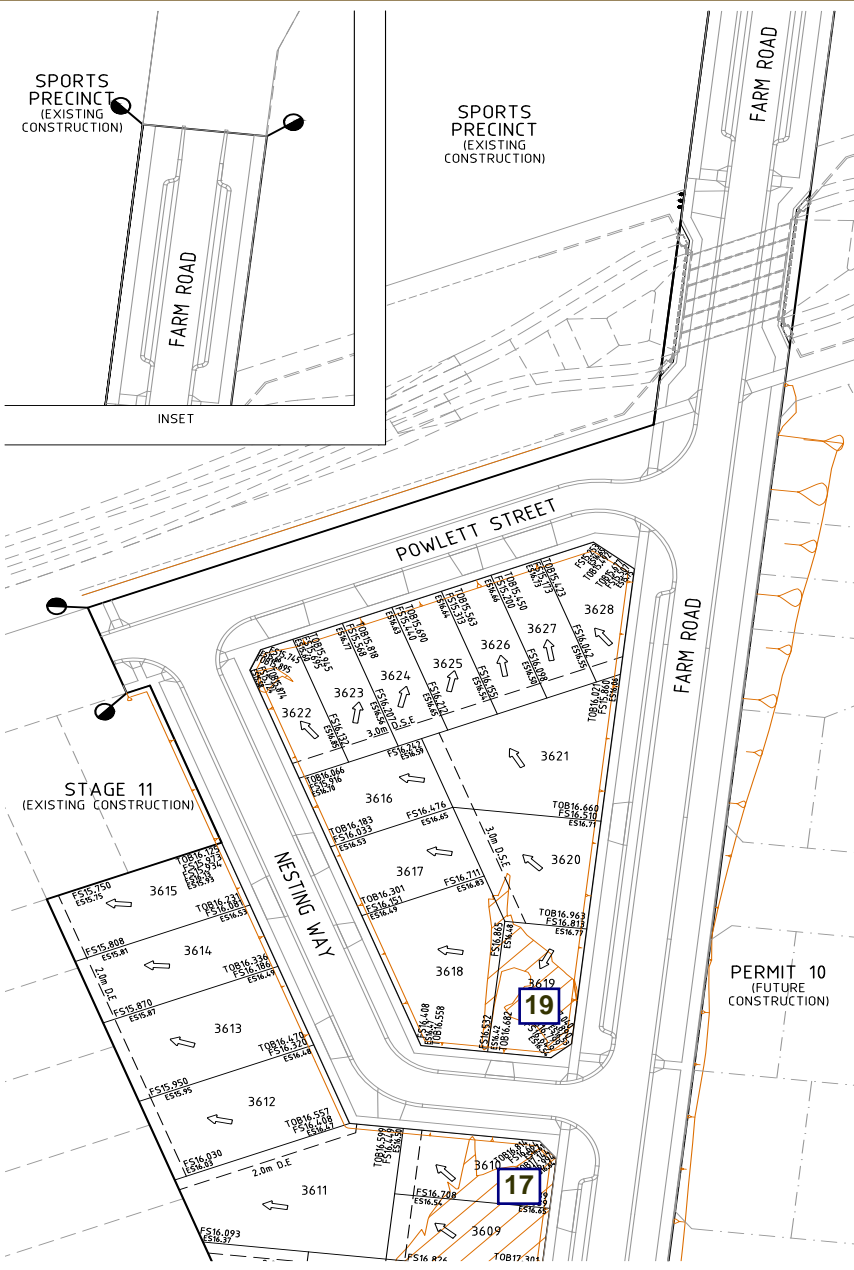
STAGE 11
(EXISTING CONSTRUCTION)

ABERDELY ROAD

TULSI AVENUE

FARM ROAD

PRINCES FREEWAY



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

Test Location Plan
not to scale

Client:	Excell Gray Bruni
Project:	Riverwalk Stage 36
Reference:	D23996 D1



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Appendix 2: Compaction Test Register and Test Certificates



Compaction Test Register

Client: Excell Gray Bruni
Project: Riverwalk Stage 36

Project No: D23996
Specification: 95%

Date:	Test No:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
10/05/2023	1	Layer 1		98.5%	Pass	Super Lot	D23996-1
10/05/2023	2	Layer 1		99.5%	Pass	Super Lot	D23996-1
10/05/2023	3	Layer 1		102.5%	Pass	Super Lot	D23996-1
10/05/2023	4	Layer 1		100.5%	Pass	Super Lot	D23996-1
10/05/2023	5	Layer 1		102.0%	Pass	Super Lot	D23996-1
10/05/2023	6	Layer 1		98.5%	Pass	Super Lot	D23996-1
17/05/2023	7	Layer 2		100.5%	Pass	Super Lot	D23996-2
17/05/2023	8	Layer 2		101.0%	Pass	Super Lot	D23996-2
17/05/2023	9	Layer 2		99.5%	Pass	Super Lot	D23996-2
1/06/2023	10	Layer 2		101.0%	Pass	Super Lot	D23996-3
1/06/2023	11	Layer 2		101.5%	Pass	Super Lot	D23996-3
1/06/2023	12	Layer 3		103.0%	Pass	Super Lot	D23996-3
13/06/2023	13	Layer 1		99.0%	Pass	Super Lot	D23996-4
13/06/2023	14	Layer 1		101.0%	Pass	Super Lot	D23996-4
13/06/2023	15	Layer 1		102.0%	Pass	Super Lot	D23996-4
13/06/2023	16	Layer 1		104.0%	Pass	Super Lot	D23996-4
13/06/2023	17	Layer 1		100.0%	Pass	Lot 3608	D23996-4
13/06/2023	18	Layer 1		98.5%	Pass	Lot 3610	D23996-4
13/06/2023	19	Layer 1		100.0%	Pass	Lot 3619	D23996-4

Material Test Report


Report Number: D23996-1
Issue Number: 1
Date Issued: 12/05/2023
Client: Excell Gray Bruni
 12 Allied Drive, Tullamarine Vic 3043
Project Number: D23996
Project Name: Riverwalk Estate Stage 36 - Level one
Project Location: Werribee
Work Request: 5900
Date Sampled: 10/05/2023 15:00
Dates Tested: 10/05/2023 - 11/05/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Location: Riverwalk Estate Stage 36 - Level one
Material: Clay
Material Source: On Site



Deer Park Laboratory
 17 Walhalla Way Ravenhall VIC 3023
 Phone: 0435 751 756
 Email: ehippola@terrafirmalabs.com.au



Accredited for compliance with ISO/IEC 17025 - Testing


 Approved Signatory: Eranda Hippola
 Laboratory Manager
 NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1						
Sample Number	D23-5900A	D23-5900B	D23-5900C	D23-5900D	D23-5900E	D23-5900F
Test Number	1	2	3	4	5	6
Date Tested	10/05/2023	10/05/2023	10/05/2023	10/05/2023	10/05/2023	10/05/2023
Time Tested	03:00	03:00	03:00	03:00	03:00	03:00
Test Request #/Location	Super Lot	Super Lot	Super Lot	Super Lot	Super Lot	Super Lot
Easting	293121	293097	293074	293076	293095	293117
Northing	5800103	5800095	5800110	5800085	5800083	5800092
Layer / Reduced Level	Layer 1	Layer 1	Layer 1	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300	300	300	300
Soil Description	Clay	Clay	Clay	Clay	Clay	Clay
Test Depth (mm)	275	275	275	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0	0	0	0
Field Wet Density (FWD) t/m ³	2.02	2.04	2.07	2.02	2.06	2.02
Field Moisture Content %	18.0	15.1	16.8	18.4	18.2	17.7
Field Dry Density (FDD) t/m ³	1.71	1.78	1.77	1.70	1.75	1.72
Peak Converted Wet Density t/m ³	2.05	2.06	2.02	2.01	2.02	2.06
Adjusted Peak Converted Wet Density t/m ³	**	**	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	17.5	15.0	17.0	18.5	19.2	17.2
Adj. Field Moisture Content % (AS1289.5.4.1)	18.0	15.1	16.8	18.4	18.2	17.7
Moisture Ratio % (AS1289.5.4.1)	103.0	100.5	99.0	99.5	95.0	103.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**	**	**
Moisture Variation (Wv) %	-0.5	0.0	0.0	0.0	1.0	-0.5
Adjusted Moisture Variation %	**	**	**	**	**	**
Hilf Density Ratio (%)	98.5	99.5	102.5	100.5	102.0	98.5
Compaction Method	Standard	Standard	Standard	Standard	Standard	Standard
Report Remarks	**	**	**	**	**	**

Moisture Variation Note:
 Positive values = test is dry of OMC
 Negative values = test is wet of OMC

Material Test Report


Report Number: D23996-2
Issue Number: 1
Date Issued: 19/05/2023
Client: Excell Gray Bruni
 12 Allied Drive, Tullamarine Vic 3043
Project Number: D23996
Project Name: Riverwalk Estate Stage 36 - Level one
Project Location: Werribee
Work Request: 5922
Date Sampled: 17/05/2023 10:22
Dates Tested: 17/05/2023 - 18/05/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Location: Riverwalk Estate stage 36 - Level one
Material: Silty Clay
Material Source: On- Site



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 Laboratory Manager
 NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D23-5922A	D23-5922B	D23-5922C
Test Number	7	8	9
Date Tested	17/05/2023	17/05/2023	17/05/2023
Time Tested	10:22	10:27	10:32
Test Request #/Location	SUPERLOT	SUPERLOT	SUPERLOT
Easting	293109	293087	293128
Northing	5800126	5800098	5800165
Layer / Reduced Level	Layer 2	Layer 2	Layer 2
Thickness of Layer (mm)	300	300	300
Soil Description	Silty Clay	Silty Clay	Silty Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	7	6	6
Percentage of Dry Oversize (%) (AS1289.5.4.1)	**	**	**
Field Wet Density (FWD) t/m ³	2.05	2.07	2.00
Field Moisture Content %	22.0	22.4	20.7
Field Dry Density (FDD) t/m ³	1.70	1.71	1.67
Peak Converted Wet Density t/m ³	**	**	**
Adjusted Peak Converted Wet Density t/m ³	2.04	2.06	2.01
Adj. Optimum Moisture Content % (AS1289.5.4.1)	21.1	21.3	19.9
Adj. Field Moisture Content % (AS1289.5.4.1)	20.6	21.0	19.4
Moisture Ratio % (AS1289.5.4.1)	**	**	**
Adjusted Moisture Ratio % (AS1289.5.4.1)	97.5	98.5	97.5
Moisture Variation (Wv) %	**	**	**
Adjusted Moisture Variation %	0.5	0.5	0.5
Hilf Density Ratio (%)	100.5	101.0	99.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

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

Material Test Report


Report Number: D23996-3
Issue Number: 1
Date Issued: 05/06/2023
Client: Excell Gray Bruni
 12 Allied Drive, Tullamarine Vic 3043
Contact: Clinton
Project Number: D23996
Project Name: Riverwalk Estate Stage 36 - Level one
Project Location: Werribee
Work Request: 5986
Dates Tested: 01/06/2023 - 02/06/2023
Location: Riverwalk Estate Stage 36 - Level one



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 NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D23-5986A	D23-5986B	D23-5986C
Test Number	10	11	12
Date Tested	01/06/2023	01/06/2023	01/06/2023
Time Tested	**	**	**
Test Request #/Location	Digged area	Digged area	Digged area
Layer / Reduced Level	Layer 2	Layer 2	Layer 3
Thickness of Layer (mm)	300	300	300
Soil Description	Silty Clay	Silty Clay	Silty 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	4
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	**
Field Wet Density (FWD) t/m ³	1.95	1.98	2.01
Field Moisture Content %	17.0	16.9	16.7
Field Dry Density (FDD) t/m ³	1.67	1.69	1.73
Peak Converted Wet Density t/m ³	1.93	1.95	**
Adjusted Peak Converted Wet Density t/m ³	**	**	1.96
Adj. Optimum Moisture Content % (AS1289.5.4.1)	18.5	18.4	17.5
Adj. Field Moisture Content % (AS1289.5.4.1)	17.0	16.9	16.1
Moisture Ratio % (AS1289.5.4.1)	92.0	92.0	**
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	92.0
Moisture Variation (Wv) %	1.5	1.5	**
Adjusted Moisture Variation %	**	**	1.5
Hilf Density Ratio (%)	101.0	101.5	103.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:
 Positive values = test is dry of OMC
 Negative values = test is wet of OMC

Material Test Report


Report Number: D23996-4
Issue Number: 1
Date Issued: 14/06/2023
Client: Excell Gray Bruni
 12 Allied Drive, Tullamarine Vic 3043
Project Number: D23996
Project Name: Riverwalk Estate Stage 36 - Level one
Project Location: Werribee
Work Request: 6035
Date Sampled: 13/06/2023 08:00
Dates Tested: 13/06/2023 - 14/06/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Location: Riverwalk Estate stage 36 -Level One
Material: Clay
Material Source: On Site



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 Approved Signatory: Eranda Hippola
 Laboratory Manager
 NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D23-6035A	D23-6035B	D23-6035C	D23-6035D
Test Number	13	14	15	16
Date Tested	13/06/2023	13/06/2023	13/06/2023	13/06/2023
Time Tested	08:00	08:00	08:00	08:00
Test Request #/Location	SUPERLOT	SUPERLOT	SUPERLOT	SUPERLOT
Easting	293093	293090	293087	293098
Northing	5800152	5800140	5800159	5800154
Layer / Reduced Level	Layer 1	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300	300
Soil Description	Clay	Clay	Clay	Clay
Test Depth (mm)	275	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0	0
Field Wet Density (FWD) t/m ³	1.90	1.94	1.95	1.98
Field Moisture Content %	16.9	19.5	18.8	22.5
Field Dry Density (FDD) t/m ³	1.62	1.62	1.64	1.62
Peak Converted Wet Density t/m ³	1.92	1.91	1.91	1.90
Adjusted Peak Converted Wet Density t/m ³	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	19.8	22.2	21.4	25.6
Adj. Field Moisture Content % (AS1289.5.4.1)	16.9	19.5	18.8	22.5
Moisture Ratio % (AS1289.5.4.1)	85.5	88.0	88.0	88.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**
Moisture Variation (Wv) %	3.0	2.5	2.5	3.0
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	99.0	101.0	102.0	104.0
Compaction Method	Standard	Standard	Standard	Standard
Report Remarks	**	**	**	**

Moisture Variation Note:

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

Material Test Report


Report Number: D23996-4
Issue Number: 1
Date Issued: 14/06/2023
Client: Excell Gray Bruni
 12 Allied Drive, Tullamarine Vic 3043
Project Number: D23996
Project Name: Riverwalk Estate Stage 36 - Level one
Project Location: Werribee
Work Request: 6035
Date Sampled: 13/06/2023 08:00
Dates Tested: 13/06/2023 - 14/06/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Location: Riverwalk Estate stage 36 -Level One
Material: Clay
Material Source: On Site



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 Approved Signatory: Eranda Hippola
 Laboratory Manager
 NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D23-6035E	D23-6035F	D23-6035G
Test Number	17	18	19
Date Tested	13/06/2023	13/06/2023	13/06/2023
Time Tested	08:00	08:00	08:00
Test Request #/Location	Lot 3608	Lot 3610	Lot 3619
Easting	**	**	**
Northing	**	**	**
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
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m ³	1.92	1.89	1.92
Field Moisture Content %	19.4	18.8	19.0
Field Dry Density (FDD) t/m ³	1.61	1.59	1.61
Peak Converted Wet Density t/m ³	1.92	1.92	1.92
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	22.5	22.3	22.0
Adj. Field Moisture Content % (AS1289.5.4.1)	19.4	18.8	19.0
Moisture Ratio % (AS1289.5.4.1)	86.0	84.5	86.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	3.0	3.5	3.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	100.0	98.5	100.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

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