

Summerhill Stage 6

GITA Inspection Verification Report

Prepared For: Streetworks Pty Ltd

Report Number 10972A V1

Version Release Date 24 February 2020

Report Released By C Caulfield

Title Project Manager

Signature



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1 Introduction

Terra Firma Laboratories was engaged by *Streetworks Pty Ltd* as the Geotechnical Inspection and Testing Authority (GITA) to provide Level 1 supervision and testing works on the earthworks component for Summerhill Stage 6. This work was conducted over the period of 5/09/2019 to 17/02/2020.

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 601 and 607 through to 631. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1: *Test Location Plan*) based on drawings prepared by GPR Consulting, Drawing referenes 0099-06-R02,R03 and 0099-06B-R02 and provided by *Streetworks Pty Ltd*.

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 *Streetworks Pty Ltd* 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 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 (10972 D1, D2 and D3 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 43 density tests (Hilf method in accordance with 1289 5.7.1) were undertaken with 3 failed results. The contractor was notified of any failed tests and the failed areas were ripped, watered, compacted and then re-tested to confirm compliance with the specification. 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 6 of Summerhill. For completed fill areas of greater than 300mm, and for works completed between 5/09/2019 and 17/02/2020, 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 6 of Summerhill was observed to be constructed in compliance with the requirements of the Technical Specification.



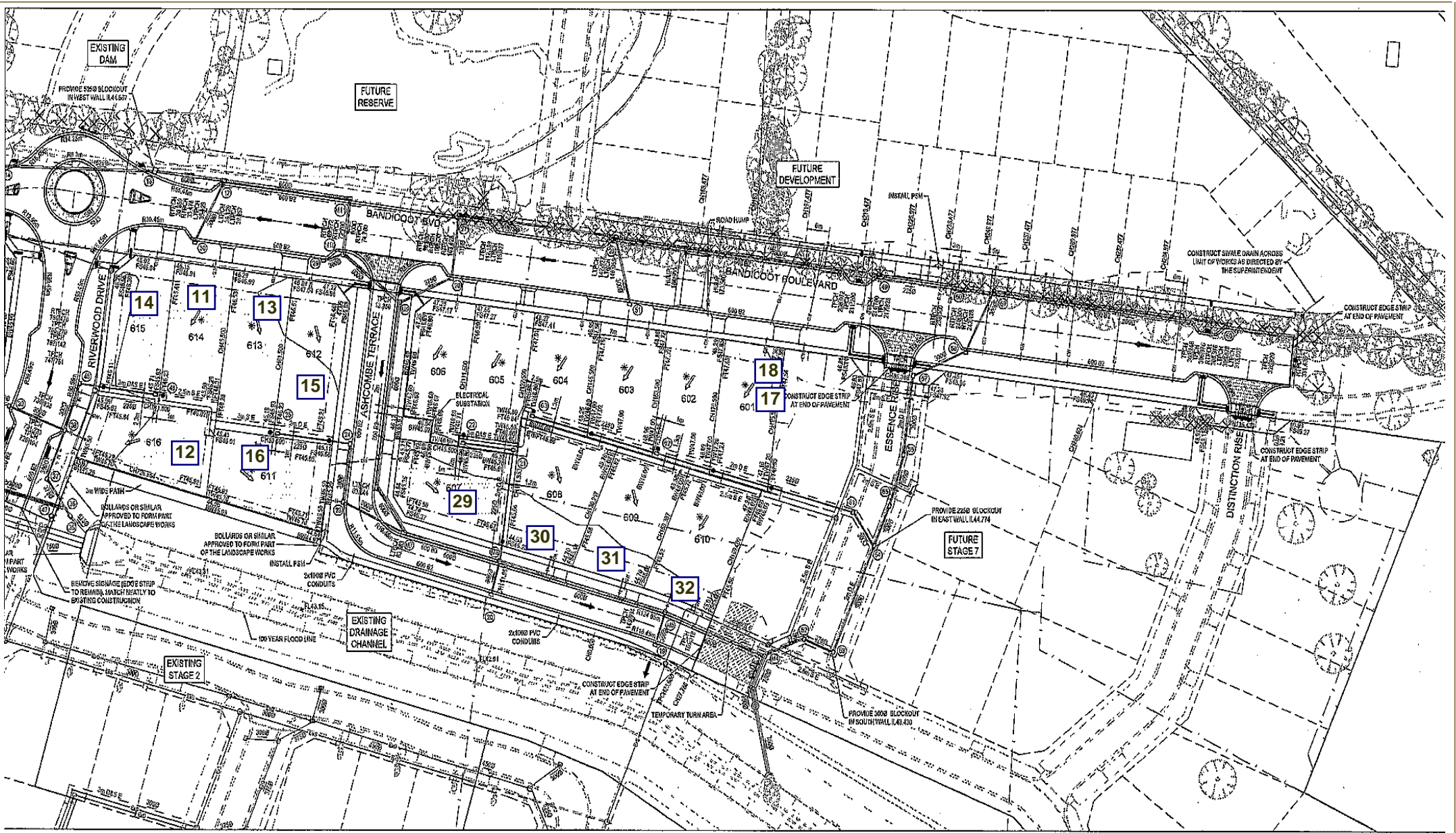
Your Worksite is Our Laboratory.

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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NOTE: IRRIGATION CONDUITS



Our Head Office
47 National Ave
Pakenham, VIC 3810

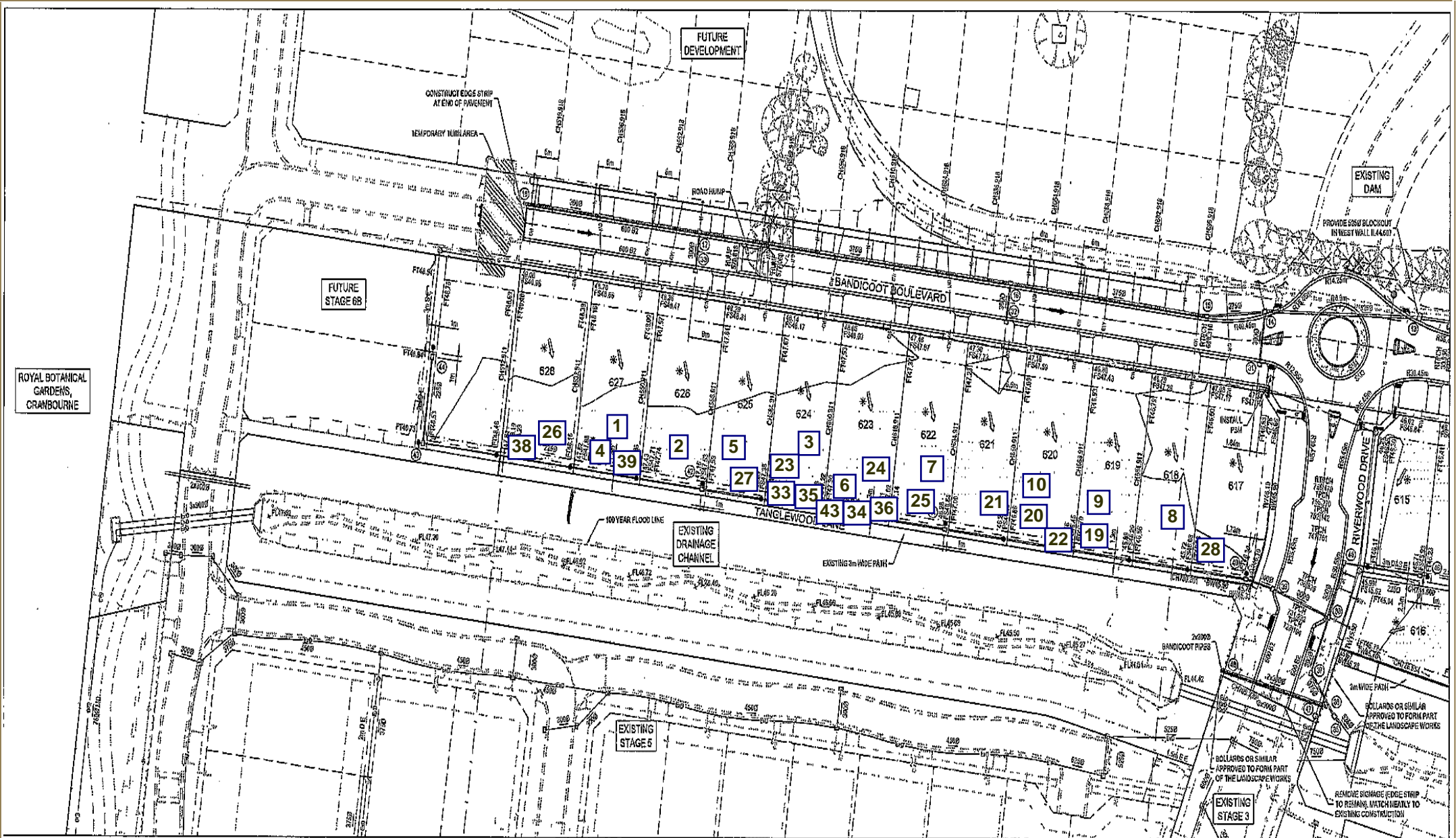
Our Laboratories
Pakenham 03 9769 5799
Deer Park 03 8348 5596
Bibra Lake 08 9395 7220

Test Location Plan
not to scale

Client: Streetworks Pty Ltd

Project: Summerhill Stage 6

Reference: 10972 D1



ROYAL BOTANICAL GARDENS, CRANBOURNE

FUTURE STAGE 6B

FUTURE DEVELOPMENT

EXISTING DAM

SANDYCOTT BOULEVARD

EXISTING DRAINAGE CHANNEL

EXISTING STAGE 5

EXISTING STAGE 3

Test Location Plan

not to scale

Client: Streetworks Pty Ltd

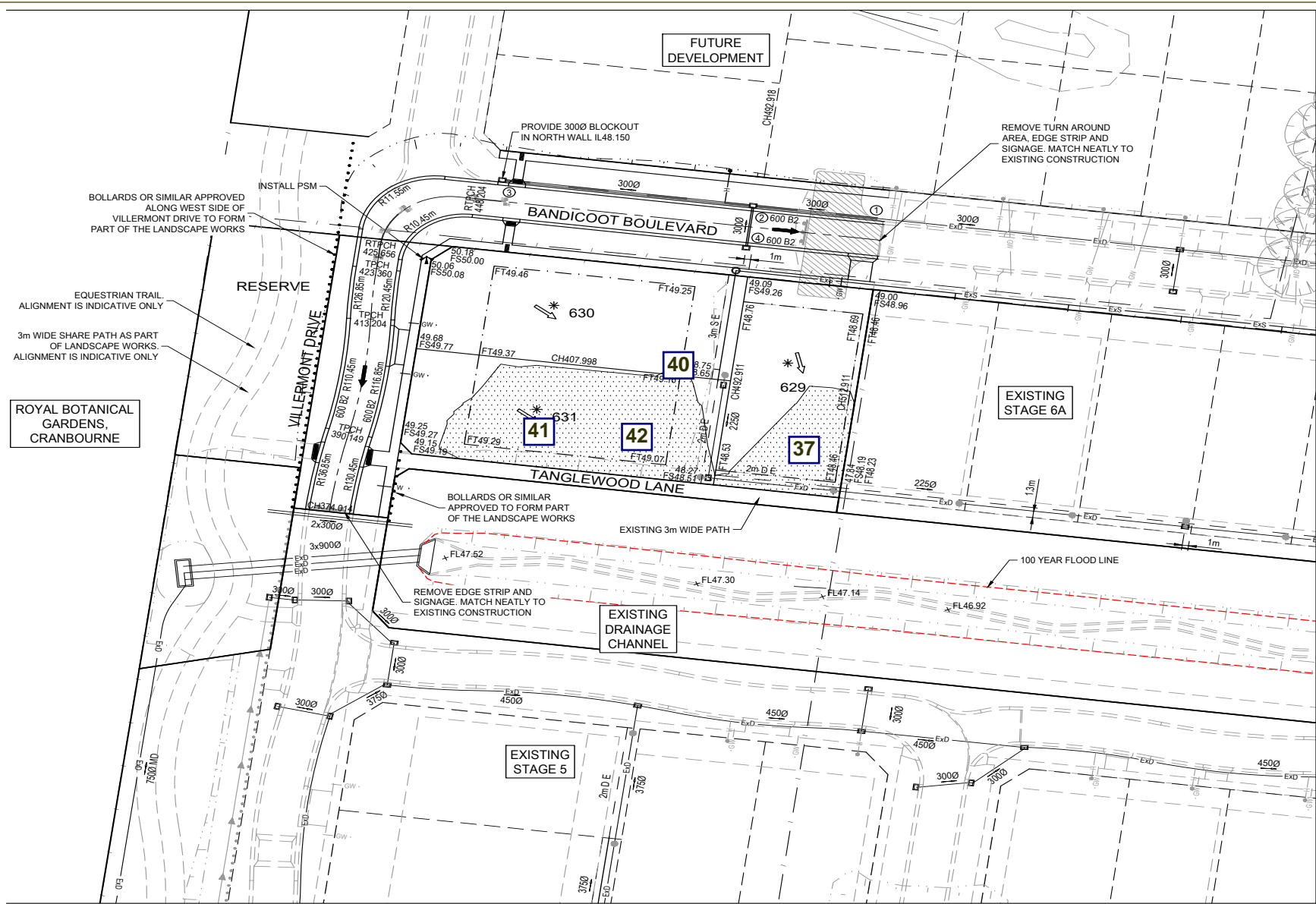
Project: Summerhill Stage 6

Reference: 10972 D2



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Bibra Lake 08 9395 7220

Test Location Plan

not to scale

Client: Streetworks Pty Ltd

Project: Summerhill Stage 6

Reference: 10972 D3



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Appendix 2: Compaction Test Register and Test Certificates



Compaction Test Register

Client: Streetworks Pty Ltd **Project No:** 10972
Project: Summerhill Stage 6 **Specification:** 95%

Date:	Test No:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
06/09/2019	1	Layer 1		92.5	Fail	Lot 627	10972-1
06/09/2019	2	Layer 1		95.0	Pass	Lot 626	10972-1
06/09/2019	3	Layer 1		95.5	Pass	Lot 624	10972-1
07/09/2019	4	Layer 1	1	101.0	Pass	Lot 627	10972-2
07/09/2019	5	Layer 2		95.5	Pass	Lot 625	10972-2
07/09/2019	6	Layer 2		97.5	Pass	Lot 623	10972-2
07/09/2019	7	Layer 2		98.5	Pass	Lot 622	10972-2
10/09/2019	8	Layer 3		98.5	Pass	Lot 618	10972-3
10/09/2019	9	Layer 3		99.5	Pass	Lot 619	10972-3
10/09/2019	10	Layer 3		97.5	Pass	Lot 620	10972-3
11/09/2019	11	Layer 1		101.0	Pass	Lot 614	10972-4
11/09/2019	12	Layer 1		98.0	Pass	Lot 616	10972-4
11/09/2019	13	Layer 1		104.0	Pass	Lot 613	10972-4
12/09/2019	14	Layer 3		95.0	Pass	Lot 615	10972-5
12/09/2019	15	Layer 2		104.0	Pass	Lot 612	10972-5
12/09/2019	16	Layer 2		105.0	Pass	Lot 611	10972-5
13/09/2019	17	Layer 1		100.0	Pass	Lot 601	10972-6
13/09/2019	18	Layer 2		101.0	Pass	Lot 601	10972-6
14/09/2019	19	Layer 1		100.5	Pass	Lot 619	10972-7
14/09/2019	20	Layer 1		92.0	Fail	Lot 620	10972-7
14/09/2019	21	Layer 1		98.5	Pass	Lot 621	10972-7
17/09/2019	22	Layer 1	20	96.0	Pass	Lot 620	10972-8
17/09/2019	23	Layer 2		96.0	Pass	Lot 624	10972-8
17/09/2019	24	Layer 3		95.5	Pass	Lot 623	10972-8
17/09/2019	25	Layer 3		95.5	Pass	Lot 622	10972-8
17/09/2019	26	Layer 4		101.0	Pass	Lot 628	10972-9
17/09/2019	27	Layer 4		99.5	Pass	Lot 625	10972-9
17/09/2019	28	Layer 2		95.5	Pass	Lot 617	10972-9
15/10/2019	29	FSL		97.5	Pass	Lot 607	10972-10
15/10/2019	30	FSL		105.5	Pass	Lot 608	10972-10
15/10/2019	31	FSL		100.0	Pass	Lot 609	10972-10
15/10/2019	32	FSL		100.5	Pass	Lot 610	10972-10
11/02/2020	33	Layer 1		95.0	Pass	Lot 624	10972-11
11/02/2020	34	Layer 1		93.0	Fail	Lot 623	10972-11
11/02/2020	35	Layer 2		95.0	Pass	Lot 624	10972-11
11/02/2020	36	Layer 2		100.0	Pass	Lot 623	10972-11
15/02/2020	37	Layer 2		99.0	Pass	Lot 629	10972-12
15/02/2020	38	Layer 2		97.0	Pass	Lot 628	10972-12
15/02/2020	39	Layer 2		98.5	Pass	Lot 627	10972-12
17/02/2020	40	Layer 1		99.0	Pass	Lot 630	10972-13
17/02/2020	41	Layer 2		105.0	Pass	Lot 631	10972-13



Compaction Test Register

Client: Streetworks Pty Ltd **Project No:** 10972
Project: Summerhill Stage 6 **Specification:** 95%

Date:	Test No:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
17/02/2020	42	Layer 3		97.5	Pass	Lot 631	10972-13
24/02/2020	43	Layer 1	33	99.5	Pass	Lot 623	10972-14

Material Test Report

Report Number: 10972-1
Issue Number: 1
Date Issued: 09/09/2019
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 06901
Work Request: 2348
Date Sampled: 06/09/2019
Dates Tested: 06/09/2019 - 06/09/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Imported



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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Scott Benbow
Laboratory Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	P19-2348A	P19-2348B	P19-2348C
Test Number	1	2	3
Date Tested	06/09/2019	06/09/2019	06/09/2019
Time Tested	09:00	09:00	09:00
Test Request #/Location	Lot No 627	Lot No 626	Lot No 624
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	200	200	200
Soil Description	SAND	SAND	SAND
Test Depth (mm)	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	**	**
Field Wet Density (FWD) t/m ³	1.77	1.76	1.81
Field Moisture Content %	6.9	6.2	8.8
Field Dry Density (FDD) t/m ³	1.65	1.66	1.67
Peak Converted Wet Density t/m ³	1.90	1.86	1.90
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	59.5	55.5	78.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	5.0	5.5	3.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	92.5	95.0	95.5
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: 10972-2
Issue Number: 1
Date Issued: 12/09/2019
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 06903
Work Request: 2354
Date Sampled: 07/09/2019 12:00
Dates Tested: 09/09/2019 - 09/09/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite



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Approved Signatory: Scott Benbow
Laboratory Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	P19-2354A	P19-2354B	P19-2354C	P19-2354D
Test Number	4	5	6	7
Date Tested	07/09/2019	07/09/2019	07/09/2019	07/09/2019
Time Tested	12:00	12:00	12:00	12:00
Test Request #/Location	Lot No 627	Lot No 625	Lot No 623	Lot No 622
Chainage (m)	Retest of Test 1	**	**	**
Location Offset (m)	**	**	**	**
Layer / Reduced Level	Layer 1	Layer 2	Layer 2	Layer 2
Thickness of Layer (mm)	300	300	300	300
Soil Description	SAND	SAND	SAND	SAND
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 (%)	**	**	**	**
Field Wet Density (FWD) t/m ³	1.94	1.92	1.83	1.90
Field Moisture Content %	9.2	14.9	8.3	14.2
Field Dry Density (FDD) t/m ³	1.78	1.67	1.69	1.66
Peak Converted Wet Density t/m ³	1.92	2.01	1.88	1.93
Adjusted Peak Converted Wet Density t/m ³	**	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	81.5	103.0	77.5	86.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**	**
Moisture Variation (Wv) %	2.5	-0.5	2.5	2.5
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	101.0	95.5	97.5	98.5
Compaction Method	Standard	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: 10972-3
Issue Number: 1
Date Issued: 12/09/2019
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 06904
Work Request: 2359
Date Sampled: 10/09/2019
Dates Tested: 10/09/2019 - 10/09/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite



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Approved Signatory: Scott Benbow
Laboratory Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	P19-2359A	P19-2359B	P19-2359C
Test Number	8	9	10
Date Tested	10/09/2019	10/09/2019	10/09/2019
Time Tested	16:00	16:00	16:00
Test Request #/Location	Lot No 618	Lot No 619	Lot No 620
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 3	Layer 3	Layer 3
Thickness of Layer (mm)	300	300	300
Soil Description	SAND	SAND	SAND
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	1.82	1.85	1.91
Field Moisture Content %	5.7	6.8	9.6
Field Dry Density (FDD) t/m ³	1.73	1.74	1.75
Peak Converted Wet Density t/m ³	1.85	1.86	1.96
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	55.5	72.5	85.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	5.0	3.0	1.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	98.5	99.5	97.5
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: 10972-4
Issue Number: 1
Date Issued: 16/09/2019
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 06905
Work Request: 2372
Date Sampled: 11/09/2019 15:30
Dates Tested: 11/09/2019 - 12/09/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite



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Approved Signatory: Scott Benbow
 Laboratory Manager
 NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	P19-2372A	P19-2372B	P19-2372C
Test Number	11	12	13
Date Tested	11/09/2019	11/09/2019	11/09/2019
Time Tested	15:30	15:30	15:30
Test Request #/Location	Lot No 614	Lot No 616	Lot No 613
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	SAND	SAND	SAND
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	**	**	**
Field Wet Density (FWD) t/m ³	1.90	1.83	1.85
Field Moisture Content %	7.4	5.8	4.4
Field Dry Density (FDD) t/m ³	1.77	1.73	1.77
Peak Converted Wet Density t/m ³	1.88	1.86	1.78
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	69.0	54.5	93.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	3.5	5.5	0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	101.0	98.0	104.0
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: 10972-5
Issue Number: 1
Date Issued: 19/09/2019
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 06906
Work Request: 2380
Date Sampled: 12/09/2019 13:00
Dates Tested: 12/09/2019 - 13/09/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite



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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Scott Benbow
 Laboratory Manager
 NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	P19-2380A	P19-2380B	P19-2380C
Test Number	14	15	16
Date Tested	12/09/2019	12/09/2019	12/09/2019
Time Tested	13:00	13:00	13:00
Test Request #/Location	Lot No 615	Lot No 612	Lot No 611
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 3	Layer 2	Layer 2
Thickness of Layer (mm)	300	300	300
Soil Description	SAND	SAND	SAND
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	**	**	**
Field Wet Density (FWD) t/m ³	1.88	1.87	1.97
Field Moisture Content %	12.8	6.9	7.6
Field Dry Density (FDD) t/m ³	1.66	1.75	1.83
Peak Converted Wet Density t/m ³	1.97	1.80	1.88
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	106.5	74.0	65.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-1.0	3.0	4.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	95.0	104.0	105.0
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: 10972-6
Issue Number: 1
Date Issued: 19/09/2019
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 06907
Work Request: 2387
Date Sampled: 13/09/2019 14:45
Dates Tested: 13/09/2019 - 16/09/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite



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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Scott Benbow
Laboratory Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1		
Sample Number	P19-2387A	P19-2387B
Test Number	17	18
Date Tested	13/09/2019	13/09/2019
Time Tested	14:45	14:45
Test Request #/Location	Lot No 601	Lot No 601
Chainage (m)	**	**
Location Offset (m)	**	**
Layer / Reduced Level	Layer 1	Layer 2
Thickness of Layer (mm)	300	300
Soil Description	SAND	SAND
Test Depth (mm)	275	275
Sieve used to determine oversize (mm)	19.0	19.0
Percentage of Wet Oversize (%)	0.0	**
Field Wet Density (FWD) t/m ³	1.79	1.78
Field Moisture Content %	3.7	4.1
Field Dry Density (FDD) t/m ³	1.73	1.72
Peak Converted Wet Density t/m ³	1.79	1.77
Adjusted Peak Converted Wet Density t/m ³	**	**
Moisture Ratio % (AS 1289.5.4.1)	44.5	70.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**
Moisture Variation (Wv) %	5.5	2.0
Adjusted Moisture Variation %	**	**
Hilf Density Ratio (%)	100.0	101.0
Compaction Method	Standard	Standard

Moisture Variation Note:

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

Material Test Report

Report Number: 10972-7
Issue Number: 1
Date Issued: 20/09/2019
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 1143
Work Request: 2389
Date Sampled: 14/09/2019 12:45
Dates Tested: 14/09/2019 - 16/09/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite



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NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	P19-2389A	P19-2389B	P19-2389C
Test Number	19	20	21
Date Tested	14/09/2019	14/09/2019	14/09/2019
Time Tested	12:45	12:45	12:45
Test Request #/Location	Lot 619	Lot 620	Lot 621
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	SAND	SAND	SAND
Test Depth (mm)	275	275	250
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	**	**	**
Field Wet Density (FWD) t/m ³	1.84	1.77	1.76
Field Moisture Content %	4.9	9.0	4.3
Field Dry Density (FDD) t/m ³	1.75	1.62	1.68
Peak Converted Wet Density t/m ³	1.83	1.92	1.79
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	2.5	3.0	2.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	100.5	92.0	98.5
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: 10972-8
Issue Number: 1
Date Issued: 23/09/2019
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Work Request: 2401
Date Sampled: 17/09/2019 16:30
Dates Tested: 17/09/2019 - 17/09/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite



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NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	P19-2401A	P19-2401B	P19-2401C	P19-2401D
Test Number	22	23	24	25
Date Tested	17/09/2019	17/09/2019	17/09/2019	17/09/2019
Time Tested	14:30	14:30	14:30	14:30
Test Request #/Location	Retest of 20	Lot No 624	Lot No 623	Lot No 622
Chainage (m)	**	**	**	**
Location Offset (m)	**	**	**	**
Layer / Reduced Level	Layer 1	Layer 2	Layer 3	Layer 3
Thickness of Layer (mm)	300	300	300	300
Soil Description	SAND	SAND	SAND	SAND
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 (%)	**	**	**	**
Field Wet Density (FWD) t/m ³	1.94	1.94	1.93	1.92
Field Moisture Content %	16.3	15.5	15.1	15.7
Field Dry Density (FDD) t/m ³	1.67	1.68	1.67	1.66
Peak Converted Wet Density t/m ³	2.03	2.02	2.02	2.01
Adjusted Peak Converted Wet Density t/m ³	**	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	126.5	129.0	125.0	126.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**	**
Moisture Variation (Wv) %	-3.5	-3.5	-3.0	-3.5
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	96.0	96.0	95.5	95.5
Compaction Method	Standard	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: 10972-9
Issue Number: 1
Date Issued: 23/09/2019
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 06909
Work Request: 2405
Date Sampled: 17/09/2019 15:15
Dates Tested: 17/09/2019 - 18/09/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite



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Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1		
Sample Number	P19-2405A	P19-2405B
Test Number	26	27
Date Tested	17/09/2019	17/09/2019
Time Tested	15:15	15:15
Test Request #/Location	Lot No 628	Lot No 625
Chainage (m)	**	**
Location Offset (m)	**	**
Layer / Reduced Level	Layer 4	Layer 4
Thickness of Layer (mm)	300	300
Soil Description	SAND	SAND
Test Depth (mm)	300	300
Sieve used to determine oversize (mm)	19.0	19.0
Percentage of Wet Oversize (%)	**	**
Field Wet Density (FWD) t/m ³	1.96	1.95
Field Moisture Content %	9.0	9.6
Field Dry Density (FDD) t/m ³	1.80	1.78
Peak Converted Wet Density t/m ³	1.93	1.96
Adjusted Peak Converted Wet Density t/m ³	**	**
Moisture Ratio % (AS 1289.5.4.1)	91.0	89.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**
Moisture Variation (Wv) %	1.0	1.0
Adjusted Moisture Variation %	**	**
Hilf Density Ratio (%)	101.0	99.5
Compaction Method	Standard	Standard

Moisture Variation Note:

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

Material Test Report

Report Number: 10972-9
Issue Number: 1
Date Issued: 23/09/2019
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 06909
Work Request: 2405
Date Sampled: 17/09/2019 15:15
Dates Tested: 17/09/2019 - 18/09/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite



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Compaction Control AS 1289 5.1.1 & 5.4.1 & 5.8.1 & 2.1.1

Sample Number	P19-2405C
Test Number	28
Date Tested	17/09/2019
Time Tested	15:15
Test Request #/Location	Lot No 617
Chainage (m)	**
Location Offset (m)	**
Layer / Reduced Level	Layer 2
Thickness of Layer (mm)	300
Soil Description	SAND
Test Depth (mm)	300
Fraction Tested (mm)	19.0
Oversize (wet basis) %	0
Oversize (dry basis) %	0
Field Wet Density t/m ³	1.96
Field Moisture Content %	15.7
Field Dry Density t/m ³	1.69
Maximum Dry Density t/m ³	1.78
Adjusted Maximum Dry Density t/m ³	**
Optimum Moisture Content (OMC) %	10.5
Adjusted Optimum Moisture Content (OMC) %	**
Moisture Variation %	-5.5
Moisture Ratio %	151.0
Density Ratio %	95.5
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: 10972-10
Issue Number: 1
Date Issued: 18/10/2019
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 6893
Work Request: 2559
Date Sampled: 15/10/2019 11:00
Dates Tested: 15/10/2019 - 15/10/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite



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NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	P19-2559A	P19-2559B	P19-2559C	P19-2559D
Test Number	29	30	31	32
Date Tested	15/10/2019	15/10/2019	15/10/2019	15/10/2019
Time Tested	11:00	11:00	11:00	11:00
Test Request #/Location	Lot 607	Lot 608	Lot 609	Lot 610
Chainage (m)	**	**	**	**
Location Offset (m)	**	**	**	**
Layer / Reduced Level	FSL	FSL	FSL	FSL
Thickness of Layer (mm)	300	300	300	300
Soil Description	SAND	SAND	SAND	SAND
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
Field Wet Density (FWD) t/m ³	1.94	1.96	2.05	1.94
Field Moisture Content %	9.1	6.6	11.9	7.7
Field Dry Density (FDD) t/m ³	1.78	1.84	1.83	1.81
Peak Converted Wet Density t/m ³	1.98	1.86	2.05	1.93
Adjusted Peak Converted Wet Density t/m ³	**	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	78.5	69.5	102.5	67.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**	**
Moisture Variation (Wv) %	2.5	3.0	-0.5	4.0
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	97.5	105.5	100.0	100.5
Compaction Method	Standard	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: 10972-11
Issue Number: 1
Date Issued: 19/02/2020
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 06054
Work Request: 3147
Date Sampled: 11/02/2020 15:30
Dates Tested: 11/02/2020 - 12/02/2020
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite



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NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	P20-3147A	P20-3147B	P20-3147C	P20-3147D
Test Number	33	34	35	36
Date Tested	11/02/2020	11/02/2020	11/02/2020	11/02/2020
Time Tested	11:00	11:00	15:30	15:30
Test Request #/Location	Lot 624	Lot 623	Lot 624	Lot 623
Chainage (m)	**	**	**	**
Location Offset (m)	**	**	**	**
Layer / Reduced Level	Layer 1	Layer 1	Layer 2	Layer 2
Thickness of Layer (mm)	300	300	300	300
Soil Description	SAND	SAND	SAND	SAND
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 (%)	**	**	**	**
Field Wet Density (FWD) t/m ³	2.06	2.06	2.08	2.11
Field Moisture Content %	12.8	13.8	15.5	12.4
Field Dry Density (FDD) t/m ³	1.83	1.81	1.80	1.88
Peak Converted Wet Density t/m ³	2.17	2.21	2.19	2.11
Adjusted Peak Converted Wet Density t/m ³	**	**	**	**
Moisture Variation (Wv) %	-2.5	-3.5	-2.5	-0.5
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	95.0	93.0	95.0	100.0
Compaction Method	Standard	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: 10972-12
Issue Number: 1
Date Issued: 19/02/2020
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 06792
Work Request: 3179
Date Sampled: 15/02/2020 12:15
Dates Tested: 15/02/2020 - 17/02/2020
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: clayey SAND
Material Source: Onsite



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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Scott Benbow
Laboratory Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	P20-3179A	P20-3179B	P20-3179C
Test Number	37	38	39
Date Tested	15/02/2020	15/02/2020	15/02/2020
Time Tested	12:15	12:15	12:15
Test Request #/Location	Lot 629	Lot 628	Lot 627
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 2	Layer 2	Layer 2
Thickness of Layer (mm)	300	300	300
Soil Description	Clayey SAND	Clayey SAND	Clayey SAND
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	2.10	2.12	2.11
Field Moisture Content %	17.7	12.5	10.3
Field Dry Density (FDD) t/m ³	1.79	1.89	1.91
Peak Converted Wet Density t/m ³	2.12	2.19	2.14
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	104.5	104.0	107.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-1.0	-0.5	-1.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	99.0	97.0	98.5
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: 10972-13
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Correct Lot Numbers Added
Date Issued: 24/02/2020
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Client Reference: 06793
Work Request: 3187
Date Sampled: 17/02/2020
Dates Tested: 17/02/2020 - 18/02/2020
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Material: silty Clay
Material Source: Onsite - Stockpile



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 Project Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

	P20-3187A	P20-3187B	P20-3187C
Sample Number			
Test Number	40	41	42
Date Tested	17/02/2020	17/02/2020	17/02/2020
Time Tested	**	**	**
Test Request #/Location	Lot 630	Lot 631	Lot 631
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 1	Layer 2	Layer 3
Thickness of Layer (mm)	300	300	150
Soil Description	silty Clay	silty Clay	silty Clay
Test Depth (mm)	275	275	125
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	**	**	**
Field Wet Density (FWD) t/m ³	2.08	2.21	2.07
Field Moisture Content %	13.7	11.9	18.0
Field Dry Density (FDD) t/m ³	1.83	1.97	1.75
Peak Converted Wet Density t/m ³	2.10	2.10	2.12
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	94.0	96.0	101.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	1.0	0.5	-0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	99.0	105.0	97.5
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: 10972-14
Issue Number: 1
Date Issued: 24/02/2020
Client: Streetworks Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: 10972
Project Name: Summerhill Estate Stage 6
Project Location: Botanic Ridge
Work Request: 3227
Date Sampled: 24/02/2020 10:00
Dates Tested: 24/02/2020 - 24/02/2020
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite



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NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	P20-3227A		
Test Number	43		
Date Tested	24/02/2020		
Time Tested	10:00		
Test Request #/Location	Lot 623		
Chainage (m)	Retest of Test 34		
Location Offset (m)	**		
Layer / Reduced Level	Layer 1		
Thickness of Layer (mm)	300		
Soil Description	SAND		
Test Depth (mm)	275		
Sieve used to determine oversize (mm)	19.0		
Percentage of Wet Oversize (%)	**		
Field Wet Density (FWD) t/m ³	2.10		
Field Moisture Content %	**		
Field Dry Density (FDD) t/m ³	**		
Peak Converted Wet Density t/m ³	2.11		
Adjusted Peak Converted Wet Density t/m ³	**		
Moisture Ratio % (AS 1289.5.4.1)	**		
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**		
Moisture Variation (Wv) %	0.0		
Adjusted Moisture Variation %	**		
Hilf Density Ratio (%)	99.5		
Compaction Method	Standard		

Moisture Variation Note:

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