# Opalia Estate Stage 9A

# GITA Inspection Verification Report

| | |
|---|---|
| **Prepared For:** | Lojac Civil Pty Ltd |
| **Report Number** | D23978A V1 |
| **Version Release Date** | 19 May 2023 |
| **Report Released By** | C Caulfield |
| **Title** | Project Manager |
| **Signature** |  |

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## Appendices

# 1 Introduction

*Terra Firma Laboratories* was engaged by Lojac Civil Pty Ltd as the Geotechnical Inspection and Testing Authority (GITA) to provide Level 1 supervision and testing works on the earthworks component for Opalia Estate Stage 9A. This work was conducted over the period of 10/05/2023 to 15/05/2023.

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 901 to 932 and 947 to 950, bounded by streets Metroon Drive, Gansha Street, Elpis Road and Cheynes 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 Breese Pitt Dixon Pty Ltd (Drawing Reference: 6751 E/9A-R) and provided by Lojac Civil 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 Lojac Civil 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 1500m$^2$), the minimum testing frequency is 1 test per layer per material type per 2500m$^2$ or 1 test per 500m$^3$ 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.

# 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 to have been conducted within the house allotment but may have been verified by testing conducted within up to a 2500m$^2$ 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 (D23978D1, 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 36 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.

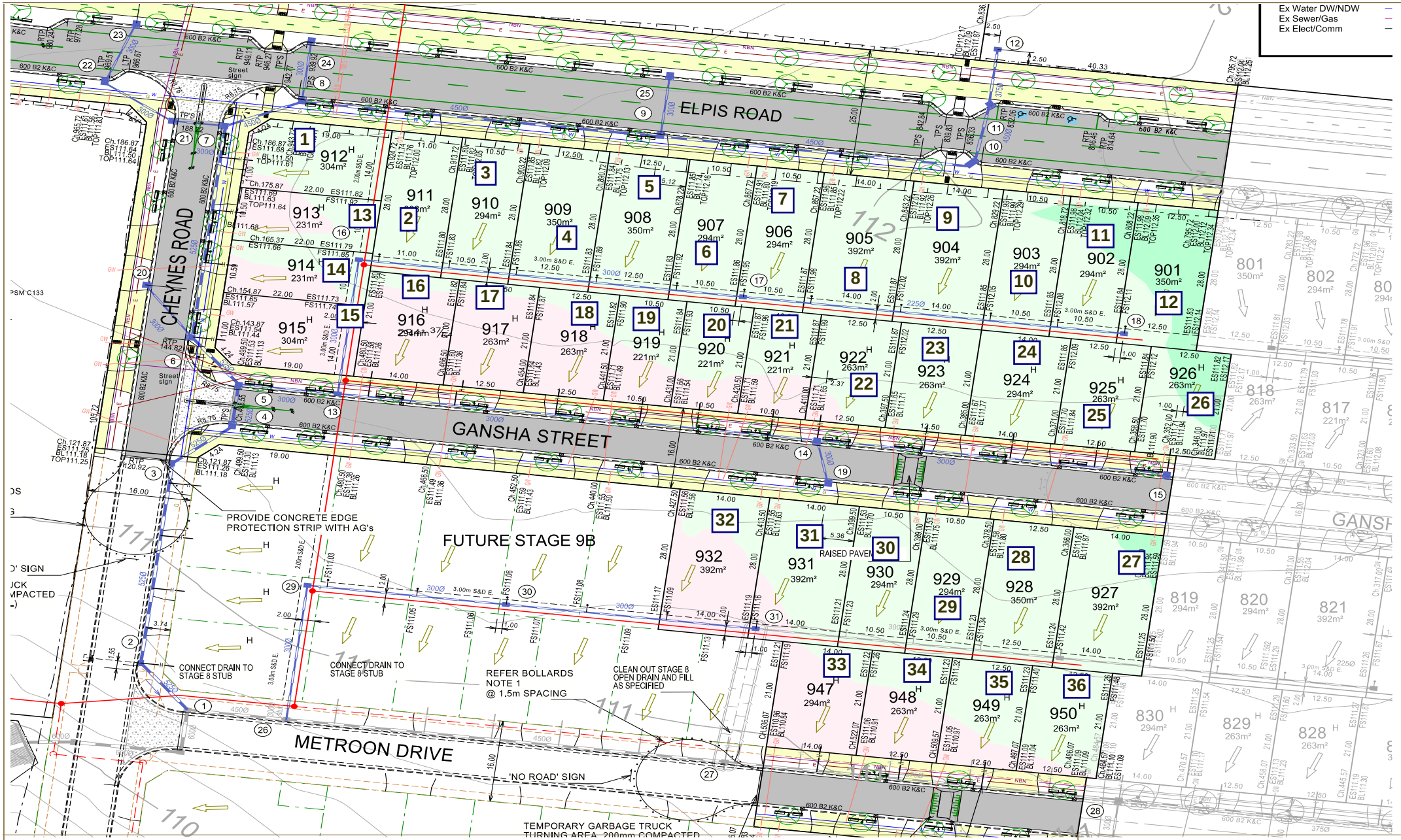
## 5 Statement of Compliance

The intention of this report is to provide a description of the earthworks construction for Stage 9A at Opalia Estate. For completed fill areas of greater than 300mm, and for works completed between 10/05/2023 and 15/05/2023, 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 9A of Opalia Estate was observed to be constructed in compliance with the requirements of the Technical Specification.

# 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




terra firma laboratories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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: Lojac Civil Pty Ltd

Project: Opalia Estate, Stage 9A

Reference: D23978 D1

# Appendix 2: Compaction Test Register and Test Certificates

# Compaction Test Register

**Client:** Lojac Civil Pty Ltd
**Project:** Opalia Estate Stage 9A
**Project No:** D23978
**Specification:** 95%

| Date: | Test No: | Layer: | Retest of: | Density: | Pass/Fail: | Lot No: | Report No: |
|---|---|---|---|---|---|---|---|
| 10/05/2023 | 1 | Layer 1 | | 99.5% | Pass | Lot 912 | D23978-1 |
| 10/05/2023 | 2 | Layer 1 | | 98.5% | Pass | Lot 911 | D23978-1 |
| 10/05/2023 | 3 | Layer 1 | | 99.5% | Pass | Lot 910 | D23978-1 |
| 10/05/2023 | 4 | Layer 1 | | 99.0% | Pass | Lot 909 | D23978-1 |
| 10/05/2023 | 5 | Layer 1 | | 100.0% | Pass | Lot 908 | D23978-1 |
| 10/05/2023 | 6 | Layer 1 | | 102.5% | Pass | Lot 907 | D23978-1 |
| 10/05/2023 | 7 | Layer 2 | | 99.5% | Pass | Lot 906 | D23978-1 |
| 10/05/2023 | 8 | Layer 2 | | 100.0% | Pass | Lot 905 | D23978-1 |
| 10/05/2023 | 9 | Layer 2 | | 100.5% | Pass | Lot 904 | D23978-1 |
| 10/05/2023 | 10 | Layer 2 | | 100.0% | Pass | Lot 903 | D23978-1 |
| 10/05/2023 | 11 | Layer 2 | | 99.5% | Pass | Lot 902 | D23978-1 |
| 10/05/2023 | 12 | Layer 2 | | 96.0% | Pass | Lot 901 | D23978-1 |
| 15/05/2023 | 13 | Layer 1 | | 101.5% | Pass | Lot 913 | D23978-2 |
| 15/05/2023 | 14 | Layer 1 | | 100.5% | Pass | Lot 914 | D23978-2 |
| 15/05/2023 | 15 | Layer 1 | | 98.5% | Pass | Lot 915 | D23978-2 |
| 15/05/2023 | 16 | Layer 1 | | 100.0% | Pass | Lot 916 | D23978-2 |
| 15/05/2023 | 17 | Layer 1 | | 99.0% | Pass | Lot 917 | D23978-2 |
| 15/05/2023 | 18 | Layer 1 | | 102.5% | Pass | Lot 918 | D23978-2 |
| 15/05/2023 | 19 | Layer 1 | | 98.0% | Pass | Lot 919 | D23978-2 |
| 15/05/2023 | 20 | Layer 1 | | 99.5% | Pass | Lot 920 | D23978-2 |
| 15/05/2023 | 21 | Layer 1 | | 100.0% | Pass | Lot 921 | D23978-2 |
| 15/05/2023 | 22 | Layer 1 | | 99.5% | Pass | Lot 922 | D23978-2 |
| 15/05/2023 | 23 | Layer 1 | | 99.0% | Pass | Lot 923 | D23978-2 |
| 15/05/2023 | 24 | Layer 1 | | 99.0% | Pass | Lot 924 | D23978-2 |
| 15/05/2023 | 25 | Layer 1 | | 99.0% | Pass | Lot 925 | D23978-2 |
| 15/05/2023 | 26 | Layer 1 | | 97.5% | Pass | Lot 926 | D23978-2 |
| 15/05/2023 | 27 | Layer 1 | | 98.5% | Pass | Lot 927 | D23978-2 |
| 15/05/2023 | 28 | Layer 1 | | 99.0% | Pass | Lot 928 | D23978-2 |
| 15/05/2023 | 29 | Layer 1 | | 99.5% | Pass | Lot 929 | D23978-2 |
| 15/05/2023 | 30 | Layer 1 | | 99.5% | Pass | Lot 930 | D23978-2 |
| 15/05/2023 | 31 | Layer 1 | | 100.5% | Pass | Lot 931 | D23978-2 |
| 15/05/2023 | 32 | Layer 1 | | 101.0% | Pass | Lot 932 | D23978-2 |
| 15/05/2023 | 33 | Layer 1 | | 100.5% | Pass | Lot 947 | D23978-2 |
| 15/05/2023 | 34 | Layer 1 | | 102.5% | Pass | Lot 948 | D23978-2 |
| 15/05/2023 | 35 | Layer 1 | | 101.5% | Pass | Lot 949 | D23978-2 |
| 15/05/2023 | 36 | Layer 1 | | 102.0% | Pass | Lot 950 | D23978-2 |

# Material Test Report

**Report Number:** D23978-1
**Issue Number:** 2 - *This version supersedes all previous issues*
**Reissue Reason:** *incorrect layer*
**Date Issued:** 17/05/2023
**Client:** Lojac Civil Pty Ltd
35/148 Chesterville Road, Moorabbin Vic 3189
**Contact:** Eski
**Project Number:** D23978
**Project Name:** Opalia Estate Stage 9A LOTS - Level one
**Project Location:** Melton South
**Work Request:** 5889
**Date Sampled:** 10/05/2023 9:15
**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:** Opalia Estate Stage 9A - Level one
**Material:** Clay
**Material Source:** Imported

terra firma laboratories
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 | D23-5889A | D23-5889B | D23-5889C | D23-5889D | D23-5889E | D23-5889F |
| 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 | ** | ** | ** | ** | ** | ** |
| Test Request #/Location | LOT 912 | LOT 911 | LOT 910 | LOT 909 | LOT 908 | LOT 907 |
| Layer / Reduced Level | Layer 1 | Layer 1 | Layer 1 | Layer 1 | Layer 1 | Layer 1 |
| Thickness of Layer (mm) | 200 | 200 | 200 | 200 | 200 | 200 |
| Soil Description | Clay | Clay | Clay | Clay | Clay | Clay |
| Test Depth (mm) | 175 | 175 | 175 | 175 | 175 | 175 |
| 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$^3$ | 1.86 | 1.96 | 1.85 | 1.84 | 1.87 | 1.86 |
| Field Moisture Content % | 20.4 | 22.7 | 21.0 | 19.1 | 21.6 | 22.8 |
| Field Dry Density (FDD) t/m$^3$ | 1.54 | 1.60 | 1.53 | 1.55 | 1.54 | 1.52 |
| Peak Converted Wet Density t/m$^3$ | 1.87 | 1.98 | 1.86 | 1.86 | 1.87 | 1.82 |
| Adjusted Peak Converted Wet Density t/m$^3$ | ** | ** | ** | ** | ** | ** |
| Adj. Optimum Moisture Content % (AS1289.5.4.1) | 23.5 | 25.3 | 24.0 | 22.0 | 22.5 | 22.0 |
| Adj. Field Moisture Content % (AS1289.5.4.1) | 20.4 | 22.7 | 21.0 | 19.1 | 21.6 | 22.8 |
| Moisture Ratio % (AS1289.5.4.1) | 87.0 | 90.0 | 87.5 | 86.5 | 96.0 | 103.5 |
| Adjusted Moisture Ratio % (AS1289.5.4.1) | ** | ** | ** | ** | ** | ** |
| Moisture Variation (Wv) % | 3.0 | 2.5 | 3.0 | 3.0 | 1.0 | -1.0 |
| Adjusted Moisture Variation % | ** | ** | ** | ** | ** | ** |
| Hilf Density Ratio (%) | **99.5** | **98.5** | **99.5** | **99.0** | **100.0** | **102.5** |
| 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

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**Material:** Clay
**Material Source:** Imported

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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 | D23-5889G | D23-5889H | D23-5889I | D23-5889J | D23-5889K | D23-5889L |
| Test Number | 7 | 8 | 9 | 10 | 11 | 12 |
| Date Tested | 10/05/2023 | 10/05/2023 | 10/05/2023 | 10/05/2023 | 10/05/2023 | 10/05/2023 |
| Time Tested | ** | ** | ** | ** | ** | ** |
| Test Request #/Location | LOT 906 | LOT 905 | LOT 904 | LOT 903 | LOT 902 | LOT 901 |
| Layer / Reduced Level | Layer 2 | Layer 2 | Layer 2 | Layer 2 | Layer 2 | Layer 2 |
| Thickness of Layer (mm) | 200 | 200 | 200 | 200 | 200 | 200 |
| Soil Description | Clay | Clay | Clay | Clay | Clay | Clay |
| Test Depth (mm) | 175 | 175 | 175 | 175 | 175 | 175 |
| 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$^3$ | 1.92 | 1.88 | 1.88 | 1.90 | 1.91 | 1.91 |
| Field Moisture Content % | 21.8 | 15.0 | 19.7 | 18.2 | 17.0 | 20.7 |
| Field Dry Density (FDD) t/m$^3$ | 1.58 | 1.64 | 1.57 | 1.60 | 1.63 | 1.58 |
| Peak Converted Wet Density t/m$^3$ | 1.93 | 1.89 | 1.87 | 1.90 | 1.92 | 1.99 |
| Adjusted Peak Converted Wet Density t/m$^3$ | ** | ** | ** | ** | ** | ** |
| Adj. Optimum Moisture Content % (AS1289.5.4.1) | 22.4 | 17.8 | 19.6 | 21.1 | 19.9 | 21.5 |
| Adj. Field Moisture Content % (AS1289.5.4.1) | 21.8 | 15.0 | 19.7 | 18.2 | 17.0 | 20.7 |
| Moisture Ratio % (AS1289.5.4.1) | 97.0 | 84.5 | 101.0 | 86.0 | 85.5 | 96.5 |
| Adjusted Moisture Ratio % (AS1289.5.4.1) | ** | ** | ** | ** | ** | ** |
| Moisture Variation (Wv) % | 0.5 | 3.0 | 0.0 | 3.0 | 3.0 | 0.5 |
| Adjusted Moisture Variation % | ** | ** | ** | ** | ** | ** |
| Hilf Density Ratio (%) | **99.5** | **100.0** | **100.5** | **100.0** | **99.5** | **96.0** |
| 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:** D23978-2
**Issue Number:** 2 - *This version supersedes all previous issues*
**Reissue Reason:** *incorrect layer*
**Date Issued:** 17/05/2023
**Client:** Lojac Civil Pty Ltd
35/148 Chesterville Road, Moorabbin Vic 3189
**Project Number:** D23978
**Project Name:** Opalia Estate Stage 9A LOTS - Level one
**Project Location:** Melton South
**Work Request:** 5916
**Date Sampled:** 15/05/2023 12:00
**Dates Tested:** 15/05/2023 - 17/05/2023
**Sampling Method:** AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
**Specification:** 95% STD
**Location:** Opalia Estate Stage 9A - Level One
**Material:** Clay
**Material Source:** Imported

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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 | D23-5916A | D23-5916B | D23-5916C | D23-5916D | D23-5916E | D23-5916F |
| Test Number | 13 | 14 | 15 | 16 | 17 | 18 |
| Date Tested | 15/05/2023 | 15/05/2023 | 15/05/2023 | 15/05/2023 | 15/05/2023 | 15/05/2023 |
| Time Tested | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 |
| Test Request #/Location | Lot 913 | Lot 914 | Lot 915 | Lot 916 | Lot 917 | Lot 918 |
| 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$^3$ | 1.98 | 1.96 | 1.91 | 1.92 | 1.93 | 1.90 |
| Field Moisture Content % | 13.2 | 13.2 | 13.3 | 13.1 | 13.7 | 13.7 |
| Field Dry Density (FDD) t/m$^3$ | 1.75 | 1.73 | 1.68 | 1.70 | 1.69 | 1.67 |
| Peak Converted Wet Density t/m$^3$ | 1.95 | 1.94 | 1.94 | 1.92 | 1.94 | 1.85 |
| Adjusted Peak Converted Wet Density t/m$^3$ | ** | ** | ** | ** | ** | ** |
| Adj. Optimum Moisture Content % (AS1289.5.4.1) | 18.6 | 18.6 | 18.7 | 18.5 | 18.7 | 18.7 |
| Adj. Field Moisture Content % (AS1289.5.4.1) | 13.2 | 13.2 | 13.3 | 13.1 | 13.7 | 13.7 |
| Moisture Ratio % (AS1289.5.4.1) | 71.0 | 71.5 | 71.5 | 70.5 | 73.5 | 73.5 |
| Adjusted Moisture Ratio % (AS1289.5.4.1) | ** | ** | ** | ** | ** | ** |
| Moisture Variation (Wv) % | 5.0 | 5.0 | 5.5 | 5.5 | 5.0 | 5.0 |
| Adjusted Moisture Variation % | ** | ** | ** | ** | ** | ** |
| Hilf Density Ratio (%) | **101.5** | **100.5** | **98.5** | **100.0** | **99.0** | **102.5** |
| 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:** D23978-2
**Issue Number:** 2 - *This version supersedes all previous issues*
**Reissue Reason:** *incorrect layer*
**Date Issued:** 17/05/2023
**Client:** Lojac Civil Pty Ltd
35/148 Chesterville Road, Moorabbin Vic 3189
**Project Number:** D23978
**Project Name:** Opalia Estate Stage 9A LOTS - Level one
**Project Location:** Melton South
**Work Request:** 5916
**Date Sampled:** 15/05/2023 12:00
**Dates Tested:** 15/05/2023 - 17/05/2023
**Sampling Method:** AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
**Specification:** 95% STD
**Location:** Opalia Estate Stage 9A - Level One
**Material:** Clay
**Material Source:** Imported

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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 | D23-5916G | D23-5916H | D23-5916I | D23-5916J | D23-5916K | D23-5916L |
| Test Number | 19 | 20 | 21 | 22 | 23 | 24 |
| Date Tested | 15/05/2023 | 15/05/2023 | 15/05/2023 | 15/05/2023 | 15/05/2023 | 15/05/2023 |
| Time Tested | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 |
| Test Request #/Location | Lot 919 | Lot 920 | Lot 921 | Lot 922 | Lot 923 | Lot 924 |
| 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$^3$ | 1.86 | 1.91 | 1.92 | 1.90 | 1.91 | 1.90 |
| Field Moisture Content % | 12.9 | 13.3 | 13.1 | 13.2 | 15.2 | 16.2 |
| Field Dry Density (FDD) t/m$^3$ | 1.65 | 1.69 | 1.70 | 1.67 | 1.66 | 1.63 |
| Peak Converted Wet Density t/m$^3$ | 1.91 | 1.92 | 1.92 | 1.90 | 1.93 | 1.92 |
| Adjusted Peak Converted Wet Density t/m$^3$ | ** | ** | ** | ** | ** | ** |
| Adj. Optimum Moisture Content % (AS1289.5.4.1) | 18.4 | 18.9 | 18.6 | 18.8 | 20.5 | 21.9 |
| Adj. Field Moisture Content % (AS1289.5.4.1) | 12.9 | 13.3 | 13.1 | 13.2 | 15.2 | 16.2 |
| Moisture Ratio % (AS1289.5.4.1) | 70.5 | 70.5 | 70.0 | 70.5 | 74.0 | 74.5 |
| Adjusted Moisture Ratio % (AS1289.5.4.1) | ** | ** | ** | ** | ** | ** |
| Moisture Variation (Wv) % | 5.5 | 5.5 | 5.5 | 5.5 | 5.0 | 5.5 |
| Adjusted Moisture Variation % | ** | ** | ** | ** | ** | ** |
| Hilf Density Ratio (%) | **98.0** | **99.5** | **100.0** | **99.5** | **99.0** | **99.0** |
| 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:** D23978-2
**Issue Number:** 2 - *This version supersedes all previous issues*
**Reissue Reason:** *incorrect layer*
**Date Issued:** 17/05/2023
**Client:** Lojac Civil Pty Ltd
35/148 Chesterville Road, Moorabbin Vic 3189
**Project Number:** D23978
**Project Name:** Opalia Estate Stage 9A LOTS - Level one
**Project Location:** Melton South
**Work Request:** 5916
**Date Sampled:** 15/05/2023 12:00
**Dates Tested:** 15/05/2023 - 17/05/2023
**Sampling Method:** AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
**Specification:** 95% STD
**Location:** Opalia Estate Stage 9A - Level One
**Material:** Clay
**Material Source:** Imported

terra firma laboratories
Deer Park Laboratory
17 Walhalla Way Ravenhall VIC 3023
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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 | D23-5916M | D23-5916N | D23-5916O | D23-5916P | D23-5916Q | D23-5916R |
| Test Number | 25 | 26 | 27 | 28 | 29 | 30 |
| Date Tested | 15/05/2023 | 15/05/2023 | 15/05/2023 | 15/05/2023 | 15/05/2023 | 15/05/2023 |
| Time Tested | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 |
| Test Request #/Location | Lot 925 | Lot 926 | Lot 927 | Lot 928 | Lot 929 | Lot 930 |
| 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 | ** | ** |
| Field Wet Density (FWD) t/m$^3$ | 1.90 | 1.85 | 1.87 | 1.89 | 1.88 | 1.86 |
| Field Moisture Content % | 17.1 | 16.8 | 17.1 | 15.5 | ** | ** |
| Field Dry Density (FDD) t/m$^3$ | 1.62 | 1.58 | 1.60 | 1.63 | ** | ** |
| Peak Converted Wet Density t/m$^3$ | 1.92 | 1.89 | 1.90 | 1.90 | 1.89 | 1.87 |
| Adjusted Peak Converted Wet Density t/m$^3$ | ** | ** | ** | ** | ** | ** |
| Adj. Optimum Moisture Content % (AS1289.5.4.1) | 22.3 | 21.7 | 22.1 | 20.1 | 19.6 | 22.7 |
| Adj. Field Moisture Content % (AS1289.5.4.1) | 17.1 | 16.8 | 17.1 | 15.5 | ** | ** |
| Moisture Ratio % (AS1289.5.4.1) | 76.5 | 77.5 | 77.5 | 77.5 | ** | ** |
| Adjusted Moisture Ratio % (AS1289.5.4.1) | ** | ** | ** | ** | ** | ** |
| Moisture Variation (Wv) % | 5.0 | 5.0 | 5.0 | 4.5 | 4.5 | 4.5 |
| Adjusted Moisture Variation % | ** | ** | ** | ** | ** | ** |
| Hilf Density Ratio (%) | **99.0** | **97.5** | **98.5** | **99.0** | **99.5** | **99.5** |
| 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:** D23978-2
**Issue Number:** 2 - *This version supersedes all previous issues*
**Reissue Reason:** *incorrect layer*
**Date Issued:** 17/05/2023
**Client:** Lojac Civil Pty Ltd
35/148 Chesterville Road, Moorabbin Vic 3189
**Project Number:** D23978
**Project Name:** Opalia Estate Stage 9A LOTS - Level one
**Project Location:** Melton South
**Work Request:** 5916
**Date Sampled:** 15/05/2023 12:00
**Dates Tested:** 15/05/2023 - 17/05/2023
**Sampling Method:** AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
**Specification:** 95% STD
**Location:** Opalia Estate Stage 9A - Level One
**Material:** Clay
**Material Source:** Imported

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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 | D23-5916S | D23-5916T | D23-5916U | D23-5916V | D23-5916W | D23-5916X |
| Test Number | 31 | 32 | 33 | 34 | 35 | 36 |
| Date Tested | 15/05/2023 | 15/05/2023 | 15/05/2023 | 15/05/2023 | 15/05/2023 | 15/05/2023 |
| Time Tested | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 | 12:00 |
| Test Request #/Location | Lot 931 | Lot 932 | Lot 947 | Lot 948 | Lot 949 | Lot 950 |
| 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 | ** | ** |
| Field Wet Density (FWD) t/m$^3$ | 1.88 | 1.94 | 1.92 | 1.92 | 1.92 | 1.92 |
| Field Moisture Content % | 16.9 | 16.8 | 15.1 | 12.2 | ** | ** |
| Field Dry Density (FDD) t/m$^3$ | 1.61 | 1.66 | 1.66 | 1.72 | ** | ** |
| Peak Converted Wet Density t/m$^3$ | 1.87 | 1.92 | 1.91 | 1.88 | 1.89 | 1.88 |
| Adjusted Peak Converted Wet Density t/m$^3$ | ** | ** | ** | ** | ** | ** |
| Adj. Optimum Moisture Content % (AS1289.5.4.1) | 21.6 | 21.3 | 19.3 | 16.4 | 19.0 | 21.8 |
| Adj. Field Moisture Content % (AS1289.5.4.1) | 16.9 | 16.8 | 15.1 | 12.2 | ** | ** |
| Moisture Ratio % (AS1289.5.4.1) | 78.5 | 79.0 | 78.5 | 74.0 | ** | ** |
| Adjusted Moisture Ratio % (AS1289.5.4.1) | ** | ** | ** | ** | ** | ** |
| Moisture Variation (Wv) % | 4.5 | 4.5 | 4.0 | 4.5 | 3.5 | 4.5 |
| Adjusted Moisture Variation % | ** | ** | ** | ** | ** | ** |
| Hilf Density Ratio (%) | **100.5** | **101.0** | **100.5** | **102.5** | **101.5** | **102.0** |
| 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