

GEOTECHNICAL REPORT
MD & PA EXCAVATIONS PTY LTD
BRIMBANK GARDENS ESTATE – STAGE 20
DERRIMUT, VICTORIA.

GS898/1-AA

16 January, 2008

GS898/1- AA : EG

16 January, 2008

MD & PA Cornfoot Pty Ltd
200 Forbes – Moranding Road
KILMORE, 3764 VIC

Attention: Mr Marty Cornfoot

Dear Sir,

RE: BRIMBANK GARDENS ESTATE – STAGE 20 DERRIMUT, VICTORIA.

This letter presents our report on the Level one inspection and testing services associated with the construction of engineered fill at the above project. Two copies of the report are provided for your reference.

If you have any questions related to this report please do not hesitate to contact Chris Senserrick or the undersigned.

For and on behalf of

GROUND SCIENCE PTY LTD



ERNIE GMEHLING

Ass Dip Eng (civil)

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APPENDICES

A FIELD DENSITY TESTING

Table A1 – Level 1 Inspection and Testing – Summary of Field Density Test Results (1 page)

Field Density Test Reports (3 pages)

1. INTRODUCTION

This report presents the results of inspection activities, compaction control and laboratory testing services performed by Ground Science Pty Ltd at Brimbank Gardens residential estate stage 20 Derrimut. Ground Science Pty Ltd were engaged to provide Level one inspection and testing services for this component of the project. Authorisation to proceed was verbally given to Ground Science Pty Ltd by Marty Cornfoot of MD & PA Excavations Pty Ltd (MD & PA Excavations) on 06/12/ 2007.

Level one Testing as defined in AS3798-2007 "Guidelines on Earthworks for Commercial and Residential Development" provides for full time inspection of the construction of controlled fill and compaction testing in accordance with AS1289 "Methods of Testing Soils for Engineering Purposes". The Level one inspection and testing was undertaken by an experienced geotechnician from Ground Science.

2. SCOPE OF WORK

2.1 Areas of work

Ground Science Pty Ltd provided Level one inspection and testing of the engineered fill placed on lots 1224 – 1233, 1283 - 1285 and lots 1286 – 1290 of Brimbank Gardens residential estate stage 20 Derrimut.

The area on which engineered fill was placed is shown on site plans Figures 1,2 and 3 which is based on drawings prepared by WBCM Pty Ltd and provided by Mr Marty Cornfoot. It is understood that the engineered fill was placed and compacted up to within 100mm below the required finished level, to allow for 100mm of topsoil placement.

The placement of the fill under Level one inspection and testing was commenced on 7 December 2007 and concluded until 10 December 2007.

2.2 Placement Specification

The placement of engineered fill on the above mentioned areas was to be carried out in accordance with AS3798 2007 "Guidelines on Earthworks for commercial and residential developments" as instructed by MD & PA Excavations Pty Ltd. In summary, the technical specification for the engineered fill is as follows;

- Prior to filling, the area shall be stripped of topsoil, subsoil, soft material and vegetation to a firm base approved by the Superintendent.
- Suitable fill material shall be placed in loose horizontal layers not exceeding 250mm in thickness;
- The fill shall be compacted to a Dry Density Ratio of at least 95% Standard (AS1289: 5.1.1, 5.4.1 or 5.7.1)
- The fill shall be moisture conditioned to a moisture ratio of 85 – 115% of standard compaction (AS1289 5.1.1, 5.4.1, or 5.7.1)
- The fill material shall not contain greater than 20%, by volume, of particles coarser than 37.5mm and no particle over 200mm in any dimension.
- The frequency of field density testing shall be in accordance with the guidelines in AS3798 which nominates a frequency of not less than:
 - 1 test per layer or 200mm per 2500m²;

- 1 test per 500m³ distributed reasonably evenly throughout the full depth and area; or
- 3 tests per site visit; whichever requires the most tests.

3. INSPECTION AND TESTING

3.1 Subgrade Preparation

Site stripping had occurred with the use of a Komatsu PC 250 excavator, With approximately 80mm to 100mm of surface soils and vegetation removed. The exposed subgrade was found to be in natural soils and consisted of Clay, high plasticity, brown. Moisture conditioning of the base layer occurred with several passes of the water truck and was then compacted using a Cat 815 compactor.

3.2 Construction Materials

Fill for the project was obtained from the road cut out of Sherrington Grange of the Brimbank Gardens Estate. This material consisted of CLAYS, high plasticity, dark brown in colour. The maximum particle size of the fill was generally less than 150mm, when observed oversize particles were separated from the fill and placed in a stockpile to be removed from site. This fill source was nominated and approved as clean fill and suitable for use by the client. The fill sources were found to be slightly dry of optimum, requiring additional moisture conditioning during of the dumped stockpiles as well as during the spreading process. Further moisture conditioning occurred with the water cart when instructed by the Ground Science site personnel and generally occurred between layers to assist in the binding of the layers.

3.3 Fill Construction

A Komatsu D85A dozer was used to push the dampened stockpiles adjacent to the fill zones out into fill areas, were the Cat 815 spread the material out into approximately 200mm loose layers. Several passes of a water cart was used to provide further moisture conditioning prior to the compactor applying a minimum eight passes.

The majority of engineered fill placed on lots 1224 to 1233 generally occurred at the front of the lot to a depth of between 80mm to 200mm. The fill placement tapered off to blend into the natural slope at approximately 6m from the front of the lot.

Filling on lots 1209 to 1210 occurred at the back half of the lots with approximately 200mm of engineered fill placed.

Minimal filling occurred on lots 1265 to 1267 which was across the rear boundary and extended out by 5m into the lots at a maximum depth of 300mm of engineered fill.

Approximately 350mm of engineered fill covered the total area of lot 1284 with the west half of lot 1283 also receiving fill.

Filling on lots 1286 to 1290 was to depths of 300mm to 400mm at various locations on the lots to blend into surrounding levels and is documented on drawing figures 1,2 & 3 which also provided a guide to the depths of fill placement with the edges of the fill zones at zero depth. It should be noted that a further topsoil layer of approximately 100mm is expected to complete the finished levels of the fill and does not form a part of the engineered fill. This layer is placed to provide for a growing medium for grass and gardens and some may be stripped during site levelling during construction of a dwelling.

During fill placement the weather conditions were generally fine, with temperatures ranging from 20 - 30

degrees.

Fill placement covered by the level one inspection and testing is nominated on figures 1,2 and 3.

3.4 Results of Compaction Control Testing

Level one inspection and testing was undertaken by an experienced technician from Ground Science who nominated the location of the in-situ density tests.

Testing comprised a total of thirteen in-situ density tests using a nuclear moisture-density gauge in accordance with Australian Standard (AS1289 5.8.1) together with thirteen "Rapid Hilf" Compaction tests (AS1289 5.7.1). A summary of the density and moisture test results is provided in Table 1. The results of the compaction control testing are presented on the Field Density Test Reports in Appendix A, together with a summary of the test results and locations in Table A1.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction tests to comply.

The moisture conditioning of the fill source indicated a reasonable moisture ratio with the results falling within the range of 83 – 109%. It should be noted that a single test fell marginally outside the moisture ratio specification but will not affect the structural integrity of the fill.

The hilf rapid compaction testing was undertaken in our Thomastown laboratory.

Field density testing indicated that the engineered fill on lots 1224 – 1233, 1283 - 1285 and lots 1286 – 1290 of Brimbank Gardens residential estate - Stage 20, Derrimut complied with the technical specification.

TABLE 1: SUMMARY OF DENSITY TESTING

Lot Number	No. of Tests Carried Out	No. of Tests Outside of the density specification requirements
1226/1227	1	0
1229/1230	1	0
1231/1232	1	0
1286/1287	1	0
1287/1288	1	0
1289	1	0
1284	1	0
1283/1284	1	0

1267	1	0
1266	1	0
1265	1	0
1210	1	0
1209	1	0
TOTAL	13	0

3.5 Stripped Surface Levels

The initial stripped surface levels were generally between 60mm and 120mm from the natural surface levels. The drawings provided by MP & MD Excavations were used to estimate the stripped surface levels and the values are shown on Figures 1, 2 and 3.

3.6 Final Surface Levels

The final levels of the placed fill were estimated from onsite survey pegs indicating finished surface levels. A Ground Science staff member estimated final levels from the plans provided by MP & MD Excavations and are shown on Figures 1, 2 and 3.

The final levels provided on Figures 1, 2 and 3 are the constructed finished surface levels of the engineered fill and a further topsoil layer of approximately 100mm is expected to complete the finished levels of the fill.

4. COMPLIANCE

Ground Science Staff have undertaken Level one inspection and testing services of the construction of the engineered fill in the areas designated on Figures 1, 2 & 3. Ground Science field staff has also observed that the prepared subgrade provided an adequate base for the subsequent placement of engineered fill.

Based on observations made by Ground Science staff and the results of density tests, we consider that the engineered fill placed on the residential allotments has been constructed in accordance with the stated intent of the Specification.

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5. LIMITATIONS

It should be noted that even though the final fill layer was moisture conditioned and compacted to meet the specification requirements, over time this material may be subjected to adverse weather conditions resulting in either surface softening or drying and cracking. The integrity of the top 200mm – 300mm of the fill will deteriorate with time and should be taken into account by the foundation engineer prior to the construction of a dwelling. The levels nominated in this report are a guide to amounts of fill placed and do not necessarily reflect accurate survey of the fill levels.

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For and on behalf of

GROUND SCIENCE PTY LTD

A handwritten signature in black ink, appearing to read 'Ernie Gmebling', written over a horizontal line.

ERNIE GMEHLING

Ass Dip Eng (civil)

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APPENDIX A

FIELD DENSITY TESTING

Table A1-Level 1 Inspection and Testing - Summary of Field Density Test Results (1 page)

Field Density Test Report (3 pages)