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Mayfield Residential Subdivision Stage 1
Geotechnical Report
Suitability of Site for Development
Bethlehem, Tauranga

For Mayfield Limited

April 2002
Reference 7073-NR-49
Revision 0

Connell Wagner

Document Control

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1. Introduction

1.1 General

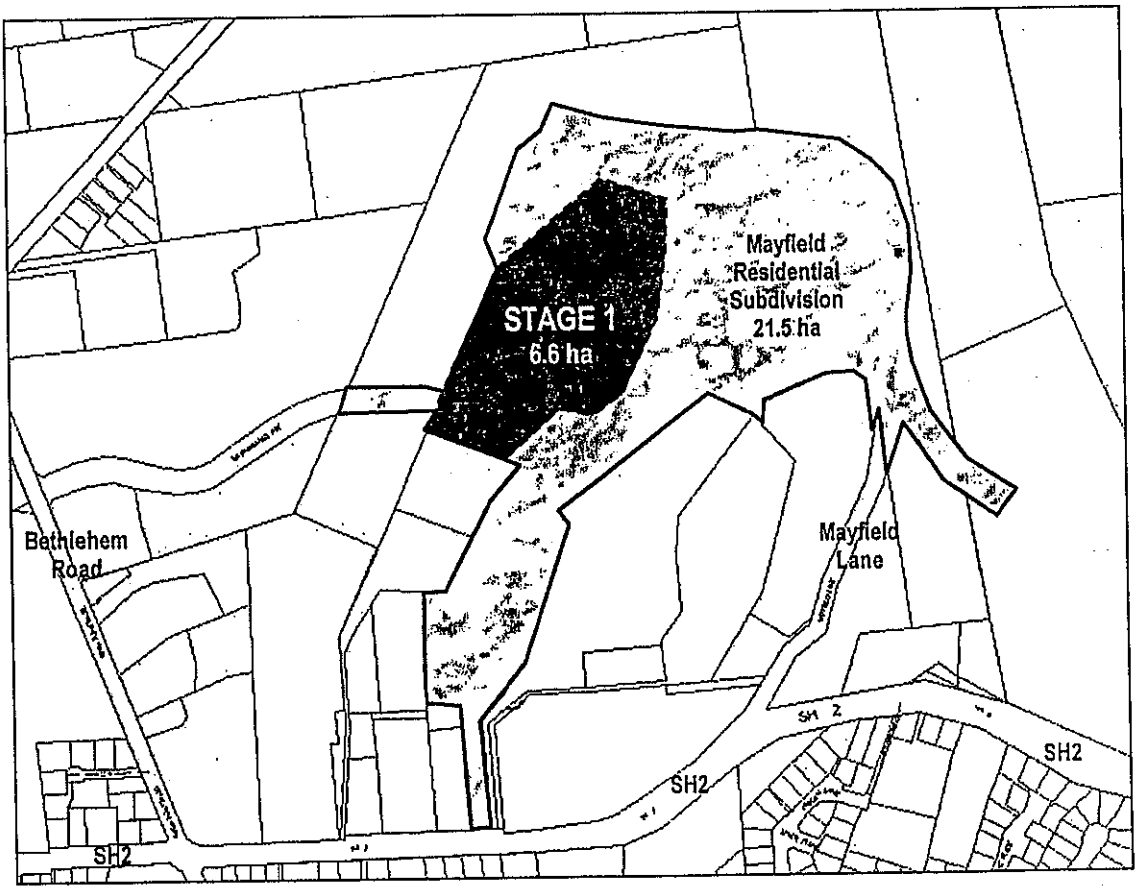
This report relates to the Mayfield Stage 1 Residential Subdivision located at 45 Mayfield Lane, Bethlehem, Tauranga, being Lots 1 to 62 inclusive. The report presents the following;

a. Detailed geotechnical and landform observations of the existing topography.
b. Compliance testing of bulk earthworks during and following construction.
c. Specific investigation of each individual lot to determine suitability of land for buildings.
d. A statement of professional opinion as to the suitability of land for building as provided in Appendix A.

The pre-development site was legally described as:

- Lot 1 DPS 86039 CT 68A/989
- Lot 1 DPS 49541 CT 68A/989
- Lot 2 DPS 86039 CT 68A/990
- Lot 3 DPS 49541 CT 42C/163
- Lot 1 DPS 46300 CT 42C/163

The following site locality plan shows the relationship of the Stage 1 development within the Mayfield Residential Subdivision area.



2. Site Topography and Landform

2.1 Pre Subdivision Landform

Original landform contours are derived from site survey levels portrayed as contours on Connell Wagner Limited Drawing 7073 / 51 Rev 02, contained in Appendix B. The total Stage 1 area contains 6.5ha of land although up to 9.9ha has been affected by earthworks to form the development.

Most of the site includes undulating terrain that was once a headland surrounded by inland areas of Tauranga Harbour. The outer edges of the site grade down to the now infilled estuary area at varying steepness, whilst parts of the northern and eastern sides of the site occupy low-lying naturally accreted areas. The surface of the low-lying areas is soft and partly swamp.

The Stage 1 area generally comprises ground sloping northward down to the now infilled estuary area at varying steepness. The highest part of the Stage 1 area is located within the southern extremes at RL 25 metres and slopes towards the north and west at grades of generally less than 10° to elevations generally less than RL 2 metres. The steepest part of the Stage 1 area is located along the western boundary where the slopes increased to up to 60° in places. The majority of the steep topography is located outside the lot boundaries and comes close within Lots 1 to 5 only.

The site has been almost entirely used for farming with a single dwelling located at the eastern extent of the Stage 1 area within the nominated Lot 48.

2.2 Previous Reports

In 1999 Connell Wagner Limited produced a geotechnical report to support the application for resource consent for subdivision development. This report was titled:

Geotechnical Report
Proposed "Mayfield" Residential Subdivision
North Bethlehem, Tauranga

June 1999
Reference: 7073-SH-05

The June 1999 report covered the full 21.5ha of site and proposed 218 residential lots.

The lot numbers and layout have been changed since the first report. The following table lists the corresponding lot numbers between the Stage 1 development and the June 1999 report:

June 1999 Geotechnical Report Lot Number	Mayfield Stage 1 Lot Number
167	1
168	2
169	3
170	4
171	5
172	6
173	7
174	8
175	9
Future Road	10
193	11
194	12
195	13
196	14

June 1999 Geotechnical Report Lot Number	Mayfield Stage 1 Lot Number
197	15
198	16
200/201	17
201/202	18
202/203	19
136	20
135/157	21
158	22
159	23
160	24
161	25
162	26
163	27
164	28
165	29
166	30
125	31
126	32
127	33
128	34
129	35
130	36
131	37
132	38
133	39
134	40
135	41
Road	42
Road	43
139/Road	44
140	45
141	46
142	47
118	49
119	50
120	51
121	52
122	53
123	54
124	55
109	56
110	57
97	58
98	59
99	60
100	61
101	62

Landform features noted within the original geotechnical report and of relevance to the Stage 1 development include:

- Areas of steep topography formed by cutting a farm track (Lots 1 to 3).
- An area that has been excavated and backfilled with willow tree stumps (Lots 29 and 30).

2.3 Subdivision Modified Landform

Modification of the existing landform occurred by conventional earthworks processes over an area of just less than 10 hectares. This included the entire Stage 1 development area as well as some areas of future roading to the north and east. Earthworks were undertaken in the period of January to April 2001.

The total volume of earthworks undertaken included the following:

- stripping and disposal, or later respreading, of approximately 30,000m^3 of organic soils
- excavation of 98,000m^3 of natural soils for use as compacted earth fill and surcharge soils
- surcharge soils added to the access road fill embankment and the pump station filling to accelerate consolidation

The final landform consists of a more uniformly graded site with maximum building platform slopes of 10° (less than 1 in 5).

2.3.1 Bulk Earthworks

Bulk earthworks were carried out to provide two new main roads and a new cul-de-sac and to create building sites within the created residential sections. Additional areas of cut and fill were also required wherever old rubbish and vegetation tipping was encountered

The bulk earthworks involved the removal of approximately 98,000m^3 of predominantly Younger Ash and Rotoehu Ash materials and Older Ash layers to an overall depth of 3 to 5 metres from the northeastern plateau as well as 1 to 2 metres from the southern extent of the site. These soils were placed as engineered fill on the central part of the site and in low-lying areas around the northern and western extremities of the site (as shown on Drawing No. 7073-20/02 rev 01, Appendix B).

2.3.2 Additional Earthworks

The following additional earthworks over low-lying ground were also required:

- Westmorland Rise access road embankment. The alignment of the newly extended access road off Bethlehem Road to the west, crosses a low-lying gully infilled with soft estuarine silts. Up to 7 metres of fill was therefore required to create a road embankment of suitable alignment and grade. The embankment was created by undercutting and removing approximately 1.5 metres depth of organic soils, prior to placement and compaction of engineered soils sourced from the main site.
- Pump station embankment. Additional filling at the northeastern extent of the property over the low lying areas was required, to provide a raised platform for a sanitary sewer pump station, required as part of the Stage 1 development.
- Low lying filling within Lots 11 and 12. An area of organic deposits was encountered that required full excavation and replacement with engineered fill.
- Lots 1 to 5. A buttress comprising non-engineered fill materials was constructed to provide support to the steep natural slopes.

- Lots 61 and 62. A retaining wall was required where a cut batter was formed which exceeded 1.5 metres high.

2.3.3 Temporary Sediment Retention Ponds

During the earthworks phase, eight temporary sediment retention ponds were formed of which six were located outside the area of future lot development. These six ponds are still in place.

The two temporary stormwater ponds located within the main site remained in place during the winter months following completion of the earthworks. They were then excavated to a clean firm base and backfilled with engineered fill during December 2001.

3. Subdivision Construction

3.1 General

The Stage 1 development includes the provision of 62 fully serviced residential lots with access from one of the two newly formed roads (Westmorland Rise and Athfield Drive), the cul-de-sac (Harbelle Close) or the right-of-way access to Lots 34 and 35.

Development of the site has included:

(a) Bulk earthworks to modify the landform for the provision of two new access roads and building sites within the lots
(b) The construction of roads, cul-de-sacs and right-of-ways as detailed in the accompanying report (Ref 7073-NR-50, dated April 2002)
(c) The installation of stormwater reticulation to provide drainage from all 62 lots and from the road reserve
(d) The installation of sanitary sewer reticulation providing sewer connections to all residential lots.
(e) Water reticulation with service connections to all lots
(f) Utility services including power, telecommunication cabling and street lighting.

This report addresses the earthworks construction of the subdivision. The remainder of the subdivision construction (points (b) to (f) as detailed above), is addressed in the accompanying construction report (Ref 7073-NR-50, dated April 2002).

3.2 Earthworks

Earthworks were undertaken within the site to improve the overall topography of the site and to provide suitable road gradients. Soils for filling were won from two areas, the southern elevated plateau and the northeastern ridgeline. Fill soils were then placed on the low-lying areas around the northern and western edges of the site as well as in the central part of the site.

Five additional specific areas were affected by earthworks as detailed below:

i. Westmorland Rise access road embankment
ii. Pump station embankment
iii. Low lying filling within Lots 11 and 12
iv. Lots 1 to 5
v. Lots 61 and 62

Nine settlement monuments were installed to monitor the settlement of those fill areas located on low-lying soft soils (locations i. to iii. above).

Topsoil re-use has been maximised by the reapplication to a depth of an average 200mm over the lots and 100mm over the berms following completion of the cut/fill operation.

During the earthworks several areas of historic refuse tipping and landfill were encountered. These areas were fully excavated to expose clean soils and the ground made up to design levels using engineered fill.

The depths of cut and heights of fill are shown on drawing 7073-20/03 Rev 01, in Appendix B.

Final asbuilt surface contours are shown on drawing 7073-20/04 Rev 01, in Appendix B.

3.3 Earthworks Methodology

The earthworks were predominantly undertaken by TS14 and S-24 self propelled motorscrapers. Areas of excavation of soft or wet organic soils were undertaken by hydraulic excavators loading large capacity dump trucks.

Compaction was achieved using a large clubfoot self propelled compactor and by the compactive effort provided by the loaded motorscrapers.

Observations and inspections of the earthworks phase were undertaken to the level of construction monitoring service CM3, which is on average two general inspections weekly with specific additional inspections for critical elements of the project.

During and after the earthworks construction settlement monitoring of areas of high filling over soft soils was undertaken.

4. Earthworks Testing

4.1 Earthwork Control Standards

Connell Wagner Limited's contract documents specified the following compliance testing for bulk earth filling:

- Minimum compaction – 95% of maximum dry density determined in accordance with the New Zealand Standard Compaction Test (NZS 4402:1986 – test 4.1.1).
- Undrained shear strength of 150kPa minimum average of any ten tests, and 140kPa for any one test.
- Air voids – maximum air voids 10% average of any ten tests. Maximum air voids 11.5% for any one test.

The frequency of testing specified was one density and air voids test per 800m³ of filling and two shear strength measurements for each density test. Approximately 65,000m³ to 70,000m³ of earth fill was placed as engineered fill requiring 88 density tests and 176 shear strength tests.

Testing for this project was undertaken by Evans Civil Engineering Services Limited who was approved for testing by the Engineer to the Contract. Parallel verification testing was undertaken by Meritec, an IANZ accredited laboratory.

4.2 Compaction Curves

Prior to earth filling, a total of five soil samples were taken from varying depths on site and tested to determine the individual maximum dry density in accordance with the New Zealand Standard Compaction Test (NZS 4402:1986 – test 4.1.1).

Compaction curve test results are as follows:

Depth of Soil Layer	Evans Civil Engineering Services			Meritec Laboratory	
	Maximum Dry Density (t/m³)	Optimum Moisture Content (%)	Maximum Shear Strength (kPa)	Maximum Dry Density (t/m³)	Optimum Moisture Content (%)
0-1.5m Light brown to brown silts	1.06	50	140	1.07	50
1.5-1.9m Coarse brown pumiceous silty sands	1.52	23	140	1.45	27
1.9-2.2m Fine white pumiceous sands	1.60	19	140	1.63	19
2.2-2.75m Dark brown silts	1.26	38	143	1.17 (reported as allophanic)	43
>2.75m	0.87	64	140	Not tested	Not tested

The target of 95% maximum dry density for the soils at Mayfield ranges from 0.83 t/m³ to 1.55 t/m³.

As each test location involved a mix of soils no single theoretical dry density could be used for comparison. The undrained shear strength and percentage air voids were therefore the predominant compliance tests used, in accordance with section 7.4.2.3 of NZS 4431:1989 Code of Practice for Earthfill for Residential Development.

Test No	Date	Lot No or Location	Depth of Fill (m)	Adjusted Dry Density (t/m3)	Oven Dried Moisture Content (%)	% Air Voids	Undrained Shear Strength (kPa)	Comments
34A	03/02/01	Road 2	0.5	1.24	43.5	-1.3	>203	
35A	03/02/01	10/11	1.0	1.27	33.0	9.6	>216	
36A	03/02/01	12	1.0	1.23	36.0	8.8	>216	Failed on air voids. Retested as 36B
36B	05/03/01	12	1.0	1.24	39.0	4.3	>216	Retest of 36A
37A	03/02/01	12	1.0	1.34	36.5	-0.1	156	
38A	03/02/01	Road 2	1.0	1.18	48.0	-1.7	156	
39A	01/03/01	Millers Road	1.5	1.04	56.0	2.1	149	
40A	01/03/01	Pumpsite	1.5	1.18	39.0	8.9	199	
41A	01/03/01	Pumpsite	1.5	1.15	43.0	6.7	173	
42A	01/03/01	Pumpsite	1.5	1.15	43.0	6.7	216	
43A	01/03/01	Pumpsite	1.5	1.06	48.0	8.7	184	
44A	01/03/01	Millers Road	1.5	1.03	54.0	5.1	216	
45A	01/03/01	Millers Road	1.5	1.11	47.5	4.9	216	
46A	01/03/01	Millers Road	1.5	1.26	34.0	9.1	171	
47A	05/03/01	Road 1	2.0	1.15	48.5	0.3	201	
48A	05/03/01	Road 1	2.0	1.05	53.5	3.7	161	
49A	05/03/01	Road 1	2.0	1.24	37.0	6.8	216	Retest of 24A
50A	06/03/01	Road 1	1.5	1.08	51.0	3.7	201	
51A	06/03/01	Road 1	1.5	1.17	40.5	8.0	193	
52A	06/03/01	Millers Road	2.0	1.07	50.5	5.1	164	
53A	06/03/01	Millers Road	2.5	1.02	56.0	3.9	216	
54A	06/03/01	Millers Road	3.0	1.06	51.0	6.4	151	
55A	06/03/01	Millers Road	2.5	0.95	66.0	1.0	169	
55B	06/03/01	Millers Road	3.0	1.17	43.0	5.0	206	
56A	07/03/01	Road 3	2.0	1.06	51.5	5.0	171	
57A	07/03/01	31	2.0	1.10	46.0	7.4	163	
58A	07/03/01	31	2.0	1.06	53.0	3.4	151	
59A	07/03/01	31	2.0	1.07	49.5	6.2	193	
60A	07/03/01	34	2.0	1.08	49.5	5.3	194	
61A	07/03/01	29	2.0	1.18	43.0	4.2	160	
62A	19/03/01	Road 3	0.5	1.01	59.0	1.9	149	
63A	19/03/01	Road 3	0.5	1.08	52.5	2.1	156	
64A	19/03/01	32	0.5	1.04	53.5	4.7	144	
65A	19/03/01	30	0.5	1.01	59.5	1.4	150	
66A	19/03/01	32	0.5	0.98	62.5	1.3	>210	
67A	19/03/01	31	0.5	1.08	62.5	5.9	155	
68A	19/03/01	30	0.5	1.06	49.0	-2.5	146	
69A	19/03/01	37	0.5	1.19	56.5	2.2	164	
70A	19/03/01	38	0.5	1.21	44.0	6.6	>216	
71A	19/03/01	37	0.5	1.23	39.0	5.7	>174	
72A	19/03/01	36	0.5	1.14	38.5	-1.1	>195	
72B	29/05/01	36	Finish GL	1.32	34.0	4.7	>216	
73A	19/03/01	36	0.5	1.08	51.5	3.2	139	
74A	19/03/01	Millers Road	3.0	1.19	44.0	2.2	>187	
75A	19/03/01	Millers Rd	3.0	1.08	53.5	1.0	161	

Tests were undertaken over the site in the areas of fill placement, as shown on drawing 7073-20/02 Rev 01, in Appendix B.

Field compaction density and air void measurements were carried out using a nuclear densometer with verification of moisture content by oven drying. Air voids were calculated from the results using an average of the measured solids density of 2.62. The range of solids density measured for the soils was 2.54 to 2.65. Due to this range the measured air voids percentage may vary from the actual by up to 2%. This has led to the reporting of some negative air voids within the testing summary table.

Shear strengths were determined using hand held Pilcon shear vane.

The following table summarises the 116 earth fill density tests undertaken on site.

Test No	Date	Lot No or Location	Depth of Fill (m)	Adjusted Dry Density (t/m3)	Oven Dried Moisture Content (%)	% Air Voids	Undrained Shear Strength (kPa)	Comments
1A	22/01/01	30	0.4	0.95	43.0	22.9	185	Failed on air voids. Retested as 4A
2A	22/01/01	Road 2	0.4	1.02	51.0	9.0	>216	
3A	24/01/01	30	0.8	1.17	41.0	7.4	202	
4A	24/01/01	30	0.8	1.26	39.0	2.8	140	Retest of 1A
5A	24/01/01	28	1.0	1.20	43.0	2.6	182	
6A	24/01/01	Road 2	1.0	1.32	34.0	4.7	>173	
7A	24/01/01	Road 1, Lot 2	1.2	1.24	39.5	3.7	186	
8A	24/01/01	25/26	1.0	1.10	49.0	4.1	190	
9A	03/02/01	Road 3, Lot 30	2.0	1.15	44.5	4.9	>216	
10A	03/02/01	30	3.0	1.21	38.0	7.8	>194	
11A	03/02/01	30	4.0	1.19	38.5	8.8	157	Failed on air voids. Retested as 11B
11B	05/03/01	30	4.0	1.11	52.5	-0.6	>200	Retest of 11A
12A	05/03/01	30	3.5	1.26	36.5	5.9	165	Excavation and refilling of un-suitables hole
13A	05/03/01	31	2.5	1.32	29.5	10.7	>216	Failed on air voids. Retested as 13B
13B	05/03/01	31	2.5	1.32	36.5	1.4	>218	Retest of 13A
14A	03/02/01	29/31	2.5	1.27	37.0	4.5	174	
15A	03/02/01	29	1.5	1.25	37.0	6.0	>190	
16A	03/02/01	29	1.5	1.19	43.5	2.8	>216	
17A	03/02/01	28	1.5	1.21	42.0	3.0	>164	
18A	03/02/01	27	1.5	1.29	35.0	5.6	>209	
19A	03/02/01	28	1.5	1.22	42.5	1.6	>214	
20A	03/02/01	28/27	1.5	1.17	43.0	5.0	157	
21A	03/02/01	27	1.5	1.23	40.0	3.9	>216	
22A	03/02/01	27	1.5	1.29	34.5	6.3	>171	
23A	03/02/01	Road 1	2.0	1.03	53.5	5.6	>213	
24A	03/02/01	Road 1	2.0	1.29	30.5	11.4	>216	Failed on air voids. Retested as 49A
25A	03/02/01	Road 1	2.0	1.04	52.5	5.7	196	
26A	03/02/01	Road 1	2.0	1.09	50.5	3.4	>200	
27A	03/02/01	Road 1	2.0	1.12	47.5	4.1	178	
28A	03/02/01	Road 1	1.5	1.14	48.0	1.8	180	
29A	03/02/01	Road 1	1.5	1.07	52.0	3.5	>216	
30A	03/02/01	Road 2/3	1.5	1.10	48.0	5.2	>216	
31A	03/02/01	Road 2	1.0	1.20	42.0	3.8	>216	
32A	03/02/01	27	1.0	1.26	38.5	3.4	>216	
33A	03/02/01	Road 2	0.5	1.36	33.5	2.5	159	

Test No	Date	Lot No or Location	Depth of Fill (m)	Adjusted Dry Density (t/m3)	Oven Dried Moisture Content (%)	% Air Voids	Undrained Shear Strength (kPa)	Comments
76A	19/03/01	Millers Road	3.0	1.27	38.0	3.3	144	
77A	20/03/01	12	4.0	1.21	42.5	2.4	153	
78A	20/03/01	13	4.0	1.14	46.0	4.0	>179	
79A	20/03/01	12/13	4.0	0.95	65.0	2.0	163	
79B	20/03/01	12/13	4.0	1.36	35.5	-0.2	>176	
80A	20/03/01	12	4.0	1.16	46.0	2.4	>193	
81A	20/03/01	11	4.0	1.01	58.0	2.9	>214	
82A	20/03/01	12	Finish GL	1.23	38.5	5.7	>163	
83A	20/03/01	Road 1	Finish GL	1.13	48.0	2.6	>163	
84A	20/03/01	Road 1	Finish GL	1.00	59.5	2.3	139	Failed on shear strength. Retested as 84B
84B	29/05/01	Road 1	Finish GL	1.11	49.0	3.2	>216	Retest of 84A
85A	20/03/01	Road 1	Finish GL	0.98	62.5	1.3	154	
85B	29/05/01	Road 1	Finish GL	1.09	49.0	5.0	>216	
86A	23/03/01	Road 1	Finish GL	1.18	46.0	0.7	>201	
87A	23/03/01	Road 1	Finish GL	1.18	42.5	4.8	>216	
88A	23/03/01	Road 1	Finish GL	0.99	60.0	2.8	157	
89A	23/03/01	Road 1	Finish GL	1.03	55.0	4.0	>199	
90A	23/03/01	1	Finish GL	1.14	47.5	2.3	>216	
91A	23/03/01	1	Finish GL	1.11	51.0	1.0	>214	
92A	23/03/01	2	Finish GL	1.08	49.0	5.9	>211	
93A	23/03/01	2/3	Finish GL	1.10	49.5	3.6	>167	
94A	23/03/01	Millers Road	4.0	1.09	45.5	8.8	>216	
95A	23/03/01	Millers Road	3.0	1.20	42.5	3.2	>202	
96A	29/05/01	Road 1	Finish GL	1.02	57.5	2.4	>190	
97A	29/05/01	Road 1	Finish GL	0.97	62.0	2.8	173	
98A	29/05/01	Road 1	Finish GL	0.98	61.0	2.8	>210	
99A	29/05/01	3	Finish GL	1.25	36.0	7.3	>216	
100A	29/05/01	Road 2	Finish GL	1.25	37.5	5.4	>216	
101A	29/05/01	Road 2/3	Finish GL	1.32	34.5	4.1	>216	
102A	29/05/01	Road 2	Finish GL	1.32	35.5	2.8	>216	
103A	29/05/01	Road 2	Finish GL	1.23	37.5	6.9	>216	
104A	29/05/01	Road 2, Lot 11	Finish GL	1.30	37.5	1.6	>216	
105A	29/05/01	25/26	Finish GL	1.23	38.0	6.3	>202	
106A	29/05/01	Road 2	Finish GL	1.27	40.5	0.1	>190	
107A	29/05/01	11/12	Finish GL	1.28	37.5	3.1	>216	
108A	29/05/01	14	Finish GL	1.49	23.0	8.9	>216	
109A	29/05/01	13	Finish GL	1.25	37.5	5.4	>184	
110A	29/05/01	25	Finish GL	1.29	38.5	1.1	>181	
111A	29/05/01	35/38	Finish GL	1.35	33.5	3.2	>206	
112A	29/05/01	35	Finish GL	1.35	36.0	-0.1	>216	
113A	29/05/01	26	Finish GL	1.35	33.5	4.7	>213	
114A	29/05/01	Road 2	Finish GL	1.30	37.5	1.6	>195	
115A	29/05/01	10	Finish GL	1.25	40.5	1.7	>216	
116A	29/05/01	Road 2	Finish GL	1.46	29.5	1.2	>216	
117A	29/05/01	10	Finish GL	1.34	35.5	1.3	>208	
131A	06/12/01	4	1.5	1.09	44.8	9.6	181	
132A	06/12/01	9	1.5	1.05	52.1	5.2	151	
133A	14/12/01	4	Finish GL	0.95	71.8	-4.5	140	Moisture content error leads to air voids error – ignore result
134A	14/12/01	9	Finish GL	1.05	54.8	2.4	150	

Any tests found to be failing were reworked and retested, the results of which are included above.

The above results confirm that the methodology adopted by the contractor for the placement, conditioning and compaction of the bulk fill was acceptable and that the required standards for the construction of engineered filling have been met.

5. Additional Specific Earthworks

5.1 Westmorland Rise Access Road Embankment

5.1.1 Construction Works

The extension of the road access to the site from the existing road embankment within the Ministry of Education land required specific construction works prior to, during, and after embankment construction.

These specific works included:

i. Undercutting of approximately 1.5 metres depth of organic soils.
ii. The placement of a subsoil drain intercepting groundwater flow from the cut face and discharging to beyond the area of fill.
iii. The placement of geogrid soil reinforcement to minimise the possible effects of differential settlement.
iv. Placement of earth fill to achieve design levels
v. The placement of surcharge filling soils over the completed embankment.
vi. The monitoring of embankment consolidation using three settlement measurement monuments located within the embankment.

5.1.2 Embankment Settlement

Settlement markers SM1, SM2 and SM3 were installed within the embankment with the base at approximately the level of the original ground. The locations of these monuments are shown on drawing 7073-20/02 Rev 01, located in Appendix B.

Readings began in April 2001 on completion of the construction and preloading of the embankment. Settlement marker readings are included in Appendix D.

Additional settlement readings were undertaken at monthly intervals from June 2001 to January 2002. The measured consolidation from April 2001 to end January 2002 is shown in the table below:

Settlement Marker	Total Consolidation to End January 2002	Gradient Since Removal of Preload
SM1	15mm	Negligible over 3 months
SM2	16mm	Negligible over 3 months
SM3	27mm	Negligible, less than 2mm over 3 months

The preload soils were removed in early February 2002 and further readings taken before the markers were lowered to the new ground level. They were then remeasured to allow continuity of the level monitoring.

Mayfield Limited requested that road construction of Westmorland Rise (including kerblines and road surfacing) be allowed to continue prior to the confirmation that 90% consolidation had occurred.

Tauranga District Council agreed on the basis that a cash bond be lodged with them allowing for the reconstruction of the affected length of road.

Recent readings indicate that the settlement of the embankment appears to have abated. This will be confirmed by continued monitoring.

5.2 Pump Station Embankment

The location of the sanitary sewer pump station is adjacent to the Stage 1 area as shown on drawing 7073-20/02 Rev 01, located in Appendix B.

The area of the pump station and an adjacent length of future road embankment is located over low lying, soft estuarine silts and as such filled embankment s were expected to experience settlement.

Preparation for filling in this area included the excavation of topsoil of approximately 400mm thickness and the placement and compaction of engineered earth fill sourced from on site.

The embankment was formed to finished level of a minimum RL 3.0m each side of the pump station and gravity sewer reticulation. Approximately 2 metres of fill was placed with additional surcharge filling of 1.0 to 1.2 metres applied in April 2001.

Four settlement monuments SM4 to SM7 inclusive were installed within and around the pump station platform area. SM4 was located adjacent to the pump station whilst SM4 and SM6 were located either side of the gravity sewer reticulation to the pump station.

Level measurements began in April 2001 and were continued at monthly intervals from June 2001 to January 2002 and total consolidation over that period is shown in the Table below:

Settlement Marker	Total Consolidation to End January 2002	Rate of Settlement
SM4	12 mm	Unknown due to marker damage
SM5	85 mm	Negligible since preload removal
SM6	8 mm	Rising since preload removal
SM7	15 mm	Rising since preload removal

The settlement markers SM4 and SM6, located adjacent to the pump station and gravity reticulation showed 12mm and 8mm total consolidation respectively from April 2001 to 12 February 2002.

The two other settlement monuments SM5 and SM7 showed 85mm and 15mm total consolidation respectively from April 2001 to end January 2002. The difference in magnitude of measured consolidations can be attributed to the distance from the original headland. SM5 is located further from the headland than SM4, SM6 or SM7 and is located within the line of the incised gully extending southward into the existing natural valley.

The greater consolidation response is therefore consistent with an increased depth of compressible soils related to the underground continuation of the incised gully.

Approximately 80% of the preload soils were removed between 20 to 27 February 2002.

Post removal readings were undertaken in March and April 2002. These generally show a rebound of the embankment area. SM4 however, shows readings consistent with damage or external loading on the monument itself.

The pump station chamber was completed at the time of preload removal with the gravity sewer to the receiving manhole not being constructed until late March 2002. The connecting pipeline between the receiving manhole and pump station chamber was installed in the week commencing 8 April 2002.

The installation of the gravity sewer reticulation and the connecting pipeline from the receiving manhole to the pump station was delayed to enable the majority of consolidation to occur prior to connection of these elements.

5.3 Lots 11 and 12

An area of low-lying original ground was undercut by approximately 1.2 metres to remove organic soils. The undercut area extends approximately 4 metres into the rear of Lot 12 and 12 metres outside of Lot 11. Approximately 2.5 to 3.0 metres of earth fill was placed above original ground to form the design ground levels.

Settlement monument SM8 was located 5 metres from the rear of Lot 12 to measure the consolidation of the earth filling whilst SM9 was located 11 metres to the north of SM8 to measure consolidation within the area of the proposed stormwater outlet alignment.

The area adjacent to SM8 was also used as a surplus soils stockpile area during the period of the lot construction works extending from October 2001 to April 2002. Most of the stockpiling occurred from February 2002 to the end of March 2002.

Settlement monitoring began in June 2001 and continued on a monthly basis to January 2002. Additional measurements were made in March and April 2002.

Total consolidation measured from June 2001 to April 2002 was 9mm for SM8 and 5mm for SM9.

Gravity sewer and stormwater reticulation to provide service connections to Lots 10, 11 and 12 was laid in March 2002 once the significant portion of consolidation had occurred.

5.4 Lots 1 to 5

The steep natural batter sloping to the northwest from Lots 1 to 5 was commented on in the original geotechnical report (as Lots 167 to 171). The original slope face was observed to be at grades up to 60° and it was considered unlikely that it would remain stable in the long term. For that reason, a building restriction line was recommended by the initial report to limit residential building to the southeastern part of each lot.

As part of the earthworks, the steep natural face was buttressed using surplus topsoil and the top extended approximately 2.5 metres to the west at the steepest location. This work was undertaken to provide a more manageable topography. The natural slope was stripped and cleared of the large tree stumps and any loose soils removed before any filling was placed.

The buttress soils were then spread by dozer initially to form a haul route with the remainder being placed by TS14 motorscraper. The finished batter was reduced from a grade of approximately 50° to 60° to a finished grade of approximately 25° to 30°.

Stability analyses were performed on the existing and final batter faces with hypothetical tension cracks in place, to aid with locating the revised Building Restriction Line so that buildings are restricted to areas that will be unaffected by potential future slips.

5.5 Lots 61 and 62

A cantilever timber pole retaining wall was constructed 2 metres inside the lot boundary to support up to 2 metres of cut face. The upper 1.2 metres of face was battered from the top of the wall to the natural ground.

The design soil loads were calculated using GALENA, a two dimensional slope stability programme.

The soil parameters for the retained soils were:

Bulk Density	17 t/m^3
Cohesion	3 kPa
Internal Friction	28 degrees

These parameters are applicable to the young ash deposit soils being retained and are compatible with the soil parameters used for the stability analyses detailed in Section 6.2.

The pole wall was designed for the resistance force required to achieve a factor of safety of 1.5 against slip failure, with the inclusion of a 5 kPa surcharge load applied 1.5 metres offset from the boundary, this being the load of a normal residential dwelling.

The retaining wall was constructed under Building Consent No 7535 dated 19 March 2002, issued by the Tauranga District Council.

6. Stability Analyses

6.1 Methodology

A series of numerical analyses have been undertaken for three cross sections through the steepest part of the batter within Lots 2 to 4. Soil profiles were based on the identified soil layering and assigned rational soil shear strengths. Analysis has been performed using GALENA, a two-dimensional slope stability program using both linear rotation and non-linear slip characteristics.

Assessment of the slopes has been made based on the minimum factor of safety as follows:

CASE	FACTOR OF SAFETY
• Static load condition for the analytical model adopted	≥1.5

Initially back analyses were performed to ensure that a relevant range of soil parameters were set for the analyses. Then a wide search of circular slips was made using Bishop's Simplified Method of Slices, which involved varying both ends of a proposed slip circle's intercepts with the slope by up to 20m in each X direction, whilst also varying the circle radii until a critical failure surface was found. This process ensures that a large variety of possible curved slip surfaces are analysed and that the one producing the lowest factor of safety is selected.

A search was then made for the slip circles with factors of safety against failure of 1.5. The intersection of the slip circles with the site surface is used to determine the location of the Building Restriction Line. Finally a second series of analyses were performed for slopes with tension cracks to ensure that the worst case scenarios were covered from which to place the Building Restriction Line.

6.2 Slope Model and Soil Strength Parameters

The soil profile comprises successive ash layers overlying Matua Subgroup deposits that extend to depth. Cross sections of the soil profile adopted are included in Appendix E. Groundwater is modelled to analyse for a high water table environment representing the situation immediately following episodes of prolonged heavy rainfall. Effective stress parameters are used for the analysis as the slopes are long established and therefore the drainage is also long established. Also the pore water pressure caused by the build up of groundwater, due to a storm event, will only dissipate relatively slowly.

Historic effective stress soil strength data is as follows:

CASE	ORIGIN	BULK DENSITY (T/m^3)	EFFECTIVE STRENGTH PARAMETERS	
			Cohesion c' (kPa)	Internal Friction ϕ' (degrees)
Data provided by Tonkin & Taylor	Supplied in letter dated 20 February 1997	Not given	7* 12** 3***	30 32 45
Collated Data	Collection of in house data based on testing and failure mechanisms	1.57** 1.4***	10 0	33 38
Laboratory Testing	Undertaken by OPUS on samples for Stage II Stableford	1.65 1.58	3* 0**	33 32

*Younger Ash Deposits – including sandy silts.
**Hamilton / Older Ash Deposits – including high plasticity silts and silty sands.
*** Te Ranga Ignimbrite – deposits of mainly sandy silts and pumiceous sands.

Soil shear strength parameters used in the model, were decided from a combination of all available data. Analysis of the pre-subdivision soils testing on the site generally confirmed the soils to be similar to those found elsewhere in the Tauranga area and thus the range of soil strength parameters given above can be applied.

The data selected were:

SET	Soil Type	Effective Strength Values		Bulk Density (T/m^3)
		Rational Values		
		Cohesion (kPa)	Angle of internal friction (ϕ') (degrees)	
1	Younger Ash	7	32	1.5
2	Fill (non-engineered)	2	15	1.5

6.3 Back Analyses

Using the above set of initial parameters, a back analysis was first performed on the original slope profile. The original slope had appeared to be in a marginally stable condition on first inspection and was not expected to remain stable in the long term. Tension cracks were noted in June 2001 which confirmed the marginally stable condition.

For this reason the stability of the original slope was assumed to have a factor of safety of about 1.2 which gives revised parameters for Younger Ash as follows:

Younger Ash Cohesion = 5 $\phi = 23°$

A second back analysis was then performed on the buttressed slope to ascertain parameters for the non-engineered fill. The buttress fill comprised excess topsoil materials mixed with excess fill material which, even though it was placed with care, is considered to be non-engineered. A non-engineered batter at a grade of 1 in 2 (vertical to horizontal) would be expected to undergo discrete ongoing slippage and so the back analysis was performed assuming the factor of safety to be only marginally in excess of 1.0.

The following revised parameters therefore apply:

Non engineered Fill Cohesion = 3 $\phi = 15°$

These parameters are considered conservative and representative of mass performance.

6.4 Numerical Analyses

The three cross sections were then analysed for a variety of potential failure scenarios to find the failure surface with the lowest factor of safety. The toe of the worst case failure surface was then artificially held at the same point whilst the upper exit point of the failure surface was varied until the factor of safety exceeded 1.5 – that required by the Building Act to ensure that residential dwelling remain unaffected by instability for a period of at least 50 years.

6.5 Results of Analysis

The results of the various slope stability analyses performed using the GALENA slope stability computer program are included in Appendix E.

The following table summarises these results:

	BRL – Extension into Lots 2, 3 and 4	
Cross Section	Normal conditions	With tension crack
XS Lot 3	9.0m	9.5m
XS Lot 3 – 4	6.5m	8.0m
XS Lot 4	2.0m	3.0m

The extension into the lots for the tension crack scenario has been used to define the Building Restriction Line for Lots 1 to 5 inclusive.

7. Requirement for Building Development

7.1 General

The Mayfield Stage 1 residential subdivision development has created a total of 61 residential lots.

7.2 Lot Classification

Each residential lot has been individually investigated by a single hand augered borehole extending to minimum 0.9 metres below the finished ground surface. The Lot by Lot bore logs are included in Appendix D.

The location of the points of bore investigation are shown on drawing 7073-20/01 Rev 01, in Appendix B. Undrained shear strengths were measured at 150mm intervals in each bore and these are tabled on the Lot Summary Report included in Appendix A, with the site classification type as described below.

The lots are described according to the following categories relative to their location on either natural or filled ground and may be included in any or all of the ensuing sections. The recommendations made in section 7.8 however, are to apply to all lots.

CATEGORY	DESCRIPTION
A	Site unencumbered by physical constraints such as steep slopes rising or falling below the level of the site and include ground surface slopes at or less than 10 degrees measured relative to the horizontal.
B	Site encumbered by topography. The surface of the site includes slopes between 10 and 15 degrees measured relative to the horizontal. Cut platforms may produce faces of up to 1.5 metres high.
C	Site encumbered by topography. The surface of the site includes slopes greater than 15 degrees measured relative to the horizontal. Cut platforms will produce moderately high cut faces that may exceed 1.5 metres and expose soils below the zone of testing undertaken for this subdivision. Sites are suitable for residential development in terms of NZS 3604:1999. Some localised deepening or broadening of foundations may be required.
D	Site encumbered by topography. The surface of the site includes slopes greater than 20 degrees measured relative to the horizontal. Cut platforms will produce high cut faces and expose soils below the zone of testing undertaken for this subdivision. At the time of finalising building development each site is to be investigated and reported by a Registered Engineer of at least Category 2 accreditation as defined by the Tauranga District Council's Code of Practice for Development. The report shall address the appropriate foundations, retaining wall requirements, access to the site and appropriate building form for the lot.
*	Sites on Naturally Occurring Soils. The natural soils are typical of the Volcanic Ash deposits found elsewhere in Tauranga. These materials are generally suitable for the support of non specific designed buildings on conventional foundations proportioned and constructed according to NZS 3604:1999. Deeper layers sometimes exhibit bands or deposits of low strength and high compressibility and these may be exposed by excavations. Some deepening or broadening of foundations may be required and this is to be determined by a Building Certifier at time of excavation.
●	Sites Located on Areas of Engineered Subdivision Filling. Sites are suitable for foundations complying with NZS 3604:1999 Code of Practice for Buildings Not Requiring Specific Design. All foundations are to be verified by the Building Certifier in the course of undertaking normal building certification.
■	Foundations on or Adjacent to Steep Topography. Buildings and their foundations may extend beyond the Building Restriction Line provided that they are specifically assessed by a Category 1 accredited Geotechnical Engineer as defined by the Tauranga District Council's Code of Practice for Development. Deepening of foundations or special foundations may be required to support a dwelling in part or whole where this extends beyond the BRL.

7.3 Lots on or including Natural Ground (Lots 1, 5 to 10, 15 to 24, 39 to 47 and 49 to 62)

These lots are all on or include original ground that has been cut to supply fill elsewhere on the site.

The natural surface has been significantly altered in shape and grade from that which existed prior to subdivision development. The lots were stripped of topsoil to expose the underlying volcanic soils and then cut across the general soil layering system in the area. The soils encountered in excavation on any one lot may vary from adjoining lots and the general description given in this report.

These lots all include building sites suitable for residential construction in accordance with NZS 3604:1999. The natural occurring soils encountered on these lots are typical of those found elsewhere within Tauranga and includes a mantle of younger and then older volcanic airfall ash layers overlying older deposits of silt and sands known as the Tauranga Beds. Lower strength soils may be encountered in excavations and foundation trenches. Where excavations for foundations expose low strength soils, advice from the Building Certifier should be obtained who may call for an inspection and recommendation from a Registered Engineer. Deepening or widening of foundations may be required. This situation is typical of that found in the naturally deposited soils throughout the Tauranga District.

7.4 Lots on or Including Filled Ground (Lots 2 to 6, 8 to 15 and 24 to 38)

Earthworked filling has been achieved to create the subdivision landform. Soils have been excavated from areas of cut and placed as structural filling in accordance with the project specification. The compliance testing detailed in the preceding sections shows that the methodology adopted in placing these materials is appropriate to the soils on the site. The consistency and layering of the natural soils is destroyed by the excavation, mixing and placing of the soils as compacted filling.

Sites are suitable for foundations complying with NZS 3604:1999 Code of Practice for Buildings Not Requiring Specific Design. All foundations are to be verified by a building inspector in the course of undertaking normal building certification.

7.5 Building Restriction Lines (Lots 1 to 5)

Building Restriction Lines (BRLs) have been included on Lots 1 to 5 inclusive. The former natural topography along the western boundary of these lots was steep, generally in excess of 45° and up to 60° in places. A non-engineered fill buttress was constructed in September 2001 to improve the overall stability of the bank.

Stability analyses have been conducted using the final ground contours to determine the existing stability of the batter and to calculate the location of the Building Restriction Line as detailed in Section 6. The BRL is located as shown on the Title Plan for these lots and on the Geotechnical Site Plan Ref. 7073-20 / 01 Rev A, in Appendix B.

Building foundations may extend over the BRL provided that the foundation requirements are investigated and designed by a Geotechnical Engineer with a Category 1 accreditation in accordance with the Tauranga District Council Code of Practice for Development. Where investigations confirm that buildings can extend beyond the BRL, then non-conforming special foundations may be needed and shall be specifically designed for the conditions measured by site specific investigation.

It is in the owners' interests to encourage growth of deep-rooted vegetation on the batter to the west of the lots which will assist with maintaining batter surface stability and inhibit the development of regressive land slipping.

7.6 General Recommendations (All Lots)

In addition to the above site specific recommendations, the following general recommendations are to apply:

(i) Some excavation into the sloping topography may be required on individual lots to form benches to accommodate residential dwellings. These cut faces will require permanent retaining structures where they exceed 1.5 metres in height. Any retaining structure or wall over 1.5 metres high will require engineering design and Building Consent. Any unretained excavations shall be battered back at 2:1 (vertical to horizontal) or at a flatter grade.

(ii) Any excavations of height 1.5 metres and greater located within 3.0 metres of any proposed dwelling should be included as part of the building consent application. Excavation faces of these proportions are to be structurally retained. The engineering design and documentation for a retaining structure is to be produced by an accredited Category 2 Registered Engineer.

(iii) Surface runoff of stormwater is not conducive to maintaining slope stability. Stormwater is therefore to be collected from all surfaces on each lot, especially hard surfaces, and directed into the reticulated stormwater system. The stormwater collection system for each lot development is to be detailed on the Building Consent drawings and be approved by the Building Certifier at the time of consenting.

(iv) Excavated spoil to be taken off site.

(v) Fill for pumping station not part of this report.

8. Conclusion

It is our opinion that domestic dwellings and structures can be constructed on all residential lots created within this subdivision provided the requirements given in Section 7 are adhered to. Our opinion is based on construction compliance testing supplied by the Contractor during the process of earthworks fill construction and on the lot by lot testing and inspection carried out by Connell Wagner as detailed in this report. Inferences are made about the consistency of materials between points of inspection and testing. The accuracy of these inferences cannot be guaranteed.

Buildings compliant with the requirements of NZS 3604:1999 can be erected on each lot with shallow foundations. In areas where natural soils are exposed by foundation excavations some deepening or broadening of these foundations may be necessary depending on the type and quality of the soils exposed.

The extent of site filling has been based on comparison of contours before and after earthworks which have been determined by isolated and separate points of level measured. Some variation to the lateral extent of filling as shown on Connell Wagner drawing 7073 / 96 Rev 01 may occur and should be expected.

The thickness of topsoil has been determined at the points of subsurface investigation. Some variation in this thickness may occur. Every endeavour has been made to limit the topsoil thickness to 0.3 metres on those areas subjected to subdivision earthworks. No guarantee is given that the thickness of topsoil on the lots is more or less than 0.3 metres.

A Statement of Professional Opinion as to the Suitability of the Subdivision for Building Development is attached as Appendix A.

This report has been compiled by Neill Raynor a Registered Engineer of Connell Wagner Ltd

The fieldwork and construction has been observed and monitored by Neill Raynor a Registered Engineer of Connell Wagner Ltd.

The information contained in this report is an accurate record of the observations and compliance testing undertaken for this project.

Neill Raynor
Registered Engineer
BE (Civil) MIPENZ

Appendix A

Statement of Professional Opinion as to the Suitability of Land for Building

Connell Wagner

STATEMENT OF PROFESSIONAL OPINION AS TO THE GEOTECHNICAL SUITABILITY OF LAND FOR BUILDING

Development: MAYFIELD RESIDENTIAL SUBDIVISION

Owner: MAYFIELD LIMITED

Location: 45 MAYFIELD LANE, BETHLEHEM, TAURANGA

I, *Gavin Charles Archer*, a Principal of Connell Wagner Ltd, Tauranga, hereby confirm that;

1) I am a Registered Engineer under the Engineers Registration Act 1974, a holder of an Annual Practising Certificate APC # 116 and a Category 1 Geotechnical Engineer as defined by the Tauranga District Council – Code of Practice for Development, Version 1, 1998.

2) An appropriate level of site investigation and construction supervision has been carried out under my direction and is described in our geotechnical report reference 7073-NR-49, dated May 2002

3) In my professional opinion, not to be construed as a guarantee, I consider that;

   a) Every part of the area shown in Connell Wagner Drawing No. 7073-20/01 Rev 01, dated May 2002, of each new allotment is suitable for the erection thereon of the building types appropriate to the zoning of the land, provided that:

      - Specific contents of the geotechnical report reference 7073-NR-49, dated May 2002 is made available and followed by each lot owner;
      - Appropriate foundations are used to suit the site soil conditions exposed by excavation;
      - Buildings are located in compliance with the Building Restriction Lines shown;
      - Deepening or widening of foundations may be required where excavations for foundations expose low strength soils. Advice is to be sought from a Registered Engineer should loose or low strength soils be exposed.

   b) The earth fills shown on the attached plan, reference 7073-20/02 Rev 01, have been placed in accordance with the Code of Practice for Development of the Tauranga District Council.

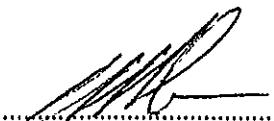
   c) The completed works give due regard to all land slope and foundation stability considerations.

   d) The filled ground is suitable for the erection thereon of residential buildings not requiring specific design in terms of NZS 3604 : 1999 and related documents providing that:

      - Specific contents of the geotechnical report reference 7073-NR-49, dated May 2002 is made available and followed by each lot owner;
      - Buildings are located in compliance with the Building Restriction Lines shown;
      - Building derive support from earth fill beneath the topsoil layer or the minimum foundation depth as required by NZS 3604:1999 whichever is the greater.

4) This professional opinion is furnished to Tauranga District Council and the owner for their purpose alone, on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection for any dwelling.

Signed: for and on behalf of Connell Wagner Ltd



8 May 2002

Gavin Archer
Category 1 accredited Geotechnical Engineer

Date

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

Subdivision Mayfield Residential Development

DPS DP 307712

The comments and notations included on this summary sheet are outlined in the support documents. These shall be read in conjunction with this summary.

TDC Sub 4577

File Ref 7073-01

Lot No.	Area (m²)	Subsurface Data						Foundations		Building Restriction Line?	Classification	Recommendations and Restrictions
		Shear Strength (kPa)	Subdivision Filling (max depth)		Natural Topography Unworked?	Natural Topography Cut?		Conventional shallow foundations to NZS 3604:1999?	Specific Design?			
		(MIN)	y / n	Depth (m)	y / n	y / n	Depth (m)	y / n / na	y / n / na	y / n		
7	693	95	n	-	n	y	1.3	y	n	n	A *	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
8	962	200⁺	y	0.4	n	y	0.8	y	n	n	A * ●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
9	846	200⁺	y	1.2	n	y	1.0	y	n	n	A * ●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
10	720	200⁺	y	1.4	n	y	0.6	y	n	n	A * ●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
11	780	200⁺	y	3.8	n	n	-	y	n	n	A ●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
12	644	200⁺	y	3.7	n	n	-	y	n	n	A ●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
13	636	200⁺	y	1.6	n	n	-	y	n	n	A ●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

Subdivision Mayfield Residential Development

DPS DP 307712

The comments and notations included on this summary sheet are outlined in the support documents. These shall be read in conjunction with this summary.

TDC Sub 4577

File Ref 7073-01

Lot No.	Area (m²)	Subsurface Data						Foundations		Building Restriction Line?	Classification	Recommendations and Restrictions
		Shear Strength (kPa)	Subdivision Filling (max depth)		Natural Topography Unworked?	Natural Topography Cut?		Conventional shallow foundations to NZS 3604:1999?	Specific Design?			
		(MIN)	y / n	Depth (m)	y / n	y / n	Depth (m)	y / n / na	y / n / na	y / n		
1	796	200+	n	-	n	y	0.7	y	n	y	A*■	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system. A Building Restriction Line (BRL) is located within this site. Buildings and foundations may extend beyond the Building Restriction Line provided they are specifically assessed and confirmed by a Geotechnical Engineer with a Category 1 accreditation as defined by the Tauranga District Council Code of Practice for Development.
2	682	200+	y	0.7	n	y	0.3	y	n	y	A■●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system. A Building Restriction Line (BRL) is located within this site. Buildings and foundations may extend beyond the Building Restriction Line provided they are specifically assessed and confirmed by a Geotechnical Engineer with a Category 1 accreditation as defined by the Tauranga District Council Code of Practice for Development.
3	684	200+	y	0.9	n	y	0.5	y	n	y	A■●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system. A Building Restriction Line (BRL) is located within this site. Buildings and foundations may extend beyond the Building Restriction Line provided they are specifically assessed and confirmed by a Geotechnical Engineer with a Category 1 accreditation as defined by the Tauranga District Council Code of Practice for Development.
4	686	200+	y	3.8	n	y	0.5	y	n	y	A■●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system. A Building Restriction Line (BRL) is located within this site. Buildings and foundations may extend beyond the Building Restriction Line provided they are specifically assessed and confirmed by a Geotechnical Engineer with a Category 1 accreditation as defined by the Tauranga District Council Code of Practice for Development.
5	757	200+	y	4.0	n	y	0.5	y	n	y	A*■●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system. A Building Restriction Line (BRL) is located within this site. Buildings and foundations may extend beyond the Building Restriction Line provided they are specifically assessed and confirmed by a Geotechnical Engineer with a Category 1 accreditation as defined by the Tauranga District Council Code of Practice for Development.
6	760	55	y	0.5	n	y	1.5	y	n	n	A*●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

Subdivision Mayfield Residential Development

DPS DP 307712

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TDC Sub 4577

File Ref 7073-01

Lot No.	Area (m^2)	Subsurface Data						Foundations		Building Restriction Line?	Classification	Recommendations and Restrictions
		Shear Strength (kPa)	Subdivision Filling (max depth)		Natural Topography Unworked?	Natural Topography Cut?		Conventional shallow foundations to NZS 3604:1999?	Specific Design?			
		(MIN)	y / n	Depth (m)	y / n	y / n	Depth (m)	y / n / na	y / n / na	y / n		
14	626	200+	y	0.7	n	y	1.0	y	n	n	A ●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
15	617	186+	y	0.4	n	y	1.7	y	n	n	A * ●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
16	729	164	y	0.4	n	y	1.2	y	n	n	A * ●	The site is located almost entirely on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
17	746	84	n	-	n	y	1.2	y	n	n	A *	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
18	684	135	n	-	n	y	1.8	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
19	667	121	n	-	n	y	3.2	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
20	616	128	n	-	n	y	4.2	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.

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Subdivision Mayfield Residential Development

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TDC Sub 4577

DPS DP 307712

File Ref 7073-01

Lot No.	Area (m²)	Subsurface Data						Foundations		Building Restriction Line?	Classification	Recommendations and Restrictions
		Shear Strength (kPa)	Subdivision Filling (max depth)		Natural Topography Unworked?	Natural Topography Cut?		Conventional shallow foundations to NZS 3604:1999?	Specific Design?			
		(MIN)	y / n	Depth (m)	y / n	y / n	Depth (m)	y / n / na	y / n / na	y / n		
21	633	154+	n	-	n	y	3.2	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
22	678	154+	n	-	n	y	3.0	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
23	596	132	n	-	n	y	3.0	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
24	596	200+	n	-	n	y	1.0	y	n	n	A*●	The site is located almost entirely on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
25	645	154+	y	1.3	n	n	-	y	n	n	A●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
26	785	200+	y	1.5	n	n	-	y	n	n	A●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
27	762	154+	y	1.3	n	n	-	y	n	n	A●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
28	628	200+	y	1.6	n	n	-	y	n	n	A●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

Subdivision Mayfield Residential Development

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TDC Sub 4577

DPS DP 307712

File Ref 7073-01

Lot No.	Area (m²)	Subsurface Data						Foundations		Building Restriction Line?	Classification	Recommendations and Restrictions
		Shear Strength (kPa)	Subdivision Filling (max depth)		Natural Topography Unworked?	Natural Topography Cut?		Conventional shallow foundations to NZS 3604:1999?	Specific Design?			
		(MIN)	y / n	Depth (m)	y / n	y / n	Depth (m)	y / n / na	y / n / na	y / n		
29	591	200+	y	3.0	n	n	-	y	n	n	A●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
30	688	121	y	6.5	n	n	-	y	n	n	A●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
31	665	154+	y	6.0	n	n	-	y	n	n	A●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
32	629	200+	y	1.1	n	y	0.3	y	n	n	A*●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
33	689	200+	y	1.0	n	n	-	y	n	n	A●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
34	830	154+	y	1.5	n	n	-	y	n	n	A●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
35	1001	200+	y	0.9	n	n	-	y	n	n	A●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
36	729	200+	y	1.4	n	n	-	y	n	n	A●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
37	648	200+	y	1.0	n	n	-	y	n	n	A●	The site is located on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

Subdivision Mayfield Residential Development

DPS DP 307712

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TDC Sub 4577

File Ref 7073-01

Lot No.	Area (m^2)	Subsurface Data						Foundations		Building Restriction Line?	Classification	Recommendations and Restrictions
		Shear Strength (kPa)	Subdivision Filling (max depth)		Natural Topography Unworked?	Natural Topography Cut?		Conventional shallow foundations to NZS 3604:1999?	Specific Design?			
		(MIN)	y / n	Depth (m)	y / n	y / n	Depth (m)	y / n / na	y / n / na	y / n		
38	754	200+	y	0.9	n	y	0.4	y	n	n	A*●	The site is located almost entirely on engineered fill and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
39	699	200+	y	0.3	n	y	1.7	y	n	n	A*●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
40	527	154+	n	-	n	y	2.4	y	n	n	A*	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
41	648	154+	n	-	n	y	3.0	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
42	699	121	n	-	n	y	4.1	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
43	711	172	n	-	n	y	5.0	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
44	656	186+	n	-	n	y	5.0	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.

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File Ref 7073-01

Lot No.	Area (m²)	Subsurface Data						Foundations		Building Restriction Line?	Classification	Recommendations and Restrictions
		Shear Strength (kPa)	Subdivision Filling (max depth)		Natural Topography Unworked?	Natural Topography Cut?		Conventional shallow foundations to NZS 3604:1999?	Specific Design?			
		(MIN)	y / n	Depth (m)	y / n	y / n	Depth (m)	y / n / na	y / n / na	y / n		
45	620	156	n	-	n	y	4.5	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
46	894	119	n	-	y	y	2.0	y	n	n	A*●	The site is located predominantly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
47	555	62	y	1.2	n	y	3.0	y	n	n	A*●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
48												No further development is intended for this lot.
49	588	183	y	1.3	n	y	1.3	y	n	n	A*●	The site is located partly on engineered fill and partly on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
50	589	132	n	-	n	y	2.0	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
51	636	200⁺	n	-	n	y	2.5	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
52	1142	200⁺	n	-	n	y	3.0	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.

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File Ref 7073-01

Lot No.	Area (m²)	Subsurface Data						Foundations		Building Restriction Line?	Classification	Recommendations and Restrictions
		Shear Strength (kPa)	Subdivision Filling (max depth)		Natural Topography Unworked?	Natural Topography Cut?		Conventional shallow foundations to NZS 3604:1999?	Specific Design?			
		(MIN)	y / n	Depth (m)	y / n	y / n	Depth (m)	y / n / na	y / n / na	y / n		
53	681	84	n	-	n	y	1.5	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
54	681	200⁺	n	-	n	y	0.9	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
55	752	200⁺	n	-	n	y	0.2	y	n	n	A*	The site is located almost entirely on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
56	750	200⁺	n	-	n	y	0.2	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
57	651	200⁺	n	-	n	y	0.2	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
58	676	156	n	-	n	y	1.7	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
59	681	81	n	-	n	y	1.7	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.

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File Ref 7073-01

Lot No.	Area (m²)	Subsurface Data						Foundations		Building Restriction Line?	Classification	Recommendations and Restrictions
		Shear Strength (kPa)	Subdivision Filling (max depth)		Natural Topography Unworked?	Natural Topography Cut?		Conventional shallow foundations to NZS 3604:1999?	Specific Design?			
		(MIN)	y / n	Depth (m)	y / n	y / n	Depth (m)	y / n / na	y / n / na	y / n		
60	657	102	n	-	n	y	2.0	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
61	632	146	n	-	n	y	2.5	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.
62	623	154	n	-	n	y	3.5	y	n	n	A*	The site is located on natural ground and is suitable for shallow foundations in accordance with NZS 3604:1999. Some deepening or broadening of the foundations may be required due to the variability of the underlying soils where exposed by foundation excavations. Excavations of 1.5m and higher shall be structurally retained. Stormwater on the lot shall be collected from all hard surfaces and disposed to the reticulation system.

Explanatory Notes to Accompany the Summary of Geotechnical Data / Recommendations for Individual Lots
MAYFIELD RESIDENTIAL SUBDIVISION – STAGE 1

1. Encumbrances include Building Restriction Areas, below ground services installed for subdivision and height restrictions. Other legal and planning encumbrances may exist on each and every lot. Inclusion of specific encumbrances listed for each lot does not warrant that each and every lot is free of planning or legal encumbrances.

2. The Building Restriction Area is an area within which a building is considered to be at low and acceptable risk from any batter instability and is defined by a Building Restriction Line (BRL). That area between the BRL and the outer edge (furthermost from the road) boundary may suffer from some instability over the life of the dwelling. Unless stated otherwise no consented building or structure is to be sited within the Building Restriction Area.

3. The filling on the site has been engineered and constructed to a quality that permits building foundations configured in accordance with NZS 3604: 1999. Advice from a Building Certifier should be obtained before lodgement for a Building Consent as to whether the structure proposed is compliant with NZS 3604: 1999. Buildings that do not comply with NZS 3604: 1999 will by nature of their complexity or mass involve a Registered Engineer to undertake the necessary design. The suitability of the site for the specifically designed structure intended would, for the purpose of compliance, need to be verified by a Registered Engineer with geotechnical experience.

4. The naturally occurring ash soils on the site, in areas that have not been modified by filling, are typical of those in Tauranga. In some areas of the subdivision the ground surface has been lowered by excavation either exposing or effectively raising the lower strength natural soils to be closer to the surface of the lots. The natural soils are generally suitable for shallow foundations for building complying with NZS 3604: 1999. Because of the variability of the ash soils however, some broadening or deepening of foundations may be required, which can be determined by the Building Certifier at the time of the normal pre-pouring foundation inspection. The comments given in (3) above similarly apply to lots in natural soil.

5. Topsoil has been placed by large machinery and therefore the thickness on each earthworked lot is variable. It should be expected that topsoil varies in thickness across part or all lot areas. The topsoil on sites not affected by earthworks remains unaffected. Every endeavour has been made to limit the thickness of topsoil to 300 mm, but no guarantee is implied or given that topsoil on any part of any lot is 300mm or less.

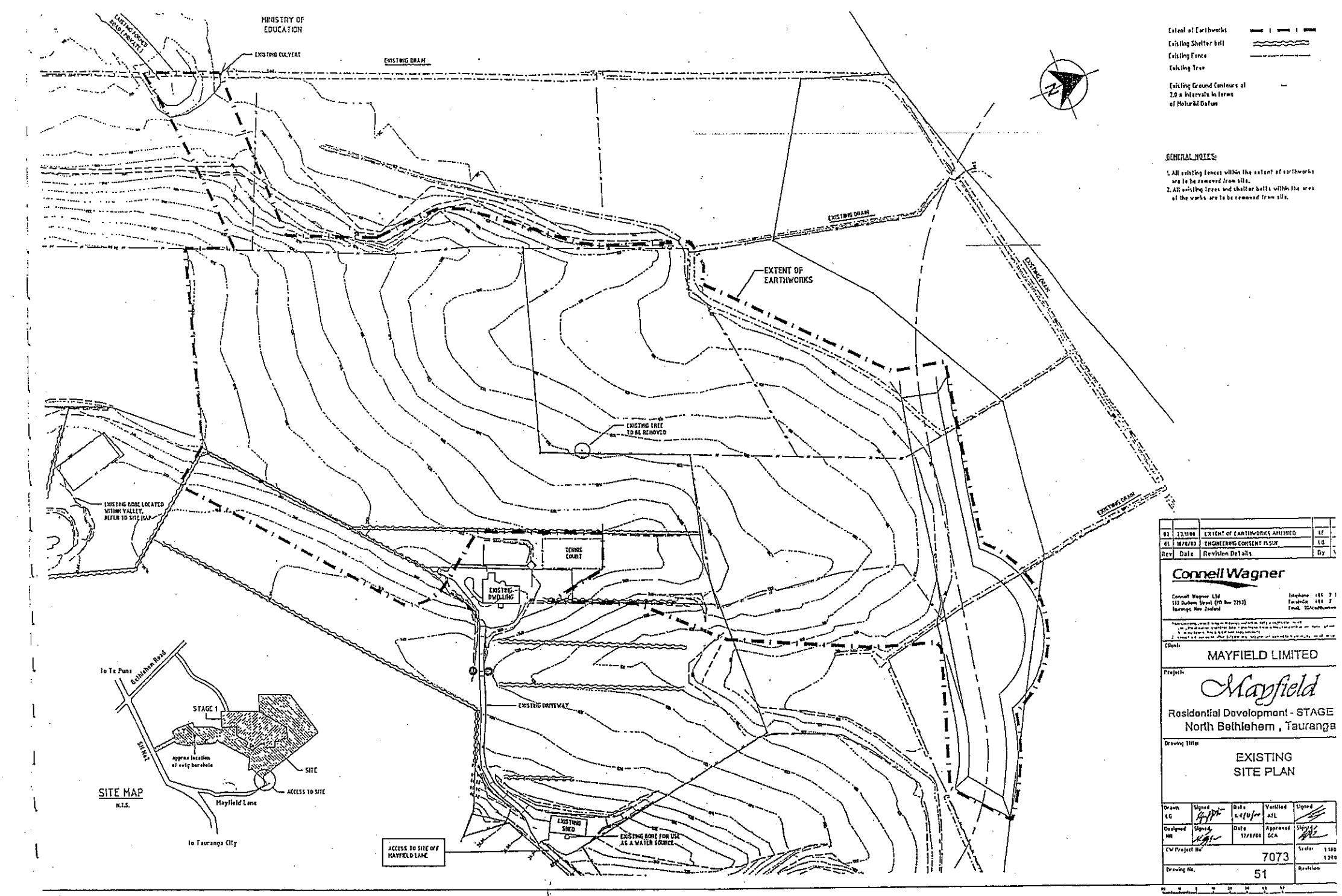
6. The classification of the lot is as defined by the following table and the specific comments on a lot by lot basis takes precedence over any general comments contained on these explanatory notes.

7. The modified landform that includes the residential sites, generally slopes to the northwest. Overland flow of stormwater on the ground surface will generally follow the shape of the topography. It is important that the stormwater on each lot is collected by channels, pits, sumps and pipes to minimise overland discharge on to properties beyond and below the lots. All stormwater shall be discharged to the stormwater reticulation system for controlled disposal.

CATEGORY	DESCRIPTION
A	Site unencumbered by physical constraints such as steep slopes rising or falling below the level of the site and include ground surface slopes at or less than 10 degrees measured relative to the horizontal.
B	Site encumbered by topography. The surface of the site includes slopes between 10 and 15 degrees measured relative to the horizontal. Cut platforms may produce faces of up to 1.5 metres high.
C	Site encumbered by topography. The surface of the site includes slopes greater than 15 degrees measured relative to the horizontal. Cut platforms will produce moderately high cut faces that may exceed 1.5 metres and expose soils below the zone of testing undertaken for this subdivision. Sites are suitable for residential development in terms of NZS 3604:1999. Some localised deepening or broadening of foundations may be required.
D	Site encumbered by topography. The surface of the site includes slopes greater than 20 degrees measured relative to the horizontal. Cut platforms will produce high cut faces and expose soils below the zone of testing undertaken for this subdivision. At the time of finalising building development each site is to be investigated and reported by a Registered Engineer of at least Category 2 accreditation as defined by the Tauranga District Council's Code of Practice for Development. The report shall address the appropriate foundations, retaining wall requirements, access to the site and appropriate building form for the lot.
*	Sites on Naturally Occurring Soils. The natural soils are typical of the Volcanic Ash deposits found elsewhere in Tauranga. These materials are generally suitable for the support of non specific designed buildings on conventional foundations proportioned and constructed according to NZS 3604:1999. Deeper layers sometimes exhibit bands or deposits of low strength and high compressibility and these may be exposed by excavations. Some deepening or broadening of foundations may be required and this is to be determined by a Building Certifier at time of excavation.
●	Sites Located on Areas of Engineered Subdivision Filling. Sites are suitable for foundations complying with NZS 3604:1999 Code of Practice for Buildings Not Requiring Specific Design. All foundations are to be verified by the Building Certifier in the course of undertaking normal building certification.
■	Foundations on or Adjacent to Steep Topography. Buildings and their foundations may extend beyond the Building Restriction Line provided that they are specifically assessed by a Category 1 accredited Geotechnical Engineer as defined by the Tauranga District Council's Code of Practice for Development. Deepening of foundations or special foundations may be required to support a dwelling in part or whole where this extends beyond the BRL.

Appendix B

Drawings



Rev	Date	Revision Details	By
03	23/11/00	EXTENT OF EARTHWORKS AMENDED	EF
01	10/8/00	ENGINEERING CONSENT ISSUE	LG

Connell Wagner

Connell Wagner Ltd
133 Durham Street (PO Box 2793)
Tauranga, New Zealand

Telephone +64 7 3
Facsimile +64 7
Email

Client:
MAYFIELD LIMITED

Project:
Mayfield
Residential Development - STAGE
North Bethlehem , Tauranga

Drawing Title:
EXISTING
SITE PLAN

Drawn LG	Signed	Date 2.4/10/00	Verified AJL	Signed
Designed MR	Signed	Date 17/8/00	Approved GCA	Signed

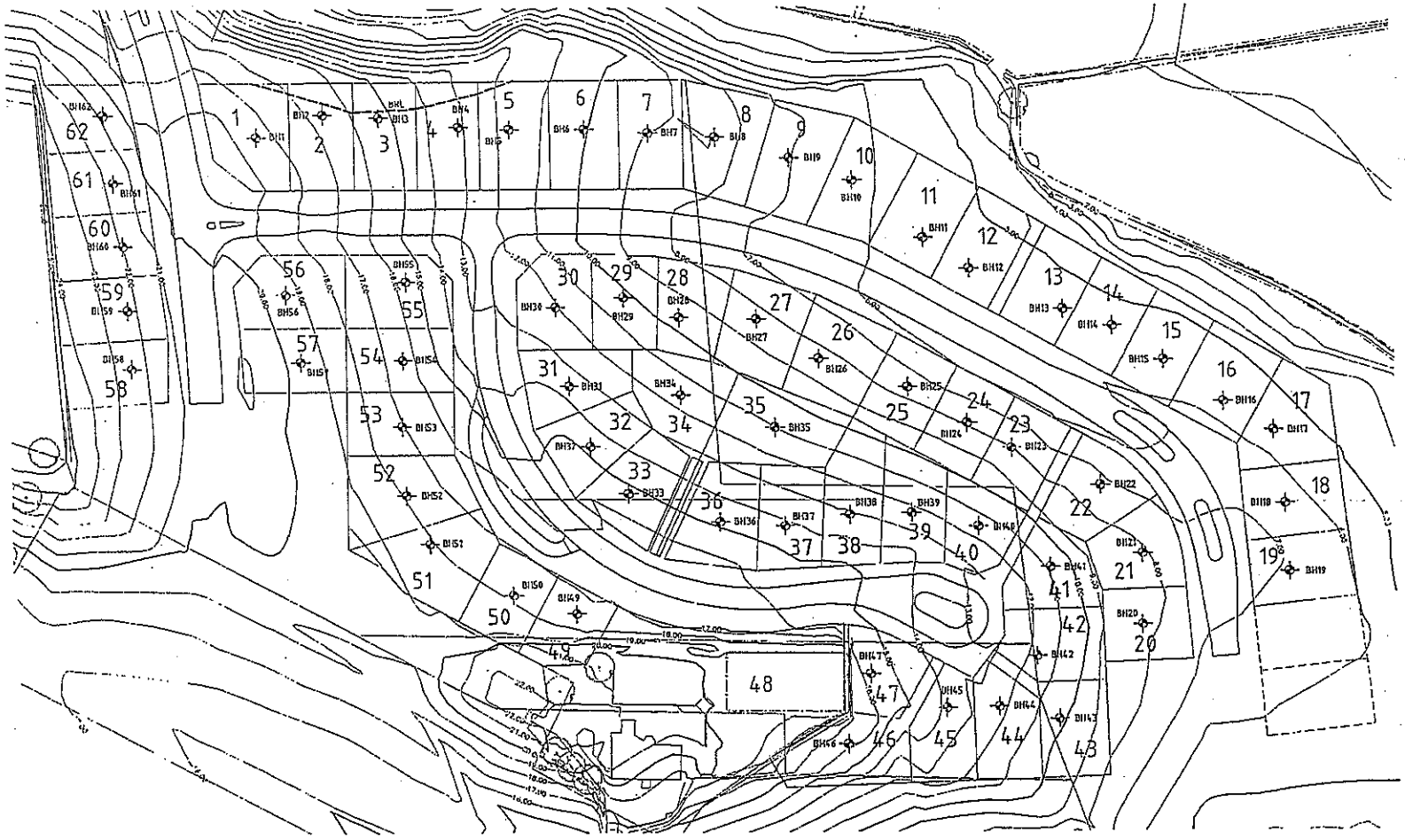
CW Project No: 7073

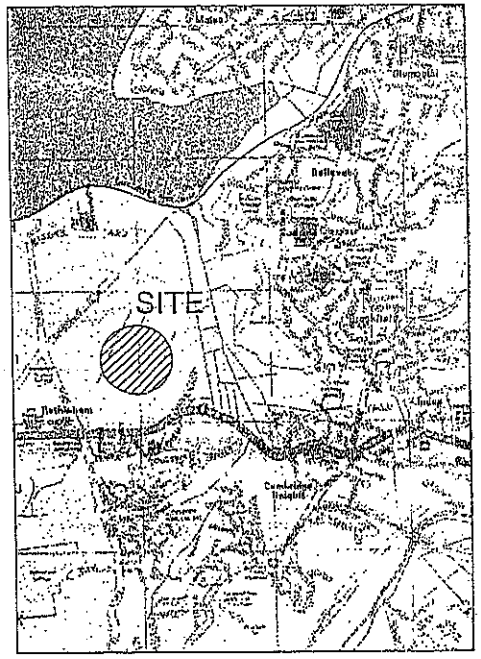
Drawing No: 51

Scale: 1:500 1:200

Revision:

A1





LOCALITY PLAN
NOT TO SCALE

LEGEND

- CONTOURS AT 1.0m INTERVALS AND IN TERMS OF MOTURIKI DATUM
- BH1 — HAND AUGERED BOREHOLE
- BRL — BUILDING RESTRICTION LINE

SCALE 1:750

Rev	Date	Revision Details	By	Ver.	App.
01	9/4/02	GEOTECH ISSUE	JJF		

Connell Wagner
Connell Wagner Ltd
143 Durham Street (PO Box 2292)
Tauranga, New Zealand
Telephone: +64 7 578 6143
Facsimile: +64 7 578 6163
Email: TGAcc@cwmail.com

Client: MAYFIELD LTD

Project: Mayfield
North Bethlehem, Tauranga

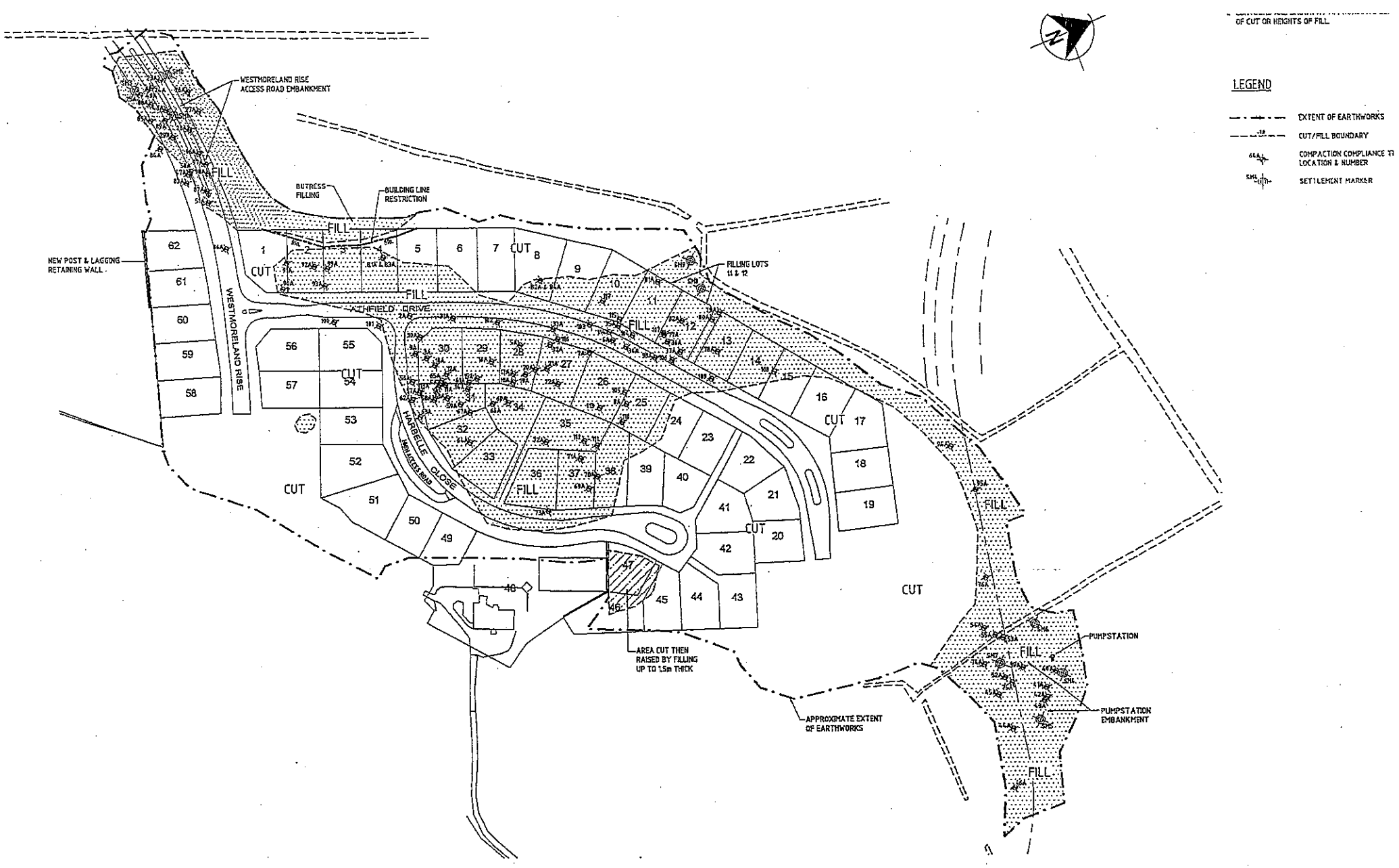
Drawn	JJF	Signed	Date 19/4/02
Designed	GD	Signed	Date 19/4/02
Verified	SII	Signed	Date 19/4/02
Approved	AL	Signed	Date

Drawing Title: GEOTECHNICAL SITE PLAN

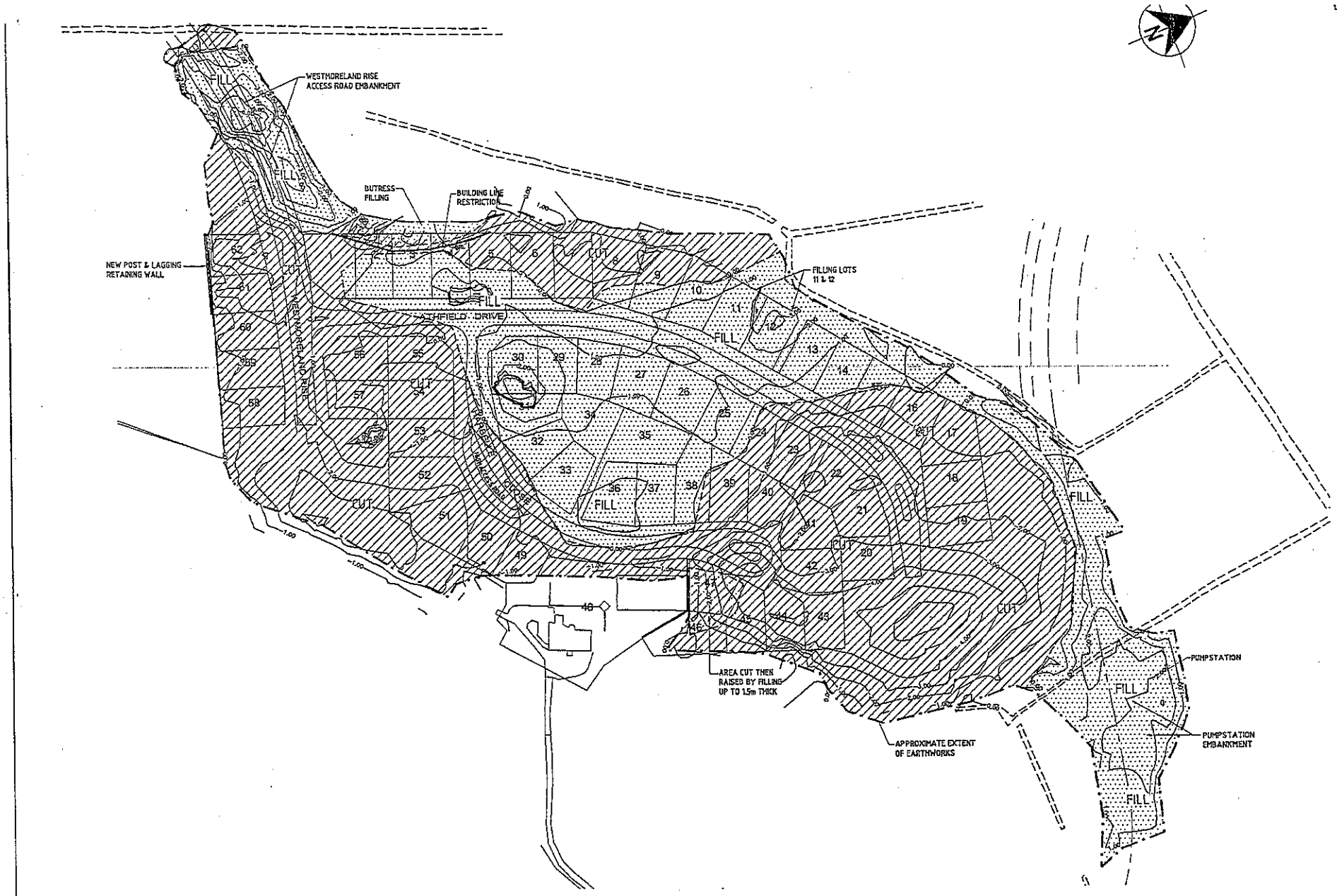
CW Project No. 70

Scale: 1:750 @ A
1:1500 @ A

Drawing No. 01


OF CUT OR HEIGHTS OF FILL
LEGEND
EXTENT OF EARTHWORKS
CUT/FILL BOUNDARY
COMPACTION COMPLIANCE TI
LOCATION & NUMBER
SETTLEMENT MARKER
WESTMORELAND RISE
ACCESS ROAD EMBANKMENT
BUTRESS
FILLING
BUILDING LINE
RESTRICTION
FILL
CUT
NEW POST & LAGGING
RETAINING WALL
WESTMORELAND RISE
ATHFIELD DRIVE
MARBELLE CLOSE
HIGH LEVEL ROAD
FILLING LOTS
11 & 12
AREA CUT THEN
RAISED BY FILLING
UP TO 1.5m THICK
APPROXIMATE EXTENT
OF EARTHWORKS
PUMPSTATION
PUMPSTATION
EMBANKMENT
SCALE 1:1000
Connell Wagner
Connell Wagner Ltd
143 Durham Street (PO Box 2297)
Tauranga, New Zealand
Telephone: +64 7 578 6183
Facsimile: +64 7 578 6143
Email: TGAcad@ccwarp.com
Client
MAYFIELD LTD
Project
Mayfield
North Bethlehem , Tauranga
Drawn CF Signed Date 16.04.02
Designed NR Signed Date 5-5-02
Verified Signed Date 6.5.02
Approved AL Signed Date 10-5-02
Drawing Title
COMPACTION TEST
LAYOUT PLAN
CW Project No.
Scale 1:1000 @
1:2000 @
Drawing No.
02
01 16.04.02 AS BUILT ISSUE CF
Rev. Date Revision Details By Ver. App.

1. CONTOURS ARE SHOWN AT APPROXIMATE DEPTHS OF CUT OR HEIGHTS OF FILL.



LEGEND

- CONTOURS OF EQUAL DEPTH
- CONTOURS OF EQUAL DEPTH
- EXTENT OF EARTHWORKS
- CUT/FILL BOUNDARY
- CUT AREA
- FILL AREA

SCALE 1:1000

AS B

Rev.	Date	Revision Details	By	Ver.	App.
01	16.04.02	AS BUILT ISSUE	CF		

Connell Wagner

Connell Wagner Ltd
143 Durham Street (PO Box 2282)
Tauranga, New Zealand

Telephone: +64 7 578 6183
Facsimile: +64 7 578 4143
Email: TGA.cw@conwag.com

Client: MAYFIELD LTD

Project: Mayfield
North Bethlehem , Tauranga

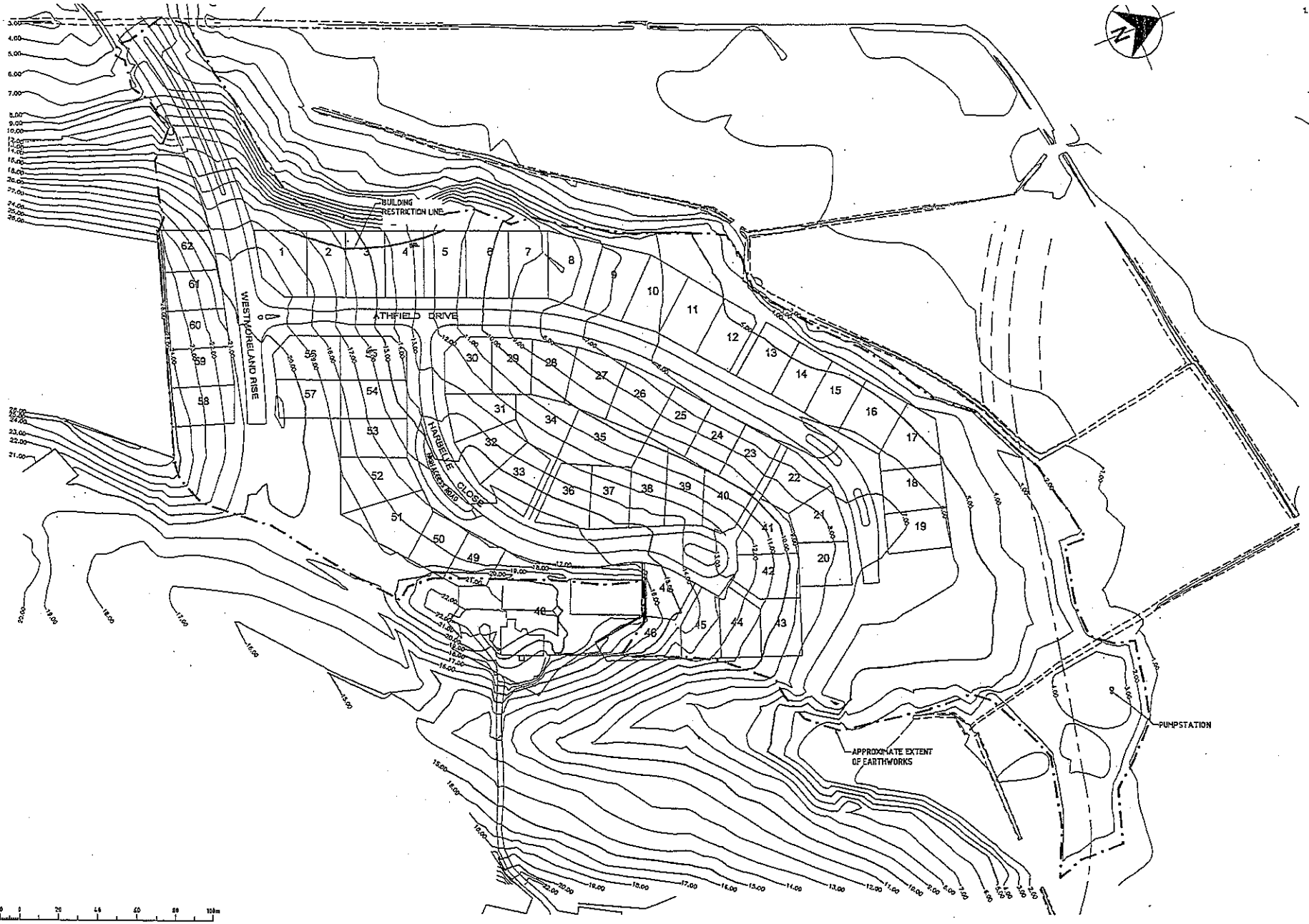
Drawn: CF	Signed:	Date: 16.04.02
Designed: NR	Signed:	Date: 6.5.02
Verified: BH	Signed:	Date: 6.5.02
Approved: AL	Signed:	Date: 10-5-02

Drawing Title: AS BUILT CUT/FILL PLAN

CW Project No.: 7

Scale: 1:1000 @ 1:2000 @

Drawing No.: 03



Rev.	Date	Revision Details	By	Ver.	App.
01	16.04.02	AS BUILT ISSUE	CF		

Connell Wagner

Connell Wagner Ltd
143 Durham Street (PO Box 2292)
Tauranga, New Zealand
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Email: TGAmail@conwag.com

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1. use the drawings and other data in electronic form without responding and checking them for accuracy against the original hard copy versions;
2. use the drawings or other data for any purpose not agreed to in writing by Connell Wagner.

Client: MAYFIELD LTD

Project: Mayfield
North Bethlehem , Tauranga

Drawn: CF	Signed: CF	Date: 16.04.02	
Designed: NR	Signed:	Date: 5.5.02	
Verified: BW	Signed:	Date: 6.5.02	
Approved: AL	Signed:	Date: [illegible]	

Drawing Title: FINISHED CONTOUR PLAN

CW Project No.: 70
Scale: 1:1000 @ / 1:2000 @ /
Drawing No.: 04

AS BI

Appendix C

Earth Fill Compaction Testing Results and Settlement Monitoring Results

ECES Evans Civil Engineering Services Ltd
14 Atkins Way
Ohauiti Rd
Tauranga
Telephone: (07) 544-4418
Facsimile: (07) 544-5568
E-mail: hcevans@bop.quik.co.nz

Dolp Rassmussen
A & R Partnership
PO Box 253
Paeroa

Attention: Dolph Rasmussen

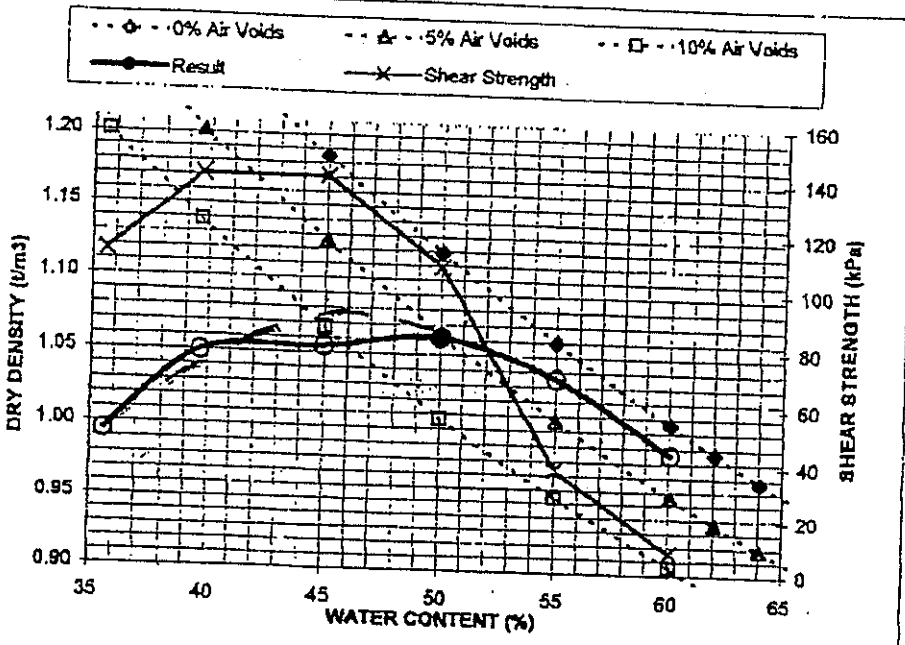
RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date:	13/02/01
Lab Reference:	TGA0007.02 1TL
Report No:	01/01/15/A
Order No:	Nil
Sample By:	Hayden Evans
Sample Method:	NZS 4407:1991 Test 2.4.2 (B)
Sample No.:	81
Date Sampled:	15/01/01
Sample Condition:	Natural
Date Received:	15/01/01
Date Reported:	13/02/01
Stockpile Volume:	N/A
Stockpile No. :	N/A
Comments:	Sample Depth 0.0m-1.5m
Page:	1 of 1

Client Request
To Carry out in-situ Dry density water content relationship test using the NZ standard hammer on the above sample from Mayfield Subdivision

Test Standards

NZS 4402 : 1986	Method of testing and sampling road aggregates
Test 4.1.1	Determination of the dry density / Water content relationship
NZS 4402 : 1986	Method of testing and sampling road aggregates
Test 2.1	Determination of the water content



Water Content (%)	Dry Density (t/m³)
Result	
36	0.99
40	1.05
45	1.05
50	1.06
55	1.04
60	0.99

Younger AS

Maximum Dry Density t/m³	1.06	1.08
Optimum Water Content %	50	45
Natural Water Content %	50	
Solid Density (Measurd) t/m³	2.54	Avg = 2.61

Notes

1 Information in Italics supplied by sampler & not verified by laboratory
2 Endorsement of this Test Report refers to testing carried out by this laboratory staff.
3 Sampling carried out by clients registered under IANZ Supplementary Criteria For Accreditation Note 4.9
4 The Material used in the test was Whole soil

Checked By: Date: 13-02-01
Hayden Evans
Laboratory Manager

Approved Signatory: Date 13-02-01
Hayden Evans
Laboratory Manager

ECES Evans Civil Engineering Services Ltd
14 Atkins Way
Ohauiti Rd
Tauranga
Telephone: (07) 544-4418
Facsimile: (07) 544-5568
E-mail: hcevans@bop.quik.co.nz

Dolp Rassmussen
A & R Partnership
PO Box 253
Paeroa

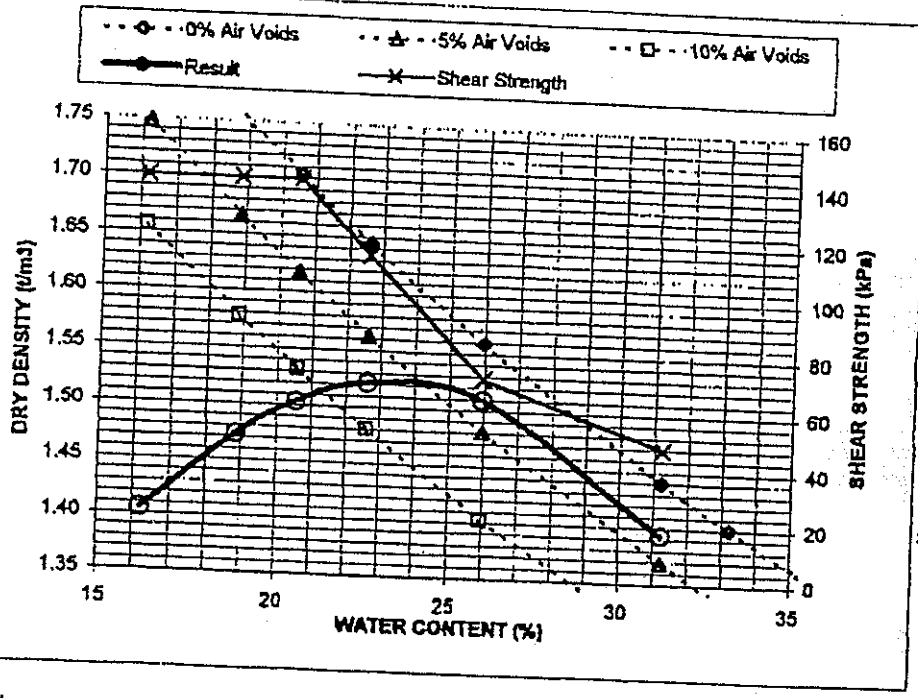
Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 13/02/01
Lab Reference: TGA0007.02 1TL
Report No: 01/01/14/A
Order No: Nil
Sample By: Hayden Evans
Sample Method: NZS 4407:1991 Test 2.4.2 (B)
Sample No.: 80
Date Sampled: 15/01/01
Sample Condition: Natural
Date Received: 15/01/01
Date Reported: 13/02/01
Stockpile Volume: N/A
Stockpile No. : N/A
Comments: Sample Depth 1.5m-1.9m
Page: 1 of 1

Client Request
To Carry out in-situ Dry density water content relationship test using the NZ standard hammer on the above sample from Mayfield Subdivision

Test Standards
NZS 4402 : 1986 Test 4.1.1 — Method of Testing Soils for Civil Engineering Purposes — Determination of the dry density / Water content relationship
NZS 4402 : 1986 Test 2.1 — Method of Testing Soils for Civil Engineering Purposes — Determination of the water content



Water Content (%)	Dry Density (t/m³)
Result	
16	1.40
19	1.47
21	1.50
23	1.52
26	1.51
31	1.39

SANDY SILT

Maximum Dry Density t/m³	1.52	1.52
Optimum Water Content %	23	24
Natural Water Content %	31	
Solid Density (Measured) t/m³	2.62	

Notes
1 Information in Italics supplied by sampler & not verified by laboratory
2 Endorsement of this Test Report refers to testing carried out by this laboratory staff.
3 Sampling carried out by clients registered under IANZ Supplementary Criteria For Accreditation Note 4.9
4 The Material used in the test was Whole soil

Checked By: Date: 13-02-01
Hayden Evans
Laboratory Manager

Approved Signatory: Date 3-02-01
Hayden Evans
Laboratory Manager

ECES Evans Civil Engineering Services Ltd
14 Atkins Way, Ohauiti Rd, Tauranga
Telephone: (07) 544-4418
Facsimile: (07) 544-5568
E-mail: hcevans@bop.quik.co.nz

Dolp Rasmussen
A & R Partnership
PO Box 253
Paeroa

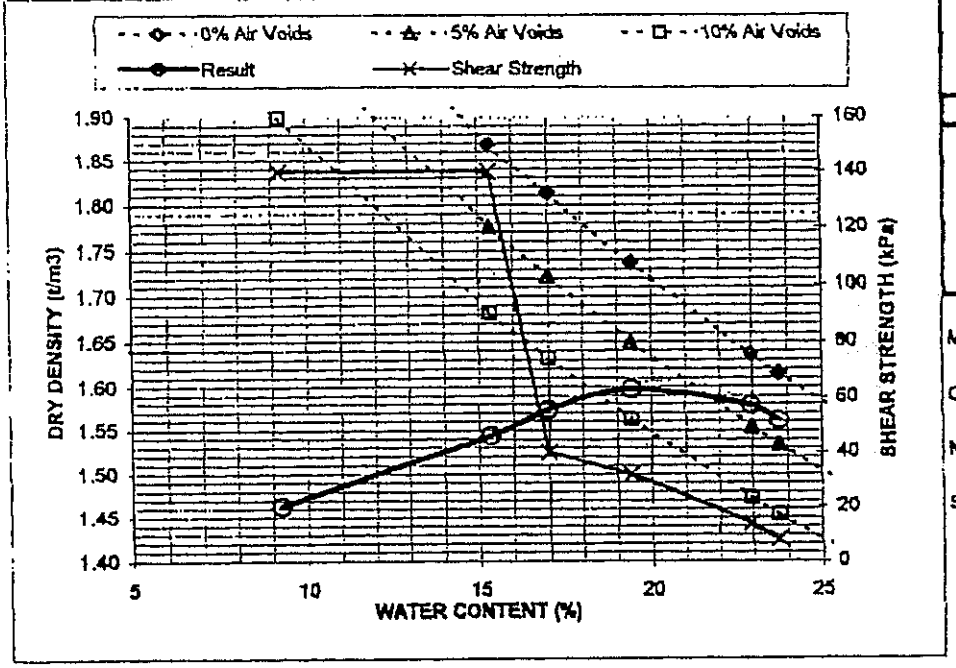
Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date:	13/02/01
Lab Reference:	TGA0007.02 1TL
Report No:	01/01/13/A
Order No:	Nil
Sample By:	Hayden Evans
Sample Method:	NZS 4407:1991 Test 2.4.2 (B)
Sample No.:	79
Date Sampled:	15/01/01
Sample Condition:	Natural
Date Received:	15/01/01
Date Reported:	13/02/01
Stockpile Volume:	N/A
Stockpile No. :	N/A
Comments:	Sample Depth 1.9m - 2.2m
Page:	1 of 1

Client Request
To Carry out in-situ Dry density water content relationship test using the NZ standard hammer on the above sample from Mayfield Subdivision

Test Standards
NZS 4402 : 1986 Method of testing and sampling road aggregates
Test 4.1.1 Determination of the dry density / Water content relationship
NZS 4402 : 1986 Method of testing and sampling road aggregates
Test 2.1 Determination of the water content



Water Content (%)	Dry Density (t/m^3)
Result	
9.0	1.46
15	1.54
17	1.57
19	1.60
23	1.58
24	1.56

SANDY

Maximum Dry Density t/m^3	1.60	1.60
Optimum Water Content %	19	21
Natural Water Content %	19	
Solid Density (Measured) t/m^3	2.62	

Notes
1 Information in Italics supplied by sampler & not verified by laboratory
2 Endorsement of this Test Report refers to testing carried out by this laboratory staff.
3 Sampling carried out by clients registered under IANZ Supplementary Criteria For Accreditation Note 4.9
4 The Material used in the test was Whole soil

Checked By: HEvans Date: 13-02-01 Approved Signatory: HEvans Date 13-02-01
Hayden Evans
Laboratory Manager
Hayden Evans
Laboratory Manager

ECES Evans Civil Engineering Services Ltd
14 Atkins Way
Ohauiti Rd
Tauranga
Telephone: (07) 544-4418
Facsimile: (07) 544-5568
E-mail: hcevans@bop.quik.co.nz

Dolp Rassmussen
A & R Partnership
PO Box 253
Paeroa

Attention: Dolph Rasmussen

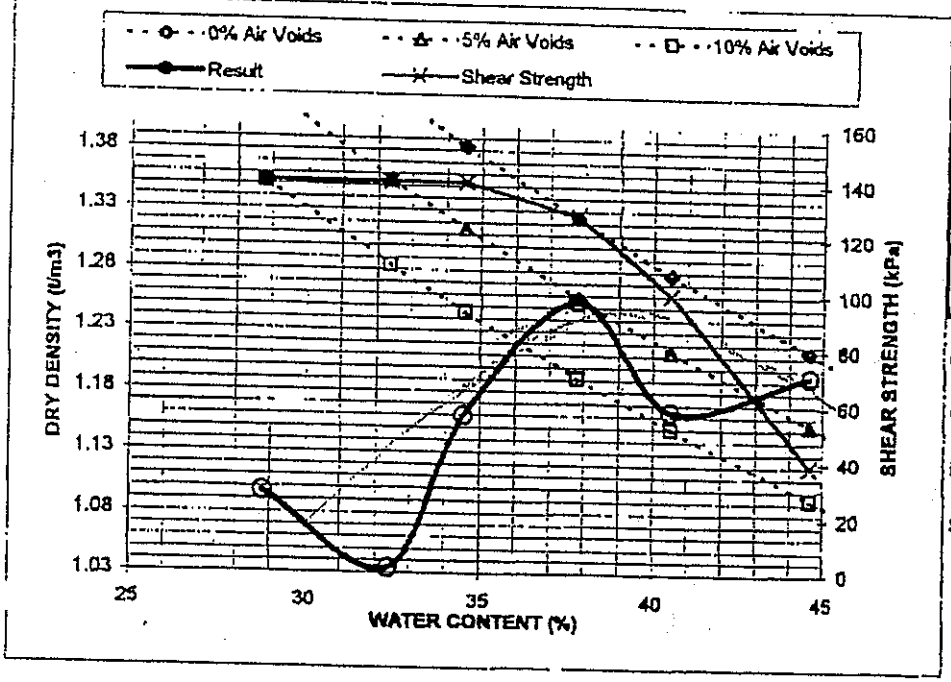
RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date:	13/02/01
Lab Reference:	TGA0007.02 1TL
Report No:	01/01/12/A
Order No:	Nil
Sample By:	Hayden Evans
Sample Method:	NZS 4407:1991 Test 2.4.2 (B)
Sample No.:	78
Date Sampled:	15/01/01
Sample Condition:	Natural
Date Received:	15/01/01
Date Reported:	13/02/01
Stockpile Volume:	N/A
Stockpile No. :	N/A
Comments:	Sample Depth 2.2m - 2.75m
Page:	1 of 1

Client Request
To Carry out in-situ Dry density water content relationship test using the NZ standard hammer on the above sample from Mayfield Subdivision

Test Standards

NZS 4402 : 1986	Method of testing and sampling road aggregates
Test 4.1.1	Determination of the dry density / Water content relationship
NZS 4402 : 1986	Method of testing and sampling road aggregates
Test 2.1	Determination of the water content



Water Content (%)	Dry Density (t/m^3)
Result	
29	1.10
32	1.03
35	1.16
38	1.26
41	1.16
45	1.19

Maximum Dry Density t/m^3	1.26	1·24
Optimum Water Content %	38	39%
Natural Water Content %	46	
Solid Density (Measured) t/m^3	2.65	

Notes

1 Information in Italics supplied by sampler & not verified by laboratory
2 Endorsement of this Test Report refers to testing carried out by this laboratory staff.
3 Sampling carried out by clients registered under IANZ Supplementary Criteria For Accreditation Note 4.9
4 The Material used in the test was Whole soil

Checked By: Date: 13-02-01
Hayden Evans
Laboratory Manager

Approved Signatory: Date 13-02-01
Hayden Evans
Laboratory Manager

ECES Evans Civil Engineering Services Ltd
14 Atkins Way
Ohauiti Rd
Tauranga
Telephone: (07) 544-4418
Facsimile: (07) 544-5568
E-mail: hcevans@bop.quik.co.nz

Dolp Rassmussen
A & R Partnership
PO Box 253
Paeroa

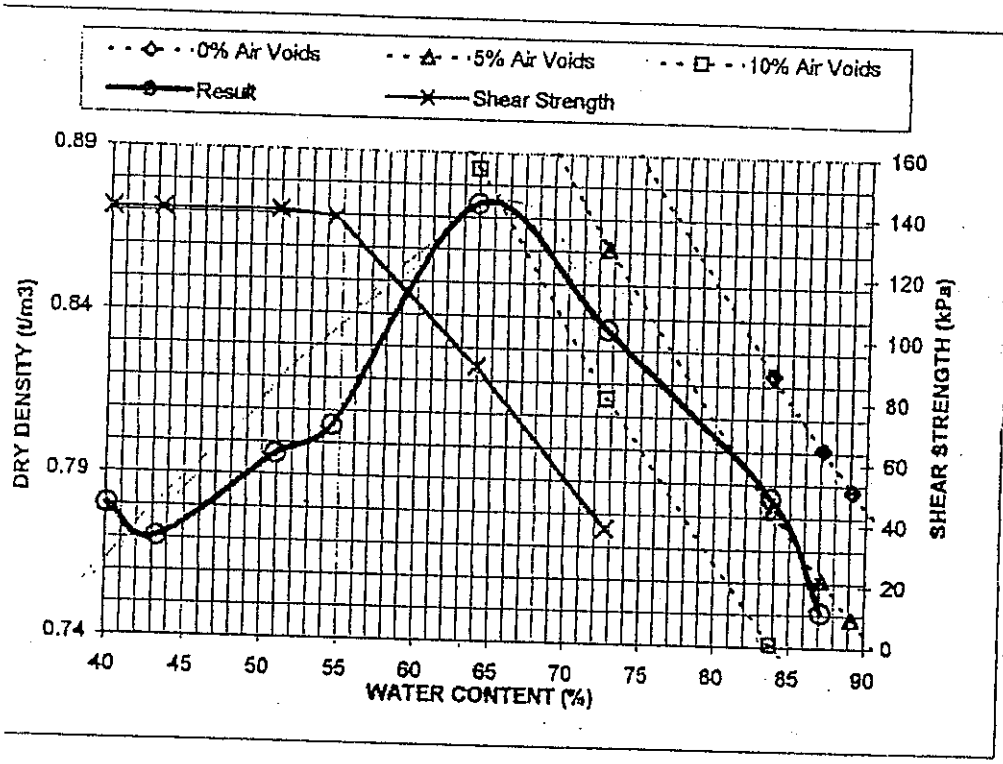
Attention: Dolph Rasmussen

RE : Contract Name: *Mayfield Subdivision*
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date:	26/03/01
Lab Reference:	TGA0007.02 6TL
Report No:	02/01/45/A
Order No:	Nil
Sample By:	Hayden Evans
Sample Method:	NZS 4407:1991 Test 2.4.2 (B)
Sample No.:	162
Date Sampled:	23/02/01
Sample Condition:	Natural
Date Received:	23/02/01
Date Reported:	29/03/01
Stockpile Volume:	N/A
Stockpile No. :	N/A
Comments:	
Page:	1 of 1

Client Request
To Carry out Dry density water content relationship test using the NZ standard hammer on the above sample from Mayfield Subdivision

Test Standards
NZS 4402 : 1986 Method of testing soils for civil engineering purposes
Test 4.1 Determination of the dry density / Water content relationship
Test 2.1 Determination of the water content



Water Content (%)	Dry Density (t/m^3)
Result	
40	0.78
43	0.77
51	0.80
54	0.81
64	0.87
73	0.84
84	0.79
87	0.75

Maximum Dry Density t/m^3	0.87	
Optimum Water Content %	64	65
Natural Water Content %	87.1	
Solid Density (Measurd) t/m^3	2.65	

Notes

1 Information in Italics supplied by sampler & not verified by laboratory
2 Endorsement of this Test Report refers to testing carried out by this laboratory staff.
3 Sampling carried out by clients registered under IANZ Supplementary Criteria For Accreditation Note 4.9
4 The Material used in the test was Whole soil

Checked By: Date: 29-03-01
Rhys Graham
Laboratory Technician

Approved By
Hayden Evans
Laboratory Manager
Date 29-03-01

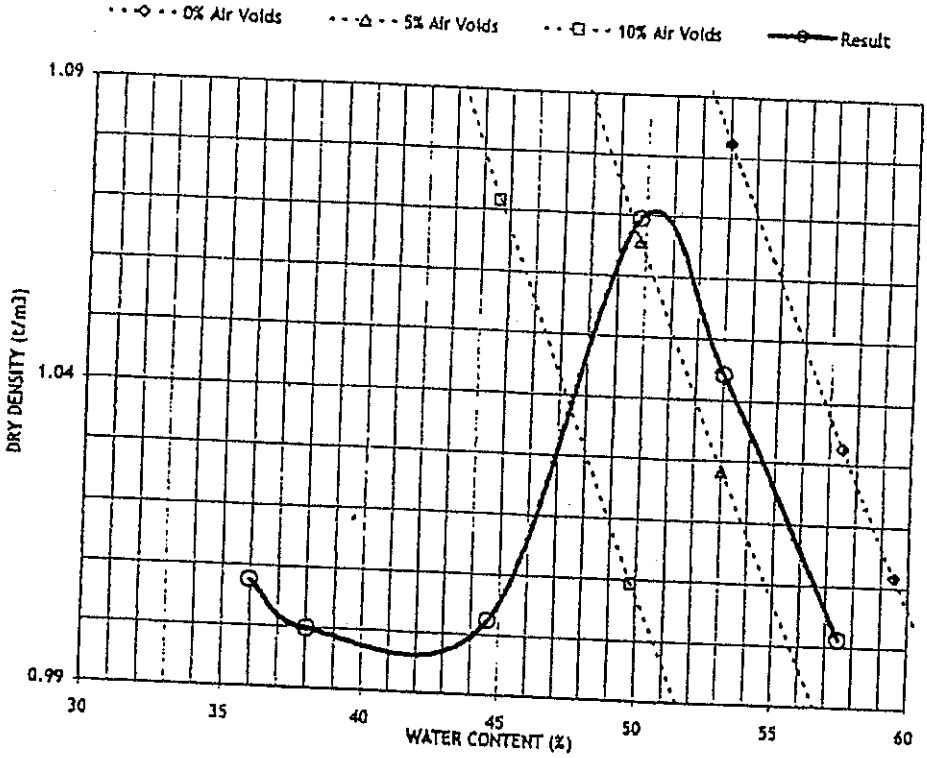
Project : Parallel Testing
Client : ECES Ltd
Location : See Below
Report No. : 44 900 01 / AC-1

Date : 21-Feb-01

Meritec

DRY DENSITY / WATER CONTENT RELATIONSHIP

Sample Number : 44 900 01 / 6
Sample Location : Mayfield Subdivision
Sample Description : Light brown - brown (Rotoehu ASH) (Client Sample No. 81) Younger Ash
Depth : 0.0 - 1.5m
Test Standard : NZS 4402:1986 Test 4.1.1 (Standard Compaction)
Single samples cured for 1 day



Dry Density (t/m³)	1.01	1.00	1.00	1.07	1.04	1.00
Water Content (%)	36.0	38.0	44.6	49.8	53.0	57.5

Maximum Dry Density :	1.07	t/m³
Optimum Water Content :	50	%
Natural Water Content :	49.8	%
Solid Density (tested) :	2.54	t/m³

THIS REPORT REPLACES MERITEC REPORT 44 900 01 / AC

Checked : Daniel Wyatt
Laboratory Technician

Approved : A Heaps
Approved Signatory

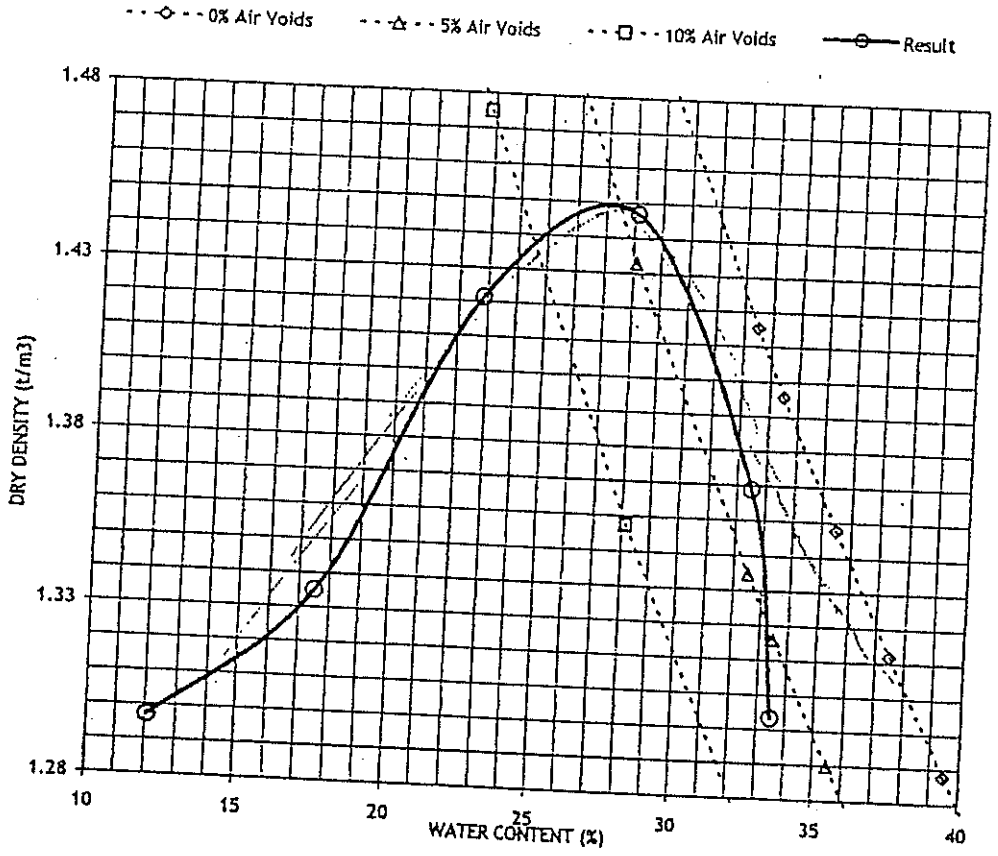
Project :	Parallel Testing
Client :	ECES Ltd
Location :	See Below
Report No. :	44 900 01 / AC

Date : 16-Feb-01

Meritec

DRY DENSITY / WATER CONTENT RELATIONSHIP

Sample Number :	44 900 01 / 5
Sample Location :	Mayfield Subdivision
Sample Description :	Light brown coarse pumiceous (Rotoehu ASH) (Client Sample No. 80)
Depth :	1.5-1.9m
Test Standard :	NZS 4402:1986 Test 4.1.1 (Standard Compaction)
	Single samples cured for 1 day



Dry Density (t/m^3)	1.30	1.34	1.42	1.45	1.37	1.30
Water Content (%)	12.0	17.5	22.8	28.1	32.5	36.7

Maximum Dry Density :	1.45	t/m^3	
Optimum Water Content :	27	%	28 %
Natural Water Content :	32.5	%	
Solid Density (tested) :	2.62	t/m^3	

Checked : Daniel Wyatt
Laboratory Technician

Approved :
Approved Signatory

laboratory

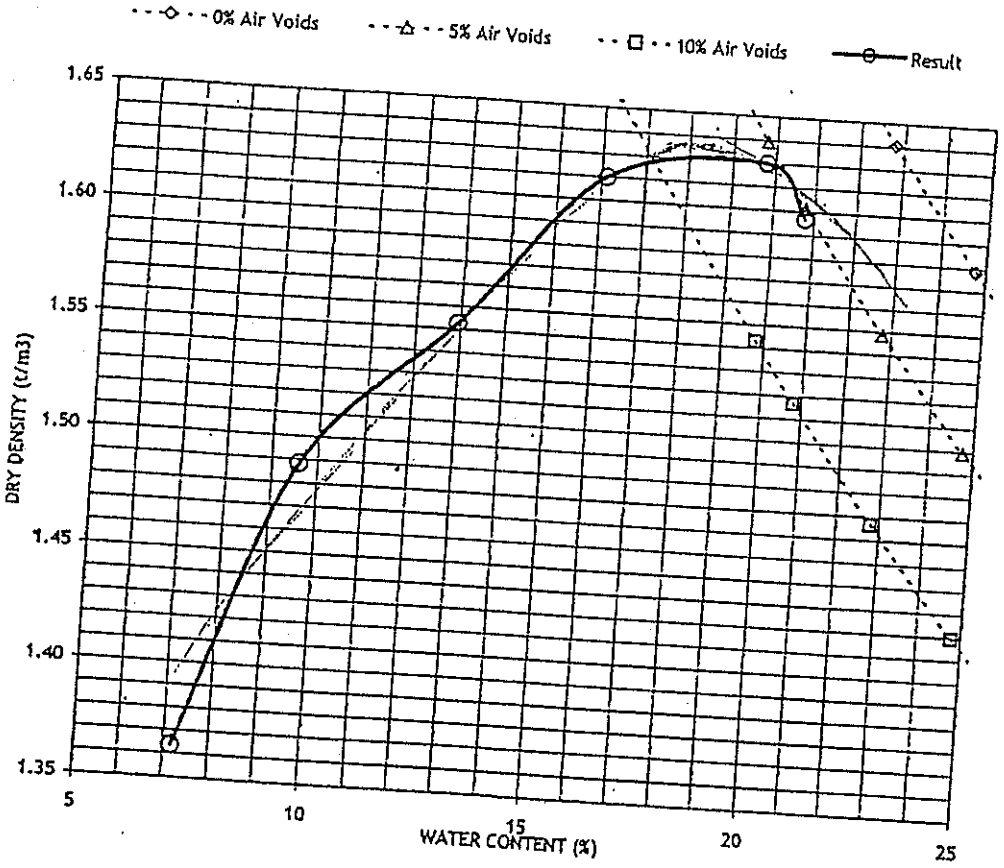
Project :	Parallel Testing
Client :	ECES Ltd
Location :	See Below
Report No. :	44 900 01 / AC

Date : 16-Feb-01

Meritec

DRY DENSITY / WATER CONTENT RELATIONSHIP

Sample Number :	44 900 01 / 4
Sample Location :	Mayfield Subdivision
Sample Description :	White fine pumiceous (Rotoehu ASH) (Client Sample No. 79)
Depth :	1.9 - 2.2m
Test Standard :	NZS 4402:1986 Test 4.1.1 (Standard Compaction)
	Single samples cured for 1 day



Dry Density (t/m³)	1.36	1.49	1.55	1.62	1.63	1.61
Water Content (%)	7.2	9.6	12.9	16.1	19.8	21.9

Maximum Dry Density :	1.63	t/m³	1.63
Optimum Water Content :	19	%	12 %
Natural Water Content :	16.1	%	
Solid Density (tested) :	2.62	t/m³	

Checked : Daniel Wyatt
Laboratory Technician

Approved :
Approved Signatory

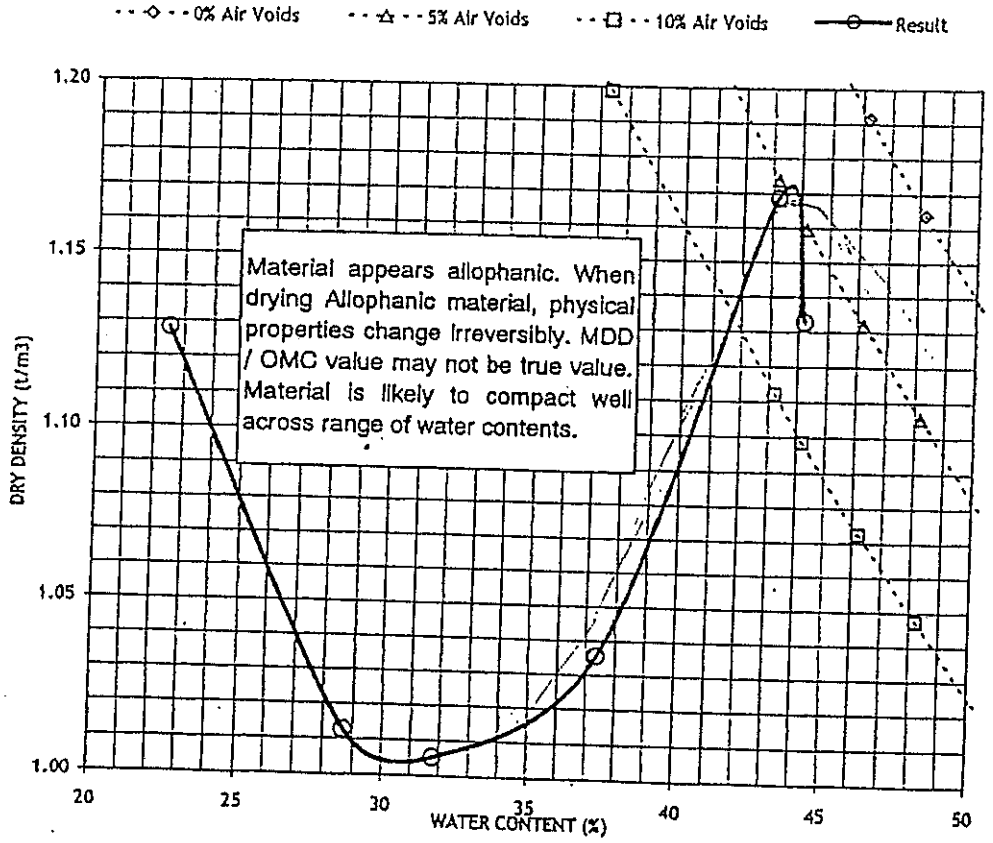
laboratory

Project :	Parallel Testing		
Client :	ECES Ltd		
Location :	See Below		
Report No. :	44 900 01 / AC	Date :	16-Feb-01

Meritec

DRY DENSITY / WATER CONTENT RELATIONSHIP

Sample Number :	44 900 01 / 3
Sample Location :	Mayfield Subdivision
Sample Description :	Dark brown Hamilton ASH (Client Sample No. 78)
Depth :	2.2 - 2.75m
Test Standard :	NZS 4402:1986 Test 4.1.1 (Standard Compaction)
	Single samples cured for 1 day



Dry Density (t/m^3)	1.13	1.01	1.01	1.04	1.17	1.13
Water Content (%)	22.5	28.7	31.8	37.3	43.2	48.9

Maximum Dry Density :	1.17	t/m^3
Optimum Water Content :	43	%
Natural Water Content :	48.9	%
Solid Density (tested) :	2.65	t/m^3

Checked : Daniel Wyeth.
Laboratory Technician

Approved :
Approved Signatory

laboratory

ECES Evans Civil Engineering Services Ltd

14 Atkins Way
Ohauiti Rd
Tauranga

Telephone: (07) 544-4418
Facsimile: (07) 544-5568
E-mail: hcevans@bop.quik.co.nz

Dolph Rasmussen
Earthmoving specialist
5 Mill Road
Paeroa

Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: 7073
Quality Control Testing: Bulk Fill

Test Completion Date: 25/01/01
Lab Reference: TGA0007.02 2TL
Report No: 01/01/30/A
Order No: Nil
Sample By: Hayden Evans
Sample Method: Unknown
Sample No.: 96
Date Sampled: 22/01/01
Date Received: 22/01/01
Date Reported: 31/01/01
Comments: Test Numbers 1A, 2A
Page: 1 of 1

Client Request

To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

NZS 4407 : 1991	Method of testing and sampling road aggregates
Test 4.2.1	Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986	Method of testing soils for civil engineering purposes
Test 2.1	Determination of the water content
In House:	Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	Air Voids %	Shear Strength (Kpa)
1A	See Map for details		0.4	1.37	1.00	36.0	43.0	0.95	63.98	22.9	185
2A	See Map for details		0.4	1.54	1.04	47.5	51.0	1.02	61.52	7.3	> 216

Notes

1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be = 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

Checked By: Hayden Evans
Laboratory Manager
Date: 31-01-01

Approved Signatory: Hayden Evans
Laboratory Manager
Date 31-01-01

ECES Evans Civil Engineering Services Ltd
14 Atkins Way, Ohauiti Rd, Tauranga
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Facsimile: (07) 544-5568
E-mail: hcevans@bop.quik.co.nz

Dolph Rasmussen
Earthmoving specialist
5 Mill Road
Paeroa

Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: 7073
Quality Control Testing: Bulk Fill

Test Completion Date: 30/01/01
Lab Reference: TGA0007.02 3TL
Report No: 01/01/38/A
Order No: Nil
Sample By: Hayden Evans
Sample Method: Unknown
Sample No.: 104
Date Sampled: 24/01/01
Date Received: 24/01/01
Date Reported: 31/01/01
Comments: Test Numbers 3A, 8A
Page: 1 of 1

Client Request

To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

NZS 4407 : 1991	Method of testing and sampling road aggregates
Test 4.2.1	Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986	Method of testing soils for civil engineering purposes
Test 2.1	Determination of the water content
In House:	Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	Air Voids %	Shear Strength (Kpa)
3A	See Map for details		0.8	1.65	1.21	36.5	41.0	1.17	55.79	7.8	> 202
4A	See Map for details		0.8	1.75	1.28	36.5	39.0	1.26	52.61	1.7	140
5A	See Map for details		1.0	1.72	1.24	39.0	43.0	1.20	54.55	0.0	182
6A	See Map for details		1.0	1.77	1.34	32.5	34.0	1.32	50.02	4.0	> 173
7A	See Map for details		1.2	1.73	1.25	38.5	39.5	1.24	53.31	3.6	186
8A	See Map for details		1.0	1.64	1.10	48.5	49.0	1.10	58.48	4.2	190

Notes

1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be = 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

Checked By: Hayden Evans, Laboratory Manager. Date: 31-01-01

Approved Signatory: Hayden Evans, Laboratory Manager. Date 31-01-01

ECES Evans Civil Engineering Services Ltd

14 Atkins Way
Ohauiti Rd
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Dolph Rasmussen
Earthmoving specialist
5 Mill Road
Paeroa

Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 6/2/01
Lab Reference: TGA0007.02 4TL
Report No: 01/01/50/A
Order No: Nil
Sample By: Hayden Evans
Sample Method: Unknown
Sample No.: 116
Date Sampled: 3/2/01
Date Received: 3/2/01
Date Reported: 11/2/01
Comments: Water Content Samples 9A - 22A
Sample Condition: Natural
Page: 1 of 1

Client Request
To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

NZS 4407 : 1991	Method of testing and sampling road aggregates
Test 4.2.1	Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986	Method of testing soils for civil engineering purposes
Test 2.1	Determination of the water content
In House:	Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	Air Voids %	Shear Strength (Kpa)
9A	6385520	2784996	2	1.66	1.20	38.5	44.5	1.15	56.56	5.3	To Hard
10A	6385527	2785006	3	1.68	1.18	42.5	38.0	1.21	54.16	10.8	> 194
11A	6385528	2785018	4	1.65	1.15	43.0	38.5	1.19	55.09	12.2	157
12A	6385531	2785013	3.5	1.72	1.22	40.5	36.5	1.26	52.49	9.3	165
13A	6385514	2785015	2.5	1.70	1.27	34.5	29.5	1.32	50.35	14.9	216
14A	6385538	2785025	2.5	1.74	1.23	41.5	37.0	1.27	52.13	8.2	174
15A	6385545	2785022	1.5	1.71	1.19	44.0	37.0	1.25	53.02	7.0	> 190
16A	6385556	2785017	1.5	1.71	1.20	42.5	43.5	1.19	55.13	2.6	> 216
17A	6385564	2785028	1.5	1.72	1.18	45.0	42.0	1.21	54.34	5.6	> 164
18A	6385562	2785032	1.5	1.74	1.26	38.0	35.0	1.29	51.27	8.3	> 209
19A	6385570	2785031	1.5	1.74	1.23	41.5	42.5	1.22	53.96	1.5	> 214
20A	6385576	2785031	1.5	1.67	1.16	44.0	43.0	1.17	55.95	6.4	157
21A	6385582	2785033	1.5	1.72	1.20	43.5	40.0	1.23	53.67	4.6	> 216
22A	6385584	2785043	1.5	1.73	1.24	39.5	34.5	1.29	51.46	10.4	> 171

Notes

1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be = 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

Checked By: Hayden Evans
Laboratory Manager
Date: 11-02-01

Approved Signatory: Hayden Evans
Laboratory Manager
Date 11-02-01

ECES Evans Civil Engineering Services Ltd

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E-mail: hcevans@bop.quik.co.nz

Dolph Rasmussen
Earthmoving specialist
5 Mill Road
Paeroa

Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 7/2/01
Lab Reference: TGA0007.02 5TL
Report No: 02/01/07/A
Order No: Nil
Sample By: Hayden Evans
Sample Method: Unknown
Sample No.: 123
Date Sampled: 3/2/01
Date Received: 3/2/01
Date Reported: 11/2/01
Comments: Water Content Samples 23A - 38A
Sample Condition: Natural
Page: 1 of 1

Client Request
To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

NZS 4407 : 1991	Method of testing and sampling road aggregates
Test 4.2.1	Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986	Method of testing soils for civil engineering purposes
Test 2.1	Determination of the water content
In House:	Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	Air Voids %	Shear Strength (Kpa)
23A	6385456	2784802	2	1.59	1.08	47.0	53.5	1.03	61.01	5.7	> 213
24A	6385450	2784804	2	1.68	1.19	42.0	30.5	1.29	51.36	19.0	> 216
25A	6385443	2784805	2	1.59	1.07	49.0	52.5	1.04	60.60	3.6	196
26A	6385467	2784814	2	1.65	1.12	47.0	50.5	1.09	58.70	1.1	> 200
27A	6385468	2784828	2	1.66	1.13	47.0	47.5	1.12	57.61	3.8	178
28A	6385459	2784833	1.5	1.68	1.18	42.5	48.0	1.14	57.07	-1.4	180
29A	6385449	2784833	1.5	1.63	1.15	42.0	52.0	1.07	59.63	4.0	> 216
30A	6385526	2784989	1.5	1.62	1.12	44.0	48.0	1.10	58.68	3.6	> 216
31A	6385547	2784987	1.0	1.71	1.23	39.5	42.0	1.20	54.56	2.2	> 216
32A	6385589	2785022	1.0	1.75	1.27	38.0	38.5	1.26	52.36	3.5	> 216
33A	6385594	2785015	0.5	1.81	1.32	36.5	33.5	1.36	48.81	5.6	159
34A	6385626	2785040	0.5	1.77	1.28	38.5	43.5	1.24	53.38	-4.0	> 203
35A	6385627	2785026	1	1.68	1.23	36.5	33.0	1.27	52.22	10.4	> 216
36A	6385648	2785047	1	1.67	1.18	41.5	36.0	1.23	53.63	12.6	> 216
37A	6385652	2785055	1	1.83	1.32	39.0	36.5	1.34	49.29	2.2	156
38A	6385636	2785052	1	1.75	1.25	39.0	48.0	1.18	55.51	-7.5	156

Notes

1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be = 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

Checked By: Hayden Evans, Laboratory Manager Date: 11-02-01

Approved Signatory: Hayden Evans, Laboratory Manager Date 11-02-01

ECES Evans Civil Engineering Services Ltd

14 Atkins Way
Ohauiti Rd
Tauranga

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Dolph Rasmussen
Earthmoving specialist
5 Mill Road
Paeroa

Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 1/3/01
Lab Reference: TGA0007.02 TTL
Report No: 03/01/01/A
Order No: Nil
Sample By: Rhys Graham
Sample Method: Unknown
Sample No.: 164
Date Sampled: 1/3/01
Date Received: 1/3/01
Date Reported: 12/3/01
Comments:
Sample Condition: Natural
Page: 1 of 1

Client Request
To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

NZS 4407 : 1991	Method of testing and sampling road aggregates
4.2.1	Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986	Method of testing soils for civil engineering purposes
Test 2.1	Determination of the water content
In House:	Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	N.D.M Air Voids %	Air Voids %	Shear Strength (Kpa)
39A	6385747	2785289	1.5	1.82	1.11	46.0	56.0	1.04	60.76	7.1	2.5	149
40A	6385762	2785296	1.5	1.63	1.13	45.0	39.0	1.18	55.64	6.6	9.8	> 189
41A	6385754	2785304	1.5	1.65	1.19	39.0	43.0	1.15	56.47	8.8	6.9	173
42A	6385752	2785309	1.5	1.65	1.18	40.0	43.0	1.15	56.52	8.6	7.0	> 216
43A	6385750	2785310	1.5	1.57	1.04	50.5	46.0	1.06	60.09	8.2	9.3	> 184
44A	6385728	2785317	1.5	1.59	1.09	46.0	54.0	1.03	60.99	8.5	5.2	> 216
45A	6385729	2785297	1.5	1.64	1.11	47.0	47.5	1.11	58.08	5.8	5.3	> 216
46A	6385715	2785347	1.5	1.69	1.20	40.5	34.0	1.26	52.38	5.8	9.5	171

Notes

1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to l 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

Checked By: Date: 12-03-01
Rhys Graham
Laboratory Technician

Approved BY Date 12-03-01
Hayden Evans
Laboratory Manager

ECES Evans Civil Engineering Services Ltd

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Ohauiti Rd
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Dolph Rasmussen
Earthmoving specialist
5 Mill Road
Paeroa

Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 5/3/01
Lab Reference: TGA0007.02 9TL
Report No: 03/01/05/A
Order No: Nil
Sample By: Rhys Graham
Sample Method: Unknown
Sample No.: 168
Date Sampled: 5/3/01
Date Received: 3/2/01
Date Reported: 9/3/01
Comments:
Sample Condition: Natural
Page: 1 of 1

Client Request
To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

NZS 4407 : 1991 — Method of testing and sampling road aggregates
4.2.1 — Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986 — Method of testing soils for civil engineering purposes
Test 2.1 — Determination of the water content
In House: — Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	NDM Air Voids %	Air Voids %	Shear Strength (Kpa)
47A	6385448	2784855	2	1.71	1.20	42.0	48.5	1.15	56.67	4.2	1.0	> 201
48A	6385452	2784818	2	1.61	1.12	44.5	53.5	1.05	60.39	8.3	4.2	161
49A	6385448	2784804	2	1.69	1.21	40.0	37.0	1.24	53.32	5.8	7.6	> 216
11B	6385528	2785018	1	1.69	1.19	42.0	52.5	1.11	58.26	5.3	0.2	> 200
13B	6385514	2785015	1.2	1.61	1.27	42.5	36.5	1.32	50.07	-1.7	1.8	> 216
36B	6385648	2785047	1.5	1.73	1.26	37.5	39.0	1.24	53.04	5.2	4.5	> 216

Notes

1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

Checked By: Date: 09-03-01
Rhys Graham
Laboratory Technician

Approved BY Date 09-03-01
Hayden Evans
Laboratory Manager

ECES Evans Civil Engineering Services Ltd

14 Atkins Way
Ohauiti Rd
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Facsimile: (07) 544-5568
E-mail: hcevans@bop.quik.co.nz

Dolph Rasmussen
Earthmoving specialist
5 Mill Road
Paeroa

Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 6/3/01
Lab Reference: TGA0007.02 10TL
Report No: 03/01/06/A
Order No: Nil
Tested By: Rhys Graham
Sample Method: Unknown
Sample No.: 169
Date Sampled: 6/3/01
Date Received: 6/3/01
Date Reported: 14/03/01
Comments:
Sample Condition: Natural
Page: 1 of 1

Client Request

To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

'ZS 4407 : 1991	Method of testing and sampling road aggregates
'est 4.2.1	Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986	Method of testing soils for civil engineering purposes
Test 2.1	Determination of the water content
In House:	Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	NDM Air Voids %	Air Voids %	Shear Strength (Kpa)
50A	6385450	2784854	1.5	1.63	1.09	48.5	51.0	1.08	59.37	5.6	4.5	201
51A	6385451	2784874	1.5	1.64	1.15	43.5	40.5	1.17	55.83	6.7	8.4	193
52A	6385736	2785290	2	1.61	1.09	47.0	50.5	1.07	59.66	7.3	5.7	> 164
53A	6385744	2785270	2.5	1.59	1.03	53.4	56.0	1.02	61.65	5.8	4.7	> 216
54A	6385737	2785261	3	1.58	1.06	49.3	51.0	1.05	60.46	7.7	7.0	151
55A	6385741	2785267	2.5	1.58	1.05	50.5	66.0	0.95	64.02	7.2	1.1	> 169

Notes

1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.
7 All Northing & Easting are taken form the New Zealand Map Grid

Checked By: Date: 14-03-01
Rhys Graham
Laboratory Technician

Approved BY Date 14-03-01
Hayden Evans
Laboratory Manager

ECES Evans Civil Engineering Services Ltd

14 Atkins Way
Ohauiti Rd
Tauranga

Telephone: (07) 544-4418
Facsimile: (07) 544-5568
E-mail: hcevans@bop.quik.co.nz

Dolph Rasmussen
Earthmoving specialist
5 Mill Road
Paeroa

Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 19/03/01
Lab Reference: TGA0007.02 12TL
Report No: 03/01/19/A
Order No: Nil
Sample By: Rhys Graham
Sample Method: NZS 47407:1991 Test 2.4.2
Sample No.: 182
Date Sampled: 19/03/01
Date Received: 19/03/01
Date Reported: 25/03/01
Comments:
Sample Condition: Natural
Page: 1 of 1

Client Request
To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

NZS 4407 : 1991	Method of testing and sampling road aggregates
Te[illegible] 4.2.1	Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
N[illegible] 402 : 1986	Method of testing soils for civil engineering purposes
Test 2.1	Determination of the water content
In House:	Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	N.D.M Air Voids %	Air Voids %	Shear Strength (Kpa)	
2A	6385508	2785018	0.5	1.60	1.06	51.0	59.0	1.01	61.94	5.7	2.4	149	*
3A	6385508	2785028	0.5	1.64	1.14	44.5	52.5	1.08	59.39	6.5	2.9	156	
4A	6385527	2785052	0.5	1.60	1.08	48.5	53.5	1.04	60.67	7.0	4.9	144	*
5A	6385527	2785015	0.5	1.62	1.10	47.0	59.5	1.01	61.75	6.9	1.4	150	
6A	6385547	2785038	0.5	1.60	1.07	49.5	62.5	0.98	62.92	7.0	1.5	> 210	
7A	6385334	2785034	0.5	1.61	1.09	48.0	49.0	1.08	59.12	6.5	6.0	155	
8A	6385526	2785025	0.5	1.67	1.14	46.5	56.5	1.06	59.83	4.1	-0.3	148	
9A	6385575	2785102	0.5	1.71	1.25	37.0	44.0	1.19	55.22	6.9	3.0	164	
0A	6385582	2785098	0.5	1.68	1.20	40.20	39.0	1.21	54.52	6.9	7.5	> 216	
A	6385578	2785085	0.5	1.70	1.24	37.07	38.5	1.23	53.58	7.0	6.2	> 174	
[illegible]	6385565	2785069	0.5	1.71	1.21	40.87	50.5	1.14	57.15	4.6	-0.2	> 195	
[illegible]	6385560	2785104	0.5	1.64	1.15	43.13	51.5	1.08	59.08	7.2	3.2	139	*
A	6385729	2785279	3	1.71	1.25	36.47	44.0	1.19	55.17	7.0	2.9	> 187	
A	6385738	2785294	3	1.65	1.12	46.80	53.5	1.06	59.40	4.9	1.8	161	
A	6385750	2785236	3	1.76	1.29	35.87	38.0	1.27	51.94	4.8	3.5	144	*

tes

1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be = 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

ecked By: Date: 25-03-0 Approved BY Date 25-03-01

Rhys Graham
Laboratory Technician

Hayden Evans
Laboratory Manager

ECES
Evans Civil Engineering Services Ltd
14 Atkins Way
Ohauiti Rd
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Facsimile: (07) 544-5568
E-mail: hcevans@bop.quik.co.nz

Dolph Rasmussen
Earthmoving specialist
5 Mill Road
Paeroa

Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 20/03/01
Lab Reference: TGA0007.02 13TL
Report No: 03/01/20/A
Order No: Nil
Sample By: Rhys Graham
Sample Method: NZS 4407 : 1991 Test 2.4.2
Sample No.: 183
Date Sampled: 20/03/01
Date Received: 20/03/01
Date Reported: 25/03/01
Comments:
Sample Condition: Natural
Page: 1 of 1

Client Request
To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards
NZS 4407 : 1991 Method of testing and sampling road aggregates
Test 4.2.1 Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986 Method of testing soils for civil engineering purposes
Test 2.1 Determination of the water content
In House: Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	N.D.M Air Voids %	Air Voids %	Shear Strength (Kpa)
77a	6385648	2785043	4	1.72	1.24	38.5	42.5	1.21	54.50	5.4	3.2	153
78A	6385670	2785063	4	1.67	1.16	43.0	46.0	1.14	56.95	5.9	4.5	> 179
79A	6385680	2785044	4	1.58	1.03	53.0	65.0	0.95	63.97	6.6	1.9	163
80A	6385675	2785046	4	1.70	1.18	43.5	46.0	1.16	56.13	3.9	2.7	> 193
81A	6385657	2785015	4	1.59	1.06	49.5	58.0	1.01	61.99	7.1	3.6	> 214
82A	6385660	2785040	Finshed Level	1.70	1.19	43.0	38.5	1.23	53.59	3.9	6.2	> 163
83A	6385445	2784859	Finshed Level	1.67	1.00	67.5	48.0	1.13	57.38	-5.0	3.2	> 163
84A	6385440	2784836	Finshed Level	1.60	0.95	68.0	59.5	1.00	62.20	-0.6	2.6	139
85A	6385442	2784820	Finshed Level	1.59	0.88	80.80	62.5	0.98	63.15	-4.0	2.1	154

Notes
1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be = 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

Checked By: Date: 25-03-01
Rhys Graham
Laboratory Technician

Approved BY Date 25-03-01
Hayden Evans
Laboratory Manager

ECES Evans Civil Engineering Services Ltd

14 Atkins Way
Ohauiti Rd
Tauranga

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E-mail: hcevans@bop.quik.co.nz

Dolph Rasmussen
Earthmoving specialist
5 Mill Road
Paeroa

Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 23/03/01
Lab Reference: TGA0007.02 14TL
Report No: 03/01/21/A
Order No: Nil
Sample By: Rhys Graham
Sample Method: NZS4407:1991 Test2.4.2
Sample No.: 185
Date Sampled: 23/03/01
Date Received: 23/03/01
Date Reported: 27/03/01
Comments:
Sample Condition: Natural
Page: 1 of 1

Client Request
To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

NZS 4407 : 1991	Method of testing and sampling road aggregates
Test 4.2.1	Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986	Method of testing soils for civil engineering purposes
Test 2.1	Determination of the water content
In House:	Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	N.D.M Air Voids %	Air Voids %	Shear Strength (Kpa)
86A	6385449	2784901	Finshed Level	1.72	1.19	45.0	46.0	1.18	55.54	1.7	1.4	> 201
87A	6385453	2784868	Finshed Level	1.68	1.20	40.0	42.5	1.18	55.40	6.3	5.2	> 216
88A	6385446	2784812	Finshed Level	1.58	1.04	51.5	60.0	0.99	62.81	7.1	3.7	157
89A	6385449	2784823	Finshed Level	1.59	1.06	49.5	55.0	1.03	61.31	7.2	4.9	> 199
90A	6385469	2784934	Finshed Level	1.68	1.20	39.5	47.5	1.14	57.04	7.1	3.0	> 216
91A	6385477	2784922	Finshed Level	1.68	1.20	40.0	51.0	1.11	57.98	6.8	1.2	> 214
92A	6385490	2784930	Finshed Level	1.60	1.09	47.5	49.0	1.08	59.39	7.3	6.8	> 211
93A	6385491	2784942	Finshed Level	1.65	1.14	44.5	49.5	1.10	58.38	6.1	3.8	> 167
94A	6385755	2785161	4	1.59	1.07	48.47	45.5	1.09	58.69	7.5	8.9	> 216
95A	6385762	2785168	3	1.70	1.21	40.40	42.5	1.20	54.88	5.2	4.1	> 202

Notes

1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be = 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

Checked By: Date: 27-03-01
Rhys Graham
Laboratory Technician

Approved BY Date 27-03-01
Hayden Evans
Laboratory Manager

ECES Evans Civil Engineering Services Ltd
14 Atkins Way, Ohauiti Rd, Tauranga
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Facsimile: (07) 544-5568
E-mail: hcevans@bop.quik.co.nz

Dolph Rasmussen
Earthmoving Specialist
5 Mill Road
Paeroa

Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 1/6/01
Lab Reference: TGA0007.02 16TL
Report No: 05/01/12/A
Order No: Nil
Sample By: Rhys Graham & Hayden Evans
Sample Method: NZS4407:1991 Test 2.4.2
Sample No.: 213
Date Sampled: 29/05/01
Date Received: 29/05/01
Date Reported: 1/6/01
Comments:
Sample Condition: Natural
Page: 1 of 2

Client Request
To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

NZS 4407 : 1991	Method of testing and sampling road aggregates
Test 4.2.1	Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986	Method of testing soils for Civil Engineering purposes
Test 2.1	Determination of the water content
In House:	Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	N.D.M Air Voids %	Air Voids %	Shear Strength (Kpa)
96A	6385458	2784847	Finish Level	1.61	1.07	50.0	57.5	1.02	61.51	6.0	2.8	> 190
97A	6385459	2784854	Finish Level	1.57	1.04	51.4	62.0	0.97	63.47	7.7	3.4	173
98A	6385458	2784859	Finish Level	1.58	1.02	55.1	61.0	0.98	62.97	5.4	3.1	> 210
99A	6385496	2784934	Finish Level	1.70	1.22	39.4	36.0	1.25	52.84	5.9	7.8	> 216
100A	6385487	2784962	Finish Level	1.73	1.25	38.0	37.5	1.25	52.65	5.3	5.6	> 216
101A	6385508	2784974	Finish Level	1.77	1.33	32.9	34.5	1.32	50.25	5.7	4.8	> 216
102A	6385568	2784999	Finish Level	1.78	1.35	32.0	35.5	1.32	50.33	5.7	3.6	> 218
103A	6385613	2785021	Finish Level	1.69	1.20	40.7	37.5	1.23	53.52	5.6	7.3	> 216
104A	6385632	2785036	Finish Level	1.79	1.33	34.3	37.5	1.30	50.86	4.0	2.0	> 216
105A	6385615	2785062	Finish Level	1.70	1.25	36.3	38.0	1.23	53.55	7.7	6.8	> 202
106A	6385646	2785057	Finish Level	1.78	1.33	34.2	40.5	1.27	52.17	4.6	0.8	> 190
107A	6385648	2785042	Finish Level	1.75	1.31	34.2	37.5	1.28	51.87	6.0	4.0	> 216
108A	6385694	2785086	Finish Level	1.83	1.41	30.3	23.0	1.49	43.81	4.4	9.6	> 216
109A	6385661	2785075	Finish Level	1.73	1.28	35.3	37.5	1.26	52.48	6.5	5.2	> 184
110A	6385607	2785076	Finish Level	1.79	1.30	37.8	38.5	1.29	51.24	1.9	1.5	> 181
111A	6385589	2785082	Finish Level	1.81	1.34	34.8	33.5	1.35	48.90	2.7	3.5	> 206

Notes
1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be = 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

Checked By: Date: 01-06-01
Rhys Graham
Laboratory Technician

Approved By: Date: 1-06-01
Hayden Evans
Laboratory Manager

ECES Evans Civil Engineering Services Ltd

14 Atkins Way
Ohauiti Rd
Tauranga

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E-mail: hcevans@bop.quik.co.nz

Dolph Rasmussen
Earthmoving Specialist
5 Mill Road
Paeroa

Attention: Dolph Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 1/6/01
Lab Reference: TGA0007.02 16TL
Report No: 05/01/12/A
Order No: Nil
Sample By: Rhys Graham & Hayden Evans
Sample Method: NZS4407:1991 Test 2.4.2
Sample No.: 213
Date Sampled: 29/05/01
Date Received: 29/05/01
Date Reported: 1/6/01
Comments:
Sample Condition: Natural
Page: 2 of 2

Client Request

To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

NZS 4407 : 1991	Method of testing and sampling road aggregates
Test 4.2.1	Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986	Method of testing soils for Civil Engineering purposes
Test 2.1	Determination of the water content
In House:	Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	N.D.M Air Voids %	Air Voids %	Shear Strength (Kpa)
112A	6385584	2785077	Finish Level	1.83	1.35	35.2	36.0	1.35	49.21	1.3	0.8	> 216
113A	6385599	2785064	Finish Level	1.78	1.32	35.5	33.5	1.33	49.63	3.7	4.9	> 213
114A	6385621	2785029	Finish Level	1.79	1.31	35.9	37.5	1.30	50.97	3.2	2.2	> 195
115A	6385629	2785025	Finish Level	1.76	1.34	31.6	40.5	1.25	52.77	7.4	2.1	> 216
116A	6385594	2785021	Finish Level	1.89	1.49	26.9	29.5	1.46	44.80	3.5	1.6	> 216
117A	6385625	2785012	Finish Level	1.82	1.36	33.4	35.5	1.34	49.38	3.1	1.8	> 208
55B	6385737	2785261	3.0m Fill	1.57	1.19	40.8	43.0	1.17	55.90	6.8	5.6	> 206
72B	6385565	2785069	Finish Level	1.77	1.25	41.8	34.0	1.32	50.11	0.6	5.2	> 216
79B	6385680	2785044	4.0m Fill	1.84	1.39	32.13	35.5	1.36	48.80	2.8	0.6	> 176
84B	6385440	2784836	Finish Level	1.66	1.14	45.80	49.0	1.11	58.02	5.0	3.5	> 216
85B	6385442	2784820	Finish Level	1.63	1.11	46.70	49.0	1.09	58.73	6.2	5.1	> 216

Notes

1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be = 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

Checked By: Date: 01-06-01
Rhys Graham
Laboratory Technician

Approved BY Date 1-06-01
Hayden Evans
Laboratory Manager

ECES Evans Civil Engineering Services Ltd

14 Atkins Way
Ohauiti Rd
Tauranga

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E-mail: hcevans@bop.quik.co.nz

Dolph Rasmussen
Earthmoving Specialist
5 Mill Road
Paeroa

Attention: Mr D Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract / No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 16/12/01
Lab Reference: TGA0007.08 1TL
Report No: 12/01/08/A
Order / Tender No: Nil
Tested By: Hayden Evans
Sample By: Hayden Evans
Sample Method: NZS4407:1991 Test 2.4.2
Sample No.: 337
Date Sampled: 6/12/01
Date Received: 6/12/01
Date Reported: 16/12/01
Comments:
Sample Condition: Natural
Page: 1 of 1

Client Request
To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

NZS 4407 : 1991	Method of testing and sampling road aggregates
Test 4.2.1	Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986	Method of testing soils for Civil Engineering purposes
Test 2.1	Determination of the water content
In House:	Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	N.D.M Air Voids %	Air Voids %	Shear Strength (Kpa)	Compaction %
B 1A	6385526	2784941	1.5m	1.58	1.09	45.5	44.8	1.09	58.9	9.5	10.0	181	Unknown
B 2A	6385599	2784988	1.5m	1.59	1.04	53.0	52.1	1.05	60.5	5.7	5.9	151	Unknown

Notes
1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be = 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

Checked By: T Shea Date: 16 - 12 - 01
Tony J Shea
Laboratory Technician

Approved By: Hayden Evans Date: 16 - 12 - 01
Hayden Evans
Laboratory Manager

ECES Evans Civil Engineering Services Ltd

14 Atkins Way Rd Ohauiti Tauranga
Telephone: (07) 544-4418
Facsimile: (07) 544-5568
E-mail: hcevans@bop.quik.co.nz

Dulph Rasmussen
Earthmoving Specialist
5 Mill Road
Paeroa

Attention: Mr D Rasmussen

RE : Contract Name: Mayfield Subdivision
Contract / No.: Unknown
Quality Control Testing: Bulk Fill

Test Completion Date: 13/12/01
Lab Reference: TGA0007.08 ZTL
Report No: 12/01/09/A
Order / Tender No: Nil
Tested By: Hayden Evans
Sample By: Hayden Evans
Sample Method: NZS4407:1991 Test 2.4.2
Sample No.: 338
Date Sampled: 14/12/01
Date Received: 14/12/01
Date Reported: 17/12/01
Comments:
Sample Condition: Natural
Page: 1 of 1

Client Request
To carry out in-situ density tests using Nuclear Surface Moisture-Density Gauge on bulk fill material on Mayfield Subdivision

Test Standards

NZS 4407 : 1991	Method of testing and sampling road aggregates
Test 4.2.1	Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode
NZS 4402 : 1986	Method of testing soils for Civil Engineering purposes
Test 2.1	Determination of the water content
In House:	Operating procedures for the uses of Geotechnics Torque Head

Test Results

Test No	Northing (m)	Easting (m)	Depth of Fill (m)	N.D.M Wet Density t/m³	N.D.M Dry Density t/m³	N.D.M Water Content %	Oven Water Content %	Corrected Dry Density t/m³	Total Voids %	N.D.M Air Voids %	Air Voids %	Shear Strength (Kpa)	Compaction %
3A	6385526	2784941	Finshed	1.63	1.06	54.0	71.8	0.95	64.2	2.8	-3.9	140	Unknown
2A	6385599	2784988	Finshed	1.62	1.06	53.5	54.8	1.05	60.5	3.6	3.2	150	Unknown

Notes
1 N.D.M = Nuclear Densometer Measurement t/m³
2 Oven = Standard oven method
3 Air Voids & Total Voids are calculated using oven water contents & the corrected dry density
4 Solid Density is assumed to be = 2.65 t/m³
5 All Nuclear Densometer Measurements are at the depth of 300mm
6 All test locations were chosen by the contractor.

Checked By: T. Shea Date: 17-12-01
Tony J Shea
Laboratory Technician

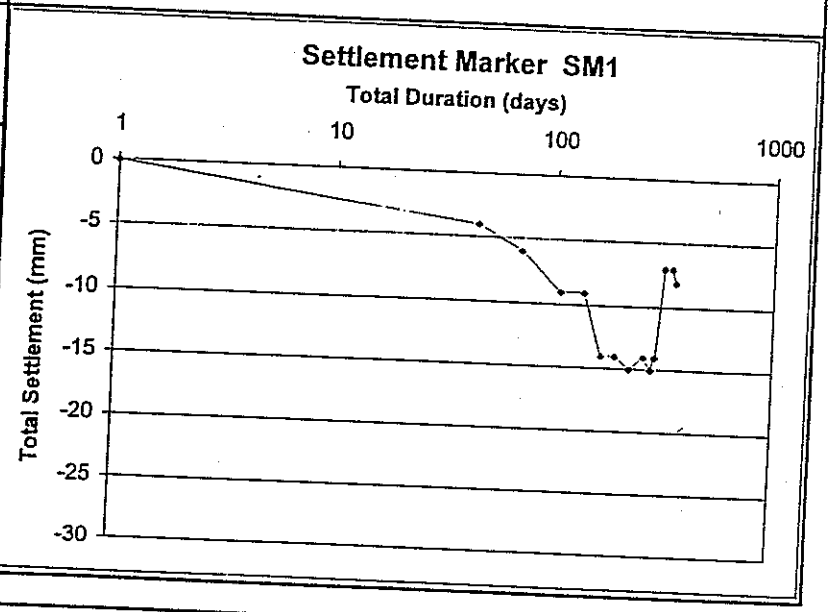
Approved By: Hayden Evans Date: 17-12-01
Hayden Evans
Laboratory Manager

Date 23/10/01
Version : 1
File Name: Test 4.2.1 Method using a Nuclear Surface Moisture - Density Gauge-Direct Transmission Mode

Settlement Marker SM 1

Date:	Level (m RL)	Settlement (mm)	Total Settlement (mm)	Duration Between Readings (days)	Total Duration (days)	Square root Time	Total Settlement (mm)
23-Apr-01	14.807		0		1	1.00	0
6-Jun-01	14.803	4	4	44	44	6.63	-4
2-Jul-01	14.801	2	6	26	70	8.37	-6
7-Aug-01	14.798	3	9	36	106	10.30	-9
6-Sep-01	14.798	0	9	30	136	11.66	-9
5-Oct-01	14.793	5	14	29	165	12.85	-14
1-Nov-01	14.793	0	14	27	192	13.86	-14
3-Dec-01	14.792	1	15	32	224	14.97	-15
8-Jan-02	14.793	-1	14	36	260	16.12	-14
29-Jan-02	14.792	1	15	21	281	16.76	-15
8-Feb-02	14.793	-1	14	10	291	17.06	-14
12-Feb-02	11.813	2980	14	4	295	17.18	-14
6-Mar-02	11.820	-7	7	22	317	17.80	-7
4-Apr-02	11.330	490	7	29	346	18.60	-7
16-Apr-02	11.329	1	8	12	358	18.92	-8

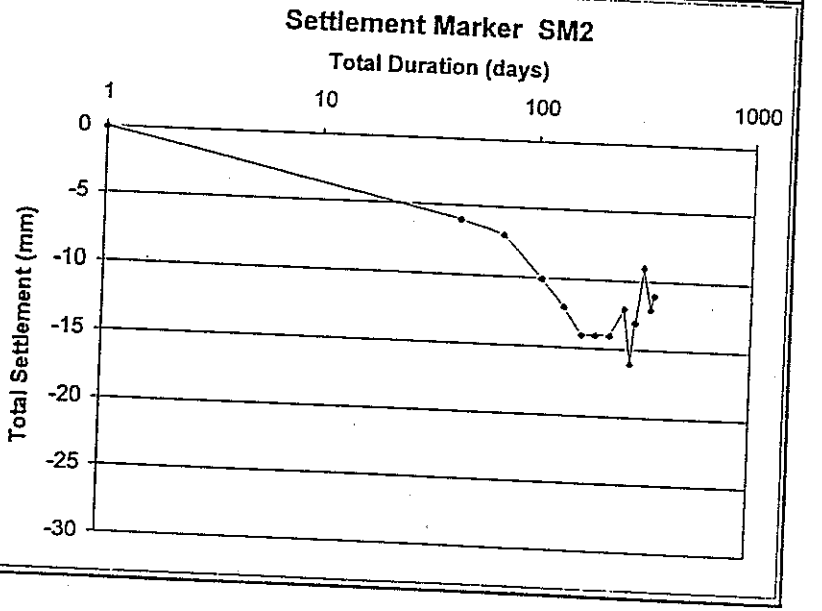
Settlement Marker SM 1



Settlement Marker SM 2

Date:	Level (m RL)	Settlement (mm)	Total Settlement (mm)	Duration Between Readings (days)	Total Duration (days)	Square root Time	Total Settlement (mm)
23-Apr-01	12.484		0		1	1.00	0
6-Jun-01	12.478	6	6	44	44	6.63	-6
2-Jul-01	12.477	1	7	26	70	8.37	-7
7-Aug-01	12.474	3	10	36	106	10.30	-10
6-Sep-01	12.472	2	12	30	136	11.66	-12
5-Oct-01	12.47	2	14	29	165	12.85	-14
1-Nov-01	12.47	0	14	27	192	12.85	-14
3-Dec-01	12.47	0	14	32	224	12.85	-14
8-Jan-02	12.472	-2	12	36	260	12.85	-12
29-Jan-02	12.468	4	16	21	281	12.85	-16
8-Feb-02	12.471	-3	13	10	291	12.85	-13
12-Feb-02	9.490	2981	13	4	295	12.85	-13
6-Mar-02	9.494	-4	9	22	317	17.80	-9
6-Mar-02	8.943	551	9	0	317	17.80	-9
4-Apr-02	9.889	-946	12	29	346	18.60	-12
16-Apr-02	9.890	-1	11	12	358	18.92	-11

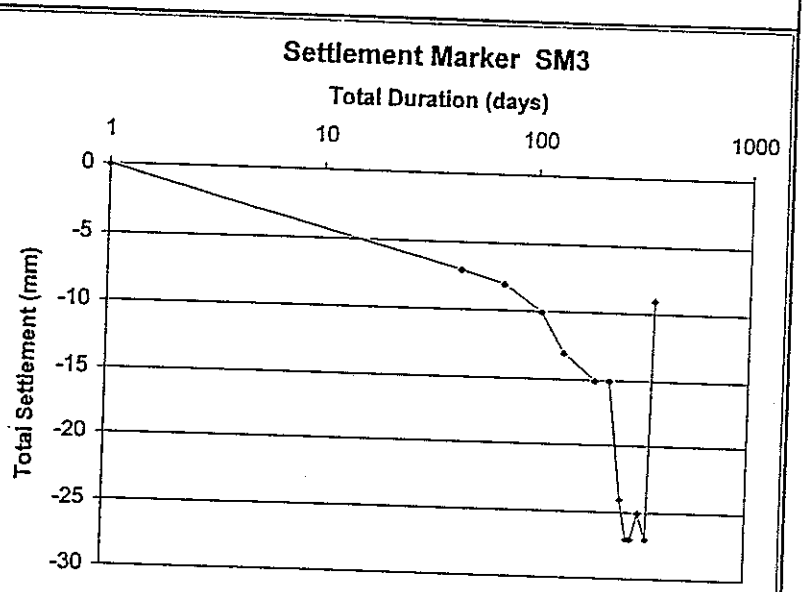
Settlement Marker SM 2



17.04.02

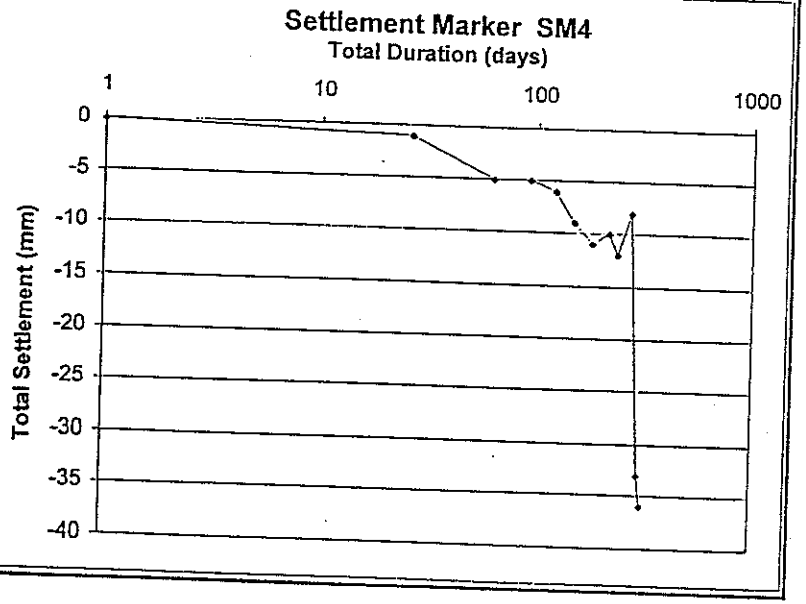
Settlement Marker	SM 3						
Date:	Level (m RL)	Settlement (mm)	Total Settlement (mm)	Duration Between Readings (days)	Total Duration (days)	Square root Time	Total Settlement (mm)
23-Apr-01	12.176		0		1	1.00	0
6-Jun-01	12.169	7	7	44	44	6.63	-7
2-Jul-01	12.168	1	8	26	70	8.37	-8
7-Aug-01	12.166	2	10	36	106	10.30	-10
6-Sep-01	12.163	3	13	30	136	11.66	-13
1-Nov-01	12.161	2	15	56	192	12.85	-15
3-Dec-01	12.161	0	15	32	224	12.85	-15
8-Jan-02	12.152	9	24	36	260	13.85	-24
29-Jan-02	12.149	3	27	21	281	14.85	-27
8-Feb-02	12.149	0	27	10	291	15.85	-27
12-Feb-02	9.795	2354	27	4	295	16.85	-27
6-Mar-02	9.797	-2	25	22	317	17.85	-25
4-Apr-02	9.795	2	27	29	346	18.85	-27
16-Apr-02	9.796	-1	9	12	358	18.92	-9

Settlement Marker SM 3



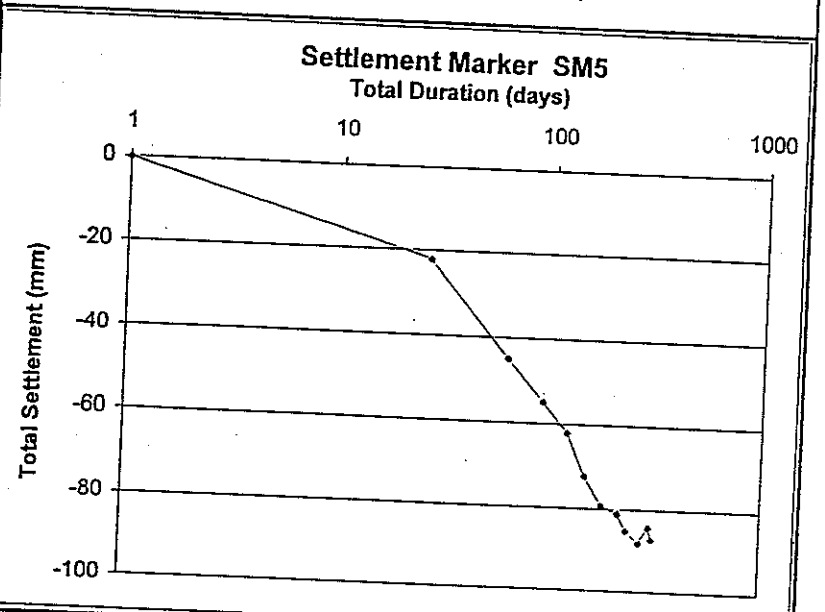
Settlement Marker	SM 4						
Date:	Level (m RL)	Settlement (mm)	Total Settlement (mm)	Duration Between Readings (days)	Total Duration (days)	Square root Time	Total Settlement (mm)
23-Apr-01	102.002		0		1	1.00	0
6-Jun-01	102.674	0	0	44	1	6.63	0
2-Jul-01	102.673	1	1	26	26	8.37	-1
7-Aug-01	102.669	4	5	36	62	10.30	-5
6-Sep-01	102.669	0	5	30	92	11.66	-5
5-Oct-01	102.668	1	6	29	121	12.85	-6
1-Nov-01	102.665	3	9	27	148	12.85	-9
3-Dec-01	102.663	2	11	32	180	13.85	-11
8-Jan-02	102.664	-1	10	36	216	14.85	-10
29-Jan-02	102.662	2	12	21	237	15.85	-12
6-Mar-02	102.666	-4	8	36	273	16.85	-8
4-Apr-02	102.641	25	33	29	302	17.85	-33
16-Apr-02	102.638	3	36	12	314	18.85	-36

Settlement Marker SM 4



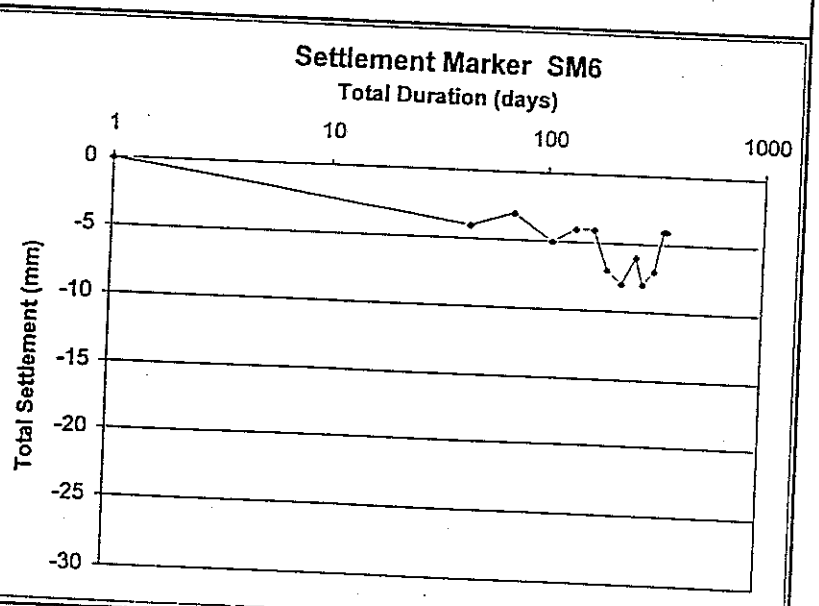
Settlement Marker	SM 5						
Date:	Level (m RL)	Settlement (mm)	Total Settlement (mm)	Duration Between Readings (days)	Total Duration (days)	Square root Time	Total Settlement (mm)
23-Apr-01	102.176		0		1	1.00	0
6-Jun-01	102.007	0	0	44	1	6.63	0
2-Jul-01	101.985	22	22	26	26	8.37	-22
7-Aug-01	101.962	23	45	36	62	10.30	-45
6-Sep-01	101.952	10	55	30	92	11.30	-55
5-Oct-01	101.945	7	62	29	121	12.30	-62
1-Nov-01	101.935	10	72	27	148	13.30	-72
3-Dec-01	101.928	7	79	32	180	14.30	-79
8-Jan-02	101.926	2	81	36	216	15.30	-81
29-Jan-02	101.922	4	85	21	237	16.30	-85
6-Mar-02	101.919	3	88	36	273	17.30	-88
4-Apr-02	101.923	-4	84	29	302	18.30	-84
16-Apr-02	101.92	3	87	12	314	18.85	-87

Settlement Marker SM 5



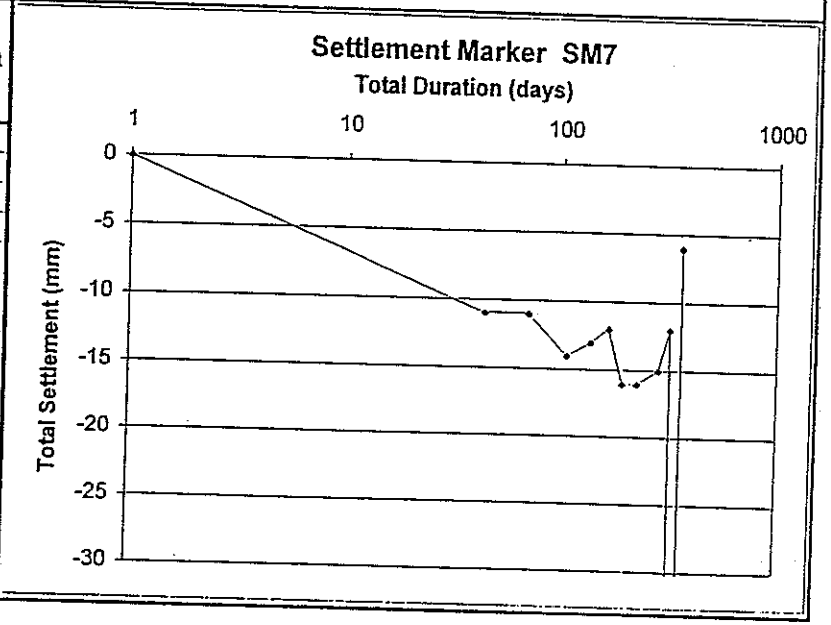
Settlement Marker	SM 6						
Date:	Level (m RL)	Settlement (mm)	Total Settlement (mm)	Duration Between Readings (days)	Total Duration (days)	Square root Time	Total Settlement (mm)
23-Apr-01	102.491		0		1	1.00	0
6-Jun-01	102.487	4	4	44	44	8.30	-4
2-Jul-01	102.488	-1	3	26	70	9.30	-3
7-Aug-01	102.486	2	5	36	106	10.30	-5
6-Sep-01	102.487	-1	4	30	136	11.66	-4
5-Oct-01	102.487	0	4	29	165	12.85	-4
1-Nov-01	102.484	3	7	27	192	12.85	-7
3-Dec-01	102.483	1	8	32	224	13.85	-8
8-Jan-02	102.485	-2	6	36	260	14.85	-6
29-Jan-02	102.483	2	8	21	281	15.85	-8
6-Mar-02	102.484	-1	7	36	317	16.85	-7
4-Apr-02	102.487	-3	4	29	346	17.85	-4
16-Apr-02	102.487	0	4	12	358	18.85	-4

Settlement Marker SM 6



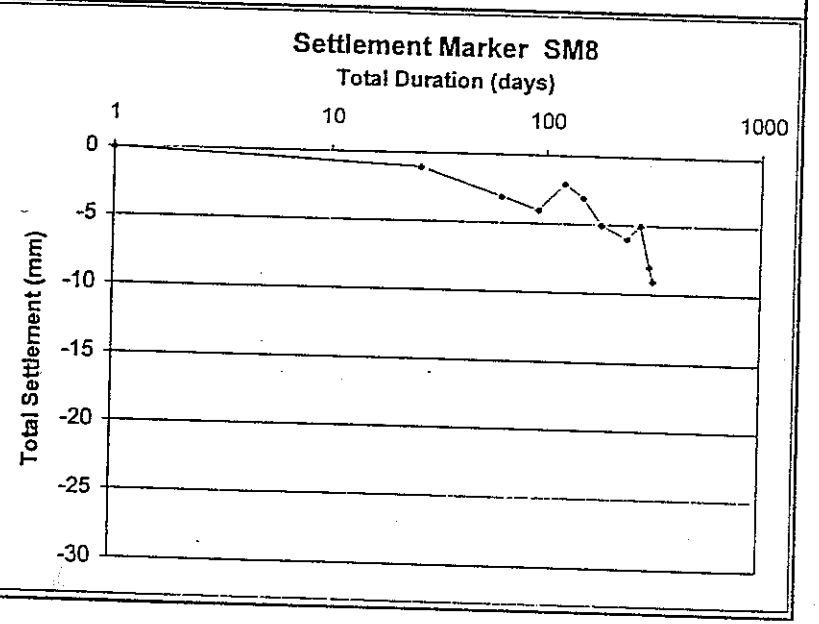
Settlement Marker	SM 7						
Date:	Level (m RL)	Settlement (mm)	Total Settlement (mm)	Duration Between Readings (days)	Total Duration (days)	Square root Time	Total Settlement (mm)
23-Apr-01	104.217		0		1	1.00	0
6-Jun-01	104.206	11	11	44	44	8.30	-11
2-Jul-01	104.206	0	11	26	70	9.30	-11
7-Aug-01	104.203	3	14	36	106	10.30	-14
6-Sep-01	104.204	-1	13	30	136	11.66	-13
5-Oct-01	104.205	-1	12	29	165	12.85	-12
1-Nov-01	104.201	4	16	27	192	12.85	-16
3-Dec-01	104.201	0	16	32	224	13.85	-16
29-Jan-02	104.202	-1	15	57	281	14.85	-15
6-Mar-02	104.205	-3	12	36	317	15.85	-12
4-Apr-02	103.992	213	225	29	346	16.85	-225
16-Apr-02	104.211	-219	6	12	358	17.85	-6

Settlement Marker SM 7



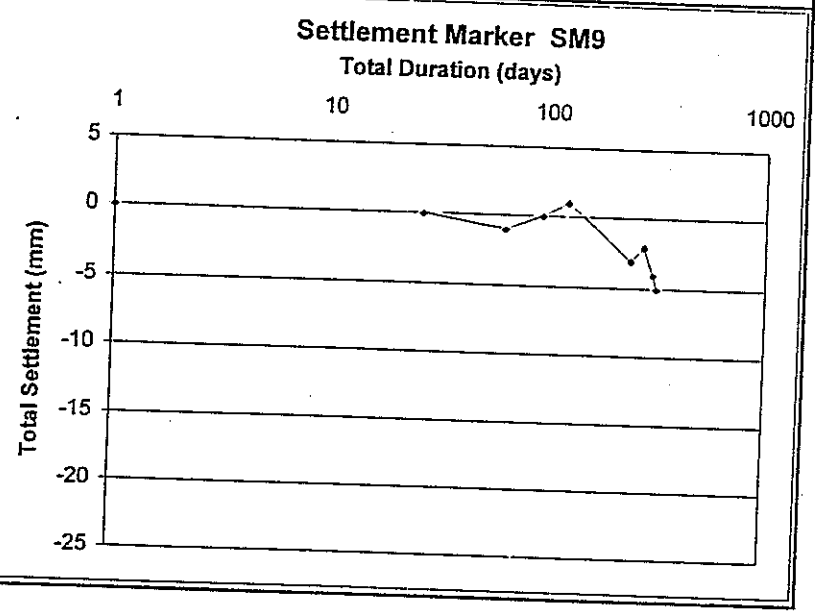
Settlement Marker	SM 8						
Date:	Level (m RL)	Settlement (mm)	Total Settlement (mm)	Duration Between Readings (days)	Total Duration (days)	Square root Time	Total Settlement (mm)
6-Jun-01	102.337		0		1	1.00	0
2-Jul-01	102.336	1	1	26	26	8.30	-1
7-Aug-01	102.334	2	3	36	62	9.30	-3
6-Sep-01	102.333	1	4	30	92	10.30	-4
5-Oct-01	102.335	-2	2	29	121	11.66	-2
1-Nov-01	102.334	1	3	27	148	12.85	-3
3-Dec-01	102.332	2	5	32	180	12.85	-5
29-Jan-02	102.331	1	6	57	237	13.85	-6
6-Mar-02	102.332	-1	5	36	273	14.85	-5
4-Apr-02	102.329	3	8	29	302	15.85	-8
16-Apr-02	102.328	1	9	12	314	16.85	-9

Settlement Marker SM 8



Settlement Marker	SM 9						
Date:	Level (m RL)	Settlement (mm)	Total Settlement (mm)	Duration Between Readings (days)	Total Duration (days)	Square root Time	Total Settlement (mm)
6-Jun-01	101.567		0		1	1.00	0
2-Jul-01	101.567	0	0	26	26	8.30	0
7-Aug-01	101.566	1	1	36	62	9.30	-1
6-Sep-01	101.567	-1	0	30	92	10.30	0
5-Oct-01	101.568	-1	-1	29	121	11.66	1
29-Jan-02	101.564	4	3	116	237	12.85	-3
6-Mar-02	101.565	-1	2	36	273	12.85	-2
4-Apr-02	101.563	2	4	29	302	13.85	-4
16-Apr-02	101.562	1	5	12	314	14.85	-5

Settlement Marker SM 9



Appendix D

Individual Lot Testing Results

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 27-Feb-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 1 — Lot No. 1

Elevation 19 m (in terms of Motunki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown slightly sandy SILT (ML) (Fill)			
(stiff)			
(becomes slightly plastic)		0.5m	
(becomes mottled creamish brown, sandy)			
(becomes dark orange brown, slightly sandy)			
end of bore 1.00m		1.0m	
		1.5m	

Borehole No. 2 — Lot No. 2

Elevation 16 m (in terms of Motunki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown slightly sandy SILT (ML) (Fill)			
(stiff)		0.5m	
(becomes mottled creamish brown)			
(becomes dark orange brown, slightly plastic)			
(becomes creamish brown mottled orange brown, sandy)			
(becomes dark orange brown speckled black, slightly plastic) end of bore 1.00m		1.0m	
		1.5m	

Borehole No. 3 — Lot No. 3

Elevation 16 m (in terms of Motunki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Creamish brown mottled orange brown and white slightly sandy SILT (ML) (Fill)			
(becomes dark orange brown mottled creamish brown, stiff, slightly plastic)		0.5m	
(becomes creamish brown, slightly sandy)			
end of bore 1.00m		1.0m	
		1.5m	

Checked By: ..... Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 27-Feb-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 4 — Lot No. 4

Elevation: 14 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 / 50 / 100 / 150 / 200

Description of Soil	Depth
Dark brown slghtly sandy SILT (OL) (Topsoil)	
Orange brown speckled black sandy SILT (ML) (Fil)	
(stiff)	0.5m
(becomes dark orange brown, stiff, slghtly plastic)	
end of bore 1.00m	1.0m
	1.5m

Borehole No. 5 — Lot No. 5

Elevation: 12 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 / 50 / 100 / 150 / 200

Description of Soil	Depth
Dark brown slghtly sandy SILT (OL) (Topsoil)	
Orange brown speckled black and white slghtly sandy SILT (ML) (Fil)	
(stiff)	0.5m
(becomes dark orange brown, slghtly plastic)	
end of bore 1.00m	1.0m
	1.5m

Borehole No. 6 — Lot No. 6

Elevation: 11 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 / 50 / 100 / 150 / 200

Description of Soil	Depth
Dark brown slghtly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slghtly sandy SILT (ML) (Younger Ash)	
(stiff, slghtly plastic)	0.5m
(becomes stiff to firm)	
(becomes soft to firm) end of bore 1.00m	1.0m
	1.5m

Checked By: S. Hay Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 06-Mar-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 7 — Lot No. 7

Elevation: 9 m (in terms of Motunkl Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 / 50 / 100 / 150 / 200

Description of Soil	Depth
Dark brown slghtly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slghtly sandy SILT (ML) (Younger Ash)	
(stiff, slghtly plastic)	
(becomes sandy)	0.5m
end of bore 1.00m	1.0m
	1.5m

Borehole No. 8 — Lot No. 8

Elevation: 8 m (in terms of Motunkl Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 / 50 / 100 / 150 / 200

Description of Soil	Depth
Dark brown slghtly sandy SILT (OL) (Topsoil)	
Dark orange brown speckled black and white slghtly sandy SILT (ML) (Fill)	
(stiff, slghtly plastic)	
(becomes sandy)	0.5m
Orange brown speckled black and white silty SAND (SM)	
(dense, sand fine to coarse)	
end of bore 0.90m	1.0m
	1.5m

Borehole No. 9 — Lot No. 9

Elevation: 7 m (in terms of Motunkl Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 / 50 / 100 / 150 / 200

Description of Soil	Depth
Dark brown slghtly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slghtly sandy SILT (ML) (Fill)	
(stiff, slghtly plastic)	0.5m
(becomes white mottled orange brown, sandy)	
(becomes orange brown, speckled black, slghtly sandy)	
end of bore 1.00m	1.0m
	1.5m

Checked By: ..... Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 10-Apr-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 10 Lot No. 10
Elevation 6 m (in terms of Molunki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slightly sandy SILT (ML) (Fill)	
(stiff, slightly plastic)	
(becomes light brown speckled white)	
(becomes orange brown speckled black and white)	0.5m
(becomes speckled white, sandy)	
end bore 0.90m	
	1.0m
	1.5m

Undrained Shear Strength (kPa): 0 50 100 150 200

Borehole No. 11 Lot No. 11
Elevation 6 m (in terms of Molunki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown speckled black and white sandy SILT (ML) (Fill)	
(stiff)	0.5m
(becomes sandy)	
end of bore 0.90m	
	1.0m
	1.5m

Undrained Shear Strength (kPa): 0 50 100 150 200

Borehole No. 12 Lot No. 12
Elevation 6 m (in terms of Molunki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown speckled black and white sandy SILT (ML) (Fill)	
(stiff)	0.5m
end of bore 0.90m	
	1.0m
	1.5m

Undrained Shear Strength (kPa): 0 50 100 150 200

Checked By: ..... Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 10-Apr-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 13 Lot No. 13
Elevation 6 m (in terms of Moturiki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown speckled black and white slightly sandy SILT (ML) (Fill)	
(becomes sandy)	0.5m
end of bore 0.90m	
	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 14 Lot No. 14
Elevation 6 m (in terms of Moturiki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slightly sandy SILT (ML) (Fill)	
Orange brown speckled black and white slightly silty SAND (SM) (Fill)	
(dense, sand fine to medium, occasional fine gravel)	0.5m
(becomes creamish white very silty)	
Orange brown speckled black slightly sandy SILT (ML) (Younger Ash)	
(stiff)	
end of bore 0.90m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 15 Lot No. 15
Elevation 6 m (in terms of Moturiki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slightly sandy SILT (ML) (Younger Ash)	
(stiff)	
(becomes slightly sandy, plastic)	0.5m
end of bore 1.00m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Checked By: ..... Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests

Job:	Mayfield Residential Subdivision - Stage 1		
Client:	Mayfield Limited	Job No.	7073-01-NC
Tested By:	G Osborne	Date:	10-Apr-02
Drill Method:	Hand auger and shear vane		
Notes:			

Borehole No. 16 Lot No. 16

Elevation 6 m (in terms of Moturiki Datum)

Soil Symbol | Depth | Water Table

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil

- Dark brown slightly sandy SILT (OL) (Topsoil)
- Creamish brown speckled black and white slightly sandy SILT (ML) (Fill)
- Creamish brown mottled white silty SAND (SM) (Fill)
  - (dense, sand fine to medium, ocasional fine gravel)
- Dark orange brown speckled black slightly sandy SILT (ML) (Younger Ash)
  - (stiff, slightly plastic)
- end of bore 1.00m

0.5m | 1.0m | 1.5m

Borehole No. 17 Lot No. 17

Elevation 6 m (in terms of Moturiki Datum)

Soil Symbol | Depth | Water Table

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil

- Dark brown slightly sandy SILT (OL) (Topsoil)
- Orange brown mottled white sandy SILT (ML) (Fill)
  - (becomes orange brown speckled black slightly sandy, stiff, plastic) (Younger Ash)
  - (becomes firm)
- end of bore 1.10m

0.5m | 1.0m | 1.5m

Borehole No. 18 Lot No. 18

Elevation 6 m (in terms of Moturiki Datum)

Soil Symbol | Depth | Water Table

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil

- Dark brown slightly sandy SILT (OL) (Topsoil)
- Orange brown mottled white slightly sandy SILT (ML) (Fill)
  - (becomes orange brown speckled black, stiff) (Younger Ash)
- end of bore 1.10m

0.5m | 1.0m | 1.5m

Checked By: ..... Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 11-Mar-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 19 — Lot No. 19

Elevation: 8 m (in terms of Motunki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown mottled white slightly sandy SILT (ML) (Fil)			
(slightly plastic)		0.5m	
Orange brown mottled white silty SAND (SM) (Fil)			
(dense, sand fine to medium)			
Light brown speckled black sandy SILT (ML) (Natural)			
Light brown speckled black silty SAND (SM)		1.0m	
(moderately dense, sand fine to medium) end of bore 1.10m			
		1.5m	

Borehole No. 20 — Lot No. 20

Elevation: 9 m (in terms of Motunki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Light creamish brown sandy SILT (ML) (Natural)			
(stiff)			
(becomes orange brown speckled black, slightly sandy, plastic)		0.5m	
end of bore 1.00m		1.0m	
		1.5m	

Borehole No. 21 — Lot No. 21

Elevation: 9 m (in terms of Motunki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown mottled white sandy SILT (ML) (Fil)			
(becomes creamish brown speckled black, firm to stiff, plastic) (Natural)		0.5m	
Creamish brown speckled black slightly silty SAND (SM)			
(moderately dense, sand fine to coarse)			
Dark orange brown speckled black SILT (MH)		1.0m	
		1.5m	

Checked By: ..... Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage I	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 11-Mar-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 22 Lot No. 22
Elevation 8 m (in terms of Moturiki Datum)
Water Table: Nil encountered

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown speckled black slightly sandy SILT (ML) (Younger Ash)			
(becomes slightly sandy)		0.5m	
(becomes sandy) end of bore 0.90m		1.0m	
0		1.5m	

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 23 Lot No. 23
Elevation 8 m (in terms of Moturiki Datum)
Water Table: Nil encountered

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown mottled white sandy SILT (ML) (Fill)			
(stiff)		0.5m	
(becomes orange brown speckled black, slightly sandy) (Younger Ash)			
(becomes slightly plastic)			
(becomes sandy)			
Orange brown speckled black SAND (SW) end of bore 1.00m		1.0m	
(moderately dense, sand medium to coarse)		1.5m	

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 24 Lot No. 24
Elevation 8 m (in terms of Moturiki Datum)
Water Table: Nil encountered

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown speckled black slightly sandy SILT (ML) (Younger Ash)			
(stiff)		0.5m	
end of bore 0.90m		1.0m	
		1.5m	

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Checked By: ..... Date: 21/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 11-Mar-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 25 — Lot No. 25

Elevation: 8 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slightly sandy SILT (ML) (Younger Ash)	
(becomes sandy)	
(becomes plastic)	0.5m
end of bore 1.00m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 26 — Lot No. 26

Elevation: 8 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Light orange brown speckled black and white slightly sandy SILT (ML) (Fill)	
(becomes sandy)	
(becomes orange brown speckled black, slightly sandy)	0.5m
(becomes plastic)	
end of bore 0.90m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 27 — Lot No. 27

Elevation: 8 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slightly sandy SILT (ML) (Fill)	
(stiff, plastic)	0.5m
end of bore 0.90m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Checked By: ..... Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage I	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 08-Mar-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 28 — Lot No. 28
Elevation 10 m (in terms of Moturiki Datum)
Water Table: Nil encountered

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown speckled black slightly sandy SILT (ML) (Fill)			
(stiff, slightly plastic)			
		0.5m	
end of bore 0.90m			
		1.0m	
		1.5m	

Undrained Shear Strength (kPa): 0 50 100 150 200

Borehole No. 29 — Lot No. 29
Elevation 10 m (in terms of Moturiki Datum)
Water Table: Nil encountered

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown speckled black slightly sandy SILT (ML) (Fill)			
(stiff, slightly plastic)			
		0.5m	
end of bore 0.90m			
		1.0m	
		1.5m	

Undrained Shear Strength (kPa): 0 50 100 150 200

Borehole No. 30 — Lot No. 30
Elevation 12 m (in terms of Moturiki Datum)
Water Table: Nil encountered

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Light orange brown slightly sandy SILT (ML) (Fill)			
(stiff)			
		0.5m	
end of bore 0.90m			
		1.0m	
		1.5m	

Undrained Shear Strength (kPa): 0 50 100 150 200

Checked By: ..... Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 07-Mar-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 31 — Lot No. 31

Elevation: 13 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Light orange brown speckled black slightly sandy SILT (ML) (Fill)	
(stiff)	0.5m
end of bore 1.00m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 32 — Lot No. 32

Elevation: 14 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown speckled black sandy SILT (ML) (Fill)	
(stiff)	
(becomes slightly sandy)	0.5m
end of bore 0.90m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 33 — Lot No. 33

Elevation: 15 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown speckled black and white slightly sandy SILT (ML) (Fill)	
(becomes creamish white speckled black, sandy)	0.5m
(becomes orange brown, slightly sandy)	
end of bore 0.90m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Checked By: ..... Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 07-Mar-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 34 — Lot No. 34

Elevation: 12 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil	Depth
Dark brown slghtly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slghtly sandy SILT (ML) (Fil)	
(stiff)	
(becomes very sandy)	0.5m
(becomes slghtly sandy, plastic)	
end of bore 0.90m	
	1.0m
	1.5m

Borehole No. 35 — Lot No. 35

Elevation: 12 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil	Depth
Dark brown slghtly sandy SILT (OL) (Topsoil)	
Light orange brown mottled white sandy SILT (ML) (Fil)	
	0.5m
end of bore 0.90m	
	1.0m
	1.5m

Borehole No. 36 — Lot No. 36

Elevation: 15 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil	Depth
Dark brown slghtly sandy SILT (OL) (Topsoil)	
Light orange brown mottled white sandy SILT (ML) (Fil)	
(stiff)	
	0.5m
end of bore 0.90m	
	1.0m
	1.5m

Checked By: ..... Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 13-Mar-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 37 — Lot No. 37
Elevation: 15 m (in terms of Moturiki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slighty sandy SILT (OL) (Topsoil)	
Light creamish brown sandy SILT (ML) (Fill)	
(stiff)	
Creamish white speckled black slighty silty SAND (SM) (Fill)	0.5m
(dense, sand fine to medium)	
Orange brown mottled white sandy SILT (ML) (Fill)	
(plastic)	
end of bore 0.90m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0 50 100 150 200

Borehole No. 38 — Lot No. 38
Elevation: 14 m (in terms of Moturiki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slighty sandy SILT (OL) (Topsoil)	
Orange brown speckled black sandy SILT (ML) (Fill)	
(stiff)	0.5m
Creamish white speckled black silty SAND (SM) (Fill)	
(dense, sand fine to medium)	
Dark orange brown speckled black slighty sandy SILT (ML) (Fill) end of bore 1.00m	1.0m
(stiff, plastic)	1.5m

Undrained Shear Strength (kPa): 0 50 100 150 200

Borehole No. 39 — Lot No. 39
Elevation: 12 m (in terms of Moturiki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slighty sandy SILT (OL) (Topsoil)	
Orange brown speckled black sandy SILT (ML) (Younger Ash)	
(stiff)	
(becomes slighty sandy)	0.5m
(becomes plastic)	
end of bore 0.90m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0 50 100 150 200

Checked By: S Hing Date: 12.4.02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 13-Mar-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 40 Lot No. 40
Elevation 12 m (in terms of Motuniki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slighty sandy SILT (OL) (Topsoil)	
Orange brown mottled white sandy SILT (ML) (Fill)	0.5m
(becomes orange brown, slighty sandy, plastic) (Younger Ash)	1.0m
end of bore 1.10m	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 41 Lot No. 41
Elevation 11 m (in terms of Motuniki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slighty sandy SILT (OL) (Topsoil)	
Orange brown speckled black slighty sandy SILT (ML) (Younger Ash)	0.5m
(stiff)	1.0m
end of bore 1.10m	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 42 Lot No. 42
Elevation 12 m (in terms of Motuniki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slighty sandy SILT (OL) (Topsoil)	
Orange brown speckled black and white slighty sandy SILT (ML) (Younger Ash)	
(stiff)	
Creamish yellow speckled black slighty silty SAND (SM)	0.5m
(dense, sand fine to medium)	
(becomes pumiceous, occasional fine gravel)	
Orange brown speckled black slighty sandy SILT (ML)	
(becomes creamish brown speckled blac, soft to firm, damp)	1.0m
end of bore 1.00m	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Checked By: S. Wing Date: 12.4.02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 09-Apr-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 43 Lot No. 43
Elevation 10 m (in terms of Motuniki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slighty sandy SILT (OL) (Topsoil)	
Orange brown speckled black and white sandy SILT (ML) (Younger Ash)	
(stiff, slighty plastic)	
	0.5m
(becomes damp, slighty sandy)	
end of bore 0.90m	
	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 44 Lot No. 44
Elevation 12 m (in terms of Motuniki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slighty sandy SILT (OL) (Topsoil)	
Orange brown mottled white sandy SILT (ML) (Fill)	
(becomes orange brown speckled black, slighty plastic, stiff) (Younger Ash)	
	0.5m
end of bore 0.90m	
	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 45 Lot No. 45
Elevation 13 m (in terms of Motuniki Datum)
Water Table: Nil encountered

Description of Soil	Depth
Dark brown slighty sandy SILT (OL) (Topsoil)	
Orange brown mottled white sandy SILT (ML)	
Creamish white speckled black slighty silty SAND (SM)	
(dense, sand fine to medium)	
	0.5m
end of bore 1.00m	
	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Checked By: Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 09-Apr-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 46 **Lot No.** 46

Elevation 16 m (in terms of Moturiki Datum)

Description of Soil

Dark brown slighty sandy SILT (OL) (Topsoil)

Light brown speckled black slighty sandy SILT (ML) (Younger Ash)

(firm)

(becomes orange brown speckled black, stiff)

end of bore 0.90m

Soil Symbol | Depth | Water Table

Water Table: Nil encountered

Undrained Shear Strength (kPa)

0 50 100 150 200

0.5m

1.0m

1.5m

Borehole No. 47 **Lot No.** 47

Elevation 16 m (in terms of Moturiki Datum)

Description of Soil

Dark brown slighty sandy SILT (OL) (Topsoil)

Orange brown speckled black slighty sandy SILT (ML) (Younger Ash)

(firm, slighty plastic)

White speckled black SAND (SW)

(moderately dense, sand fine)

end of bore 0.90m

Soil Symbol | Depth | Water Table

Water Table: Nil encountered

Undrained Shear Strength (kPa)

0 50 100 150 200

0.5m

1.0m

1.5m

Borehole No. **Lot No.**

Elevation m (in terms of Moturiki Datum)

Description of Soil

Soil Symbol | Depth | Water Table

Water Table

Undrained Shear Strength (kPa)

0 50 100 150 200

0.5m

1.0m

1.5m

Checked By: S Hargreaves Date: 12.4.02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 10-Apr-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 49 — Lot No. 49

Elevation 18 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slighty sandy SILT (OL) (Topsoil)	
Orange brown speckled black slighty sandy SILT (ML) (Younger Ash)	
(becomes sandy)	0.5m
Creamish brown speckled black and white silty SAND (SM) (Rotoehu Ash)	
(dense, sand fine to medium)	
end of bore 0.90m	
	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 50 — Lot No. 50

Elevation 18 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slighty sandy SILT (OL) (Topsoil)	
Orange brown speckled black slighty silty SAND (Younger Ash)	
(becomes sandy)	0.5m
Creamish brown speckled black and white silty SAND (SM) (Rotoehu Ash)	
(dense, sand fine to medium)	
end of bore 1.00m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 51 — Lot No. 51

Elevation 18 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slighty sandy SILT (OL) (Topsoil)	
Creamish brown speckled black and white silty SAND (SM) (Rotoehu Ash)	
(dense, sand fine to medium)	
Creamish brown speckled black SILT (ML)	0.5m
Grey speckled black SAND (SW)	
(dense, sand fine)	
Dark orange brown slighty sandy SILT (MH) (Chocolate)	
(stiff, highly plastic)	
end of bore 0.90m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Checked By: S. Hay Date: 12.4.02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 06-Mar-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 52 — Lot No. 52

Elevation: 17 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown mottled white sandy SILT (ML)			
White speckled black SAND (SW) (Rotoehu Ash)			
(fine, dense)		0.5m	
Creamish brown speckled black and white sandy SILT (ML)			
(plastic, stiff)			
Grey speckled black and white slightly silty SAND (SM) end of bore 0.90m		1.0m	
		1.5m	

Borehole No. 53 — Lot No. 53

Elevation: 16 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown speckled black slightly sandy SILT (ML) (Younger Ash)			
(stiff, slightly plastic)		0.5m	
end of bore 1.00m		1.0m	
		1.5m	

Borehole No. 54 — Lot No. 54

Elevation: 16 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Undrained Shear Strength (kPa): 0 | 50 | 100 | 150 | 200

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown speckled black slightly sandy SILT (ML) (Younger Ash)			
(stiff)			
(becomes slightly plastic)		0.5m	
end of bore 1.00m		1.0m	
		1.5m	

Checked By: ..... Date: 12/4/02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 06-Mar-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 55 — Lot No. 55

Elevation: 16 m (in terms of Motunki Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slightly sandy SILT (ML) (Younger Ash)	
(stiff, slightly plastic)	
	0.5m
end of bore 0.90m	
	1.0m
	1.5m

Undrained Shear Strength (kPa): 0 50 100 150 200

Borehole No. 56 — Lot No. 56

Elevation: 19 m (in terms of Motunki Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown mottled white sandy SILT (ML) (Fill)	
(becomes orange brown speckled black, slightly sandy, plastic)	
(becomes mottled white)	0.5m
end of bore 0.90m	
	1.0m
	1.5m

Undrained Shear Strength (kPa): 0 50 100 150 200

Borehole No. 57 — Lot No. 57

Elevation: 19 m (in terms of Motunki Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slightly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slightly sandy SILT (ML) (Younger Ash)	
White speckled black SAND (SW) (Rotoehu Ash)	
(dense, fine)	0.5m
Orange brown slightly sandy SILT (ML)	
(stiff)	
end of bore 0.90m	
	1.0m
	1.5m

Undrained Shear Strength (kPa): 0 50 100 150 200

Checked By: S Hay Date: 12.4.02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 09-Apr-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 58 — Lot No. 58

Elevation: 21 m (in terms of Motunkl Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slghtly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slghtly sandy SILT (ML) (Younger Ash)	
Yellowish brown speckled black slghtly silty SAND (SM) (Rotoehu Ash)	
(dense, sand fine to medium)	0.5m
(becomes slghtly pumiceous)	
(becomes fine to coarse)	
Creamish brown slghtly sandy SILT (ML)	
(firm, plastic) end of bore 1.00m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 59 — Lot No. 59

Elevation: 20 m (in terms of Motunkl Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slghtly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slghtly sandy SILT (ML) (Younger Ash)	
(stiff, slghtly plastic)	0.5m
(becomes firm to stiff)	
end of bore 1.00m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 60 — Lot No. 60

Elevation: 20 m (in terms of Motunkl Datum)

Water Table: Nil encountered

Description of Soil	Depth
Dark brown slghtly sandy SILT (OL) (Topsoil)	
Orange brown speckled black slghtly sandy SILT (ML) (Younger Ash)	
(stiff, slghtly plastic)	0.5m
(becomes firm to stiff)	
end of bore 0.90m	1.0m
	1.5m

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Checked By: ..... Date: 12.4.02

BOREHOLE LOG

Connell Wagner

Location of Tests	Job:	Mayfield Residential Subdivision - Stage 1	
	Client:	Mayfield Limited	Job No. 7073-01-NC
	Tested By:	G Osborne	Date: 09-Apr-02
	Drill Method:	Hand auger and shear vane	
	Notes:		

Borehole No. 61 — Lot No. 61

Elevation: 20 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown speckled black slightly sandy SILT (ML) (Younger Ash)			
Creamish brown speckled black slightly silty SAND (SM)			
(moderately dense, sand medium)			
(becomes slightly pumiceous, sand medium to coarse)		0.5m	
Creamish brown speckled black sandy SILT (ML)			
(firm, plastic)			
Grey speckled black silty SAND (SM) (Rotoehu Ash) end of bore 0.90m			
(moderately dense, sand fine)		1.0m	
		1.5m	

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. 62 — Lot No. 62

Elevation: 20 m (in terms of Moturiki Datum)

Water Table: Nil encountered

Description of Soil	Soil Symbol	Depth	Water Table
Dark brown slightly sandy SILT (OL) (Topsoil)			
Orange brown speckled black slightly sandy SILT (ML) (Younger Ash)			
(stiff, plastic)			
(becomes damp)		0.5m	
(becomes sandy)			
end of bore 1.00m		1.0m	
		1.5m	

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Borehole No. — Lot No.

Elevation: m (in terms of Moturiki Datum)

Water Table:

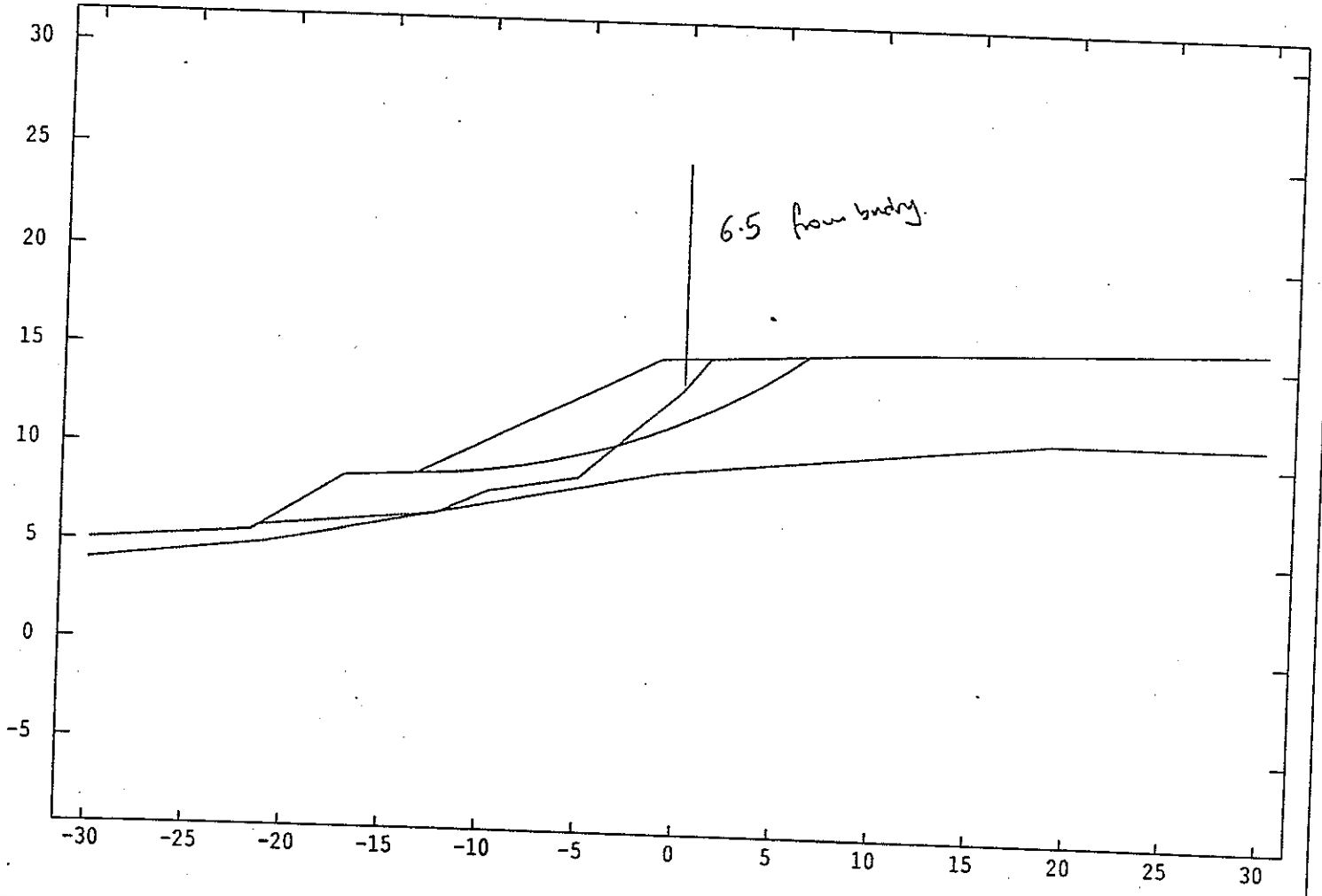
Description of Soil	Soil Symbol	Depth	Water Table
		0.5m	
		1.0m	
		1.5m	

Undrained Shear Strength (kPa): 0, 50, 100, 150, 200

Checked By: S. Harper Date: 12.4.02

Appendix E

Results of GALENA Slope Stability Analyses



GALENA
Version 3.00
Clover Technology

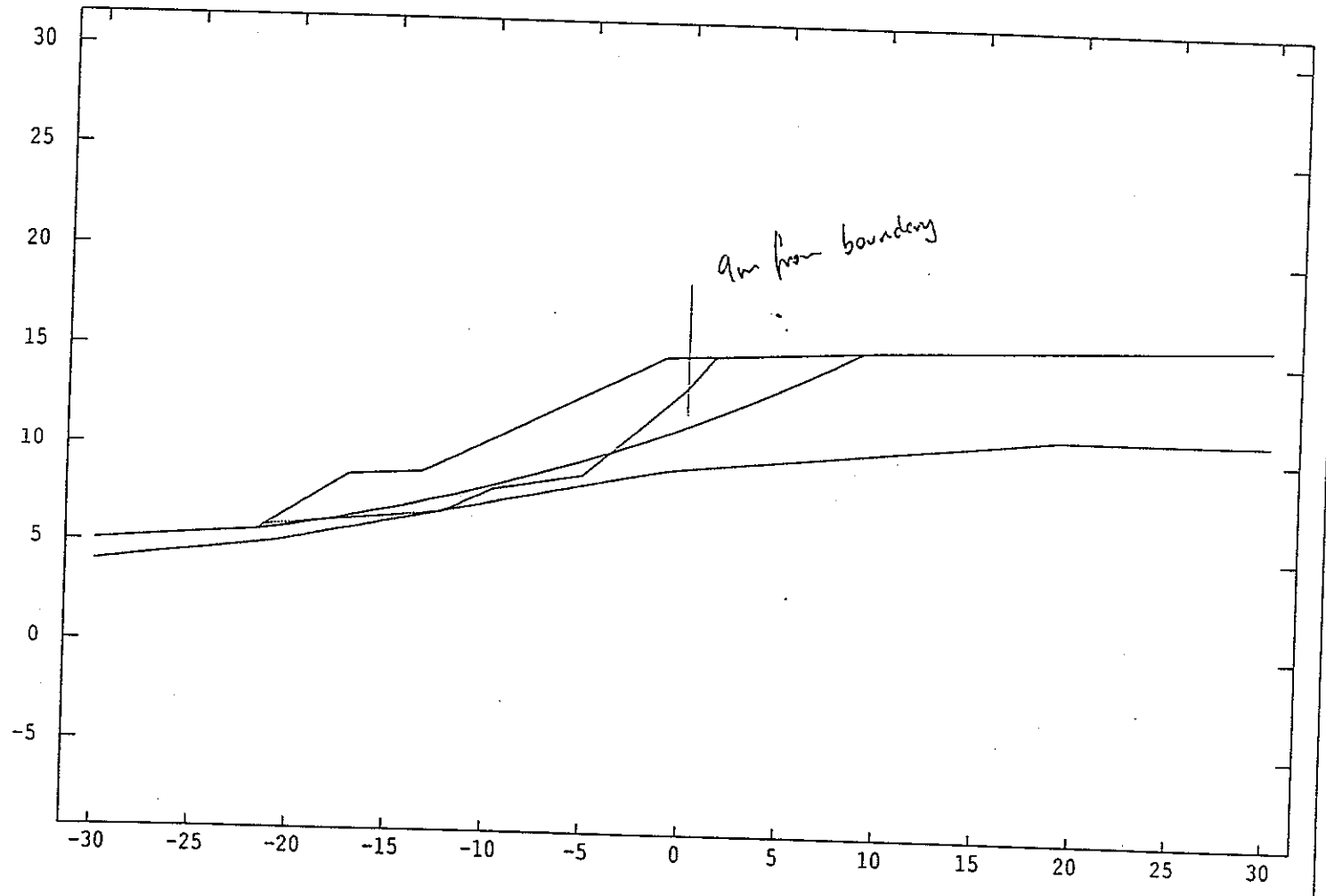
Analysis
Number: 3
Method: Bishop Simplified
Type: Multiple
Surface: Circular

Results
Critical (minimum)
Factor of Safety: 1.526

Processed: 25 Mar 2002

Project: MAYFILED RESIDENTIAL SUBDIVISION - DETERMINATION OF BRLs
XS Lot 3
File: XS Lot 3.gmf

Connell Wagner



GALENA
Version 3.00
Clover Technology

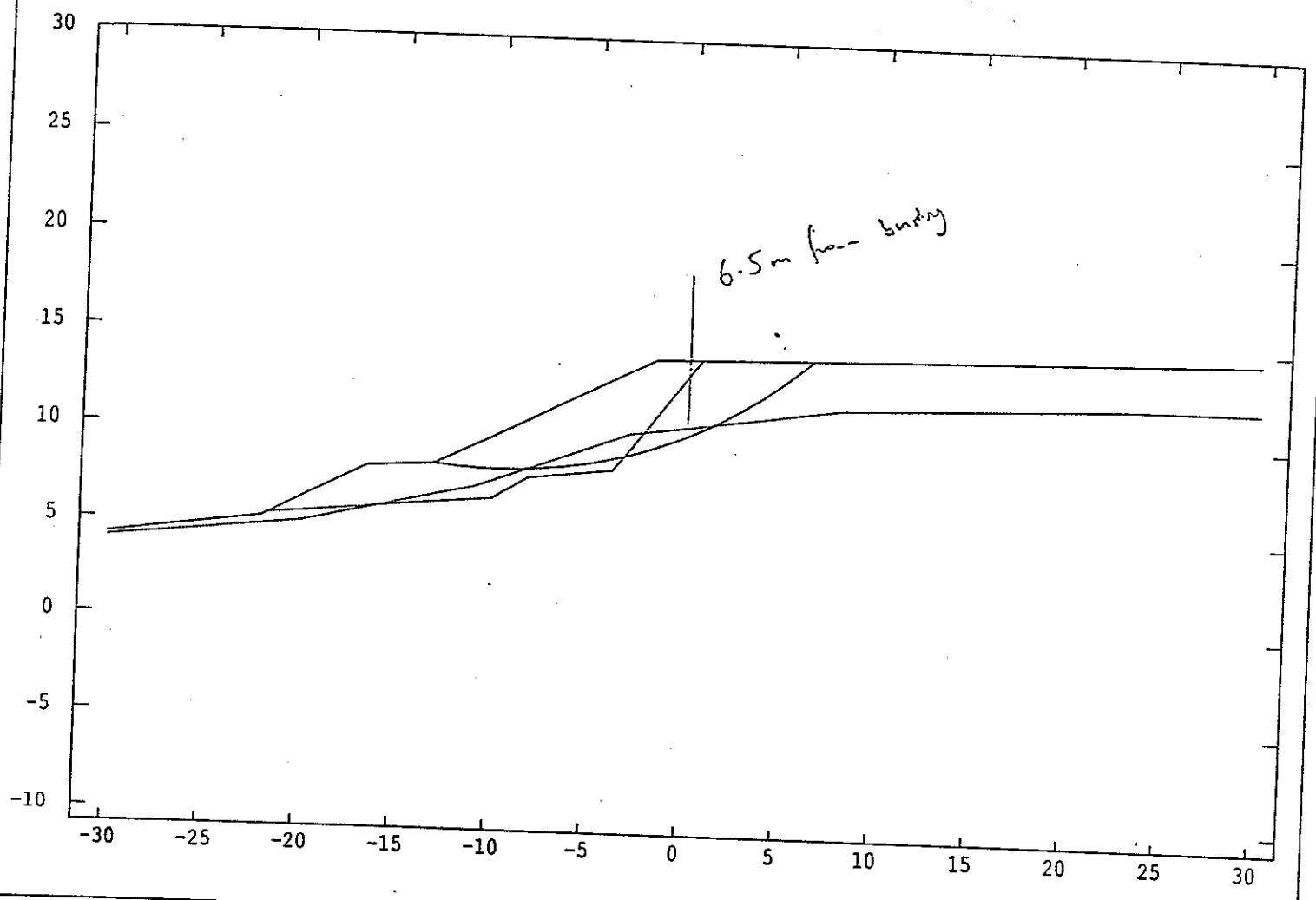
Analysis
Number: 5
Method: Bishop Simplified
Type: Multiple
Surface: Circular

Results
Critical (minimum)
Factor of Safety: 1.513

Processed: 25 Mar 2002

Project: MAYFILED RESIDENTIAL SUBDIVISION - DETERMINATION OF BRLs
XS Lot 3
File: XS Lot 3.gmf

Connell Wagner



GALENA
Version 3.00
Clover Technology

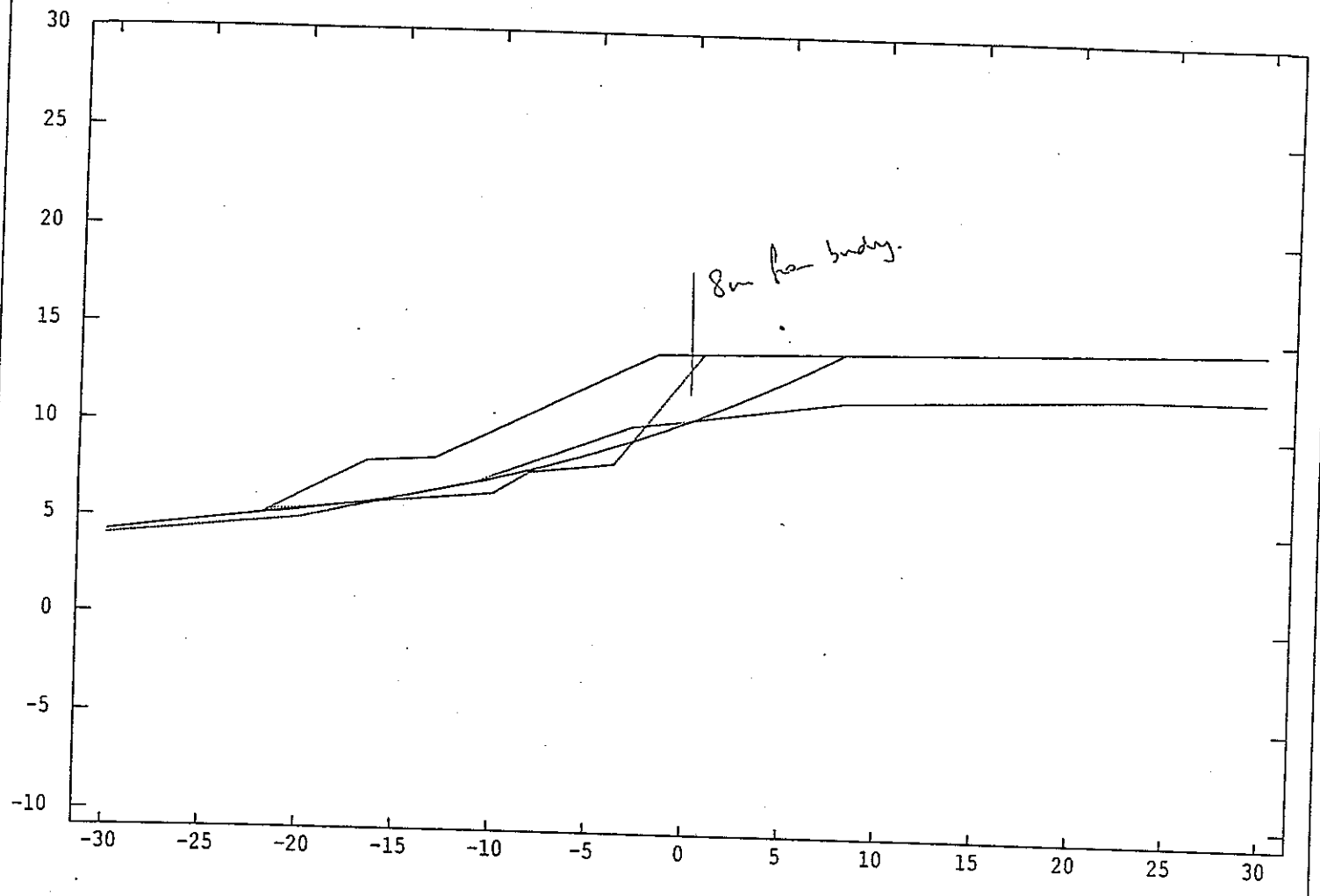
Analysis
Number: 3
Method: Bishop Simplified
Type: Multiple
Surface: Circular

Results
Critical (minimum)
Factor of Safety: 1.536

Processed: 25 Mar 2002

Project: MAYFIELD RESIDENTIAL SUBDIVISION - DETERMINATION OF BRLs
Cross Section Lot 3-4 boundary
File: XS Lot 3-4.gmf

Connell Wagner



GALENA
Version 3.00
Clover Technology

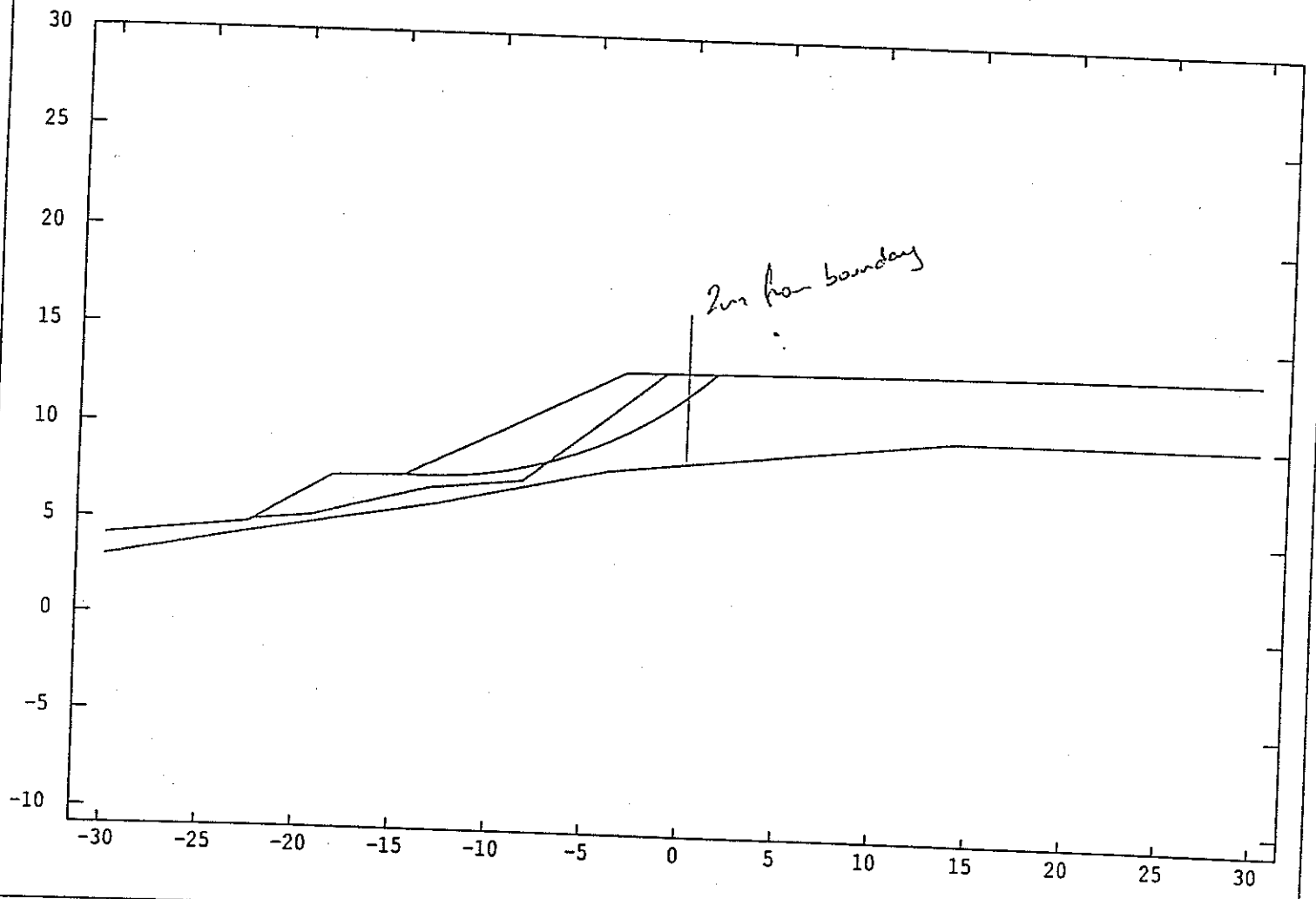
Analysis
Number: 5
Method: Bishop Simplified
Type: Multiple
Surface: Circular

Results
Critical (minimum)
Factor of Safety: 1.501

Processed: 25 Mar 2002

Project: MAYFIELD RESIDENTIAL SUBDIVISION - DETERMINATION OF BRLs
Cross Section Lot 3-4 boundary
File: XS Lot 3-4.gmf

Connell Wagner



GALENA
Version 3.00
Clover Technology
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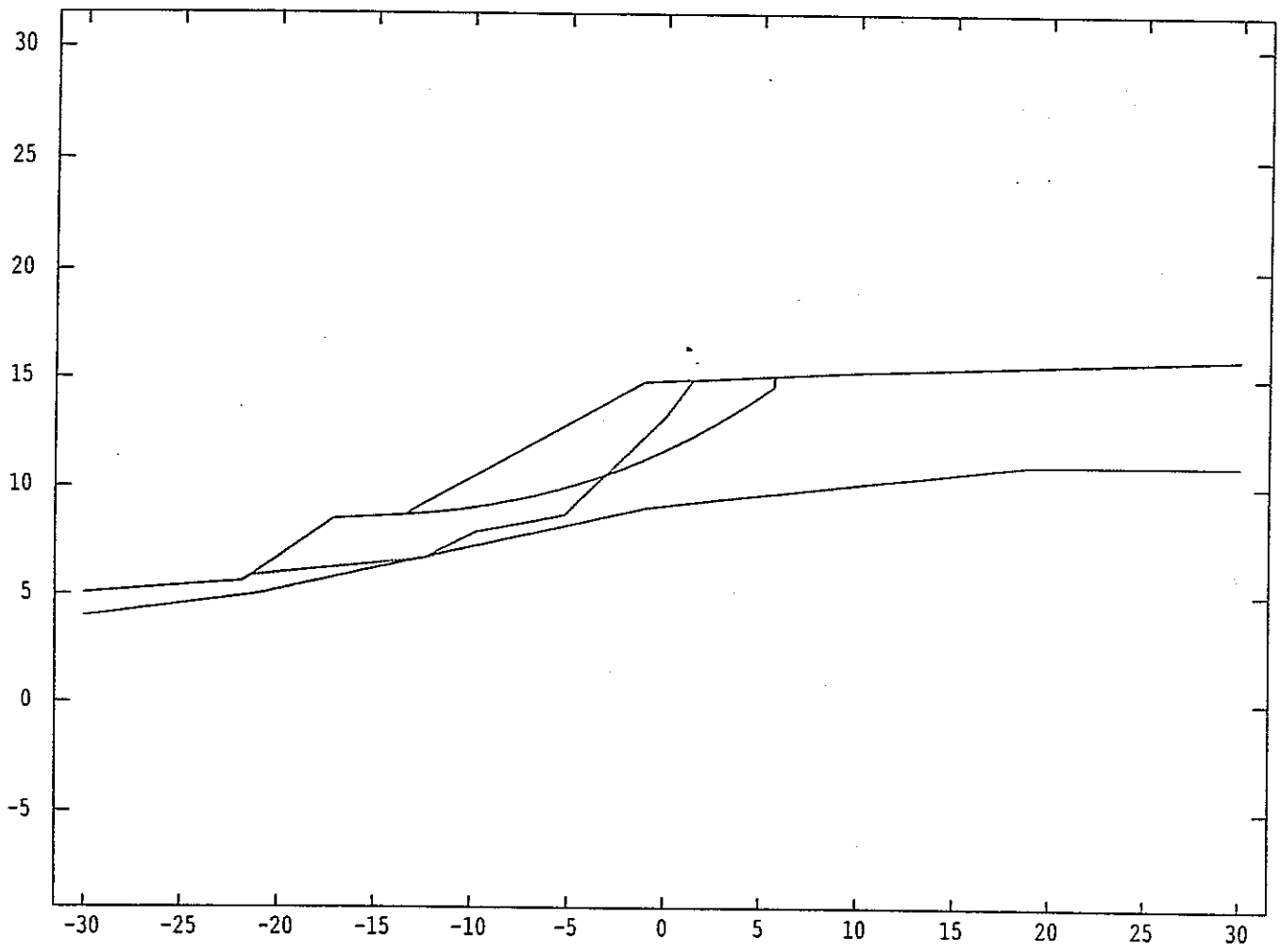
Analysis
Number: 3
Method: Bishop Simplified
Type: Multiple
Surface: Circular

Results
Critical (minimum)
Factor of Safety: 1.500

Processed: 25 Mar 2002

Project: MAYFIELD RESIDENTIAL SUBDIVISION - DETERMINATION OF BRLs
X Section Lot 4
File: XS Lot 4.gmf

Connell Wagner



GALENA

Version 3.00

Clover Technology

Analysis

Number: 3
Method: Bishop Simplified
Type: Multiple
Surface: Circular

Results

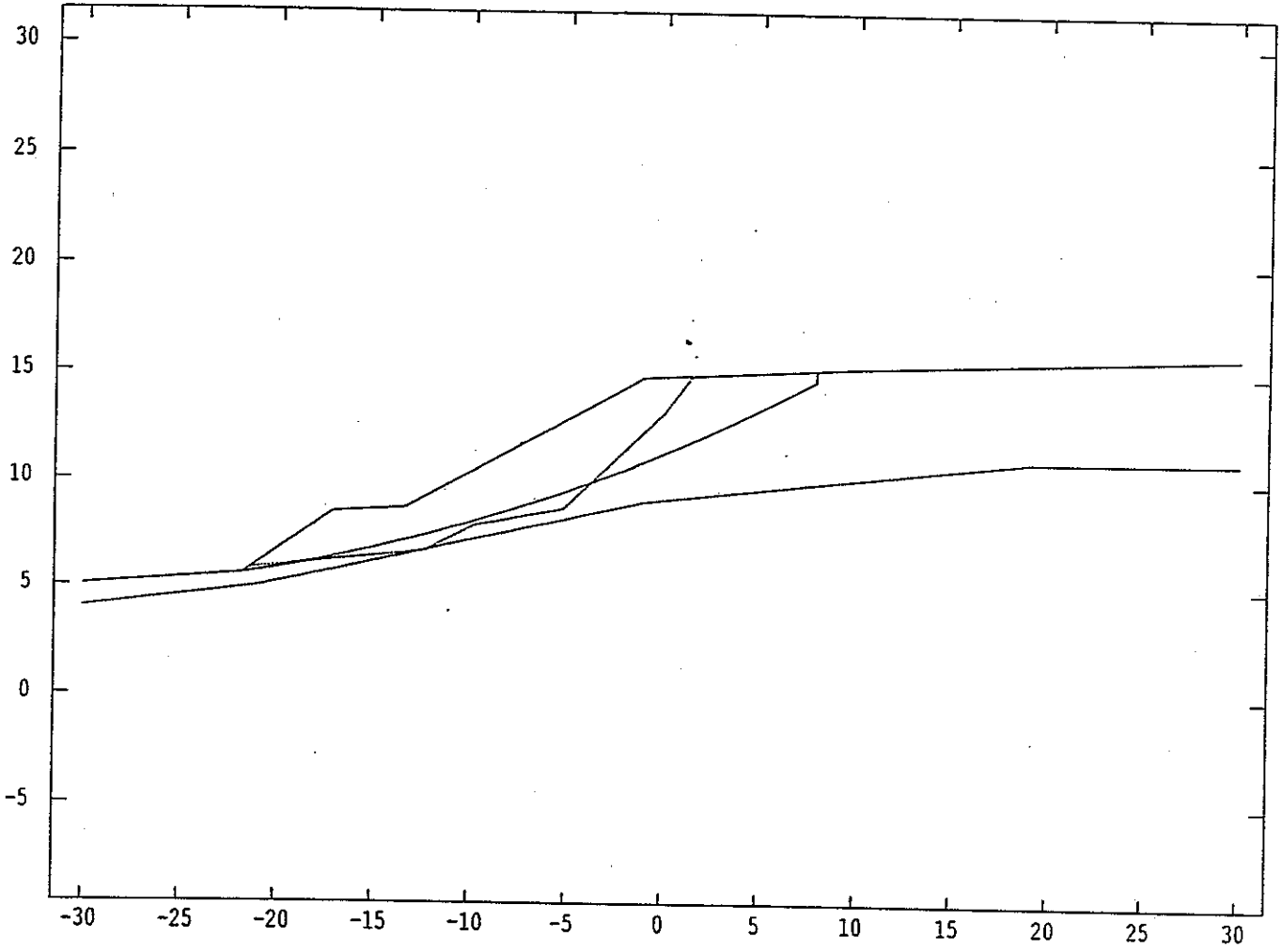
Critical (minimum)
Factor of Safety: 1.509

Processed: 18 Apr 2002

Project: MAYFILED RESIDENTIAL SUBDIVISION - DETERMINATION OF BRLs
XS Lot 3

File: XS Lot 3 tcrack.gmf

Connell Wagner



GALENA

Version 3.00

Clover Technology

Analysis

Number: 5
Method: Bishop Simplified
Type: Multiple
Surface: Circular

Results

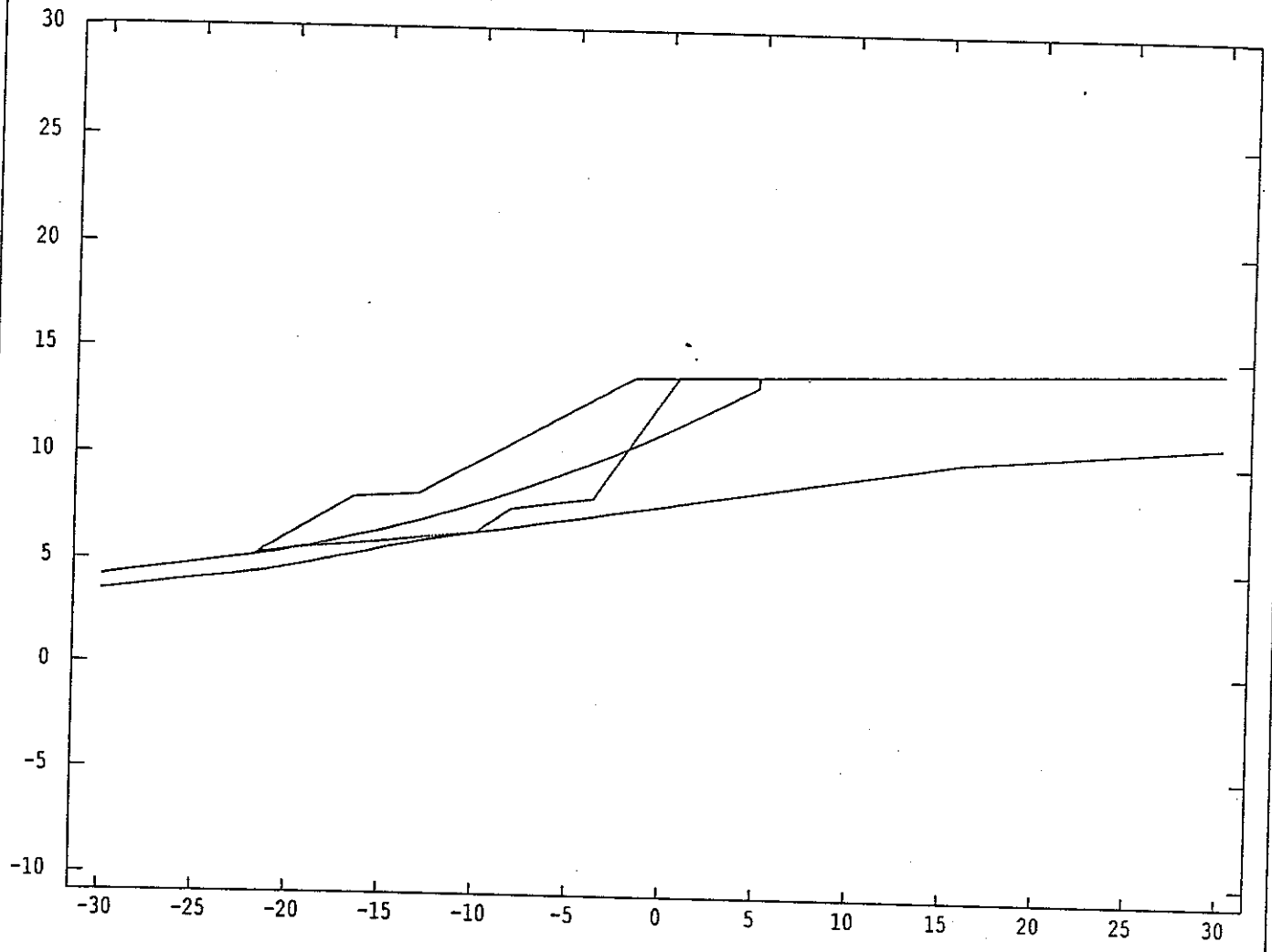
Critical (minimum)
Factor of Safety: 1.496

Processed: 18 Apr 2002

Project: MAYFILED RESIDENTIAL SUBDIVISION - DETERMINATION OF BRLs
XS Lot 3

File: XS Lot 3 tcrack.gmf

Connell Wagner



GALENA
Version 3.00
Clover Technology

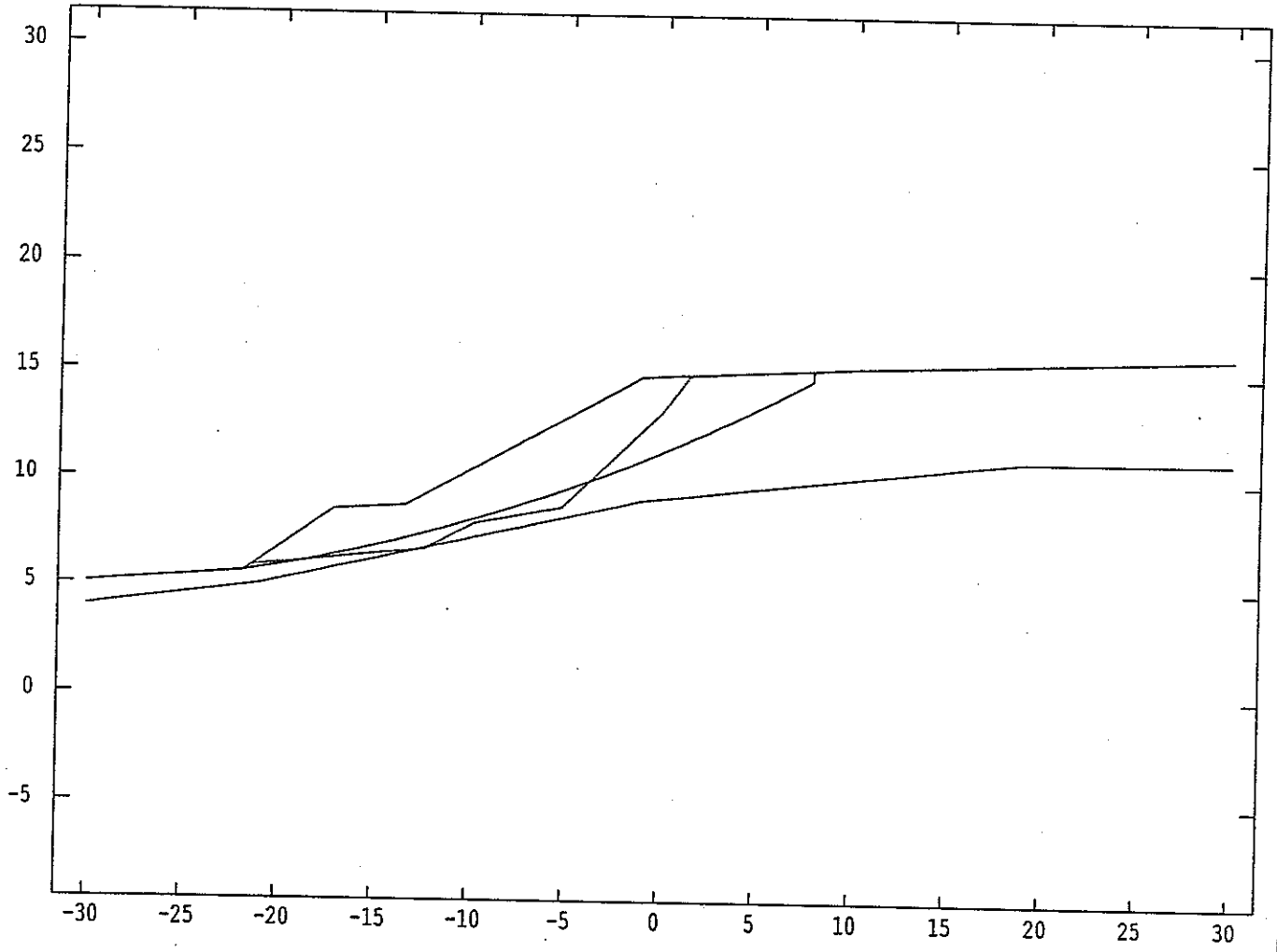
Analysis
Number: 4
Method: Bishop Simplified
Type: Multiple
Surface: Circular

Results
Critical (minimum)
Factor of Safety: 1.587

Processed: 18 Apr 2002

Project: MAYFIELD RESIDENTIAL SUBDIVISION - DETERMINATION OF BRLs
Cross Section Lot 3-4 boundary
File: XS Lot 3-4 tcrack.gmf

Connell Wagner



GALENA

Version 3.00

Clover Technology

Analysis

Number: 5
Method: Bishop Simplified
Type: Multiple
Surface: Circular

Results

Critical (minimum)
Factor of Safety: 1.496

Processed: 18 Apr 2002

Project: MAYFILED RESIDENTIAL SUBDIVISION - DETERMINATION OF BRLs
XS Lot 3

File: XS Lot 3 tcrack.gmf

Connell Wagner