

### 5.205.10 Contractor's Work

We have relied on the Contractor's work practices and assume that the works have been carried out in accordance with:

- (i) The approved Contract drawings and design details,
- (ii) The approved Contract specifications,
- (iii) Authorised Variations to (i) and (ii) during the execution of the works,
- (iv) The conditions of Resource, Earthworks and Building Consents where applicable,
- (v) The relevant Coffey Geotechnics reports, recommendations and site instructions,

and that all as-built information and other details provided to the Client and/or Coffey Geotechnics are accurate and correct in all respects.

## 6 STATEMENT OF PROFESSIONAL OPINION AS TO THE SUITABILITY OF LAND FOR BUILDING DEVELOPMENT

I, S.G. Lander, of Coffey Geotechnics (NZ) Limited, Auckland, hereby confirm that:

1. I am a Chartered Professional Engineer experienced in the field of geotechnical engineering as defined in section 1.2.3 of NZS 4404 and was retained by the Owner/Developer as the Geotechnical Engineer on stages 3 and 4 of the Mahurangi Ridge subdivision, Mahurangi East Road, Snells Beach.
2. The extent of preliminary investigations carried out to date are described in the Foundation Engineering Consultants Limited (FECL) Geotechnical Investigation Report reference 10880, dated 22 July 2004, and the report also prepared by FECL, reference 10880, dated 24 January 2007, outlining earthworks construction recommendations. The conclusions and recommendations of these documents have been re-evaluated in the preparation of this report. The results of all tests carried out are appended.
3. In my professional opinion, not to be construed as a guarantee, I consider that:
  - (a) The earth fills shown on the appended Asbuilt Cut to Fill Depth Contour Plan have been placed in compliance with NZS 4431, Rodney District Council's Standards for Engineering Design and Construction, the provisions of the RDC District Plan, and related documents.
  - (b) The completed earthworks give due regard to land slope and foundation stability considerations within the residential lots, but as shown on the appended Asbuilt Batter Setback Plans, Specific Design Zones shown shaded on lots 27, 28, 34, 42, 48, 49, 50, 56, 57, 58, 59, 60, 61, 62, 63, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 80, 81 and 82 have gradients steeper than 1V:4H (14 degrees) or are adjacent to land having such gradients.

Within these areas, no earthworks should take place or elsewhere if similar gradients exist unless endorsed by a Chartered Professional Engineer experienced in geomechanics, as such operations may, in certain circumstances, have detrimental

effects on overall site stability. Any cuts into existing batters should be supported by engineer designed retaining walls and retain the full height of the excavation.

For building construction in accordance with the provisions of NZS 3604 within the shaded batter setback areas where a batter slope steeper than 1V:4H (14 degrees) is located below the proposed building, the leading (downslope) edge foundations will need to be piled to typical depths as noted in the Suitability Statement Summary (Table 3). The appended drawing (ref. A3-9320/BSB, dated April 2010) outlines likely pile depths with regard to building location within the batter setback areas.

It is anticipated that a geotechnical ultimate bearing capacity of 300 kPa will be available for the specific design of piles in end bearing. The piles can be designed using a  $\phi'$  value of 30 degrees, however, side adhesion should be ignored.

- (c) All underfill drains have been installed in accordance with good engineering practice and should require no specific maintenance.
- (d) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on lots 27, 28, 34 to 38, 40, 41 and 48 to 82 inclusive.

Due to the presence of firm subsoils within the likely zone of influence of future shallow foundations on lots 39 and 42, the geotechnical ultimate bearing capacity here should be limited to 240 kPa.

On all lots, any proposed building platform excavations in excess of 1 metre should be checked to confirm available bearing capacities.

- (e) As recommended in the FECL Geotechnical Investigation Report, the backfilling and compaction of the stormwater and sanitary sewer trenches where the final gradient is greater than 1 in 6, has to the best of our knowledge been carried out to normal engineering standards.

Nevertheless, no building development should take place within the 45 degree zone of influence of drain inverts unless endorsed by specific site investigations, foundation designs and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics to ensure that lateral stability and differential settlement issues are addressed and that building loads are transferred beyond the influence of the pipe and beyond the extent of the trench backfill.

- (f) No building construction, including the construction of additional retaining walls and no earthworks should take place within 3.5 metres of the front face of the cantilever pole retaining wall on lots 34, 35, 36, 37 and 38 unless endorsed by specific designs and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics to ensure that no additional loads are applied to the walls. Specific site investigation should not be required.
- (g) The assessed AS 2870 expansive site Class for all lots is M (moderate).
- (h) Subject to the geotechnical limitations, restrictions, recommendations and expansive soil assessments associated with 3(b), 3(c), 3(d), 3(e) 3(f) and 3(g) above:

- (i) The filled and undisturbed original ground within residential lot boundaries is generally suitable for residential buildings constructed in accordance with NZS 3604 and related documents.
  - (ii) On all lots foundation design may be carried out in accordance with AS 2870 (Class M) or in accordance with NZS 3604 provided that in this latter case the minimum foundation depth below cleared ground level following topsoil removal and benching of building platform areas is 600mm.
4. Road subgrades and lot accessway subgrades have been formed having due regard for slope stability and settlement.

The professional opinion contained within this report is furnished to the Rodney District Council and Cabra Developments Limited for their purposes alone on the express condition that it will not be relied upon by any other person. Prospective purchasers should still satisfy themselves as to any specific conditions pertaining to their particular land interest.

It does not remove the necessity for the normal inspection of site conditions and the design of foundations as would be made under all normal circumstances.

The Suitability Statement Summary (Table 3) summarises the status of each residential lot covered by this Suitability Statement.

For and on behalf of Coffey Geotechnics (NZ) Limited



**Chris Thompson**

Engineering Geologist



**Shane Lander**

Associate Geotechnical Engineer / CPEng

**TABLE 3: SUITABILITY STATEMENT SUMMARY**

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :1996 Class
27	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions. Typical depth of leading edge piling (for gradients) if required approximately 1 metre. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	150	300	M
28	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 1 metre. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
34	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines and retaining wall. Typical depth of leading edge piling (for gradients) if required approximately 1.5 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	100	300	M
35	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines and retaining wall. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	150	300	M
36	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines and retaining wall. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
37	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines and retaining wall. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
38	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines and retaining wall. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
39	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	240	M

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :1996 Class
40	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
41	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
42	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	240	M
48	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions. Typical depth of leading edge piling (for gradients) if required approximately 3 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
49	Specific site investigation, foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions. Typical depth of leading edge piling (for gradients) if required approximately 2.5 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	400	300	M
50	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
51	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
52	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
53	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	150	300	M

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :1996 Class
54	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
55	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
56	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
57	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 3 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	100	300	M
58	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
59	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 3.5 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	150	300	M
60	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M

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61	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 3 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
62	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
63	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 3 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
64	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	100	300	M
65	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 2 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
66	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 1 metre. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
67	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 1 metre. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M

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68	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
69	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 1 metre. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	100	300	M
70	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions. Typical depth of leading edge piling (for gradients) if required approximately 1.5 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
71	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 2 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
72	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 3.5 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
73	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 3 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	100	300	M
74	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 3 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	100	300	M



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75	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 3 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
76	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	100	300	M
77	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	100	300	M
78	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
79	Specific foundation design and construction inspections required in areas shown shaded on consent notice plans due to proximity to service lines. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
80	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 2.5 metres. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	100	300	M
81	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 1 metre. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	100	300	M

GEOTECHNICAL COMPLETION REPORT

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :1996 Class
82	Specific foundation design and construction inspections required in areas shown shaded on batter setback plans due to 1 in 4 gradient restrictions and on consent notice plans due to proximity to service lines. Typical depth of leading edge piling (for gradients) if required approximately 1 metre. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M