

Statement Of Professional Opinion As To The Suitability Of Land For Building Development

I, S.G. Lander, of Coffey Geotechnics (NZ) Limited trading as Foundation Engineering, 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 the residential Barwick Estate subdivision at 30 to 50 Rishworth Avenue, Whangaparaoa.
2. The extent of preliminary investigations carried out to date are described in Geotechnical Investigation Report number 11094, dated 21 November 2003 and the conclusions and recommendations of that document 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 cut/ fill depth contour as-built plan have been placed in compliance with NZS 4431, Rodney District Council's Standards for Engineering Design and Construction, the provisions of the RDC Proposed District Plan 2000 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 Consent Notice Area plan, areas on lots 8, 9, 10, 20, 21, 22 and all of lots 27, 28, 31 and 32 have gradients steeper than 1 in 4 or are adjacent to land having such gradients.

No cuts of any height and no fills (including subfloor hardfills) in excess of 400mm height should take place in these areas or elsewhere if similar gradients exist unless fully supported by retaining walls designed and inspected by a Chartered Professional Engineer experienced in geomechanics, as such operations may, in certain circumstances, have detrimental effects on overall site stability. For retaining walls up to 1.5 metres high, the designs may assume an undrained shear strength of natural ground, $S_u = 50$ kPa. All retaining wall designs must make due allowance for slope surcharge loads and global stability considerations.

Similarly, no building construction should take place in these areas unless endorsed by design of all foundations by a Chartered Professional Engineer experienced in geomechanics. For building construction in accordance with the provisions of NZS 3604 in these areas it is envisaged that geotechnical ultimate bearing capacities of 300 and 450 kPa respectively will be available for the design of shallow strip/ pad footings and for piles in end bearing.

Building development that falls outside the scope of NZS 3604 should be endorsed by specific site investigations, design of all foundations and retaining walls and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics.

- (c) The function of the counterfort drains installed on lots 26, 27, 28, 31 and 32 inclusive should not be impaired by any building development or landscaping works. These drains have been installed in accordance with good engineering practice and should require no specific maintenance. However the compaction of the surficial backfill soils may not be to certifiable standards and therefore all buildings having foundations within 2 metres of a counterfort drain will require Engineering design.
- (d) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on all lots.
- (e) The backfilling and compaction of the stormwater and sanitary sewer trenches on this subdivision has where possible been carried out to appropriate standards having regard for the prevailing ground conditions and associated compaction induced pipe loadings.

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 the areas highlighted on lots 4, 7, 28, 29, 30 and 31 on the appended Consent Notice Area plan 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 existing retaining walls. Specific site investigation should not be required.

For building construction in accordance with the provisions of NZS 3604 in these areas it is envisaged that a geotechnical ultimate bearing capacity of 450 kPa will be available for the design of piles in end bearing.

- (g) An overland flowpath easement is located along the common boundary of lots 24 and 25. The open swale here must be kept clear of obstructions including overgrown vegetation at all times. Further, it must be preserved during any future development on these lots. This does not preclude the construction of a boundary fence across and along the flowpath provided the railings and palings are kept at least 200mm above its base.
 - (h) For protection of plantings, no-build zones have been created along the northern boundaries of lots 32, 33, 34, 35, 36, 37 and 38 as shown on the appended Consent Notice Areas plan.
 - (i) The assessed AS 2870 expansive site Class for all lots is S (slight).
 - (j) Subject to the geotechnical limitations, restrictions, recommendations and expansive soil assessments associated with 3(b), 3(c), 3(d), 3(e), 3(f), 3(g), 3(h) and 3(i) 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 S) 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 450mm.
4. Road subgrades and lot accessway subgrades have been formed having due regard for slope stability and settlement.
5. Geotechnical aspects of slope and bund stability and pond permeability within the utility reserve (lot 44) have been appropriately addressed and in these respects the pond is suitable for its intended use.

The recreation reserve (lot 43) has been formed to standards appropriate for its intended use. However, we note the presence of deep topsoil placed here during earthworks operations.

The professional opinion contained within this report is furnished to the Rodney District Council and Elan 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.

This opinion 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 appended table summarises the status of each residential lot covered by this Suitability Statement.

FOUNDATION ENGINEERING



R.J. Knowles
SENIOR GEOTECHNICAL ENGINEER

Report Reviewed By:






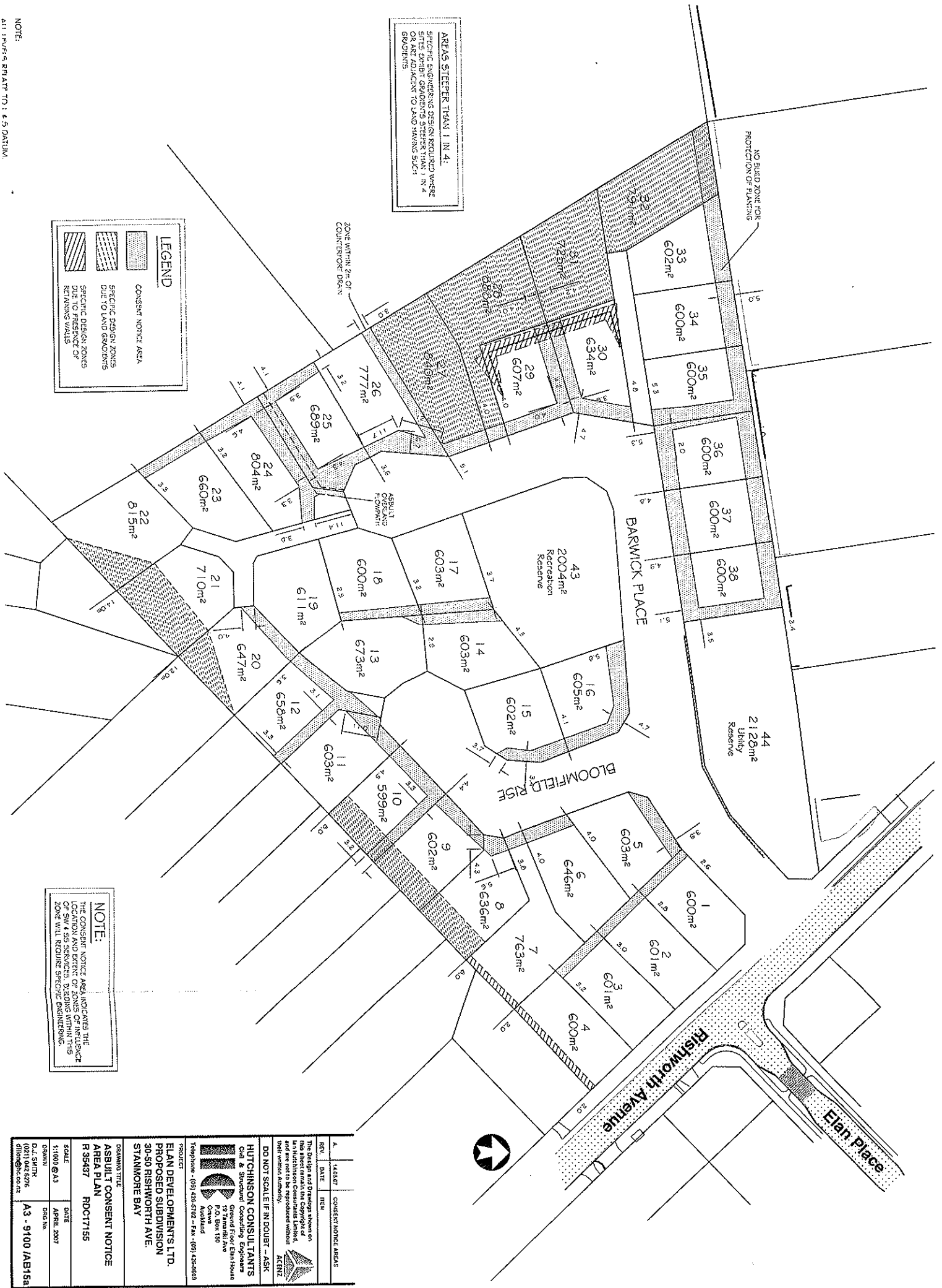
S.G. Lander
MIPENZ, CPEng

NOTE:
 ALL FINISH RISE TO 1.5 DATUM

AREAS STEEPER THAN 1 IN 4:
 SPECIFIC ENGINEERING DESIGN REQUIRED WHERE
 SITES EXIST - ONE TO 1.5 DATUM IN 4
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 SITES EXIST - ONE TO 1.5 DATUM IN 4
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 SITES EXIST - ONE TO 1.5 DATUM IN 4
 SPECIFIC ENGINEERING DESIGN REQUIRED WHERE
 SITES EXIST - ONE TO 1.5 DATUM IN 4

LEGEND

-  CONSENT NOTICE AREA
-  SPECIFIC DESIGN ZONES DUE TO LAND GRADIENTS
-  SPECIFIC DESIGN ZONES DUE TO PRESENCE OF RETAINING WALLS



NOTE:
 THE CONSENT NOTICE AREA INDICATES THE LOCATION AND EXTENT OF INTERFERENCE OF SW & SS SERVICES. DESIGN WITHIN THIS ZONE WILL REQUIRE SPECIFIC DESIGNATIONS.

REV	DATE	DESCRIPTION
A	14.03.07	CONSENT NOTICE AREAS

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ACERNZ

DO NOT SCALE IF IN DOUBT - ASK

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 Civil & Structural Consulting Engineers
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 Pt. Chevalier
 Auckland

PROJECT
 ELAN DEVELOPMENTS LTD.
 PROPOSED SUBDIVISION
 30-50 RISHWORTH AVE.
 STANMORHE BAY

DRAWING TITLE
 ASBULT CONSENT NOTICE
 AREA PLAN
 R35497 RDC17155

SCALE
 1:1000 @ A3

DATE
 APRIL 2007

DRAWN
 D.J. SMITH

DATE
 APRIL 2007

DRG. NO.
 A3 - 9100 /A/B15a

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