

Report on Soil Productivity
165-243 Flygers Line and
609 and 611 Rangitikei Line
Palmerston North

Flygers Investment Group Ltd
c/- Resonant Consultants

Report prepared by
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1 Executive Summary

- An application has been made to Palmerston North City Council by Flyers Investment Group Ltd seeking to rezone part of the land at 165-243 Flyers Line and 609 and 611 Rangitikei Line, Palmerston North.
- The land comprises of LOT 2 DP 389924, LOT 1 DP 389924 & Part Section 553 Town of Palmerston North, (40.1614 ha total).
- Perrinag Consultancy Ltd has been engaged to check and provide an opinion on the soil types on the property.
- The Land Use Capability (LUC) units on this site are Ilw2, and IIs1, which indicate a flat contour, but potential land use is limited by wetness and fragments of iron pan. Due to limitations of wetness, drying out in summer and the presence of an ironstone pan, these are not the most versatile soils and lean towards the lower end of the LUC class 2.
- The poorly-drained soil types on this property are Kairanga silt loam, and Te Arakura sandy loam, shallow phase, which are poorly or imperfectly drained and have a continuing slight wetness limitation after drainage. Water tends to lie in the winter and are susceptible to compaction and pugging, restricting winter grazing by heavy cattle. These soils tend to dry out in the summer.
- The free-draining soil type on this property is Karapoti brown sandy loam, gravelly phase, which is well to somewhat extensively drained. The gravel and drying out in the summer limits intensive or horticultural use for this soil.
- The soils are true to the map and are poorly-drained and unsuitable for horticultural or vegetable growing uses. They can still be used for arable crops (maize, barley, wheat) and will support grazing of livestock on pasture. While these soil types are valuable for pastoral farming and arable cropping, they are not rare.
- There are no commercial gardens, orchards or other horticultural enterprises in the vicinity.
- The land is currently being used for growing maize but is capable of other farming uses.
- The surrounding land in the district supports various land uses. The larger blocks include sheep and cattle breeding and finishing; horse agistment; maize and cereal cropping and dairy support. The smaller lifestyle blocks include dairy support; cropping, horse grazing and agistment and prime livestock production.
- In this proposed rezoning the balance of the area remaining is still big enough (approx. 27 ha) to allow the continuation of the current range of land use options.

2 Proposed Rezoning

165-243 Flyers Line and 609 and 611 Rangitikei Line, Palmerston North.

2.1 Background

- An application has been made to Palmerston North City Council by Flyers Investment Group Ltd seeking rezone part of the land at 165-243 Flyers Line and 609 and 611 Rangitikei Line, Palmerston North. A copy of the rezoning proposal is included in Appendix I.

- The land comprises of:

Legal Description	Valuation Reference	Area (ha)
LOT 2 DP 389924	14461 276 00	19.2015
LOT 1 DP 389924	14461 277 00	0.8623
Part Section 553 Town of Palmerston North	14461 275 00	20.0976
Total Area		40.1614

- Perrinag Consultancy Ltd has been engaged to check and provide an opinion on the soil types on the property.

2.2 Site Inspection

- The property was visited on 14 August 2020. Neil O'Hara, project manager on behalf of Flyers Investment Group Ltd met the author on-site and provided a plan of the rezoning proposal which included the property boundaries.
- The soils were checked against those mapped by digging holes to check the soil profile and photographing them for reference.

3 Soil Description

The Soil Resource Map and soil profile photos are included in Appendix II.

The poorly-drained soil types on this property are Kairanga silt loam, and Te Arakura sandy loam, shallow phase, which are poorly or imperfectly drained and have a continuing slight wetness limitation after drainage. Water tends to lie in the winter and are susceptible to compaction and pugging, restricting winter grazing by heavy cattle. These soils tend to dry out in the summer.

The free-draining soil type on this property is Karapoti brown sandy loam, gravelly phase, which is well to somewhat extensively drained. The gravel and drying out in the summer limits intensive or horticultural use for this soil.

The soils are true to the map and are poorly-drained and unsuitable for horticultural or vegetable growing uses. They can still be used for arable crops (maize, barley, wheat) and will support grazing of livestock on pasture.

The author has estimated from the old local county soil maps (Kairanga, Manawatu and Pohangina) that 33% or 93,000 ha may be a reasonable assessment of imperfectly to poorly drained soils on Class II landforms within the Manawatu District Council (MDC) area (includes rural areas in PNCC transferred from MDC or any of the old County Councils) (Appendix II). Hence, while these soil types are valuable for pastoral farming and arable cropping, they are not rare.

The following descriptions are taken from Soil Bureau Bulletin 33, Soils and Agriculture in Kairanga County:

Ref.	Soil Name	Description
4	Kairanga silt loam	This is a poorly drained soil, with many yellowish-brown mottles on areas that have been subject to infrequent flooding in historic times. The alluvial soil lies wet in winter and under heavy stocking pressure the topsoil become pugged. Apart from fertiliser, the main requirement is drainage.
7c	Karapoti brown sandy loam, gravelly phase	Well to somewhat extensively drained on old levee ridges, underlain by gravels or stones within 30 cm of the surface.
8b	Te Arakura sandy loam, shallow phase	Poorly drained gley soil formed from alluvium on the river flats. Thin horizontal iron-stained bands may occur in the lowest horizon. The gravels come within 45 cm of the surface. Can be tile and mole drained. Tends to dry out in the summer.

Reference:

Cowie, J.D. 1978. Soils and Agriculture in Kairanga County, North Island, New Zealand. New Zealand Soil Bureau Bulletin 33.

4 Land Use Capability Classes (LUC)

The Land Use Capability classes are shown in Appendix III.

Land Use Capability (LUC) is "...land categorised into eight classes according to its long-term capability to sustain one or more productive uses." "Classes I-IV are classified as arable land, while LUC Classes V-VIII are non-arable. The limitations or hazards to use increase, and the versatility of use decreases, from LUC Class I to LUC Class VIII". "This can be thought of as a rating of 'best' to 'worst' land for common productive purposes."

Reference: Land Use Capability Survey Handbook, 3rd Edition. (This document is available on www.landcareresearch.co.nz).

The Land Use Capability units on this site are Ilw2, and IIs1, which indicate a flat contour, but potential land use is limited by wetness and fragments of iron pan, as well as a moisture deficit in summer. Due to limitations of wetness, drying out in summer and the presence of an ironstone pan, these are not the most versatile soils and lean towards the lower end of the LUC class 2.

There are no commercial gardens, orchards or other horticultural enterprises in the vicinity.

Ilw2	Te Arakura sandy loam, Kairanga silt loam.	Flat river terraces with deep, fertile soils which have a continuing slight wetness limitation after drainage.
IIs1	Karapoti brown sandy loam, gravelly phase.	Flat-gently undulating river levees with recent, free-draining sandy-textured soils

Reference:

Fletcher, J. R. 1981. New Zealand Land Resource Inventory Survey: Taranaki-Manawatu Region: land use capability extended legend. National Water and Soil Conservation Organisation, Water & Soil Division, Ministry of Works and Development. Wellington.

Care must be taken with cultivation or grazing heavy cattle in winter to ensure compaction of the poorly drained soils does not occur and that soil structure is not damaged for long periods. Damaged soil will have deep pugging or hoof prints throughout, which make it very rough to walk or drive across. The real impact, however is on loss of pasture production. "Degraded soils have a low load-bearing capacity. As a result, pastures on these soils are easily trampled into the mud when wet. This makes them both inaccessible and unpalatable to stock. Trampling can reduce pasture utilisation by 20-40 percent." (*Shepherd, T.G. 2000. Visual Soil Assessment. Volume 1. Field guide for cropping and pastoral grazing on flat-rolling country. Horizons.mw & Landcare Research, Palmerston North.*)

5 Current Usage

The land is being used mainly for maize growing by the current owners.



6 Restrictions on Range of Options for Land Use

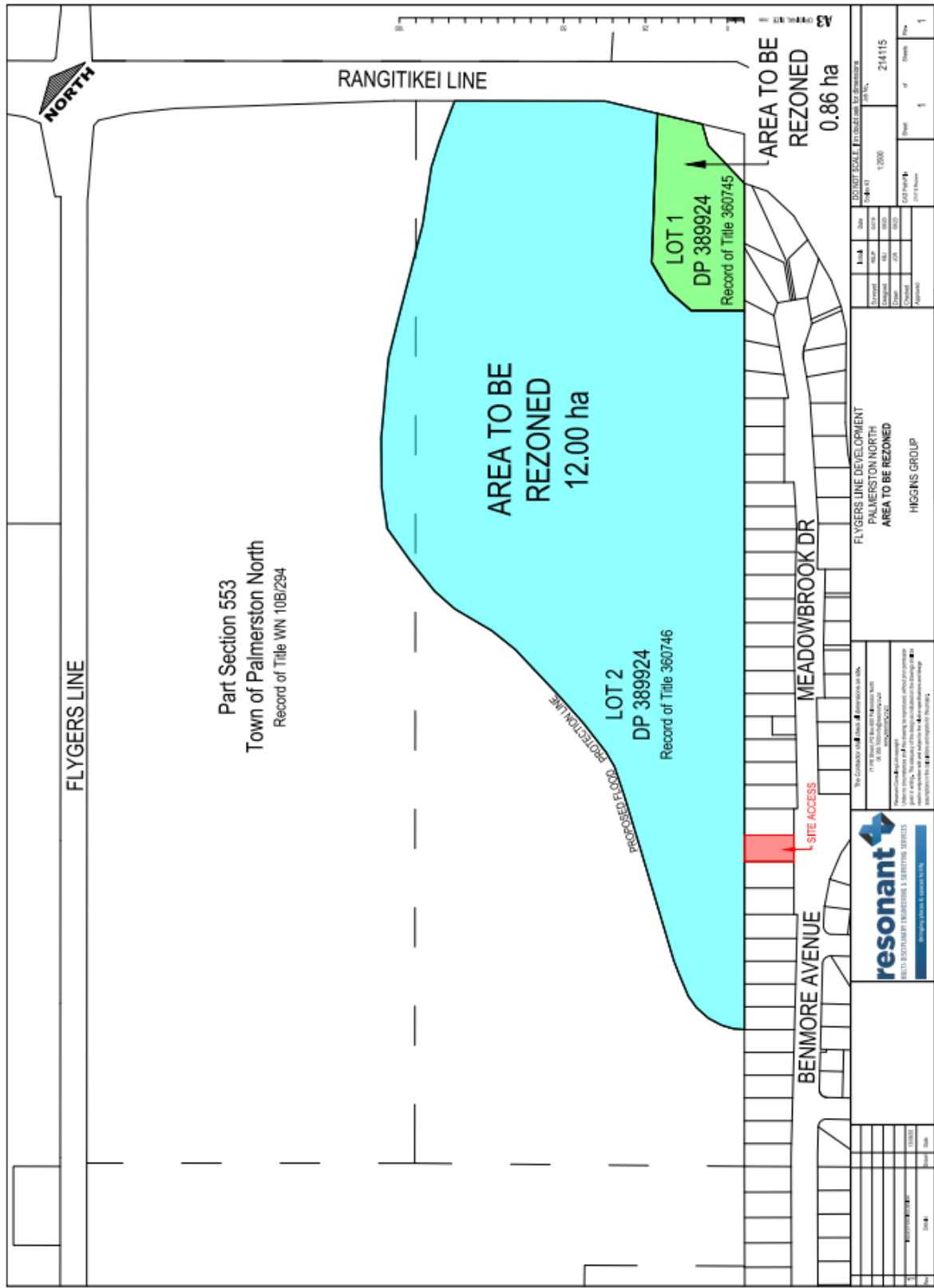
In this proposal, the croplable land will be reduced from 40 ha to approximately 27 ha. The remaining 27 ha will still allow any current livestock system to operate and will still allow crops to be sown and harvested.

7 Summary

The reduction in productive income needs to be balanced with the need for more housing in or near Palmerston North. The advantages of this site include:

- The proposed land use for housing development will provide approximately 157 new houses and boundaries the existing residential area and as such does not fragment urban development.
- The soils are true to the map; are poorly-drained and unsuitable for horticultural or vegetable growing uses. They can still be used for arable crops (maize, barley, wheat) and will support grazing of livestock on pasture.
- The balance is still big enough (approx. 27 ha) that there is no restriction to the range of land use options.

Appendix I: Proposed Area to be Re-zoned



Appendix II: Soil Map



Cowie, J.D. 1978. *Soils and Agriculture of the Kairanga County, North Island, New Zealand*. NZ Soil Bureau. Bulletin 33. Original Scale: 1: 63360

Poorly drained soils in the Manawatu District Council and Palmerston North City Council (rural area)

Soil Series	Parewanui	Kairanga	Te Arakura	Ohakea	Tokomaru	Milson	Marlon	Total Area (ha)	% of County	County Total ha****
	Gley Recent Soils Poorly drained Accumulating	Gley Recent Soils Poorly drained Accumulating	Gley Soils Poorly drained Non-accumulating	Yellow-Grey Earths Poorly drained Soils of Terraces and Fans						
County Mapped										
Kairanga *		8,500	6,950	9,100				24,550	53%	46,600
Manawatu **	1,700	2,180	795	6,265	4,865	970	1,635	18,410	27%	68,600
Pohangina ***	-	45	-	640	-	220	395	1,300	11%	11,407
Kiwitea (part) ****				50			172	222	11%	2,000
PN City										4,302
	1,700	10,725	7,745	6,955	13,965	1,190	2,202	44,482	33%	132,909
										Oroua 49,200
										balance Kiwitea 91,000
										Area accounted for 273,109
										Current MDC area 278,000

Note: The total area for Pohangina County excludes the 83% portion in Ruahine Ranges.

The old Oroua or Kiwitea Counties have not been soil mapped.

*Cowie, J.D. 1978. *Soils and Agriculture in Kairanga County, North Island, New Zealand*. New Zealand Soil Bureau Bulletin 33.

**Cowie, J.D, Rijkse, W.C. 1977. *Soils of Manawatu County, North Island, New Zealand*. New Zealand Soil Bureau Bulletin 30.

***Rijkse, W.C. 1977. *Soils of Pohangina County, North Island, New Zealand*. New Zealand Soil Bureau Bulletin 42.

**** Senarath, A., Palmer, A. 2005. *Soils of the Kiwitea District, Northern Manawatu*.

Institute of Natural Resources Massey University. *Soil and Earth Sciences Occasional Publication No. 5*.

*****[https://kids.kiddle.co/List of former territorial authorities in New Zealand](https://kids.kiddle.co/List_of_former_territorial_authorities_in_New_Zealand)



Location of soil profile sites

Photo evidence of the two main soil profiles confirming they are poorly drained as evidenced by the orange-brown mottles in the topsoil:



Site 1: Kairanga silt loam



Site 2: Kairanga silt loam



Site 3: Te Arakura sandy loam



Site 4: Te Arakura sandy loam



Site 5: Karapoti brown sandy loam

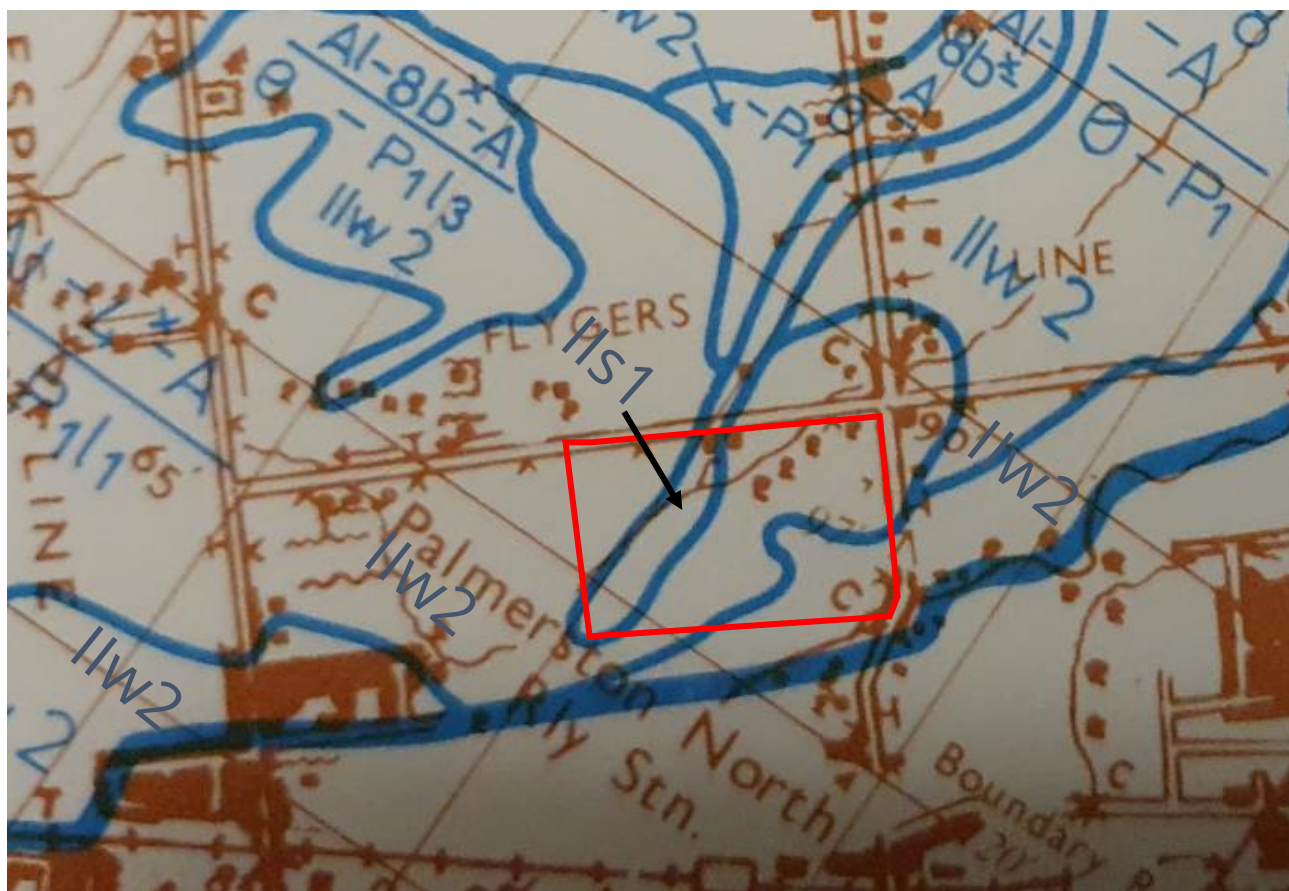


Site 6: Karapoti brown sandy loam



Site 7: Karapoti brown sandy loam

Appendix III: Land Use Capability (LUC) Map



Ministry of Works and Development 1979. New Zealand Land Resource Inventory Worksheet N149 Palmerston North. Original Scale: 1:63,360.