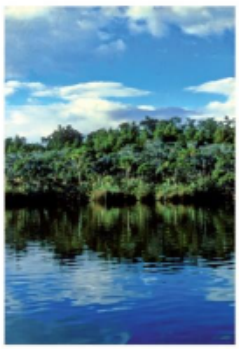
APPENDIX C

Landcare Research Site Investigation Report



AFFCO Manawatu – Soil Assessment of Proposed Irrigatable Land

Landcare Research
Manaaki Whenua

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Summary

The soils were identified by soil survey methods on 7 areas of land surrounding and adjacent to AFFCO Manawatu Meat Works Plant, Feilding, in May 2103.

The predominant soils over these areas are man-made or natural shallow and stony sandy soils that equate to Rangitikei shallow soils, with respect to potential effluent irrigation. There are two areas to the east and north of the Main Buildings that have up to 30 cm of composted paunch waste spread over sands or gravels.

Deeper, well-drained, sandy Manawatu soils occur in patches with the above shallow and stony soils in the paddocks with trees to the south-west of the main buildings. Most of the paddocks across Rapanui Street from the Wallace Corporation buildings have these deeper sandy Manawatu soils. They grade into imperfectly drained Kairanga silt loams towards the southern area of these paddocks.

The paddocks along Rapanui Street are the most suitable for effluent irrigation, although care will need to be taken with irrigating the imperfectly drained Kairanga silt loams during the wet periods (autumn through to spring).

1 Methods of Soil Identification

The soils on 7 general areas (shown in the accompanying map) surrounding and adjacent to the AFFCO Manawatu Meat Works Plant, Feilding were examined on 9 and 16 May 2013 by augering to 120 cm or impenetrable stony layers. There were a total of 67 auger sites, which were located by GPS (using the NZTM reference system). Depths of the different soil horizons and soil textures were recorded according to the methodology described in Milne et al. (1995).

Small pits were dug and photographed at 3 locations to illustrate the main different soil types.

The soil types were referenced against those described in CPG's 2012 Report, Cowie (1978), and Cowie and Rijkse (1977). Soil classifications are according to Hewitt (1998).

2 Soils on the Pastoral Areas Surrounding the Meat Works Plant Potentially Available for Effluent Irrigation

The two small pasture paddocks between the gate and main buildings have stony or shallow man-made (Anthropic) soils with sandy or stony loamy sand topsoil textures. The underlying fill was not investigated. The smaller of the two paddocks formerly had buildings on it. It was confirmed by AFFCO Engineering Supervisor, Larry O'Fee that some concrete pads or broken-up concrete had previously been found by small-scale investigating excavations under the replaced soil and gravels. The larger paddock formerly contained the stockyards and may not have concrete in the fill.

The largest area investigated, comprising a block paddocks extending north-east of Campbell Road, contains a mosaic of approximately:

- 40% deep (50–120+ cm) sandy Manawatu soils (Photograph 1) with fine sandy loams or loam fine sands over banded sands or gravels
- 50% stony or boulder sandy Rangitikei shallow soils (Photograph 2) on former river channels and stony ridges, reflecting the river system that historically flowed through the area
- 10% man-made (Anthropic) stony soils with sandy topsoil matrices at the eastern end of the block. A small mounded stony area to the west of the large building and south of the small shed/ stock yards was a former de-odorizing or filtration pad.

The shallow and stony man-made (Anthropic) soils are likely to behave like Rangitikei shallow sandy and stony soils as regards effluent irrigation.

Figure 1 Manawatu gravelly loam fine sand over banded sands to 50 cm on gravels.

Figure 2 Shallow and stony man-made (Anthropic) soil similar to Rangitikei shallow soils.

There are also several sites that once contained buildings, and a water hydrant in one paddock.

While the soils in this area are well-drained (drainage in the shallow stony soils being very rapid), effluent irrigation would be challenging in most of the paddocks because of the small paddock sizes and variable soil patterns.

The paddocks along Ratanui Street, to the south-west of Wallace Corporation Hides and Slinks buildings, have well and moderately well-drained deep sandy and silty Manawatu soils over the larger area of paddocks to south of the main AFFCO buildings area. The Manawatu soils grade into imperfectly drained Kairanga silty soils (Photograph 3) at the south-eastern end.

Figure 3 Kairanga silt loam soil, imperfectly drained.

The area in the paddock immediately to the north of the Wallace Corporation buildings that does not have existing human effluent disposal contains shallow and stony, and some deeper sandy soils. The adjacent, smaller, humped and hollowed paddock has stony and shallow man-made (Anthropic) soils. These shallow and stony soils would behave like the Rangitikei shallow and stony soils.

The paddock to the east of the Main Buildings has two quite different soils:

- The southern half of the paddock has up to about 30 cm of composted paunch waste spread over gravels or imperfectly drained (mottled sands).
- The northern half of the paddock has man-made (Anthropic) shallow and stony soils.

The paddock to the north-west of the Effluent Ponds has an area on the west side of the shingle track that contains up to about 30 cm of composted paunch waste over loose sands on gravels. The rest of the paddock has shallow and stony man-made (Anthropic) soils – see Photograph 2. The former soils in this paddock appear to have been excavated, as there is a distinct bank of about 1-m height along the boundary fence line.

The larger paddocks to the immediate north of the Main Buildings and Car Park contain a rubbish dump capped with gravelly soil and two small sludge-settling ponds, the supernatant discharging directly onto the paddock. The former soils in these paddocks also appear to have been excavated (using the small, c. 1-m high, concrete-block wall that borders the southern side of the bigger paddock, as evidence of excavation). The current soils are shallow and stony sandy man-made (Anthropic) soils that would behave like Rangitikei shallow and stony soils with respect to effluent irrigation.

3 References

Cowie JD 1978. Soils and agriculture of Kairanga County, North Island, New Zealand. New Zealand Department of Scientific and Industrial Research, Soil Bureau Bulletin 33. Wellington, Government Printer. 92 p.

Cowie JD, Rijkse WC 1977. Soils of Manawatu County. New Zealand Soil Bureau Soil Survey Report No. 30, containing New Zealand Soil Map No. 104. Extended legend and explanatory notes to accompany the soil map. Lower Hutt, New Zealand Soil Bureau, Department of Scientific and Industrial Research. 34 p.

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Hewitt AE 1998. New Zealand Soil Classification. Landcare Research Science Series No. 1. 2nd edn. Lincoln, Manaaki Whenua Press. 133 p.

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APPENDIX 1. Map of soils on areas surrounding the AFFCO Meat Works Plant.

PAUNCH
MM
DUMP
MM
MM
MM
PAUNCH
MM
MM
MM
Human effluent
Rang + Man
Man + Rang
Man
Rang sty & sh + Man
Kair
266 m
Image © 2013 DigitalGlobe
Image Horizons Regional Consortium

LEGEND

MM - Man-made Anthropic Soils

Rang sty&sh - Rangitikei shallow and stony sandy soils

Man - Manawatu sandy soils

Kair - Kairanga silt loam soils

Old channels with stony soils

Google earth

Imagery Date: 3/27/2013 40°14'12.29" S 175°35'09.26" E elev 74 m eye alt 1.29 km