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Omahu Road Industrial Rezoning Submissions: Soils assessment

**Prepared for
Hastings District Council**

**Prepared by
Dan Bloomer
Page Bloomer Associates Ltd**

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Omahu Road Industrial Rezoning Submissions: Soils assessment

Brief

Prepare a short report providing information on a number of submissions received by Hastings District Council for Plan Change 57 – Omahu Industrial Area, particularly with regard to the versatility and capability of the soils in the Omahu North Area.

A number of submissions stated that there was a distinctive drop off in productivity in the soils on their sites. This was where the soils were believed to change from Category 6 to Category 13s. The submissions have suggested that due to the drop off in productivity these areas of land should be considered for industrial rezoning as part of the plan change. Advice was requested on the following:

1. An explanation as to the likely reason for the drop off in productivity where the soils change from 6 to 13s.
2. How the quality, versatility and capability of the soil affect the ability for primary production in the area?
3. What methods can be put in place to improve the quality, versatility and capability of the soil?

This information is to provide information to council officers to help with in their recommendations for Plan Change 57, and the hearings committee to make decisions on submissions. The report need not make specific judgements on individual submissions/properties, as to the merits of submissions, but rather provide a broad overview as to the likely reasons of the changes in soil productivity outlined in submissions.

Previous Reports

A previous report provided by the Client was prepared by John Wilton of AgFirst Consultants. Its brief was to:

1. Describe those characteristics of the land relevant to its productive potential “life supporting capacity”, and
2. The relative versatility of the land for productive purposes to other Plains zone land within the Heretaunga Plains.

Report limitations

This report is essentially a desk-top study only. A brief site visit compared existing plantings and growth patterns with aerial photography, with all observations made from the road. No on-site investigations were carried out.

The Client provided aerial photo maps and soil maps (Catchments 1, 2 and 3) of the area designated for re-zoning. These also show the boundaries of the land described in submissions seeking extended boundaries for the re-zoning.

Reliance has been placed on consultant general experience, Council and Google aerial imagery and on the published soil map (Heretaunga Plains (1997) Plan No 2683) and associated book (Griffiths, E. 2001. “Soils of the Heretaunga Plains: A guide to their management”).

Base soil analysis

Soils present

As the Wilton Report notes, the predominant soil type the area proposed for re-zoning is Soil 6, Twyford sandy loam (Heretaunga Plains (1997) Plan No 2683).

There are small areas of 1 Omahu soil at the eastern and western ends of the re-zoning area. Small pockets of 13 and 13s Karamu (the predominant adjacent soil type) and 14 Hastings are also mapped within the re-zone area.

It should be noted that soil maps are representations of soil type location only. Within the map polygons there are likely to be areas of related soils, and the actual boundaries are rougher and blurred. Soils seldom exhibit strong clear boundaries as marked on maps, and their natural diversity cannot adequately be recorded when mapped at the scale used.

Soil properties

Wilton notes that 6 Twyford and 13 Karamu soils are versatile and highly productive. 14 Hastings also fits this description. The 1 Omahu soil is gravelly and of limited versatility. While preferred for premium grape production, the small areas in question are separated from similar land by Omahu Road.

Soils 6 Twyford, 13 and 13s Karamu and 14 Hastings are all susceptible to pugging and compaction when wet, and to damage and compaction if cultivated in difficult conditions.

Soil 6 Twyford differs from soils 13 and 13s Karamu and 14 Hastings in that it is better drained and does not generally require artificial drainage when used for agricultural or horticultural purposes.

With the exception of 1 Omahu, these soils have reasonable water holding ability: Soil 6 Twyford (~75mm), 13 Karamu (50-75mm), 13s Karamu (30-50mm) and 14 Hastings (100mm).

Soil management

Compaction and pugging reduce infiltration and drainage, and thus reduce the productivity and resilience of soils until damage is remediated.

Orchards require a depth to water table of 60cm or more. If artificial drainage is not used, crop and orchards can be disadvantaged during wet periods.

A relatively long history of cultivation and the intensive trafficking of orchards in the Twyford area has left some legacy of compaction and associated waterlogging. This was studied by Griffiths (2000, pers.com) who showed that orchards suffering root problems during extended wet periods could be remediated using fine rooted grasses and careful water management.

Artificial drainage is recommended to address water table issues on 13 Karamu (40m spacing), 13s Karamu (60-80m spacing) and 14 Hastings (40m spacing). Soil 14 Hastings has naturally imperfect drainage and depth to water table after wet periods of only 30-60cm. Soils 13 and 13s Karamu tend to be moderately well drained with a natural water table depth of 60-90cm after wet periods.

While the soils in the area do hold water they are, in most years, likely to require irrigation for reliable production. Production and orchard development will be reduced if water is limited. Application intensities need to be less than soil infiltration rates which can be low on these soils, especially if affected by cultivation or compaction.

Drop off in productivity where the soils change from 6 to 13s

The most likely cause of productivity drop between soil types relates to the natural infiltration and drainage properties of the two soils.

Artificial drainage is recognised as suitable mitigation on Karamu 13s (and Karamu 13) but is not needed on 6 Twyford.

How the quality, versatility and capability of the soil affect the ability for primary production in the area

As the Wilton report notes, 6 Twyford silt loam and 13 (and 13s) Karamu soils are versatile and highly productive.

Their inherent fertility, good water holding ability and (with artificial drainage as required) rooting depth make them productive and versatile. They are able to successfully support a wide range of crops including permanent orchard plantings as well as field cropping.

The capability of 13 and 13s Karamu is limited by the noted drainage limitations, which can be effectively addressed.

The quality of these soils can be damaged particular if worked or trafficked when wet. Over the decades this has happened on many sites but the issue is fixable and has often been addressed. A few years of care, particularly if planted in fine rooted pastures, is restorative.

Constant field cropping can reduce the soil organic matter content, making the soils more prone to damage and reducing their infiltration and drainage ability. This can also be addressed by reducing cultivation and including a restorative pasture phase in a cropping rotation.

Methods that can be put in place to improve the quality, versatility and capability of the soil

In essence, standard good agricultural practice is sufficient to maintain the quality, and hence versatility and capability of the Twyford and Karamu soils.

In field cropping, minimising traffic and cultivation, especially when soils are wet, is important. When this conflicts with harvest schedules, soil remediation such as ripping and restorative pasture or crops may be needed.

In permanent crop systems compaction between rows is the most likely adverse factor. This is made worse by trafficking (e.g. with heavy sprayers) when soils are very wet. However most orchards develop strong compacted zones under wheel tracks and these help support traffic in adverse (wet)

conditions. If rutting does occur, ripping and care with a pasture restoration crop are standard methods of mitigation.

Submitters soil assessments

A number of submissions discuss “poorer soil”. While 1 Omahu is of limited versatility, the remaining soils which cover most of the area are highly versatile and of high value for horticulture or agriculture.

John Agnew’s submission refers to poorer soil (mapped as 1 Omahu) which is of lesser versatility and in that case is orphaned from similar viticultural soils by Omahu Road.

Vesty Partnership’s submission indicates a preferred zone change boundary that closely follows the mapped line between 6 Twyford and 13s Karamu. The area of the proposed industrial re-zoning is mapped as about half 1 Omahu and half 6 Twyford. The area mapped as 1 Omahu shows in aerial photographs, suggesting evidence of reduced and uneven growth.

Almost all the area sought for extended re-zoning is mapped as 6 Twyford which as noted is a productive and versatile soil. Aerial images do not show growth patterns significantly different to the rest of the site for which re-zoning has not been sought.

The Vesty Partnership also questions the drainage of the infiltration ponding area planned for the site. The pond is mapped as about half and half 6 Twyford and 13s Karamu. The 13s Karamu soil can have very slow infiltration rates and this should be considered in any drainage design planning.

The submission by Bayley, Bayley Family Trust, Rimu Holdings and Totara Holdings does refer to “land of lesser horticultural value” and “areas of poorer soils” but no maps show the location of these places. All remaining areas shown for additional re-zoning occupy the 6 Twyford, 13 and 13s Karamu soils which as previously noted are productive and versatile and suitable for horticultural production.

Submissions without soil reference.

Three related submissions (Osbourne and Campbell, Manley, Razos Engineering,) indicate a preferred zone change boundary that runs adjacent to the mapped line between 6 Twyford and 13 Karamu. No discussion of soil is included in those submissions. The additional area includes 6 Twyford (~2/3rd) and 13 Karamu (~1/3rd) which are both productive and versatile soils. There does not appear to be significant impediment to horticultural use.

One submission (Flynn) indicates a preferred zone change boundary that runs adjacent to the mapped line between 6 Twyford and 13s Karamu. No discussion of soil is included in that submission. The site appears to be connected with other land being used for cropping.

The Golden Oak Partnership submission covers an area also mapped predominantly as 6 Twyford and 13s Karamu with “existing industrial activity” covering mostly the 13s Karamu and the 6 Twyford currently in horticultural production. The land is well integrated into large areas of horticulture with no obvious limitations to its use for that purpose.

The Currie, Currie and Hustler submission notes the small size of the property after rezoning would be too small for “and realistic, horticultural activity”. The soil is mapped as 13 Karamu which is recognised as productive and versatile. The site could conceivably be integrated into a neighbouring property.

Comments

There appears to be some confusion over the purpose of the drainage ponds marked in the plan. Some submitters assume these could be irrigation storage ponds, others that they are merely reserved to increase the area available for storm water infiltration. There does appear to be conflict if water potentially affected by industrial activities is applied to premium horticultural cropping land.