



Soil and Resource Report for 174 Brookvale Road, Havelock North.

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Prepared For: Vermont Street Partners No. 4 Ltd

20th November 2024

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1.0 INTRODUCTION

This report has been prepared at the request of the client to assess the Land Use Capability (LUC) classifications and productivity potential at 174 Brookvale Road, Havelock North. The New Zealand Land Resource Inventory (NZLRI) maps have classified the site as LUC class 3. As such, this area could potentially fall under the National Policy Statement for Highly Productive Land (NPS-HPL).

The purpose of the report is to map the site and identify any Highly Productive Land as defined by the National Policy Statement for Highly Productive Land (NPS-HPL) and assess its productivity potential. To achieve this, a site visit was carried out to map the soils and land use classes present and assess them in relation to the NPS-HPL and their productive uses.

This report presents the description of each of the soil types identified on the survey area as well as descriptions of each of the LUC units mapped. This information is then used to determine and quantify any HPL and assess its production potential. This information is accompanied by a site description map showing LUC, soil and soil classifications along with the relevant LUC unit and soil profile descriptions.

2.0 MAPPING METHOD

A site visit was carried out on the 6th of November 2024 to evaluate and describe the soil types and the LUC units present. The survey area was mapped at a scale of 1:5,000.

LUC mapping was carried out in accordance with the methods described in the 3rd Edition of the Land Use Capability Survey Handbook (Lynn et al 2009). This process involves making a land resource inventory (LRI) of the property in which soil types, soil parent materials, land slopes, erosion type and severity and land cover are recorded. Whenever any of these land features changes a new unit is made.

Specific field work activities include digging and describing soil profiles on each landform with supporting holes dug or profiles observed on bank/drain cuttings to establish soil boundaries, measuring slopes with a clinometer, and gathering any other data that may be of assistance in assessing the suitability of the land for primary production such as erosion, susceptibility of the land to flooding, winter wetness and/or cold, high temperatures, exposure to salt winds, aspect, and accessibility. This information is then used to determine the specific LUC units, as described in the Land Use Capability Classification of the Southern Hawke's Bay-Wairarapa Region for the area.

3.0 SITE DESCRIPTION

The site is located at 174 Brookvale Road and covers a total of 13.6ha made up of two legal titles, legal title number 858136 - 4.1ha (Title 1) and HBJ1/57 – 9.5ha (Title 2). The site is mostly flat with over half developed with buildings and hard stand areas. Minimal area is left on title 1 for any primary production with approximately 2/3 of title 2 currently used in a productive capacity.

Soils at the site are imperfectly drained alluvial soils with varying degrees of stone and gravel content. The southern end of Title 2 is currently used as part of a fruit tree nursery by a local Hawke’s Bay company with the remaining area of both titles being used for a number of commercial enterprises located in various buildings and hardstand parking and accessways.

3.1 Soil Profiles and Descriptions

On Title 1 there are only two notable flat grassed areas. These are shown on the soil map in Section 7 of this report as anthropic or manmade soil and mottled fluvial recent soil (recorded as Hinds_25a.1 in S-map). A third area has not been highlighted as it covers only 400m² adjacent to a building and as such a negligible production potential.

The area of anthropic soil is located on an excavated area of the site where the slope from the terrace above has been removed to create a flat area. The soil at this site consists of very stony subsoil a number of metres below the surface of the original soil profile. Figure 1 below shows the area including the bank cutting on the right while figure 2 shows the shallow, stony soil surface that exists below the grass cover.



Figure 1. Excavated site with anthropic soil



Figure 2. Very shallow soil over gravel at the excavated site.

The soil at this site cannot be dug manually with a spade due to the degree of stoniness and only has a very thin layer of soil material overlaying the stony profile.

The area of natural soil is located next to the accessway to the site. It is approximately 150m long and varies in width from 6m to 28m. This area includes imperfectly drained, mottled fluvial recent soil. In this particular location the profile has a high degree of stoniness in the subsoil which prevented a profile hole from being dug. Below is a representative description of the profile.

The soils across Title 2 vary from mottled to gleyed alluvial soils with gravel present at a depth of between 200-500mm that prevented manual digging or soil auger penetration. Hard pans were also encountered in three instances that prevented auger penetration past 400mm. Stoniness was at the soil surface in a number of locations.

In general, the condition of the soil on Title 2 was found to be slightly to significantly degraded due to compaction and a loss of soil structure. Figure 3 below shows the degraded topsoil of a recently cultivated area of the site with structure almost total lost leaving a powdery texture topsoil containing small, compacted clods of subsoil



Figure 3. Soil degradation at the site from a loss of structure likely due to over cultivation.

Soil Profile	Soil Profile Description
	<p>Soil Name: Hinds_25a.1.</p> <p>Soil classification: Mottled fluvial recent soil.</p> <p>Parent material: Alluvium</p> <p>Soil description:</p> <p>0-200 Loss of soil structure and organic matter, becoming powdery with compacted lumps</p> <p>200-400mm: Firm, massive, sticky plastic, light yellowish brown (2.5y6/3) to light brownish grey (2.5y6/2) sandy clay with black (10yr 2/1) iron staining and yellowish red (5yr 5/8) mottling.</p> <p>400mm+ – clay to firm to auger</p> <p>Overall drainage: Imperfectly drained</p>

3.2 Land Use Capability Descriptions

LUC classifications categorize land into eight classes according to its long-term capability to sustain one or more productive uses.

- Classes 1-4 have arable potential with limitations to this land use moving from class 1 being the most versatile, multi-use land with minimal physical limitations for arable use and increasing to severe limitations under class 4 land. These classes are also suitable to viticulture, berry production, pastoralism, tree crops and production forestry.
- Classes 5-7 are suitable for pastoral farming and production forestry.
- Class 8 land has no productive use and is rather managed for catchment protection and conservation purposes.

The LUC units mapped on the proposed site are presented in the table below. An LUC map showing the distribution of the mapped units is contained in Section 7.

Resource information	Luc unit	Total area (ha)	Parent material	Dominant soil type	Slope (degree)	Land Cover	Erosion degree & severity		Landuse suitability	Stock carrying capacity (su/ha)
							Actual	Potential		
<p>3w 2</p> <p>Flat terraces and depressions which have poor internal drainage, or in areas where natural drainage outfalls are restricted. The gley and organic soils mapped on this unit are more difficult to drain effectively than soils on LUC unit Illwl.</p>		6.4	Alluvium	Central yellow-brown loams	0-3°	Pasture	Nil	Nil	Grazing. Some cereals Root and green fodder crops Grass seed	Average: 17 Top: 20 Potential: 24 FSI: 20-23
<p>7s 2*</p> <p>Manmade soil from the levelling of stony alluvial soils where the A and B soil horizons have been removed, leaving a stoney C horizon at the soil surface.</p>		0.35	Alluvium	Anthropic	0-3°	Unimproved pasture	Nil	Nil	Very limited grazing	Data not available

Land use capability unit descriptions are taken from the author's field work and the Land use capability classification of the Southern Hawke's Bay – Wairarapa Region (National water and soil conservation authority).

4.0 SOIL CLASSIFICATIONS

4.1 Highly Productive Land

The NPS-HPL came into effect on 17th October 2022 and was updated in August 2024 with the amendments taking effect from 14th September 2024. This policy seeks to protect highly productive land for use in land-based primary production, both now and for future generations. The policy statement defines highly productive land as land that has been mapped in accordance with clause 3.4 of the NPS-HPL and is included in an operative regional policy statement as required by clause 3.5. There is an interim regime for identifying highly productive land prior to a regional policy statement containing maps of highly productive land in the region is operative. Under clause 3.5(7) of the NPS-HPL, highly productive land in the interim period includes land that is: (i) zoned general rural or rural production; and (ii) LUC 1, 2, or 3 land; but is not: (i) identified for future urban development; or (ii) subject to a Council initiated, or an adopted, notified plan change to rezone it from general rural or rural production to urban or rural lifestyle.

The following definition of LUC 1, 2, or 3 land is taken from section 1.3, page 5 of the NPS-HPL:

LUC 1, 2, or 3 land means land identified as Land Use Capability Class 1, 2, or 3, as mapped by the New Zealand Land Resource Inventory or by any more detailed mapping that uses the Land Use Capability classification.

4.2 NZLRI Mapping

The NZLRI is based on an LUC assessment of the whole of New Zealand and has been carried out at a scale of 1:50,000. It is intended for regional use and planning and is not meant to be used at a farm scale. The 3rd Edition of The Land Use Capability Survey Handbook (Lynn et al 2009) cautions against enlarging LUC data beyond the scale at which it was gathered as it can produce unreliable and misleading results and at time results that are nonsense.

At a scale of 1:50,000, on average one mapping observation is made every 25ha but could be a little as one every 100ha (Hewitt and Lilburne 2003, Grealish 2019). As such, it is quite possible that no information has been gathered on the proposed site. For the purpose of this report, with a site covering 13.6ha the appropriate scale of mapping is approximately 1:5,000 or one to four observations per hectare (Lynn et al 2009).

Using the NZLRI for site specific information is outside of its intended purpose and outside of its parameters of reliability. At best it can only provide an indication of the possible LUC units present. The correct process for mapping soil types and LUC at a site of this size is to carry out a site survey at the correct scale by a suitably qualified person as has been done for this report.

5.0 OVERALL SITE ASSESSMENT

Area and percentage of LUC units and HPL on the two legal titles at the site.

LUC Unit - 858136	Area (ha)	HPL Classification	% of total Area
3w 2	0.2	HPL	4.9
7s 2*	0.3	Not HPL	7.3
Unproductive	3.6	Not HPL	87.8
Total area	4.1		
Area HPL	0.2	Total % HPL	4.9
Total area non-HPL	3.9	Total % non-HPL	95.1

LUC Unit - HBJ1/57	Area (ha)	HPL Classification	% of total Area
3w 2	6.2	HPL	65.3
Unproductive	3.3	Not HPL	34.7
Total area	9.5		
Area HPL	6.2	Total % HPL	65.3
Total area non-HPL	3.3	Total % non-HPL	34.7

5.1 NPS-HPL Classification

It is acknowledged that as this site is classified as LUC class 3 by the NZLRI it is also classified as HPL under the NPS-HPL. This classification is relevant in relation to the HPL legislation, but it does not supersede the site survey in relation to the actual LUC classifications at the site and its primary productivity potential.

5.2 Site Assessment and Productivity

Due to the unreliability of the NZLRI data at a farm scale it cannot be used to accurately assess either site LUC classifications or site productivity potential. Weight therefore needs to be given to the information gained from the site survey and provided in this report as it has been obtained by following the correct mapping protocols, at the correct scale, by a suitably qualified person.

5.2.1 Title 1

As can be seen in the soil and LUC maps there is very little in the way of undeveloped ground that has any potential primary productive use on Title 1. The soils on this title have been discussed in Section 3.1 of this report and have highlighted only three flat, undeveloped areas that could be considered to have any production potential. The smallest of these is discounted as it is the size of a small residential lawn – approximately 400m². Of the remaining two areas the largest - 0.35ha, has anthropic or a manmade soil profile due to site levelling. This process

has resulted in the removal of a significant depth of the original soil profile leaving only a very stony subsoil material. Due to these alterations this area no longer has the productivity potential of the original site and as such has a new LUC classification of 7s 2* reflecting that.

The area of 3w 2 on this title is unaltered and in general land of this classification is capable of supporting grazing, production of some cereal crops, root and green fodder crops and grass seed. However, due to its very small size – 0.2ha - and its long narrow shape it is of no practical use in primary production beyond a family vegetable garden.

5.2.2 Title 2

As can be seen in the soil and LUC maps a significant area of this title is also occupied by buildings, accessways and hardstand areas. These areas have no productive potential and therefore cannot be given a LUC classification. The balance of the site is classified as LUC unit 3w 2 includes and productive land but with degraded soil structure likely due to over cultivation.

5.3 Productivity Potential

5.3.1 Title 1

Some sites where development has occurred can undergo rehabilitation and be restored for primary production uses at minimal expense. This title however, has undergone development to such a degree that such an undertaking would be totally impractical, unjustifiable and likely unattainable. As such there is virtually no production potential on this title due to development and the very small area of natural soil.

5.3.2 Title 2

In the description of the 3w 2 LUC unit Noble (1985) states that the heavy textured subsoils of this title give rise to slow internal drainage and poor soil aeration. The impeded drainage and long periods of high water tables make this unit more suited to intensive grazing than cropping, although some maize, barley, grass seed, and summer forage cropping may be carried out.

The gleying and mottling observed in the soil profiles confirm the impeded drainage and prolonged soil wetness. The impeded drainage along with the stony soil profile limit the productive uses available for this site to grazing and shallow rooted or wet tolerant plant/tree species and short rotation cropping options. Continuous cropping is not sustainable on these soils and results in soil structural degradation.

Further adding to the limited production opportunities is the small area available for productive use. Currently the tree nursery that operates at the site uses the productive area of both 174 and 176 Brookvale Road, however, these areas need to be considered as operating as separate sites. In this capacity the productive area remaining on Title 2 is 6.2ha. At this size

and on a site that is best suited to grazing commercial viability is unlikely with the title most likely to be used as a lifestyle block.

It should be noted that though the title is currently used as a tree nursery this land use appears to be unsustainable based on the degraded soil profiles found at the site.

6.0 CONCLUSIONS

- The entire site is technically classified as HPL under the NPS-HPL but in reality the majority has been highly modified and developed with buildings and hard surface areas. As such, that area of the site is in no way able to be used for primary production let alone in a highly productive capacity.
- Rehabilitation of the developed areas of the site for primary production is unviable.
- There is limited area for productive use and as such is unlikely to be able to support a commercially viable enterprise.
- Impeded soil drainage and stony soil profiles on the productive area of the site limit the productive potential and make it more suited to intensive grazing than cropping.
- Productive soils at the site have been degraded due to compaction and loss of soil structure and require remedial action to return them to their natural level of productivity.
- The current land use appears to be unsustainable due to the soil profile degradation observed.
- The lack of land use options or site versatility mean this site would not be classified as a highly productive site.

174 Brooksdale Road Soil Map



174 Brooksdale Road Land Use Capability Classifications



174 Brooksdale Road Highly Productive Land Classifications



Hinds_25a.1

Report generated: 5-Nov-2024 from <https://smap.landcareresearch.co.nz>

Hind_25a.1 (100% of the mapunit at location (1935109, 5602872), Confidence: Medium)

This information sheet describes the typical average properties of the specified soil to a depth of 1 metre, and should not be the primary source of data when making land use decisions on individual farms and paddocks. S-map correlates soils across New Zealand. Both the old soil name and the new correlated (soil family) name are listed below.

Capture of the base soil information in this region was funded by Hawkes Bay Regional Council and Manaaki Whenua.

Soil Classification

Soil Classification:

Mottled Fluvial Recent Soils (RFM)

Family Name:

Hinds (Hind)

Sibling Name:

Hinds_25a.1 (Hind_25a.1)

Soil profile material

Soil with stones (non contra:

Depth class (diggability)

Deep (> 1 m)

Profile texture

loam

Parent Material

Stones/rocks

hard sandstone rock

Soil material

hard sandstone rock

Origin

Alluvium

Soil Sibling Concept

This soil belongs to the Recent soil order of the New Zealand soil classification. Recent Soils are weakly developed, showing limited signs of soil-forming processes although a distinct topsoil is present, a B horizon is either absent or only weakly expressed. It is formed in alluvial sand silt or gravel deposited by running water, from hard sandstone parent material.

The topsoil typically has loam texture and is stoneless. The subsoil has dominantly loam textures, with gravel content of more than 3% but below 35% for most part of the soil. The plant rooting depth extends beyond 1m.

Generally the soil is imperfectly drained with low vulnerability of water logging in non-irrigated conditions, and has high soil water holding capacity. Inherently these soils have a high structural vulnerability and a low N leaching potential, which should be accounted for when making land management decisions.



About this publication

- This information sheet describes the *typical average properties* of the specified soil.
- For further information on individual soils, contact Landcare Research New Zealand Ltd: www.landcareresearch.co.nz
- Advice should be sought from soil and land use experts before making decisions on individual farms and paddocks.
- The information has been derived from numerous sources. It may not be complete, correct or up to date.
- This information sheet is licensed by Landcare Research on an "as is" and "as available" basis and without any warranty of any kind, either express or implied.
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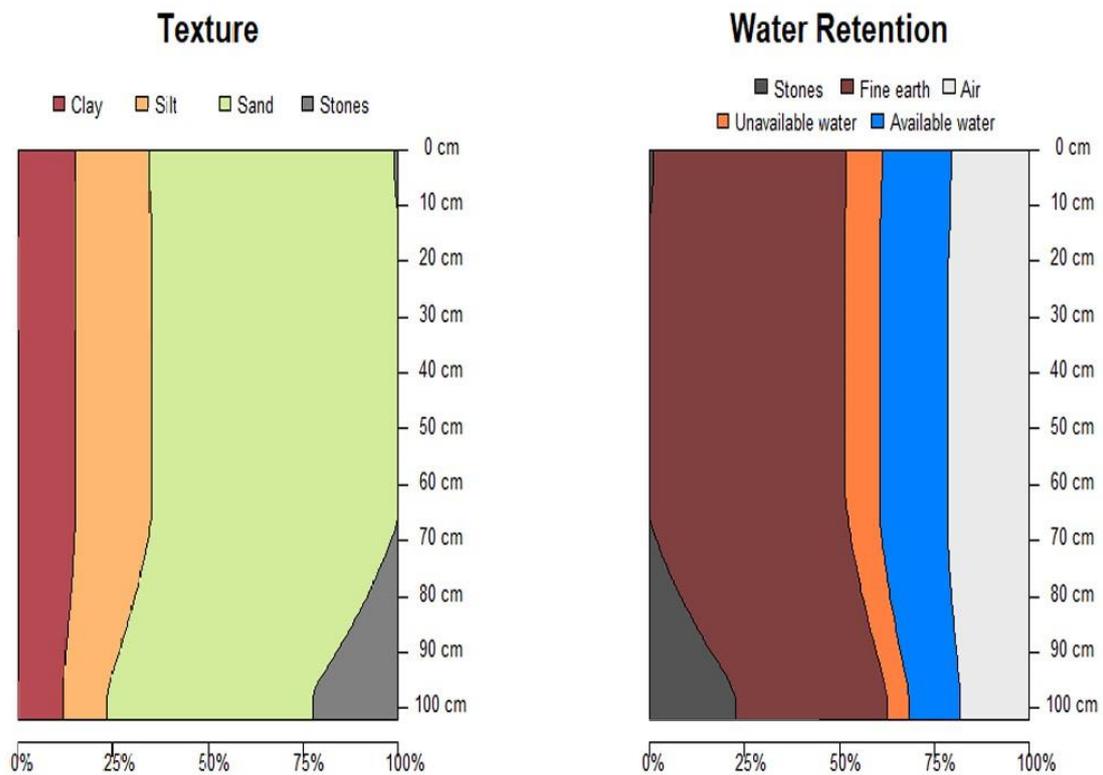
Hinds_25a.1

Soil horizons

Characteristics of functional horizons in order from top to base of profile:

Functional Horizon	Thickness	Stones	Clay*	Sand*	Permeability
Loamy Weak	15 - 25 cm	0 %	10 - 20 %	50 - 80 %	rapid
Loamy Weak	65 - 80 cm	0 %	10 - 20 %	50 - 80 %	moderate
Stony Loamy Weak	0 - 20 cm	15 - 30 %	10 - 20 %	60 - 80 %	moderate

* clay and sand percent values are for the mineral fines (excludes stones). Silt = 100 - (clay + sand)



The values for the graphs above have been generated from horizon and pedotransfer data. These values have then been splined to create continuous estimates of soil water holding capacity and particle size distribution the soil profile. These curves express the particle size distribution and water retention of the soil however there may be barriers to rooting depth that are not necessarily represented in these properties directly. It is advisable to check the potential rooting depth and rooting barrier fields in the soil physical properties section on page three of this factsheet.

Hinds_25a.1

Soil physical properties

Depth class (diggability)

Deep (> 1 m)

Potential rooting depth

Unlimited

Rooting barrier

No significant barrier within 1 m

Depth to hard rock

No hard rock within 1 m

Depth to soft rock

No soft rock within 1 m

Depth to stony layer class

Moderately deep

Texture profile

Loam

Topsoil stoniness

Stoneless

Topsoil clay range

10 - 20 %

Drainage class

Imperfectly drained

Permeability profile

Moderate over rapid

Depth to slowly permeable horizon

No slowly permeable horizon

Permeability of slowest horizon

Moderate (4 - 72 mm/h)

Aeration in root zone

Moderately limited

Profile available water

(0 - 30cm or root barrier)

High (54 mm)

(0 - 60cm or root barrier)

High (108 mm)

(0 - 100cm or root barrier)

High (177 mm)

Dry bulk density

topsoil

1.00 g/cm³

subsoil

1.30 g/cm³

Soil chemical properties

Topsoil P retention

Medium (33%)

Soil management factors

Vulnerability classes relate to soil properties only and do not take into account climate or management

Soil structure integrity

Structural vulnerability

High (0.69)

Pugging vulnerability

not available yet

Septic tank installation category

A1 if slope > 15 deg otherwise B3

Contaminant management

N leaching vulnerability

Low

P leaching vulnerability

not available yet

Dairy effluent (FDE) risk category

B

Water management

Water logging vulnerability

Moderate

Drought vulnerability - if not irrigated

Low

Bypass flow

Low

Hydrological soil group

C

Relative Runoff Potential

Slope	0-3°	4-7°	8-15°	16-25°	>25°
Risk	VL	VL	L	L	M

SINDI - Soil quality Indicators

SINDI - Soil Quality Indicators

A suite of soil quality indicators is available from <http://sindi.landcareresearch.co.nz/>

- Compare your soil with information from our soils databases.
- Assess the intrinsic resources and biological, chemical and physical quality of your soil
- See how your soil measures up against current understanding of optimal values.
- Learn about the effect each indicator has on soil quality and some general management practices that could be implemented to improve soil quality.

9.0 REFERENCES

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3.0 SITE DESCRIPTION

The property is located at 176 Brookdale Road and covers a total of 8.9ha. The site is flat with a number of commercial buildings and hard stand areas. The soils are imperfectly drained alluvial soils with varying degrees of stone and gravel content. The site is currently used as a fruit tree nursery by a local Hawke's Bay company.

3.1 Soil Profiles and Descriptions

The soils across the site vary from mottled to gleyed alluvial soils with gravel present at a depth of between 200-500mm that prevented manual digging or soil auger penetration. A hard pan was also encountered that prevented auger penetration past 400mm with stones at the soil surface in a number of locations.

Some areas of the site were not accessible at the time of the site visit due to horticultural spraying having just been completed or being carried out.

In general, the condition of the soil at the site was found to be slightly to significantly degraded due to compaction and a loss of soil structure from repeated machinery movement and likely over cultivation.

Also of note at the site is an old settlement pond that has been filled in. The area of the site has Anthropogenic or a manmade soil profile. Based on the report by the Land and Water People in which trenches were dug and soil auger samples taken this area was found to be a mix of topsoil and subsoil along with sand, gravel and rubbish.

Two typical soil profiles are described below with the descriptions from the S-Map soils identified at the site included in the appendix.

Soil Profile	Soil Profile Description
	<p>Soil Name: Hinds_25a.1.</p> <p>Soil classification: Mottled fluvial recent soil.</p> <p>Parent material: Alluvium</p> <p>Soil description:</p> <p>0-260mm: Friable, weakly developed, 2-3mm nut, some compaction evident, very dark greyish brown (10yr 3/2), sticky, plastic, silt loam.</p> <p>260-400mm Very firm, massive, breaks to weakly developed 2-3mm nut, light brownish grey (10yr 6/2), sticky, plastic, gravelly clay with dark yellowish brown (5yr 4/6) iron deposits.</p> <p>Overall drainage: Imperfectly drained</p>



Soil Name: Hinds_25a.1.

Soil classification: Mottled fluvial recent soil.

Parent material: Alluvium

Soil description:

0-400mm: Friable, strongly to moderately developed, 2-8mm nut, very dark grayish brown (10yr 3/2), sticky, plastic, sandy clay

400-600mm: Friable, moderately to weakly developed, 2-5mm nut, yellowish brown (10yr 5/4), sticky, plastic, slightly sandy loam with black flecks (10yr 2/1) and faint yellow (2.5y 7/8) mottling.

600-850mm: Firm, massive, sticky plastic, light yellowish brown (2.5y6/3) to light brownish grey (2.5y6/2) sandy clay

Overall drainage: Imperfectly drained

3.2 Land Use Capability Descriptions

LUC classifications categorize land into eight classes according to its long-term capability to sustain one or more productive uses.

- Classes 1-4 have arable potential with limitations to this land use moving from class 1 being the most versatile, multi-use land with minimal physical limitations for arable use and increasing to severe limitations under class 4 land. These classes are also suitable to viticulture, berry production, pastoralism, tree crops and production forestry.
- Classes 5-7 are suitable for pastoral farming and production forestry.
- Class 8 land has no productive use and is rather managed for catchment protection and conservation purposes.

The LUC units mapped on the proposed site are presented in the table below. An LUC map showing the distribution of the mapped units is contained in Section 7.

Resource information	Luc unit	Total area (ha)	Parent material	Dominant soil type	Slope (degree)	Land Cover	Erosion degree & severity		Landuse suitability	Stock carrying capacity (su/ha)
							Actual	Potential		
<p>3w 2</p> <p>Flat terraces and depressions which have poor internal drainage, or in areas where natural drainage outfalls are restricted. The gley and organic soils mapped on this unit are more difficult to drain effectively than soils on LUC unit Illwl.</p>		6.7	Alluvium	Central yellow-brown loams	0-3°	Fruit tree seedlings	Nil	Nil	Grazing. Some cereals Root and green fodder crops Grass seed	Average: 17 Top: 20 Potential: 24 FSI: 20-23
<p>4s 2*</p> <p>Flat area with a soil profile consisting of fill material containing mixed soil horizons, sand, gravels and manmade materials.</p>		0.4	Alluvium, manmade material	Anthropic	0-3°	Fruit tree seedlings	Nil	Nil	Data not available	Data not available

Land use capability unit descriptions are taken from the author's field work and the Land use capability classification of the Southern Hawke's Bay – Wairarapa Region (National water and soil conservation authority).

4.0 SOIL CLASSIFICATIONS

4.1 Highly Productive Land

The NPS-HPL came into effect on 17th October 2022 and was updated in August 2024 with the amendments taking effect from 14th September 2024. This policy seeks to protect highly productive land for use in land-based primary production, both now and for future generations. The policy statement defines highly productive land as land that has been mapped in accordance with clause 3.4 of the NPS-HPL and is included in an operative regional policy statement as required by clause 3.5. There is an interim regime for identifying highly productive land prior to a regional policy statement containing maps of highly productive land in the region is operative. Under clause 3.5(7) of the NPS-HPL, highly productive land in the interim period includes land that is: (i) zoned general rural or rural production; and (ii) LUC 1, 2, or 3 land; but is not: (i) identified for future urban development; or (ii) subject to a Council initiated, or an adopted, notified plan change to rezone it from general rural or rural production to urban or rural lifestyle.

The following definition of LUC 1, 2, or 3 land is taken from section 1.3, page 5 of the NPS-HPL:

LUC 1, 2, or 3 land means land identified as Land Use Capability Class 1, 2, or 3, as mapped by the New Zealand Land Resource Inventory or by any more detailed mapping that uses the Land Use Capability classification.

4.2 NZLRI Mapping

The NZLRI is based on an LUC assessment of the whole of New Zealand and has been carried out at a scale of 1:50,000. It is intended for regional use and planning and is not meant to be used at a farm scale. The 3rd Edition of The Land Use Capability Survey Handbook (Lynn et al 2009) cautions against enlarging LUC data beyond the scale at which it was gathered as it can produce unreliable and misleading results and at time results that are nonsense.

At a scale of 1:50,000, on average one mapping observation is made every 25ha but could be a little as one every 100ha (Hewitt and Lilburne 2003, Grealish 2019). As such, it is quite possible that no information has been gathered on the proposed site. For the purpose of this report, with a site covering 8.9ha the appropriate scale of mapping is between approximately 1:5,000 or one to four observations per hectare (Lynn et al 2009).

Using the NZLRI for site specific information is outside of its intended purpose and outside of its parameters of reliability. At best it can only provide an indication of the possible LUC units present. The correct process for mapping soil types and LUC at a site of this size is to carry out a site survey at the correct scale by a suitably qualified person as has been done for this report.

5.0 OVERALL SITE ASSESSMENT

Area and percentage of LUC units and HPL at the site.

LUC Unit -	Area (ha)	HPL Classification	% of total Area
3w 2	6.7	HPL	75.3
4s 2*	0.4	Not HPL	3.9
Unproductive	1.0	Not HPL	11.0
Riparian/water course	0.9		9.8
Total area	8.8		
Area HPL		Total % HPL	75.3
Total area non-HPL		Total % non-HPL	24.7

5.1 NPS-HPL Classification

It is acknowledged that as this site is classified as LUC class 3 by the NZLRI it is also classified as HPL under the NPS-HPL. This classification is relevant in relation to the HPL legislation, but it does not supersede the site survey in relation to the actual LUC classifications at the site and its primary productivity potential.

5.2 Site Assessment

Due to the unreliability of the NZLRI data at a farm scale it cannot be used to accurately assess either site LUC classifications or site productivity potential. Weight therefore needs to be given to the information gained from the site survey and provided in this report as it has been obtained by following the correct mapping protocols, at the correct scale, by a suitably qualified person.

As can be seen in the LUC map a significant area of the site is occupied by buildings, accessways and hardstand areas. These areas have no productive potential and therefore cannot be given a LUC classification. The balance of the site includes the old filled in settling pond, a riparian zone and productive land.

Due to the alteration of the soil profile at the site of the old settling pond this area has been given a 4s 2* classification reflecting the degradation of the natural soil profile. The remaining area of the site, apart from the riparian zone, retains its 3w 2 classification.

It should be noted that soil degradation due to compaction and loss of soil structure was observed at the site and needs remedial action to return it to its natural level of productivity.

5.3 Productivity

In the description of the 3w 2 LUC unit Noble (1985) states that the heavy textured subsoils of this unit give rise to slow internal drainage and poor soil aeration. The impeded drainage and

long periods of high water tables make this unit more suited to intensive grazing than cropping, although some maize, barley, grass seed, and summer forage cropping may be carried out.

The gleying and mottling observed in the soil profiles at the site confirm the impeded drainage and prolonged soil wetness. The impeded drainage along with the stony soil profile limit the productive uses available for this site to grazing and shallow rooted or wet tolerant plant/tree species and short rotation cropping options. Continuous cropping is not sustainable at the site and would result in soil structural degradation.

Further adding to the limited production opportunities is the small area (6.7ha) of the site available for productive use. Currently the tree nursery that operates at the site uses both 174 and 176 Brookvale Road, however, the sites need to be considered as operating as two separate sites. At this size and on a site that is best suited to grazing, commercial viability is unlikely with the site most likely to be used as a lifestyle block.

It should be noted that though the site is currently used as a tree nursery this land use appears to be unsustainable based on the degraded soil profiles found at the site.

6.0 CONCLUSIONS

- The entire site is technically classified as HPL under the NPS-HPL but in reality significant areas of the site have been developed and have no productive potential.
- The site is currently operated in conjunction with 174 Brookvale Road but needs to be considered separately in its productive capacity rather than as one block.
- Impeded soil drainage and stony soil profiles limit the productive potential of the site making it more suited to intensive grazing than cropping.
- Soils at the site have been degraded due to compaction and loss of soil structure and require remedial action to return them to their natural level of productivity.
- The current land use appears to be unsustainable due to the soil profile degradation observed.
- The lack of land use options or site versatility mean this site would not be classified as a highly productive site.

176 Brooksdale Road Soil Map



176 Brooksdale Road Land Use Capability Classifications



176 Brooksdale Road Highly Productive Land Classifications





SOIL REPORT

Hawkes Bay Regional Council

Hinds_25a.1

Report generated: 5-Nov-2024 from <https://smap.landcareresearch.co.nz>

Hind_25a.1 (100% of the mapunit at location (1935109, 5602872), Confidence: Medium)

This information sheet describes the typical average properties of the specified soil to a depth of 1 metre, and should not be the primary source of data when making land use decisions on individual farms and paddocks. S-map correlates soils across New Zealand. Both the old soil name and the new correlated (soil family) name are listed below.

Capture of the base soil information in this region was funded by Hawkes Bay Regional Council and Manaaki Whenua.

Soil Classification

Soil Classification:

Mottled Fluvial Recent Soils (RFM)

Family Name:

Hinds (Hind)

Sibling Name:

Hinds_25a.1 (Hind_25a.1)

Soil profile material

Soil with stones (non contra:

Depth class (diggability)

Deep (> 1 m)

Profile texture

loam

Parent Material

Stones/rocks

hard sandstone rock

Soil material

hard sandstone rock

Origin

Alluvium

Soil Sibling Concept

This soil belongs to the Recent soil order of the New Zealand soil classification. Recent Soils are weakly developed, showing limited signs of soil-forming processes although a distinct topsoil is present, a B horizon is either absent or only weakly expressed. It is formed in alluvial sand silt or gravel deposited by running water, from hard sandstone parent material.

The topsoil typically has loam texture and is stoneless. The subsoil has dominantly loam textures, with gravel content of more than 3% but below 35% for most part of the soil. The plant rooting depth extends beyond 1m.

Generally the soil is imperfectly drained with low vulnerability of water logging in non-irrigated conditions, and has high soil water holding capacity. Inherently these soils have a high structural vulnerability and a low N leaching potential, which should be accounted for when making land management decisions.



About this publication

- This information sheet describes the *typical average properties* of the specified soil.
- For further information on individual soils, contact Landcare Research New Zealand Ltd: www.landcareresearch.co.nz
- Advice should be sought from soil and land use experts before making decisions on individual farms and paddocks.
- The information has been derived from numerous sources. It may not be complete, correct or up to date.
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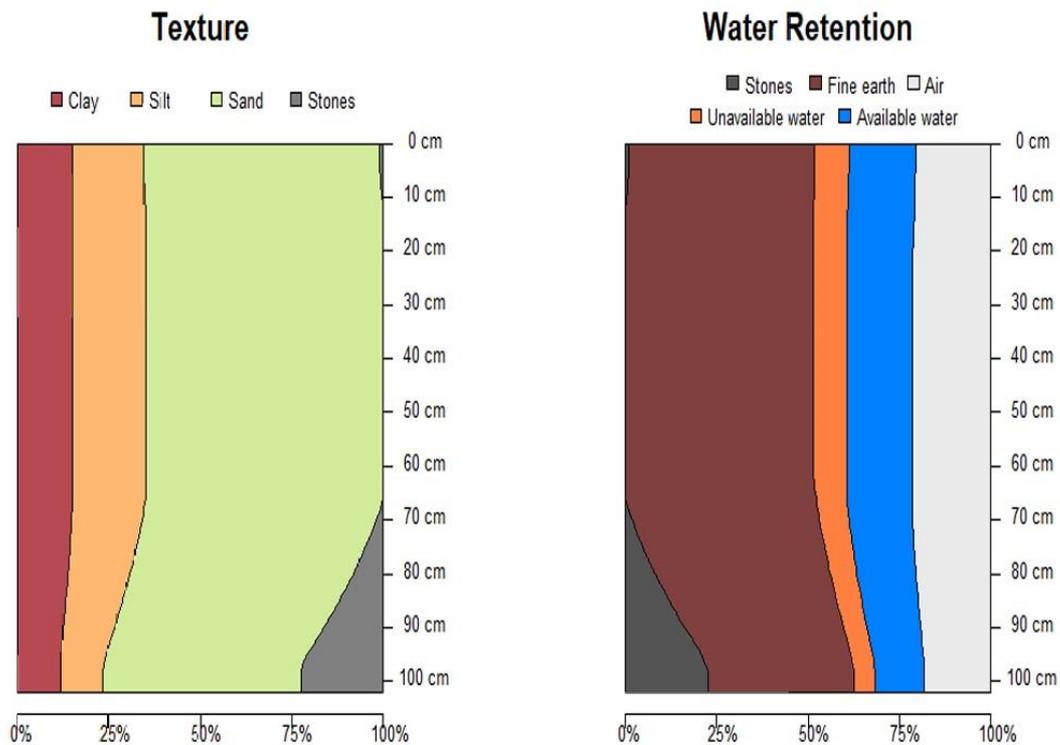
Hinds_25a.1

Soil horizons

Characteristics of functional horizons in order from top to base of profile:

Functional Horizon	Thickness	Stones	Clay*	Sand*	Permeability
Loamy Weak	15 - 25 cm	0 %	10 - 20 %	50 - 80 %	rapid
Loamy Weak	65 - 80 cm	0 %	10 - 20 %	50 - 80 %	moderate
Stony Loamy Weak	0 - 20 cm	15 - 30 %	10 - 20 %	60 - 80 %	moderate

* clay and sand percent values are for the mineral fines (excludes stones). Silt = 100 - (clay + sand)



The values for the graphs above have been generated from horizon and pedotransfer data. These values have then been splined to create continuous estimates of soil water holding capacity and particle size distribution the soil profile. These curves express the particle size distribution and water retention of the soil however there may be barriers to rooting depth that are not necessarily represented in these properties directly. It is advisable to check the potential rooting depth and rooting barrier fields in the soil physical properties section on page three of this factsheet.

Hinds_25a.1

Soil physical properties

Depth class (diggability)

Deep (> 1 m)

Potential rooting depth

Unlimited

Rooting barrier

No significant barrier within 1 m

Depth to hard rock

No hard rock within 1 m

Depth to soft rock

No soft rock within 1 m

Depth to stony layer class

Moderately deep

Texture profile

Loam

Topsoil stoniness

Stoneless

Topsoil clay range

10 - 20 %

Drainage class

Imperfectly drained

Permeability profile

Moderate over rapid

Depth to slowly permeable horizon

No slowly permeable horizon

Permeability of slowest horizon

Moderate (4 - 72 mm/h)

Aeration in root zone

Moderately limited

Profile available water

(0 - 30cm or root barrier)

High (54 mm)

(0 - 60cm or root barrier)

High (108 mm)

(0 - 100cm or root barrier)

High (177 mm)

Dry bulk density

topsoil

1.00 g/cm³

subsoil

1.30 g/cm³

Soil chemical properties

Topsoil P retention

Medium (33%)

Soil management factors

Vulnerability classes relate to soil properties only and do not take into account climate or management

Soil structure integrity

Structural vulnerability

High (0.69)

Pugging vulnerability

not available yet

Septic tank installation category

A1 if slope > 15 deg otherwise B3

Contaminant management

N leaching vulnerability

Low

P leaching vulnerability

not available yet

Dairy effluent (FDE) risk category

B

Water management

Water logging vulnerability

Moderate

Drought vulnerability - if not irrigated

Low

Bypass flow

Low

Hydrological soil group

C

Relative Runoff Potential

Slope	0-3°	4-7°	8-15°	16-25°	>25°
Risk	VL	VL	L	L	M

SINDI - Soil quality Indicators

SINDI - Soil Quality Indicators

A suite of soil quality indicators is available from <http://sindi.landcareresearch.co.nz/>

- Compare your soil with information from our soils databases.
- Assess the intrinsic resources and biological, chemical and physical quality of your soil
- See how your soil measures up against current understanding of optimal values.
- Learn about the effect each indicator has on soil quality and some general management practices that could be implemented to improve soil quality.

9.0 REFERENCES

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