

This Technical Data Sheet describes the *typical average properties* of the specified soil.

It is essentially a summary of information obtained from one or more profiles of this soil that were examined and described during the Topoclimate survey or previous surveys. It has been prepared in good faith by trained staff within time and budgetary limits. However, no responsibility or liability can be taken for the accuracy of the information and interpretations. Advise should be sought from soil and landuse experts before making landuse decisions on individual farms and paddocks. The characteristics of the soil at a specific location may differ in some details from those described here.

No warranties are expressed or implied unless stated.

Soil name: Chaslands

Overview

Chaslands soils occupy about 7,300ha on hilly and rolling land east of the Mataura River, south of Mataura. They are formed in loess derived from greywacke and schist which overlays tuffaceous greywacke rock. Chaslands soils are imperfectly drained, have a deep rooting depth, high water holding capacity, and have heavy silt loam textures with P-retention of 50–85%. They are primarily used for intensive sheep and beef production. Climate is cool temperate with reliable summer rainfall.

Soil classification

NZ Soil Classification (NZSC):

Mottled Firm Brown; stoneless; silty

Previous NZ Genetic Classification:

Strongly leached yellow-brown earths.

Classification explanation

The NZSC of the Chaslands soils is consistent with the previous classification. Chaslands soils are imperfectly drained soils with yellow-brown subsoils, and rarely suffer from drought. There is a subsoil horizon that is structureless, with slightly firm or greater soil strength that may limit root penetration. This horizon has slow permeability that causes waterlogging during wet periods, which is reflected in the imperfect drainage.

Soil phases and variants

Identified units in the Chaslands soils are:

- Chaslands rolling deep (ChR1): has no gravels within 90cm depth; occurs on slopes 7–15°
- Chaslands undulating deep (ChU1): has no gravels within 90cm depth; occurs on slopes 0–7°
- Chaslands hilly deep (ChH1): has no gravels within 90cm depth; occurs on slopes 15–25°
- Chaslands steep deep (ChS1): has no gravels within 90cm depth; occurs on slopes >25°
- Chaslands undulating deep clayey variant (ChU1vc): has no gravels within 90cm; has silty clay texture; occurs on slopes of 0–7°.
- Chaslands rolling deep clayey variant (ChR1vc) has no gravels within 90cm; has silty clay texture; occurs on slopes of 7–15°.

The soil properties described in this Technical Data Sheet are based on the most common phase, Chaslands rolling deep (ChR1). Values for other phases and variants can be taken as being similar. Where they differ significantly they are recorded with a separate versatility rating, e.g., Chaslands hilly deep (ChH1).

Associated soils

Some soils that commonly occur in association with Chaslands soils are:

- Tokanui: well drained equivalent of the Chaslands soils

- Scrubby Hill: occurs above 100m altitude in the hilly land southeast of Waimahaka, but is more leached and has podzolised and acidic properties, high P-retention and thin iron pans.
- Fortification: moderately deep on the underlying bedrock; strongly leached with P-retention of >85%.

Similar soils

Some soils that have similar properties to Chaslands soils are:

- Haldane: similar profile form, but has a structured subsoil throughout the profile, and pH of less than 5.5 in the subsoil; occurs in complexes with strongly leached soils above 100m altitude in the hilly land southeast of Waimahaka;
- Ferndale: similar profile form, but has pH of less than 5.5 in the subsoil; occurs in the rolling and hilly land between Mataura and Clinton.
- Woodlands: similar profile but occurs on terraces on the Southland plains
- Fortrose: occurs in near-source loess adjacent to the Mataura river; has loamy silt subsoil textures.

Typical profile features

The following is a 'generic' or composite profile description representing the most common combination of characteristics for this soil type. The actual profiles for which descriptions and data are available are listed at the end of this Technical Data Sheet.

Chaslands profile	Horizon	Depth (cm)	Description
	Ap	0–27	Greyish yellow-brown silt loam; weak soil strength; moderately developed medium polyhedral structure; abundant roots
	Ap/Bw(g)	27–50	Dull yellow-orange silt loam; common greyish yellow and orange mottles; many wormcasts; weak soil strength; strongly developed medium polyhedral structure; many roots.
	Bw(g)	50–75	Bright yellowish brown silt loam; common dull yellow-orange mottles; slightly firm soil strength; moderately developed coarse prismatic structure; few roots
	BC(g)	75–90	Dull yellow-orange silt loam; few orange mottles; slightly firm soil strength; massive structure; few roots

Key profile features

Chaslands soils have topsoils 20–30cm deep with a moderate to strongly developed structure. Subsoils have moderate structure that becomes compact and structureless below 50cm depth. This compact horizon causes the imperfect drainage of the soil that is reflected in the typical mottling of the subsoil. The moderate weathering of the soils is reflected in the yellow orange colour.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–27	Moderate	<i>Moderate</i>	Silt loam	Gravel free
Ap/Bw(g)	27–50	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
Bw(g)	50–75	Moderate – High	<i>Slow</i>	Silt loam	Gravel free
BC(g)	75–90	Moderate – High	<i>Slow</i>	Silt loam	Gravel free

Profile drainage: Imperfect
Plant readily available water: *High*
Potential rooting depth: Deep
Rooting restriction: No major restriction

Key physical properties

Chaslands soils have a deep rooting depth and high plant available water, meaning there is no major physical barrier to root growth. The compact subsoil is slowly permeable, and may cause short-term waterlogging and limit aeration after heavy rainfall. Texture is heavy silt loam in all horizons, with topsoil clay content of 25–36%, and the soils are typically stone free. The clayey variant has silty clay textures and topsoil clay content of 35–40%.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–27	High	Moderate	Moderate	High	High	Low	Very low	Moderate
Ap/Bw(g)	27–50	Moderate	High	Low	Low	Low	Very low	Very low	Low
Bw(g)	50–75	Moderate	High	Low	Very low	Very low	Very low	Very low	Very low
BC(g)	75–90	Moderate	High	Low	Very low	Very low	Very low	Very low	Very low

Key chemical properties

Topsoil organic matter levels are 6–10%; P-retention values 50–80%, higher in the subsoil; pH values are moderate and mostly consistent down the profile. Cation exchange and base saturation values are very low, as are the available cations calcium, magnesium and potassium. Reserve phosphorus levels are low and sulphate sulphur levels high in the subsoil. Micro-nutrient levels are generally adequate.

Vulnerability to environmental degradation

Note: the vulnerability ratings given in the table below are generalised and should not be taken as absolutes for this soil type in all situations. The actual risk depends on the environmental and management conditions prevailing at a particular place and time. Specialist advice should be sought before making management decisions that may have environmental impacts. Where vulnerability ratings of Moderate to Very severe are indicated, advice may be sought from Environment Southland or a farm management consultant.

Vulnerability factor	Rating	Vulnerability compared to other Southland soils
Structural compaction	slight	These soils have a slight vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the high topsoil clay and P-retention values, but is offset by the imperfect drainage.
Nutrient leaching	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the imperfect drainage, high water holding capacity and slow subsoil permeability.
Topsoil erodibility by water	slight	Due to the topsoil clay percentage, the topsoil erodibility of these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	minimal	Vulnerability to long-term decline in soil organic matter levels is partly dependent on soil properties, and highly dependent on management practices (e.g., crop residue management and cultivation practices).
Waterlogging	moderate	These soils have a moderate vulnerability to waterlogging during wet periods. This rating reflects the imperfect drainage and slowly permeable subsoil.

General landuse versatility ratings for Chaslands soils

Note: The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive land use. These ratings differ from those used in the past in that sustainability factors are incorporated in the classification.

Refer to the Topoclimate district soil map or property soil map to determine which of the soil symbols listed below are applicable, then check the versatility ratings for that symbol in the appropriate table.

ChR1 (Chaslands rolling deep)

ChR1vc (Chaslands rolling deep clayey variant)

Versatility evaluation for soil ChR1, ChR1vc.		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Inadequate aeration during wet periods; rolling slopes.
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Inadequate aeration during wet periods; rolling slopes.
Forestry	Moderate	Vulnerable to sustained waterlogging

ChU1 (Chaslands undulating deep)
ChU1vc (Chaslands undulating deep clayey variant)

Versatility evaluation for soil ChU1, ChU1vc.		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rainfall
Arable	Moderate	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rainfall
Intensive pasture	Moderate	Inadequate aeration during wet periods; risk of short-term water logging after heavy rainfall.
Forestry	Moderate	Vulnerable to sustained waterlogging

ChH1 (Chaslands hilly deep)

Versatility evaluation for soil ChH1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes
Forestry	Moderate	Hilly slopes; vulnerable to sustained waterlogging

ChS1 (Chaslands steep deep)

Versatility evaluation for soil ChS1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes
Forestry	Moderate	Hilly slopes

Management practices that may improve soil versatility

- Careful management after heavy rainfall and wet periods will reduce the impact of short-term waterlogging. Intensive stocking, cultivation and vehicular traffic should be minimised during these periods.
- Installation and maintenance of subsurface drainage with moles and tiles may reduce the risk of short-term waterlogging.

Soil profiles available for Chaslands soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
ChR1	MWT15	28b	✓	✓	✓	✓
ChH1	MWT12	28b	✓	✓	✓	✓
ChR1	MWT20	28b	✓	✓	✓	✓
ChU1vc	NT2	30	✓	✓	✓	✓
ChU1	ST7	29	✓	✓	✓	✓

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