

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: **Chewings**

Overview

Chewings soils occupy about 680 ha on low angle fans and flood plains of minor streams north and northeast of the Takitimu Mountains. They are formed in mixed loess and alluvium derived from soft calcareous tertiary rocks and some tuffaceous greywacke. These soils are deep to moderately deep, poorly drained, and have silty clay textures. They are used for pastoral grazing with sheep and beef cattle. Regular rainfall occurs although soils can occasionally dry out in dry summers. Winters are cold.

Soil classification

NZ Soil Classification (NZSC):

Calcareous Orthic Gley; stoneless; clayey

Previous NZ Genetic Classification:

Gleyed recent soil

Classification explanation

The NZSC for Chewings soils is consistent with the previous classification. The soils are poorly drained due to a high groundwater table, and accumulation of sediment is sufficiently slow that subsoils show structural development. The soils show the influence of the calcareous parent material with pH values of 6.5–8. The soils are typically stone free, and have dominantly silty clay textures.

Soil phases and variants

Identified units in the Chewings soils are:

- Chewings undulating deep (CwU1): has no gravel above 90cm depth; occurs on slopes of 0–7°
- Chewings undulating moderately deep (CwU2): has gravel between 45 and 90cm depth; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Chewings undulating deep (CwU1). Values for other phases and variants can be taken as being similar. Where they differ significantly they are recorded with a separate versatility rating.

Associated soils

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

- Mararoa: well drained, deep, Brown soil; formed in loess on terraces
- Glenelg: well drained, stony soil; on intermediate terraces
- Invercargill: peat soils that occur on low lying areas.
- Hazlett: well drained, shallow soil; formed in shallow loess over soft mudstone

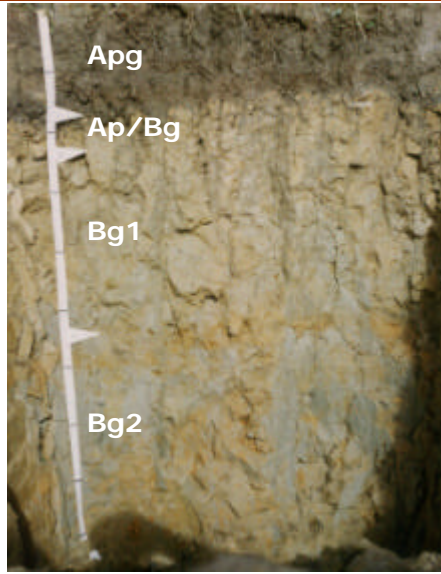
Similar soils

Some soils that have similar properties to Chewings soils are:

- Braxton: poorly drained Gley soil with no influence of calcareous parent material; formed on intermediate terraces
- Makarewa: poorly drained Gley soil with no influence of calcareous parent material; formed in clayey floodplain alluvium
- Manapouri: poorly drained Gley soil with no influence of calcareous parent material; formed in silty floodplain alluvium

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.

Chewings profile	Horizon	Depth (cm)	Description
	Apg	0–17	Brownish grey silty clay; very few dark reddish brown mottles; firm soil strength; weakly developed coarse polyhedral structure; abundant roots.
	Ap/Bg	17–24	Dull yellow silty clay; common bright yellowish brown mottles; many worm casts; slightly firm soil strength; weakly developed coarse blocky and polyhedral structure; abundant roots
	Bg1	24–54	Grey silty clay; many bright brown and few brownish grey mottles; very few worm casts; slightly firm soil strength; strongly developed coarse to very coarse blocky structure; many roots
	Bg1	54–90	Brownish grey silty clay; many bright brown mottles; few olive mottles; firm soil strength; strongly developed very coarse prismatic structure; common roots between peds
	Bg2		

Key profile features

Chewings soils have a 15–20cm deep topsoil which has weak to moderate structure. Subsoil has a moderate to strongly developed coarse prismatic structure. The dominance of grey colours throughout the subsoil reflects the poor drainage.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–17	Moderate	Moderate	Silty clay	Gravel free
Ap/Bg	17–24	Moderate – High	Moderate	Silty clay	Gravel free
Bg1	24–54	Moderate – High	Slow	Silty clay	Gravel free
Bg2	54–90	Moderate – High	Slow	Silty clay	Gravel free

Profile drainage:	Poor
Plant readily available water:	<i>Moderate</i>
Potential rooting depth:	Deep
Rooting restriction:	Limited subsoil aeration during sustained wet periods

Key physical properties

Chewings soils have a deep rooting depth and moderate available soil water, although the rooting depth may be limited by poor aeration during wet periods due to the poor drainage and slow subsoil permeability. Texture is dominantly silty clay, although silty layers may occur in the subsoil. Topsoil clay content is 40–60%. The soils are typically stone free, although the moderately deep phase will have gravel between 45 and 90cm depth.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–17	High	Moderate	Very high	Very high	Very high	High	Low	Low
Ap/Bg	17–24	High	Moderate	Very high	Very high	Very high	High	Low	Low
Bg1	24–54	Very high	Low	High	Very high	Very high	High	Very low	Low
Bg2	54–90	Very high	Low	High	Very high	Very high	High	Low	Low

Key chemical properties

Topsoil organic matter levels are 12–17%; P-retention values 40–50% and pH high (above 6.5), reflecting the calcareous parent material. Cation exchange and base saturation values are high as are available calcium and magnesium levels. Potassium levels are low. Reserve phosphorus and sulphur levels are also low. Micronutrient levels are generally adequate although molybdenum responses in legumes can be expected.

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 moderate P-retention value and high organic matter and clay content.
Nutrient leaching	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the imperfect to poor drainage and moderate water holding capacity.
Topsoil erodibility by water	minimal	Due to the high clay and organic matter content the topsoil erodibility of these soils is minimal. 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	severe	These soils have a severe vulnerability to waterlogging during wet periods. This rating reflects the slow permeability and poor drainage.

General landuse versatility ratings for Chewings soils

Note: The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive landuse. 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.

CwU1 (Chewings undulating deep)

CwU2 (Chewings undulating moderately deep)

Versatility evaluation for soil CwU1, CwU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain
Arable	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain
Intensive pasture	Moderate	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Forestry	Limited	Inadequate aeration during wet periods; vulnerability to sustained waterlogging.

Management practices that may improve soil versatility

- Careful management after heavy rain and wet periods will reduce the impact of short-term waterlogging. Intensive stocking, cultivation and heavy vehicular traffic use should be minimal during these periods.
- Installation and maintenance of subsurface mole and tile drains will reduce the risk of short-term waterlogging.

Soil profiles available for Chewings soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
CwU1	KT1	5	✓	✓	✓	
CwU1	KT13	5	✓	✓	✓	✓
CwU2	150/75/25	43	✓			

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