

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: **Wendonside**

Overview

Wendonside soils occupy about 1,300 ha on the Waikaia plain in northern Southland. They are formed into a moderately deep layer of loess overlying slightly weathered gravelly alluvium derived from schist and greywacke rock. Soils are well drained, with a shallow to slightly deep rooting depth, moderately high water capacity, and have a cemented pan in the underlying gravels. Present use is pastoral farming with sheep and beef grazing and some cropping. Climate is temperate, with cold winters and warm summers. Regular rainfall occurs but some years can be seasonally dry.

Soil classification

NZ Soil Classification (NZSC):

Cemented Firm Brown; soils with stones, silty over skeletal

Previous NZ Genetic Classification:

Intergrade yellow-grey to yellow-brown earth

Classification explanation

The NZSC of Wendonside soils is consistent with previous classifications. Wendonside soils typically have formed in moderately deep loess overlying cemented (firm) gravels at 45–90cm depth. The soils have silty textures in the topsoil.

Soil phases and variants

Identified units in the Wendonside soils are:

- Wendonside undulating moderately deep (WsU2): has gravel between 45 and 90cm depth; occurs on slopes of 0–7°
- Wendonside undulating shallow (WsU3): has gravel within 45cm depth; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Wendonside undulating moderately deep (WsU2). 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., Wendonside undulating shallow (WsU3).

Associated soils

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

- Otama: low angle dunes with silty to loamy textures, and gravel below 45cm depth
- Crookston: formed in deep to moderately deep silty loess, with gravel below 45cm depth
- Arthurton: imperfectly drained deep to moderately deep soil

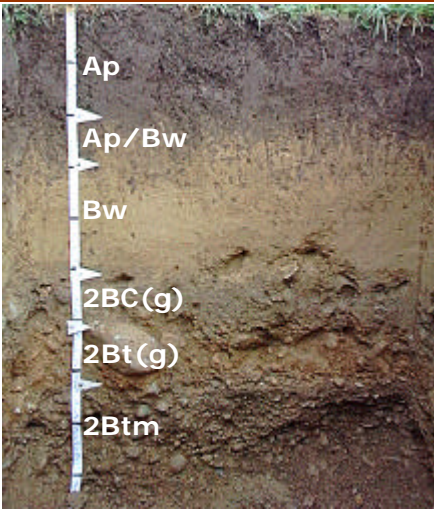
Similar soils

Some soils that have similar properties to Wendonside soils are:

- Crookston: similar to the Wendonside moderately deep, but the underlying gravels are not cemented
- Oreti: occurs where loess is less than 45cm deep (commonly less than 20cm) to the underlying gravels

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.

Wendonside profile	Horizon	Depth (cm)	Description
	Ap	0–20	Brownish grey loamy silt; weak soil strength; moderately developed very fine to coarse polyhedral structure; abundant roots
	Ap/Bw	20–29	Dull yellow loamy silt; many worm casts; weak soil strength; strongly developed very fine to medium polyhedral and fine to coarse blocky structure; many roots
	Bw	29–51	Dull yellow very slightly gravelly loamy silt; few worm casts; weak soil strength; massive structure; gravels slightly weathered and subrounded; many roots
	2BC(g)	51–61	Greyish yellow very gravelly loamy silt; many dull yellow and few bright brown mottles; few dull yellow orange clay coats on gravel faces; slightly firm soil strength; compact particle packing; gravels slightly weathered and subangular; common roots
	2Bt(g)	61–72	Dull yellow-orange very gravelly clay loam; few grey mottles; many dull yellow orange clay coats on gravel faces; compact particle packing; gravels slightly weathered and subrounded; few roots
	2Btm	72–90	Dull yellowish brown extremely gravelly loamy sand; dense particle packing; massive structure; gravels cemented by clay; no roots

Key profile features

Wendonside topsoils are about 20cm deep, with a moderately developed structure. Subsoil structure is massive. Gravel content increases with depth below about 30cm depth.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–20	Moderate – High	<i>Moderate</i>	Loamy silt	Gravel free
Ap/Bw	20–29	Moderate – High	<i>Moderate</i>	Loamy silt	Gravel free
Bw	29–51	Moderate – High	<i>Moderate</i>	Loamy silt	Very slightly gravelly
2BC(g)	51–61	—	<i>Moderate</i>	Loamy silt	Very gravelly
2Bt(g)	61–72	—	<i>Rapid</i>	Clay loam	Very gravelly
2Btm	72–90+	—	<i>Rapid</i>	Loamy sand	Extremely gravelly

Profile drainage: Moderately well
Plant readily available water: *Moderately high*
Potential rooting depth: Slightly deep
Rooting restriction: Gravelly subsoil and cemented pan

Key physical properties

Wendonside soils have a slightly deep rooting depth (45–60cm) that is limited by the cemented subsoil gravels. Plant available water is moderately high, with good aeration and permeability throughout the soil. Textures are loamy silts in upper horizons, becoming loamy as the gravel abundance increases. Topsoil clay content is less than 20%. Topsoils are gravel free and subsoils very to extremely gravelly.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–20	Moderate	Moderate	Moderate	Moderate	Moderate	Very low	Very low	Very low
Ap/Bw	20–29	Moderate	Moderate	Low	Low	Low	Very low	Very low	Very low
Bw	29–51	Moderate	Moderate	Low	Low	Very low	Very low	Very low	Very low
2BC(g)	51–61	Moderate	Moderate	Very low	Very low	Very low	Very low	Very low	Very low
2Bt(g)	61–72	Moderate	High	Low	Very low	Very low	Very low	Very low	Very low
2Btm	72–90+	Moderate	High	Moderate	Very low	Very low	Very low	Very low	Very low

Key chemical properties

Topsoil organic matter content is about 6%; P-retention 30–40%, increasing up to 80% in the underlying gravels. Soil pH values are moderate (high 5s). Cation exchange and base saturation levels are moderate in the topsoil, but low to very low in the subsoil. Topsoil available calcium level is moderate and magnesium and potassium levels low. Soil reserve phosphorus levels are low. Micronutrient levels are generally adequate although molybdenum responses in legumes and boron responses in brassics can occur.

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	moderate	These soils have a moderate vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the good drainage, but moderate to low clay, organic matter and P-retention.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the moderate drainage and permeability, that is offset by the moderately high water retention.
Topsoil erodibility by water	slight	Due to the moderate to low clay and organic matter content, topsoil erodibility in these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	slight	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	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the moderate drainage and permeability.

General landuse versatility ratings for Wendonside 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.

WsU2 (Wendonside undulating moderately deep)

Versatility evaluation for soil WsU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Restricted rooting depth.
Arable	Moderate	Vulnerability to topsoil structural degradation by cultivation and compaction; restricted rooting depth.
Intensive pasture	Moderate	Vulnerability to topsoil structural degradation by cultivation and compaction; vulnerability to leaching to groundwater.
Forestry	Limited	Restricted rooting depth.

WsU3 (Wendonside undulating shallow)

Versatility evaluation for soil WsU3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Restricted rooting depth.
Arable	Limited	Restricted rooting depth.
Intensive pasture	Limited	Restricted rooting depth.
Forestry	Limited	Restricted rooting depth.

Management practices that may improve soil versatility

- Management of nutrient applications that minimise leaching losses
- Long-term cultivation should be carefully managed to minimise structural degradation
- Over cultivation of dry soils in summer may allow wind erosion
- Organic matter levels should be carefully maintained and enhanced

Soil profiles available for Wendonside soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
WsU2	WT2	24	☒	☒	☒	☒

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Crops for Southland
PO Box 1306, Invercargill. New Zealand



www.cropssouthland.co.nz