

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: **Venlaw**

Overview

Venlaw soils occupy about 300 ha on hilly and steep land in the Hokonui Hills and the Kaiwera district, in upland areas above 300m altitude. These soils also occur on hilly areas in southern Southland that are outside the Topoclimate survey area. They are formed in stony colluvium from tuffaceous greywacke, on predominantly shady slopes. Venlaw soils are well drained, with a high water-holding capacity and slightly deep rooting depth that is limited by gravelliness and/or presence of bedrock. Venlaw soils are strongly leached, with P-retention of >85% and pH of <5.5 typical in the subsoil. Present use is native forest with some areas used for extensive grazing with sheep. Climate is cool, with exposure to prevailing winds. Regular rainfall occurs.

Soil classification

NZ Soil Classification (NZSC):

Acidic Orthic Allophanic; angular-stony, tuffaceous sandstone; clayey.

Previous NZ Genetic Classification:

Strongly leached upland yellow-brown earth.

Classification explanation

The NZSC of Venlaw soils is consistent with the previous classification. They are strongly leached soils with low bulk density, P-retention of >85% and subsoil pH of less than 5.5. Venlaw soils have a horizon with >35% tuffaceous greywacke gravel within 45cm depth, and textures are typically loamy clay.

Soil phases and variants

Identified units in the Venlaw soils are:

- Venlaw steep shallow (VeS3): has gravel within 45cm depth; occurs on slopes of >25°
- Venlaw hilly shallow (VEH3): has gravel within 45cm depth; occurs on slopes of 15–25°

The soil properties described in this Technical Data Sheet are based on the most common phase, Venlaw steep shallow (VES3). 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., Venlaw hilly shallow (VeH3).

Associated soils

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

- Rosemarkie: formed in moderately deep to deep loess

Similar soils

Some soils that have similar properties to Venlaw soils are:

- Kaiwera: lowland equivalent of the Venlaw soil
- Waiarikiki: moderately deep soil formed in gravelly colluvium, but the very gravelly horizon with >35% gravel occurs deeper, at between 45 and 90cm depth
- Pukerau: strongly leached shallow soil on tuffaceous greywacke bedrock within 45cm depth

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.

Venlaw profile	Horizon	Depth (cm)	Description
No profile photo available	Ah1	0–18	Dark brown loamy clay; weak soil strength; strongly developed very fine to medium blocky structure; abundant roots.
	Ah2	18–28	Dark yellowish brown moderately gravelly loamy clay; weak soil strength; moderately developed medium to coarse blocky structure; gravels are moderately weathered and angular; many roots.
	Bw	28–47	Yellowish brown very gravelly loamy clay; weak soil strength; weakly developed very coarse breaking to medium blocky structure; gravels are moderately weathered and angular; few roots.
	BC	47–64	Yellowish brown very gravelly clay loam; weak soil strength; weakly developed coarse blocky structure; few roots.
	R	64+	On fractured moderately weathered tuffaceous sandstone

Key profile features

Venlaw soils have a 15–25cm deep topsoil with strong to moderately developed structure. Subsoil structure is moderate, grading to weakly developed in the lower subsoil. Bedrock is common in the subsoil, between 45 and 90cm depth.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ah1	0–18	Very Low	<i>Moderate</i>	Loamy clay	Gravel free
Ah2	18–28	Low	<i>Moderate</i>	Loamy clay	Moderately gravelly
Bw	28–47	Low	<i>Moderate</i>	Loamy clay	Moderately gravelly
BC	47–64	Moderate	<i>Moderate</i>	Clay loam	Very gravelly

Profile drainage: Well
Plant readily available water: *High*
Potential rooting depth: Slightly deep
Rooting restriction: Subsoil gravelliness and/or presence of bedrock

Key physical properties

Venlaw soils have a slightly deep (45–60cm) rooting depth that is limited by the subsoil gravelliness and/or presence of bedrock. The soils have a high plant water availability, with good drainage, aeration and permeability throughout the profile. Textures are loamy clays and clay loams. Topsoil clay content is about 40%. The soils are gravelly throughout, and typically have at least 35% gravel within 45cm depth.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Au1	0–18	Low	Very high	Very high	Very low	Very low	Moderate	High	Moderate
Au2	18–28	Low	Very high	High	Very low	Very low	Very low	Very low	Low
Bw	28–47	Low	Very high	High	Very low	Very low	Very low	Very low	Low
BC	47–64	Moderate	Very high	High	Very low	Very low	Very low	Very low	Moderate

Additional chemical properties (as a profile average)

Soil reserve potassium (Kc) values are low. Sulphate S levels are very high in the subsoil.

Key chemical properties

Topsoil organic matter levels are about 20–25% and are relatively high in the subsoil. P-retention values are very high (>85%) with pH low (<5.4). Cation exchange levels are high and base saturation very low. Available calcium levels are low and magnesium and potassium levels moderate to high in the topsoil, but very low in the subsoil. Soil reserve phosphorus levels are low. Micronutrient 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	minimal	These soils have a minimal vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the good drainage, high clay, organic matter and P-retention.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the good drainage and moderate permeability, offset by the high water-holding capacity.
Topsoil erodibility by water	slight	Due to the high clay and high 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	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	nil	These soils have a nil vulnerability to waterlogging during wet periods. This rating reflects the good drainage and hilly to steep slopes.

General landuse versatility ratings for Venlaw 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.

VeS3 (Venlaw steep deep)

Versatility evaluation for soil VeS3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Steep slopes
Arable	Unsuitable	Steep slopes
Intensive pasture	Limited	Steep slopes
Forestry	Limited	Steep slopes; restricted rooting depth

VeH3 (Venlaw hilly deep)

Versatility evaluation for soil VeH3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes
Forestry	Limited	Restricted rooting depth

Management practices that may improve soil versatility

- Careful management of forest. Logging operations can cause erosion on steep slopes.

Soil profiles available for Venlaw soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
VeS3	Kii37R	42	✓	✓	✓	
VEH3	M320	26	✓	✓	✓	

Published by Crops for Southland with financial support from Environment Southland.

Copyright © 2002, Crops for Southland

This Technical Data Sheet may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made. Crops for Southland and Environment Southland would appreciate receiving a copy of any publication that uses this Technical Data Sheet as a source.

No use of this Technical Data Sheet may be made for resale or for any other commercial purpose whatsoever without prior permission in writing from Crops for Southland.

Crops for Southland
PO Box 1306, Invercargill. New Zealand



www.cropssouthland.co.nz