

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: Papatotara

### Overview

Papatotara soils occupy about 1900 ha on low and intermediate terraces in the lower Waiiau valley. They are formed into alluvium from basic igneous and metamorphic rocks as well as from greywacke, derived from the Fiordland and Takitimu Mountains. These soils are well drained, with deep rooting depth and high plant available water. The soils typically have silt loam texture, but are characterised as having variable texture, reflecting their alluvial origin. They are highly productive soils currently used for sheep, dairy, beef and deer production and would be suited to intensive cropping. Climate is cool temperate with regular rain over the year.

### Soil classification

#### NZ Soil Classification (NZSC):

Typic Orthic Allophanic; soils with stones; silty over skeletal

#### Previous NZ Genetic Classification:

Moderate to strongly leached yellow-brown earth.

### Classification explanation

The NZSC of Papatotara soils is consistent with the previous classification. The soils typically are strongly leached, with upper horizon P-retention of >85% and moderate to low bulk density. Papatotara soils typically have silty textures, and gravels occur between 45 and 90cm depth. The degree of leaching in Papatotara soils is variable, and includes variants with P-retention of 65–80% that would be classified as Brown soils in the NZSC. These Brown soils are more likely to occur in the deep phase.

### Soil phases and variants

Identified units in the Papatotara soils are:

- Papatotara undulating moderately deep (PpU2): has gravel between 45 and 90cm depth; occurs on slopes of 0–7°
- Papatotara undulating deep (PpU1): has no gravel within 90cm depth; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Papatotara undulating moderately deep (PpU2). 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., Papatotara undulating deep (PpU1).

### Associated soils

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

- Glenelg: shallow soil forming into terrace gravels
- Braxton: moderately deep to deep poorly drained soil of the terraces
- Tuatapere : moderately deep to deep soils on the floodplain

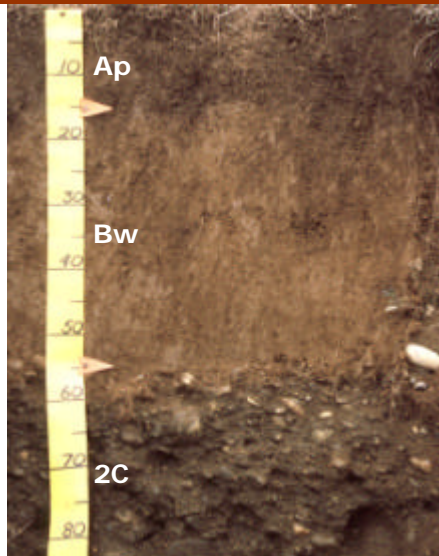
## Similar soils

Some soils that have similar properties to Papatotara soils are:

- Pourakino: intergrade between Brown and Allophanic soils, with P-retention of 70–85%; formed in consistently silty loess in the Pourakino river valley
- Princhester: intergrade between Brown and Allophanic soils, with P-retention of >85%; formed in basic volcanic and greywacke alluvium on fans in The Key area.
- Drummond: non-allophanic soil that has been significantly influenced by mafic volcanic parent material; occurs in the Aparima, and on intermediate terraces in the lower Waiau river valleys

## 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.

Papatotara profile	Horizon	Depth (cm)	Description
	Ap	0–15	Greyish yellow brown silt loam; weak soil strength; moderately developed very fine to fine polyhedral structure; abundant roots
	Bw	15–55	Dull yellowish brown silt loam; few worm casts; very weak soil strength; moderately developed extremely fine to fine polyhedral structure; abundant roots
	2C	55–90+	Greyish olive extremely gravelly loamy sand; very weak soil strength; single grain structure; gravels rounded and slightly weathered; no roots

## Key profile features

Papatotara topsoils are 15–25cm deep with a moderately developed structure. Above the gravels the subsoil structure is also moderately developed, with weak soil strength, resulting in very good rooting volume.

## Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–15	Moderate	<i>Moderate</i>	Silt loam	Gravel free
Bw	15–55	Moderate	<i>Moderate</i>	Silt loam	Gravel free
2C	55–90+	—	<i>Rapid</i>	Loamy sand	Extremely gravelly

**Profile drainage:** Well  
**Plant readily available water:** *High*  
**Potential rooting depth:** Moderately deep  
**Rooting restriction:** Extreme subsoil gravelliness

## Key physical properties

Papatotara soils have a moderately deep rooting depth, and high plant available water, being limited by the subsoil gravels at 45–90cm depth. The deep phases will have no restrictions to root growth. The soils have good aeration and permeability throughout the profile. Textures are silt loams, but are variable and can include horizons of silty clays, clay loams, and loamy silts. Topsoil clay content is 30–40%.

## Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–15	Moderate	High	High	Very low	Low	Moderate	Low	Low
Bw	15–55	Moderate	High	Moderate	Very low	Very low	Low	Very low	Moderate
2c	55–90+	Moderate	Moderate	Low	Very low	Very low	Very low	Very low	Low

## Key chemical properties

Topsoil organic matter levels are 7–13%, P-retention typically >85%, but does include soils with 60–80% P-retention. Soil pH is moderate (low to high 5s). Cation exchange values are high and base saturation low. Available calcium and magnesium levels are low with magnesium levels moderate. 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
<b>Structural compaction</b>	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 P-retention, and moderate to high clay content.
<b>Nutrient leaching</b>	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the well drained nature of the soil that is off-set by the high water-holding capacity.
<b>Topsoil erodibility by water</b>	minimal	Due to the high organic matter and moderate to high clay content, topsoil erodibility in these soils is minimal. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
<b>Organic matter loss</b>	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).
<b>Waterlogging</b>	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage and permeability.

## General landuse versatility ratings for Papatotara 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.

### PpU2 (Papatotara undulating moderately deep)

Versatility evaluation for soil PpU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Restricted rooting depth
Arable	High	No major limitation
Intensive pasture	Moderate	Vulnerability to leaching to ground water
Forestry	Moderate	Restricted rooting depth

### PpU1 (Papatotara undulating deep)

Versatility evaluation for soil PpU1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	High	No major limitation
Arable	High	No major limitation
Intensive pasture	Moderate	Vulnerability to leaching to ground water
Forestry	High	No major limitation

### Management practices that may improve soil versatility

- Management of nutrient applications so as to minimise leaching losses

## Soil profiles available for Papatotara soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
PpU2	EMT7	18	✓	✓	✓	✓
PpU2	CLT7	17	✓	✓	✓	✓
PpU1	MT13	7	✓	✓	✓	✓
PpU2	SB10139	17	✓	✓	✓	✓
PpU1	167/75/6	17	✓	✓		

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

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