

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: Ashers

### Overview

Ashers soils cover 550 ha on alluvial and old marine terraces on the the coastal area of the Southland plain south east of Invercargill. They are formed into loess that has been derived from greywacke and schist rocks. Ashers soils are well to imperfectly drained, with high available water capacity and silty textures. The soils show strong leaching, with high P-retention and are strongly acidic. The podzol features are likely to be less evident in areas that have significant development inputs. They are used for pastoral farming with sheep, dairy and deer. The climate is cool temperate with reliable summer rain.

### Soil classification

**NZ Soil Classification (NZSC):**

Firm Pan Podzol; stoneless; silty

**Previous NZ Genetic Classification:**

Lowland podzolised yellow-brown earth

### Classification explanation

The NZSC of the Ashers soil is consistent with the previous classification. Ashers soils are strongly leached, with low base saturation, and are strongly acidic. The profile form is characterised by humus and iron eluviation staining the matrix and coating peds, with the development of a Bh or Bs horizon. There is a subsoil horizon that is structureless, with slightly firm or greater soil strength, that may limit root penetration, and has slow permeability that may cause waterlogging during wet periods. The soils are typically stone free and have silt loam textures to 90cm depth.

### Soil phases and variants

Identified units in the Ashers soils are:

- Ashers undulating deep (AsU1): has no gravels within 90cm depth; occurs on slopes of 0-7°
- Ashers rolling deep (AsR1): has no gravel within 90cm depth; occurs on slopes of 7-15°

The soil properties described in this Technical Data Sheet are based on the most common phase, Ashers undulating deep (AsU1). 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., Ashers rolling deep (AsR1).

### Associated soils

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

- Mokotua: imperfectly drained Brown soil
- Tisbury: occurs on same landforms but are poorly drained
- Waikiwi: well drained Brown soil

## Similar soils

Some soils that have similar properties to Ashers soils are:

- Waihoaka: podzolised soil forming into loess in hilly land of the southern coast, from Bluff to Tuatapere
- Kapuka: podzolised moderately deep to shallow soil on marine terraces
- Tiwai: podzolised shallow soil on marine terraces with thin iron pans, and cemented 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.

| Ashers profile | Horizon | Depth (cm) | Description   |
|----------------|---------|------------|---|
|                | Ap      | 0-17       | Black silt loam; weak soil strength; strongly developed very fine and extremely fine polyhedral structure; abundant roots   |
|                | Bh      | 17-25      | Dark brown silt loam; few greyish yellow mottles; firm soil strength; weakly developed very fine polyhedral structure; abundant roots   |
|                | Bw(g)   | 25-60      | Dull yellowish brown silt loam; few dark reddish brown and few greyish yellow mottles; few worm casts; slightly firm soil strength; moderately developed medium to coarse and very fine polyhedral structure; common organic and iron complex coats; many roots |
|                | BC(g)   | 60-90+     | Dull yellow-orange silt loam; few bright yellowish brown and greyish mottles; firm soil strength; massive; no roots   |
|                | BC(g)   | 60-90+     | Dull yellow-orange silt loam; few bright yellowish brown and greyish mottles; firm soil strength; massive; no roots   |

## Key profile features

Ashers soils have a dark coloured topsoil that is 17-25 cm deep, with strongly developed structure. Subsoil structure is moderately developed, grading to structureless in the lower subsoil. The dark brown colour of the Bh horizon reflects the strong accumulation of complexes of iron and organic matter that are common in the subsoil of these soils.

## Typical physical properties

Note: values in *Italics> are estimates*

| Horizon | Depth (cm) | Bulk density    | Permeability | Texture   | Gravel content |
|---------|------------|-----------------|--------------|-----------|----------------|
| Ap      | 0-17       | Low – Moderate  | Moderate     | Silt loam | Gravel free    |
| Bh      | 17-25      | Moderate        | Moderate     | Silt loam | Gravel free    |
| Bw(g)   | 25-60      | Moderate        | Moderate     | Silt loam | Gravel free    |
| BC(g)   | 60-90      | Moderate – High | Slow         | Silt loam | Gravel free    |

**Profile drainage:** Imperfect  
**Plant readily available water:** *High*  
**Potential rooting depth:** Deep  
**Rooting restriction:** Subsoil acidity and aluminium toxicity may be limiting

## Key physical properties

Ashers soil have a deep rooting depth and high plant available water, although the subsoil acidity and aluminium toxicity may be limiting (particularly on less developed sites). Soils are well to imperfectly drained, with slowly permeable subsoils that may cause short-term waterlogging after heavy rain. Textures are silt loams throughout the profile, with topsoil clay content of 20-25%. No stones or gravels occur in these soils.

## Typical chemical properties

| Horizon | Depth (cm) | pH  | P retention | CEC       | BS       | Ca       | Mg       | K        | Na       |
|---------|------------|-----|-------------|-----------|----------|----------|----------|----------|----------|
| Ap      | 0-17       | Low | High        | Very high | Low      | Moderate | Moderate | Very low | Low      |
| Bh      | 17-25      | Low | High        | High      | Very low | Low      | Very low | Low      | Low      |
| Bw(g)   | 25-60      | Low | High        | Moderate  | Very low | Very low | Very low | Very low | Low      |
| BC(g)   | 60-90      | Low | Moderate    | Low       | Very low | Very low | Very low | Very low | Very low |

## Key chemical properties

Topsoil organic matter levels range from 16-25%. P-retention values of 60-70% increase in the subsoil. Soil pH values are low (often below 5.0) and tend to decrease in the subsoil. Cation exchange values are high, reflecting high organic matter levels, and base saturation low. Available cations are low. Carbon nitrogen ratios are high, reflecting the low biological activity of the soil. Aluminium levels are high in the subsoil, indicating possible toxicity to plants. Micronutrient levels are generally adequate. In some sites the topsoil acidity and available cations have improved due to significant development inputs.

## 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 high organic matter and P-retention levels.  |
| <b>Nutrient leaching</b>            | slight   | These soils have a slight vulnerability to leaching to groundwater. This rating reflects the high water-holding capacity and slow subsoil permeability.  |
| <b>Topsoil erodibility by water</b> | slight   | Due to the topsoil organic matter content, topsoil erodibility in these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover.                          |
| <b>Organic matter loss</b>          | 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). |
| <b>Waterlogging</b>                 | moderate | These soils have a moderate vulnerability to waterlogging during wet periods. This rating reflects the imperfect drainage and slow subsoil permeability.   |

## General landuse versatility ratings for Ashers 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.

### AsU1 (Ashers undulating deep)

| Versatility evaluation for soil AsU1 |                    |  |
|--------------------------------------|--------------------|--|
| Landuse                              | Versatility rating | Main limitation  |
| Non-arable horticulture              | Moderate           | Inadequate aeration during wet periods; vulnerability to sustained waterlogging. |
| Arable                               | Moderate           | Inadequate aeration during wet periods; vulnerability to sustained waterlogging  |
| Intensive pasture                    | Moderate           | Inadequate aeration during wet periods; subsoil acidity                          |
| Forestry                             | Moderate           | Vulnerability to sustained waterlogging  |

### AsR1 (Ashers rolling deep)

| Versatility evaluation for soil AsR1 |                    |  |
|--------------------------------------|--------------------|--|
| Landuse                              | Versatility rating | Main limitation  |
| Non-arable horticulture              | Moderate           | Inadequate aeration during wet periods; vulnerability to sustained waterlogging. |
| Arable                               | Limited            | Rolling slopes   |
| Intensive pasture                    | Moderate           | Inadequate aeration during wet periods; subsoil acidity                          |
| Forestry                             | Moderate           | 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 should be minimised during these periods.
- Installation and maintenance of subsurface mole and tile drains will reduce the risk of short-term waterlogging.

## Soil profiles available for Ashers soils

| Soil symbol | Profile ID | Topoclimate map sheet | Profile description available | Physical data available | Chemical data available | Profile photo available |
|-------------|------------|-----------------------|-------------------------------|-------------------------|-------------------------|-------------------------|
| AsU1        | ET5        | 28a                   | ✓                             | ✓                       | ✓                       | ✓                       |
| AsU1        | LT3        | 41                    | ✓                             | ✓                       | ✓                       | ✓                       |
| AsU1        | LT15       | 41                    | ✓                             | ✓                       | ✓                       | ✓                       |
| AsU1        | LT20       | 41                    | ✓                             | ✓                       | ✓                       | ✓                       |

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