

## SAND OVER BROWN CLAY

**General Description:** *Thick loose grey sand with a bleached subsurface layer, abruptly overlying a brown, grey and red mottled coarsely structured heavy clay, calcareous with depth*

**Landform:** Very gently undulating plains.

**Substrate:** Lagoon bed calcareous clay (Padthaway Formation).

**Vegetation:**



**Type Site:** Site No.: SE098

1:50,000 sheet: 7023-2 (Penola)      Hundred: Penola

Annual rainfall: 625 mm      Sampling date: 07/12/04

Landform: Flat on very gently undulating plain

Surface: Soft with no stones

### Soil Description:

Depth (cm)	Description
0-13	Dark greyish brown loose single grain light loamy sand. Clear to:
13-46	Very pale brown (bleached) loose sand with 2-10% ironstone gravel in lower 10 cm. Sharp to:
46-70	Brown, yellowish brown, red and greyish brown mottled very hard medium heavy clay with strong coarse prismatic structure. Gradual to:
70-105	Light brownish grey, yellowish brown and red mottled very hard heavy clay with strong coarse lenticular structure and slickensides. Clear to:
105-140	Yellowish brown and grey mottled hard medium heavy clay with 20-50% calcrete fragments (6-20 mm) and 20-50% fine carbonate segregations.



**Classification:** Bleached-Mottled, Supracalcic, Brown Chromosol: thick, non-gravelly, sandy / clayey, deep

## Summary of Properties

**Drainage:** Imperfectly drained. Water can perch on top of the clay for several weeks following heavy or prolonged rainfall. This is unlikely to affect grape vines except in unusually wet springs.

**Fertility:** Inherent fertility is moderately low, as indicated by the exchangeable cation data (sum of cations is less than 5 cmol(+)/kg). Although there is ample nutrient retention capacity in the subsoil, most of the topsoil capacity is attributable to organic matter (compare first and second layer sums of cations). As the sampling site is outside the planted area of the vineyard, nutrient test results indicate deficiencies. Concentrations of phosphorus, sulphur and trace elements are low.

**pH:** Acidic at the surface, neutral with depth.

**Rooting depth:** 105 cm in pit, but few roots below 70 cm.

### Barriers to root growth:

**Physical:** The hard, coarsely structured subsoil clay impedes uniform proliferation of roots, leading to restricted water use efficiency.

**Chemical:** The high carbonate content in the clay from 105 cm restricts deeper root growth.

**Water holding capacity:** (Estimates for potential root zone of grape vines)

Total available: 75 mm

Readily available: 40 mm

**Seedling emergence:** Good, unless surface becomes water repellent.

**Workability:** Sandy soils can be worked over a wide range of moisture conditions. However, dry working pre-disposes surface to erosion.

### Erosion Potential

**Water:** Low.

**Wind:** Moderately low.

## Laboratory Data

Depth cm	pH H <sub>2</sub> O	pH CaCl <sub>2</sub>	CO <sub>3</sub> %	EC 1:5 dS/m	ECe dS/m	Org.C %	Avail. P mg/kg	Avail. K mg/kg	Cl mg/kg	SO <sub>4</sub> -S mg/kg	Boron mg/kg	Trace Elements mg/kg (EDTA)				Sum cations cmol (+)/kg	Exchangeable Cations cmol(+)/kg				Est. ESP
												Cu	Fe	Zn	Mn		Ca	Mg	Na	K	
0-13	6.0	4.8	0	0.085	0.72	1.48	8	181	72	2.9	0.3	1.29	154	1.22	16.4	4.3	3.10	0.56	0.18	0.50	4.1
13-46	7.0	6.5	0	0.030	0.47	0.12	2	36	14	3.0	0.2	0.24	54	0.11	6.39	1.7	1.27	0.26	0.04	0.08	2.4
46-70	6.9	6.0	0	0.048	0.32	0.36	4	304	14	13.3	1.6	0.20	97	0.17	6.15	22.5	13.7	7.07	0.93	0.80	4.1
70-105	7.7	7.1	0.6	0.123	0.55	0.14	2	227	21	21.9	1.5	0.12	18	0.08	12.6	22.1	15.1	5.51	0.92	0.64	4.2
105-140	8.7	7.8	41.4	0.166	0.56	0.11	2	158	46	8.6	1.6	0.08	13	0.26	4.93	21.5	15.4	4.76	0.90	0.44	4.2

**Note:** Sum of cations, in a neutral to alkaline soil, approximates the CEC (cation exchange capacity), a measure of the soil's capacity to store and release major nutrient elements.

ESP (exchangeable sodium percentage) is derived by dividing the exchangeable sodium value by the CEC, in this case estimated by the sum of cations.