SANDY CLAY LOAM OVER CALCAREOUS RED CLAY

General Description: *Sandy loam to sandy clay loam over a well structured red calcareous clay, becoming more clayey and calcareous with depth*

Landform: Gently undulating plains.

Substrate: Heavy clay (Blanchetown Clay equivalent) mantled by fine carbonate.

Vegetation: Mallee.

Type Site:

Site No.:	MP011	1:50,000 mapsheet:	6727-3 (Alexandrina)
Hundred:	Freeling	Easting:	326600
Section:	331	Northing:	6091410
Sampling date:	06/12/2004	Annual rainfall:	390 mm average

Lower slope (1% gradient) of gently undulating rise. Firm surface with no stones.

Soil Description:

Depth (cm)	*Description*
0-13	Dark reddish brown hard massive slightly calcareous light sandy clay loam. Clear to:
13-30	Reddish brown firm highly calcareous light clay with strong fine polyhedral structure, 2-10% carbonate nodules (6-20 mm) and 2-10% fine carbonate segregations. Gradual to:
30-60	Reddish brown firm very highly calcareous light medium clay with strong medium polyhedral structure, 20-50% soft carbonate segregations, and 2-10% carbonate nodules (6-20 mm). Gradual to:
Buried soil	
60-90	Reddish brown and dark greyish brown mottled firm slightly calcareous medium clay with strong medium angular blocky structure and 2-10% fine carbonate segregations. Gradual to:
90-140	Brown and dark greyish brown mottled firm moderately calcareous medium heavy clay with strong coarse angular blocky structure and 20-50% fine carbonate segregations.

Classification: Hypercalcic, Effervescent, Red Sodosol; medium, non-gravelly, clay loamy / clayey, moderate

Summary of Properties

Drainage: Moderately well drained. The soil rarely remains wet for more than a week or so following heavy or prolonged rainfall. However, deep drainage is impeded by the heavy clay substrate. Inefficient irrigation may lead to watertable development and salt accumulation.

Fertility: Inherent fertility is moderately high, as indicated by the exchangeable cation data. Although nutrient retention capacity is high, free carbonate to the surface tends to tie up phosphorus, manganese and zinc. At the sampling site, concentrations of phosphorus, zinc, manganese and copper are all marginally low.

pH: Alkaline at the surface, strongly alkaline with depth.

Rooting depth: Grape vine roots to 90 cm in pit, but few roots below 60 cm.

Barriers to root growth:

Physical: The coarsely structured heavy clay from 90 cm prevents deeper growth.

Chemical: High pH, sodicity and boron concentration from 30 cm restrict root growth.

Waterholding capacity: (Estimates for potential rootzone of grape vines)
Total available: 75 mm
Readily available: 35 mm

Seedling emergence: Good to fair, provided that surface does not develop hard setting condition and seal over (e.g. as result of excessive cultivation).

Workability: Satisfactory. The soil can be safely worked over a range of moisture contents.

Erosion Potential:

Water: Low.

Wind: Low.

Laboratory Data

Depth cm	pH H_2O	pH $CaCl_2$	CO_3 %	EC 1:5 dS/m	ECe dS/m	Org.C %	Avail. P mg/kg	Avail. K mg/kg	Cl mg/kg	SO_4-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	8.7	7.9	3.0	0.170	1.33	0.78	17	413	83	10.8	2.4	1.01	15	2.41	13.2	17.5	12.1	3.08	1.09	1.15	6.2
13-30	9.1	8.3	14.2	0.460	2.87	0.44	4	223	321	35.2	4.6	0.78	7.8	0.46	5.81	22.1	12.7	5.45	3.35	0.60	15.2
30-60	9.5	8.5	22.2	0.746	5.13	0.17	2	442	542	38.6	12.1	1.26	8.8	0.17	2.24	20.2	6.67	6.23	6.19	1.10	30.7
60-90	9.5	8.6	6.8	0.723	2.47	0.06	3	527	347	28.6	15.7	0.76	5.8	<.05	2.68	21.6	5.06	6.48	8.65	1.36	40.1
90-140	9.5	8.6	23.4	0.893	3.51	0.12	4	342	322	78.8	10.7	0.57	7.7	0.21	2.76	18.2	5.99	3.94	7.40	0.84	40.7

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.

Further information: DEWNR Soil and Land Program