CLAY LOAM OVER COARSELY STRUCTURED RED CLAY

General Description: *Hard clay loam over a coarsely structured red clay, calcareous with depth*

Landform: Alluvial plains.

Substrate: Medium textured alluvium.

Vegetation: Red gum (Euc. camaldulensis) woodland.

Type Site: Site No.: CH130

1:50,000 sheet:	6727-3 (Alexandrina)	Hundred:	Freeling
Annual rainfall:	380 mm	Sampling date:	25/06/02
Landform:	Alluvial plain, 0% slope		
Surface:	Hard setting with no stones		

Soil Description:

Depth (cm)	*Description*
0-12	Very dark grey hard clay loam with moderate fine granular structure. Clear to:
12-25	Dark brown hard clay loam with weak fine granular structure. Abrupt to:
25-55	Dark reddish brown and dark brown very hard medium heavy clay with weak coarse prismatic breaking to strong fine angular blocky structure. Clear to:
55-90	Dark brown very hard slightly calcareous medium clay with weak coarse prismatic breaking to strong medium angular blocky structure, and 2-10% fine and tubular carbonate segregations. Gradual to:
90-125	Yellowish brown, yellowish red and strong brown very hard slightly calcareous sandy light clay with weak coarse prismatic breaking to moderate medium angular blocky structure, and minor fine carbonate segregations. Gradual to:
125-160	Reddish yellow, dark brown and reddish brown hard sandy clay loam with weak coarse subangular blocky structure and 10% inclusions of soil from layer above.

Classification: Hypocalcic, Subnatric, Red Sodosol; medium, non-gravelly, clay loamy / clayey, deep

Summary of Properties

Drainage: Moderately well drained. Water perches on the clayey subsoil for up to a week following heavy or prolonged rainfall.

Fertility: Inherent fertility is moderately high, as indicated by the exchangeable cation data. Concentrations of all tested nutrient elements are adequate to high. Organic carbon levels are also high. Note that high surface sulphate and calcium concentrations are probably due to residual applied gypsum.

pH: Slightly alkaline at the surface, alkaline with depth.

Rooting depth: Vine roots to 160 cm in pit, but there are few below 25 cm.

Barriers to root growth:

Physical: The tight clayey subsoil severely restricts root proliferation. Although there is some growth in the clay, it is confined to planes of weakness between aggregates.

Chemical: There are no apparent chemical barriers to root growth, although sodicity may build up over a long period under irrigation.

Water holding capacity: Approximately 200 mm total available water in the upper 150 cm, but only about 120 mm of this is effectively available due to poor root density. Only about 55 mm of water are readily available in the main root zone (0-55 cm).

Seedling emergence: Fair due to hard setting sealing surface. Gypsum helps alleviate the problem.

Workability: The hard surface has a narrow moisture range over which it can be worked without shattering (too dry) or puddling (too wet). Gypsum application broadens the range.

Erosion Potential

Water: Low.

Wind: Low.

Laboratory Data

Depth cm	pH H_2O	pH $CaC1_2$	CO_3 %	EC1:5 dS/m	ECe dS/m	Org.C %	Avail. P mg/kg	Avail. K mg/kg	SO_4-S mg/kg	Boron mg/kg	Trace Elements mg/kg (DTPA)				Sum of cations cmol (+)/kg	Exchangeable Cations cmol(+)/kg				ESP
											Cu	Fe	Mn	Zn		Ca	Mg	Na	K	
Row	7.9	7.4	0	0.67	-	2.78	69	593	428	1.6	8.90	26	5.67	11.0	29.8	24.20	3.05	1.06	1.47	3.6
0-12	8.2	7.6	0	0.49	-	2.55	31	636	147	1.7	8.04	20	6.33	7.13	28.7	21.39	4.07	1.65	1.55	5.8
12-25	8.5	7.6	0	0.17	-	1.92	9	437	21.9	1.2	3.38	18	4.30	3.41	22.4	16.92	3.40	1.04	1.06	4.6
25-55	8.2	7.4	0	0.24	-	0.95	6	352	102	1.3	2.45	14	3.74	0.97	23.6	15.00	5.74	1.82	1.00	7.7
55-90	8.6	7.9	<10	0.36	-	0.49	2	357	121	1.4	2.25	18	3.62	0.23	25.4	15.91	6.39	2.16	0.91	8.5
90-125	8.8	8.0	<10	0.22	-	0.20	3	259	51.1	1.3	1.10	17	3.16	0.44	14.7	9.26	3.69	1.14	0.62	7.7
125-160	8.3	7.5	<10	0.16	-	0.18	2	216	52.4	1.2	0.76	18	4.16	0.57	9.1	5.08	2.62	0.84	0.55	9.2

Note: Row sample bulked from cores (0-10 cm) taken along the planting rows near the pit.

Sum of cations is a measure of the soil's capacity to store and release major nutrient elements. In neutral to alkaline soils the sum is approximately equivalent to CEC (cation exchange capacity).

ESP (exchangeable sodium percentage) is derived by dividing the exchangeable sodium value by the CEC, which at this site is estimated from the sum of cations.