SANDY LOAM OVER POORLY STRUCTURED RED CLAY

General Description: *Hard sandy loam to sandy clay loam overlying a coarsely structured red heavy clay with soft carbonate at depth*

Landform: Slopes of undulating rises and low hills

Substrate: Heavy clay with slickensides and mantled by soft carbonate

Vegetation:

Type Site: Site No.: CH080

1:50,000 sheet:	6627-4 (Noarlunga)	Hundred:	Willunga
Annual rainfall:	550 mm	Sampling date:	30/05/95
Landform:	Moderately inclined hillslope, 12% slope		
Surface:	Hard setting with no stones		

Soil Description:

Depth (cm)	*Description*
0-15	Firm dark brown fine sandy loam with moderate granular structure and up to 10% ironstone gravel. Clear to:
15-30	Hard massive dark reddish brown clay loam with up to 10% ironstone gravel. Abrupt to:
30-60	Firm dark reddish brown medium clay with coarse prismatic breaking to polyhedral structured medium clay. Clear to:
60-90	Firm orange medium clay with strong coarse prismatic structure and slickensides. Clear to:
90-130	Firm orange calcareous medium clay with strong coarse prismatic structure, 10-20% soft carbonate, and slickensides.

Classification: Vertic, Subnatric, Red Sodosol; medium, slightly gravelly, loamy / clayey, deep

Summary of Properties

Drainage Moderately well drained. The clayey subsoil has low permeability and holds up water movement so that parts of the profile may be saturated for a few days after heavy rain. Only excessive irrigation applications will cause problems during summer.

Fertility Natural fertility is moderately high, although surface soil fertility relies on adequate amounts of organic matter, due to its relatively low clay content. In the rows, concentrations of all elements are adequate, except for a marginal magnesium deficiency induced by high calcium levels resulting from gypsum application.

pH Neutral at the surface, alkaline with depth.

Rooting depth 130 cm in pit, but few roots below 90 cm.

Barriers to root growth

Physical: The hardness of the soil and coarseness of the aggregates restrict the capacity of roots to proliferate uniformly.

Chemical: Levels of boron, salt and exchangeable sodium are all within safe limits.
Note that elevated surface electrical conductivity (EC) levels are due to recently applied gypsum.

Water holding capacity 120 mm in root zone, but a significant proportion of this is effectively unavailable because of poor root distribution. There are about 50 mm of readily available water in the root zone.

Workability Fair, due to hard setting surface which shatters when dry and puddles when wet. Gypsum will help overcome this condition.

Erosion Potential Moderate water erosion potential due to the slope and the erodibility of the sandy loam surface.

Laboratory Data

Depth cm	Particle size analysis				pH H_2O	pH $CaCl_2$	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	CEC cmol (+)/kg	Exchangeable Cations cmol(+)/kg				ESP
	Coarse sand	Fine sand	Silt	Clay												Ca	Mg	Na	K	
Row	-	-	-	-	6.9	6.8	0	1.51	2.12	2.1	46	268	1433	1.7	12.5	22.64	1.60	0.37	0.81	na
0-15	19	44	19	17	6.6	6.3	0	0.13	1.20	1.4	9	209	31	1.1	9.3	8.13	1.29	0.14	0.56	1.5
15-30	10	34	22	33	6.7	6.0	0	0.05	0.45	1.3	<4	414	12	1.3	9.0	7.38	2.27	0.40	0.59	4.4
30-60	3	12	9	75	6.5	5.7	0	0.09	0.47	1.2	<4	409	21	2.1	28.0	15.83	5.87	1.81	1.72	6.5
60-90	-	-	-	-	6.9	6.3	0	0.15	0.51	0.6	<4	381	53	2.2	28.4	16.85	5.70	1.97	1.50	6.9
90-130	-	-	-	-	8.3	7.9	9.0	0.28	0.82	0.3	<4	298	92	1.8	20.3	14.83	4.37	1.45	0.99	7.1

Note: Row sample bulked from 20 cores (0-10 cm) taken from the tree/vine lines around the pit.

DTPA trace element analyses from row sample (mg/kg): Cu = 2.86, Zn = 1.73, Mn = 20.5

CEC (cation exchange capacity) is 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.

* The rows had been top-dressed with gypsum a week prior to sampling, resulting in extremely high sulphate and calcium values, and high electrical conductivity (measure of soluble salt content).