SANDY LOAM OVER POORLY STRUCTURED BROWN CLAY

General Description: *Loamy sand to sandy clay loam surface soil sharply overlying yellow, brown and red mottled clay.*

Landform: Slopes of rolling low hills

Substrate: Weakly consolidated clayey sand to sandy clay sediments deposited in ancient glacial valleys

Vegetation: Eucalyptus fasciculosa / Euc. leucoxylon woodland

Type Site:

Site No.:	CH025	1:50,000 mapsheet:	6627-3 (Willunga)
Hundred:	Encounter Bay	Easting:	278850
Section:	132	Northing:	6070950
Sampling date:	14/10/92	Annual rainfall:	655 mm average

Upper slope of 10% in a landscape of undulating low hills. Hard setting surface with occasional granite boulders (glacial erratics).

Soil Description:

Depth (cm)	*Description*
0-10	Dark greyish brown massive sandy loam with trace of quartz gravel. Abrupt to:
10-18	Very pale brown massive loamy sand with 10% quartz gravel. Abrupt to:
18-39	Dark yellowish brown and brown heavy clay with strong coarse prismatic structure. Gradual to:
39-60	Yellowish brown and red medium heavy clay with coarse prismatic structure. Gradual to:
60-110	Light grey, olive brown and red sandy clay with weak prismatic structure. Diffuse to:
110-160	Light grey and yellow massive clayey sand to sandy clay, hardened in places to sandstone.

Classification: Bleached-Mottled, Eutrophic, Brown Kurosol; medium, non-gravelly, loamy / clayey, deep

Summary of Properties

Drainage: Imperfectly drained because water "perches" on top of the slowly permeable subsoil clay. The soil may remain wet for several weeks.

Fertility: Natural fertility is moderate as indicated by the exchangeable cation data. The subsoil clay has a high capacity for storing nutrients. Copper, manganese and zinc are all very low below the top 10 cm. Phosphorus is adequate but potassium is marginal at 90 mg/kg. Each of the major cations (calcium, magnesium and potassium) are deficient. Other elements are satisfactory.

pH: Acidic throughout. Applications of dolomitic lime are required.

Rooting depth: 110 cm at type site, but root density is very low from 60 cm.

Barriers to root growth:

Physical: The massive, hard 10-18 cm layer, and the tight subsoil clay both restrict the proliferation of roots. Root growth is also restricted by waterlogging in subsurface layers. These layers commonly dry very rapidly in spring, creating a barrier between the root mass in the surface soil and the stored water in the subsoil.

Chemical: Low pH and low subsoil fertility may both play a role in restricting root growth.

Waterholding capacity 70 mm in upper 60 cm, and a further 60 mm below, most of which is effectively unavailable because of poor root growth.

Seedling emergence: Fair due to the poorly structured hard setting surface.

Workability: Fair. The soil has a narrow moisture range for effective working.

Erosion Potential:

Water: Moderately high because of the very high erodibility of the soil and the 10% slope.

Wind: Low.

Laboratory Data

Depth cm	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 mg/kg	Boron mg/kg	Trace Elements mg/kg (DTPA)				CEC cmol (+)/kg	Exchangeable Cations cmol(+)/kg				ESP	Ext Al mg/kg
											Cu	Fe	Mn	Zn		Ca	Mg	Na	K		
0-10	5.2	4.6	0	0.05	0.27	2.6	39	90	-	1.2	0.3	374	4.0	1.8	4.8	2.91	0.71	0.12	0.18	2.5	3
10-18	5.3	4.7	0	0.04	0.12	0.3	14	55	-	0.7	<0.1	170	0.1	0.2	1.2	0.64	0.24	0.13	0.10	na	2
18-39	5.3	4.5	0	0.06	0.14	0.8	<4	209	-	2.4	0.1	69	0.2	0.1	18.9	5.16	8.73	0.49	0.59	2.6	2
39-60	5.5	4.5	0	0.07	0.21	0.2	<4	136	-	1.3	<0.1	15	<0.1	0.1	13.2	2.41	7.36	0.56	0.31	4.2	<1
60-110	5.5	4.4	0	0.06	0.27	0.1	<4	88	-	1.6	<0.1	6	<0.1	0.2	9.1	1.34	5.35	0.51	0.21	5.6	2
110-160	5.5	4.2	0	0.04	0.33	<0.1	<4	58	-	1.0	<0.1	17	<0.1	0.1	4.1	0.79	2.70	0.40	0.09	9.8	2

Note: 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.

Further information: DEWNR Soil and Land Program