THICK ACIDIC SAND OVER MOTTLED BROWN CLAY

General Description: *Thick, coarse, bleached sand over mottled and poorly structured brown clay, delved with little clay brought up*

Landform: Slightly undulating plain at the foot of Mt. Muirhead.

Substrate: Clayey Padthaway sediments, possibly with influence from nearby Bridgewater Formation (sands).

Vegetation: Originally brown stringy bark (Eucalyptus baxteri) woodland.

Type Site:

Site No.:	SE107B	1:50,000 mapsheet:	6922-1 (Millicent)
Hundred:	Mt. Muirhead	Easting:	446880
Section:	115	Northing:	5843760
Sampling date:	15/07/2009	Annual rainfall:	750 mm average

Very slight rise on gently undulating plain. Paddock recently delved to base of topsoil.

Soil Description:

Depth (cm)	*Description*
0-15	Very dark grey soft loose single grained organic sand. Occasional large clay lumps. Many roots. Abrupt to:
15-40	Bleached grey sand, single grain to massive. Roots few to common. Diffuse to:
40-55	Bleached grey brown sand, single grain to massive. Roots few to common. Sharp to:
55-75	Firm to hard brown and yellowish brown mottled sandy medium heavy clay. Strong very coarsely columnar, breaking to weak medium subangular blocky structure. Roots common. Diffuse to:
75-95	Hard light brownish grey sandy medium heavy clay with olive yellow and red mottles. Strong very coarsely prismatic, breaking to weak medium subangular blocky structure. Roots common. Diffuse to:
95-110	Hard light brownish grey and olive yellow mottled sandy medium heavy clay. Strong very coarse prismatic structure. Roots few to common. Diffuse to:
110-150	Hard pale olive and brownish yellow mottled sandy medium heavy clay. Strong very coarse prismatic structure. Roots few to common.

Classification: Mesotrophic, Mottled-Subnatric, Brown Sodosol; thick, non-gravelly, sandy/clayey, deep

Summary of Properties

Drainage: Imperfectly drained. Excessively drained in the surface horizons, leading to rapid nutrient leaching. Water perches on the surface of the subsoil clay, saturating the lower topsoil and upper subsoil (layers 3 and 4) for periods of up to several weeks following heavy or prolonged rainfall. The delve lines concentrate water movement, with active seepage along delve lines observed. Coarse columnar structure in the subsoil results in very slow, strongly preferential and uneven drainage.

Fertility: The surface soil has low inherent fertility, as indicated by the sum of cations. The bleached subsurface is significantly less fertile again. The clayey subsoil has high nutrient retention capacity. Clay delving has significantly increased the potential for the surface soil to retain nutrients (although capacity is still low).

pH: Strongly acidic to 50 cm, moderately acidic in the subsoil.

Rooting depth: 150 cm.

Barriers to root growth:

Physical: Dense and infertile bleached subsurface restricts root abundance. This impact is greatly reduced in the delve zone. The hard coarsely structured dispersive subsoil confines most root growth to the surfaces of the aggregates, resulting in poor root distribution patterns.

Chemical: Low pH, high aluminium, very low fertility and sodicity may impede root growth in sensitive species.

Waterholding capacity: Approximately 120 mm in the rootzone, but not all available due to poor root distribution in clay subsoil.

Seedling emergence: Fair to good. Clay at the surface will overcome water repellence. Some areas of high clay concentration may be hardsetting.

Workability: Good

Erosion Potential:

Water: Low.

Wind: Moderate if surface vegetative cover is removed. Surface cay lumps reduce risk.

Laboratory Data

Depth cm	pH H_2O	pH $CaC1_2$	CO_3 %	EC 1:5 dS/m	ECe dS/m	Org.C %	Avail. P mg/kg	Avail. K mg/kg	NO_3 + NH_4 mg/kg	React Fe mg/kg	Cl mg/kg	SO_4-S mg/kg	Ext Al mg/kg	Boron mg/kg	Trace Elements mg/kg (DTPA)				Sum cations cmol (+)/kg	Exchangeable Cations cmol(+)/kg				Est ESP
															Cu	Fe	Zn	Mn		Ca	Mg	Na	K	
0-15	5.1	4.1	0	0.078	0.24	2.63	12	78	11	271	4	2.5	2.7	0.3	0.37	80	2.37	5.37	3.59	2.66	0.54	0.07	0.19	1.95
15-40	5.2	4.2	0	0.016	0.17	0.39	20	25	3	165	3	1.3	6	0.1	0.3	53	0.5	0.32	0.67	0.32	0.06	0.06	0.04	8.96
15-40*	5.0	4.0	0	0.135	0.25	0.51	13	61	9	163	7	2.3	3.8	0.2	0.17	50	0.74	0.86	1.16	0.67	0.16	0.07	0.11	6.03
40-55	4.9	4.4	0	0.029	0.81	0.13	37	24	4	159	19	1.9	7.7	0.2	0.15	58	0.64	0.15	0.72	0.29	0.07	0.07	0.05	9.72
40-55*	4.9	4.5	0	0.021	0.26	0.14	18	26	4	104	6	1.9	5.8	0.1	0.08	32	0.68	0.25	0.52	0.21	0.06	0.05	0.04	9.62
55-75	6.1	5.1	0	0.081	0.52	0.49	8	119	4	2180	37	3.9	1.1	0.7	0.15	111	0.5	0.29	17.48	8.2	7.65	1.16	0.27	6.64
75-95	7.0	6.0	0	0.074	0.40	0.19	3	131	4	928	24	5.2	0	1.3	0.1	32	0.41	0.13	20.06	8.44	9.44	1.84	0.34	9.17
95-110	7.7	6.7	0	0.085	0.64	0.09	2	141	4	880	45	17.1	0	1.4	0.2	19	0.57	0.17	21.14	8.61	9.61	2.54	0.38	12.0
110-	8.4	7.4	0	0.219	1.32	0.12	2	238	5	1162	155	67.2	0	1.6	0.09	22	0.6	0.21	32.31	12.4	14.6	4.68	0.61	14.5

*A1 and A2 sand mixed through delving

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.

Further information: DEWNR Soil and Land Program