FLINTY GRADATIONAL CLAY

General Description: *Gradational well structured brown clay on limestone with flinty fragments throughout.*

Landform: Gently undulating plain

Substrate: Gambier limestone.

Vegetation: Improved pasture (perennial rye grass).

Type Site:

Site No.:	SE108	1:50,000 mapsheet:	7022-3 (Schank)
Hundred:	Benara	Easting:	460210
Section:	38	Northing:	5813580
Sampling date:	18/08/2006	Annual rainfall:	755 mm average

Low point on undulating plain, with many large flint stones at or near the surface.

Soil Description:

Depth (cm)	*Description*
0-10	Very friable black silty clay loam with moderate, fine polyhedral structure breaking to strong, very fine polyhedral structure. Abundant roots. Many flint stones present. Gradual to:
10-20	Very friable black silty clay loam with strong, very fine polyhedral structure. Abundant roots. Flint stones common. Clear to:
20-40	Very friable, very dark brown silty light clay with strong, very fine polyhedral structure. Abundant roots. Abundant shards of flint gravel. Gradual to:
40-65	Very friable, dark brown medium clay with strong, fine polyhedral structure. Many roots. Flint gravel common. Diffuse to:
65-90	Very friable, dark yellowish brown light medium clay with a dark brown mottle. Strong, medium polyhedral structure. Roots common. Many flint stones and cobbles present. Clear to:
90-100	Moist dark brown medium heavy clay with weak medium polyhedral structure. Roots common. Many flint stones and cobbles present. Sharp to:
100-150	Soft Gambier limestone with a very few flint stones and cobbles. No roots.

Classification: Melanic, Eutrophic, Brown, Dermosol; medium, moderately gravelly, clay loamy/clayey, deep

Summary of Properties

Drainage: Well drained due to the strong, fine aggregation of the soil. The limestone substrate is also well drained. Drainage is not excessive due to high clay content.

Fertility: Inherent fertility is high as indicated by the sum of cations. Copper and zinc levels are low in the pit sample, but a tissue test is needed to confirm deficiencies. Nitrogen availability is high. Potassium levels are adequate for pastures, and moderate levels are available through the entire profile. Subsoil extractable phosphorus is unusually high, improving availability of P to plants. Surface P (paddock sample) is adequate for pastures. Reactive iron levels exceed 3000 mg/kg in the top 65 cm, indicating a very high P adsorption capacity. This is likely to impact on the efficiency of applied P fertiliser. By way of illustration, total P level for the paddock sample is 707 mg/kg.

pH: Acidic throughout. Strongly acidic between 10 and 90 cm. Irrigation (with alkaline groundwater) is the most expedient method of raising subsoil pH.

Rooting depth: 100 cm in pit.

Barriers to root growth:

Physical: There are no physical barriers above the limestone. The abundant flints reduce waterholding capacity, but do not prevent root growth.

Chemical: Acidity is a potential barrier, however no restriction to root growth was observed.

Waterholding capacity: Approximately 100 mm in the potential rootzone. Capacity of fine earth is very high due to high clay content and favourable structure, but the abundant flints reduce the effective soil volume.

Seedling emergence: Good. May be some problems where flints are present at the surface. Stone rolling has been used in this instance to improve surface condition.

Workability: The flint stones make the site problematic for cultivation. However, the soil has high potential for perennial horticultural enterprises such as vine and fruit trees.

Erosion Potential: Low (water and wind)

Laboratory Data

Depth cm	pH H_2O	pH $CaCl_2$	CO_3 %	EC 1:5 dS/m	ECe dS/m	Org.C %	$NH_4 + NO_3$ mg/kg	Avail. P mg/kg	Avail. K mg/kg	SO_4-S mg/kg	Boron mg/kg	Trace Elements mg/kg (EDTA)				Sum cations cmol (+)/kg	Exchangeable Cations cmol(+)/kg					ESP
												Cu	Fe	Mn	Zn		Ca	Mg	Na	K	Al	
Paddock	5.8	5.1	0	0.12	0.99	7.13	60	25	248	10.1	1	0.6	533	105	1.7	19.4	16.2	1.81	0.6	0.67	0.03	3.1
0-10	6.4	5.4	0	0.10	0.5	5.61	32	17	151	8.5	1	0.5	517	24.9	0.7	20.7	17.6	2.11	0.54	0.42	0.01	2.6
10-20	5.6	4.4	0	0.06	0.25	2.94	8	11	53	5.4	0.5	0.3	874	4.8	0.3	9.0	7.25	0.76	0.42	0.15	0.38	4.7
20-40	5.4	4.2	0	0.05	0.27	1.81	7	9	62	5	0.5	0.2	809	2.0	0.3	8.3	5.73	0.92	0.35	0.19	1.07	4.2
40-65	5.4	4.2	0	0.04	0.18	1.62	7	12	110	4.5	0.8	0.3	466	1.0	0.1	20.9	12.0	5.45	0.42	0.43	2.57	2.0
65-90	5.8	4.6	0	0.05	0.22	0.99	6	11	118	7.8	0.9	0.3	140	0.5	0.3	25.6	18.9	4.97	0.44	0.43	0.87	1.7
90-100	6.7	5.9	0	0.13	0.58	1.37	7	13	140	5.9	0.8	0.2	101	27.5	0.2	37.8	32.7	4.01	0.64	0.42	0	1.7
100-150	8.7	7.7	94	0.10	0.32	0.14	5	6	22	3.1	0	0.2	22	2.0	0.7	9.7	9.34	0.25	0.07	0.06	0	0.7

Note: Paddock sample bulked from cores (0-10 cm) taken from the same paddock as the pit.

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