

# NAI Nairne Land System

Rolling low hills between Inverbrackie and Macclesfield

**Area:** 63.6 km<sup>2</sup>

**Annual rainfall:** 630 – 885 m average

**Geology:** The land is underlain by phyllites, schists and metasiltsstones, with minor interbedded quartzites and metasandstones of the Brachina and Tarcowie Formations. Localized medium to fine grained outwash sediments occur in drainage depressions and on narrow creek flats.

**Topography:** The land system comprises mainly rolling low hills with slopes in the range 10 - 30%. Distinctive features of the landscape are prominent peaks with rocky outcrops and short steep slopes. There are no major alluvial flats or gently inclined outwash fans between the hills, but narrow drainage depressions with well defined watercourses are common features. Most of the Land System drains to the east (i.e. Bremer and Angas River catchments). In the north the System straddles the watershed between the Onkaparinga and Bremer catchments.

**Elevation:** 210 m in the south to 500 m (Murdock Hill) in the north

**Relief:** Up to 80 m, but usually up to 50 m

**Soils:** The soils are mainly shallow to moderately deep overlying basement rock. Sandy loam surface textures are characteristic. These generally overlie more clayey subsoils, but on steeper slopes, rock is at shallow depth and subsoils are absent. Deep sandy loam to clay loam soils occur in minor drainage depressions.

### Main soils

*Soils on hillslopes formed on weathering basement rock*

- K3** Acidic sandy loam over red clay
- K4** Acidic sandy loam over brown clay
- K1b** Acidic gradational loam over brown clay loam

### Minor soils

*Soils on hillslopes formed on weathering basement rock*

- K1a** Acidic gradational loam over red clay
- K2** Acidic loam over red clay
- L1** Shallow sandy loam

*Soils of lower slopes and drainage depressions formed on outwash sediments or deeply weathered rock*

- F1** Loam to sandy loam over brown clay – over fine grained alluvium (**F1**) or over coarse grained alluvium (**F1/F2**)
- F2** Sandy loam over poorly structured brown clay – over deeply weathered rock (**F2a**) or over alluvium (**F2b**)
- M1** Deep sandy loam
- M2** Deep black clay loam



**Main features:** The Nairne Land System comprises predominantly rolling low hills with sandy loam surface texture contrast soils, mixed with shallow stony soils on upper slopes and deeper loamy texture contrast soils in drainage depressions. Almost 40% of the land is non-arable due to moderately steep slopes, although nearly all the land is accessible to equipment for pasture management or for horticulture. The soils are generally deep but have moderately low inherent fertility due to the mainly low clay content of their surfaces, and most are prone to acidification and erosion. Drainage is impeded in many soils by clayey subsurface layers. Saline seepage is widespread although total area is small. Nevertheless, its presence highlights the need for improved catchment management including better water use efficiency.

**Soil Landscape Unit summary:** 8 Soil Landscape Units (SLUs) mapped in the Nairne Land System:

SLU	% of area	Main features #
AyC	22.3	<p>Rolling low hills up to 80 m high, formed on phyllites, schists, and metasiltstones, with interbedded quartzites and metasandstones. Slopes are 10-18%. Soils typically have sandy loam surfaces overlying reddish or brownish clay subsoils grading to weathering rock. Differences reflect variations in parent rock type, degree of weathering and position in the landscape.</p> <p>Main soils: <u>Acidic sandy loam over red clay on rock</u> - <b>K3</b> (E)  <u>Acidic sandy loam over brown clay on rock</u> - <b>K4</b> (C)  <u>Acidic gradational brown loam</u> - <b>K1b</b> (L)  <u>Acidic loam over red clay on rock</u> - <b>K2</b> (L)  <u>Shallow sandy loam on rock</u> - <b>L1</b> (M) on steeper rocky slopes  <u>Acidic gradational red loam</u> - <b>K1a</b> (M) on upper slopes</p> <p>These soils are moderately deep but the predominant sandy loam surface soils are prone to nutrient deficiencies and acidification. They are also highly erodible. There is minor saline seepage on lower slopes.</p>
AzC AzD	14.7 0.8	<p>Moderately steep, often prominent, upper slopes and crests associated with the rolling low hills of Soil Landscapes AyC and CoD. Parent rocks are schists and miscellaneous quartzitic fine grained metamorphic types. Slopes are mostly in the range 12% to 25%, but reach 40% on some short slopes. There is no defined drainage pattern.</p> <p><b>AzC</b> Slightly rocky upper slopes and crests with slopes 12-30%.  <b>AzD</b> Steep rocky slopes of 30-40%.</p> <p>The soils have mostly sandy loam to loam surfaces which grade to either weathering rock or to more clayey subsoils forming in weathering rock. There are limited texture contrast profiles with a sharp break between the surface and subsoil.</p> <p>Main soils: <u>Acidic gradational brown loam</u> - <b>K1b</b> (E)  <u>Shallow sandy loam on rock</u> - <b>L1</b> (E)  <u>Acidic gradational red loam</u> - <b>K1a</b> (L)  <u>Acidic sandy loam over brown clay on rock</u> - <b>K4</b> (L)</p> <p>These are moderately deep and moderately well drained soils of relatively low fertility and high erodibility. The soils are also prone to acidification. Much of the land occurs in high positions, with significant exposure. The moderate to steep slopes and occasional rocky areas restrict land use to grazing.</p>
CoC CoD	1.2 54.0	<p>Rises and low hills formed on phyllites, schists, and metasiltstones.</p> <p><b>CoC</b> Undulating rises with relief to 20 m and slopes of 5-10%.  <b>CoD</b> Gently rolling low hills with relief to 50 m and slopes of 10-18%.</p> <p>Main soils: <u>Acidic sandy loam over red clay on rock</u> - <b>K3</b> (E)  <u>Acidic sandy loam over brown clay on rock</u> - <b>K4</b> (C)  <u>Acidic gradational brown loam</u> - <b>K1b</b> (L)  <u>Acidic loam over red clay on rock</u> - <b>K2</b> (L)  <u>Sandy loam over poorly structured brown clay</u> - <b>F2a</b> (L) on lower slopes  <u>Shallow sandy loam on rock</u> - <b>L1</b> (M) on steeper rocky slopes</p> <p>Many soils are imperfectly drained due to impeding clayey subsoils. Most of the land is arable, although erosion potential is moderate to high. There is minor saline seepage on lower slopes.</p>



LeE	0.4	Shallow drainage depressions with medium to fine grained alluvium. Main soils: <u>Loam over brown clay</u> - <b>F1</b> (E) <u>Sandy loam over poorly structured brown clay</u> - <b>F2b</b> (E) These soils are deep and moderately fertile. Their main drawback is imperfect drainage caused by water perching on their clayey subsoils. Minor saline seepages occur in places.
LtE LtJ	4.2 2.4	Narrow valleys and drainage depressions formed on mixed alluvium. <b>LtE</b> With stable watercourses. <b>LtJ</b> With eroded watercourses. Main soils: <u>Sandy loam over brown clay</u> - <b>F1/F2</b> (E) <u>Deep sandy loam</u> - <b>M1</b> (L) <u>Loam over brown clay</u> - <b>F1</b> (L) <u>Sandy loam over poorly structured brown clay</u> - <b>F2b</b> (C) <u>Deep black clay loam</u> - <b>M2</b> (L) These soils are deep with moderate to moderately low fertility. Waterlogging is commonly a problem, caused by the low lying topography and impeding clayey subsoils. Watercourse erosion and saline seepages are sporadic problems.

# PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

(D) Dominant in extent (>90% of SLU)	(C) Common in extent (20–30% of SLU)
(V) Very extensive in extent (60–90% of SLU)	(L) Limited in extent (10–20% of SLU)
(E) Extensive in extent (30–60% of SLU)	(M) Minor in extent (<10% of SLU)

### Detailed soil profile descriptions:

*Soils on hillslopes formed on weathering basement rock*

**K1a** Acidic gradational loam (Mesotrophic, Red Dermosol)

Thick fine sandy loam with minor ironstone grading to a brownish to reddish coarsely blocky clay loamy to clayey subsoil, siltier with depth, grading to kaolinized phyllite or siltstone, continuing below 200 cm.

**K1b** Acidic gradational loam (Eutrophic, Brown Dermosol)

Thick gravelly brown loam grading to a dark brown and yellow micaceous, coarsely prismatic clay loamy to clayey subsoil, merging with weathering schist from about 100 cm.

**K2** Acidic loam over red clay on rock (Eutrophic, Red Kurosol)

Medium thickness reddish brown loam to clay loam with a gravelly and paler coloured A2 horizon, overlying a red, very well structured clay grading to weathering phyllite from about 100 cm.

**K3** Acidic sandy loam over red clay on rock (Bleached-Mottled, Eutrophic, Red Chromosol)

Medium thickness sandy loam with a paler or bleached A2 horizon, overlying a dark red and brown mottled prismatic structured clay, grading to weathering schist or phyllite by 100 cm.

**K4** Acidic sandy loam over brown clay on rock (Bleached-Mottled, Eutrophic, Brown Kurosol)

Thick, gravelly loamy sand to loam with a bleached and gravelly A2 horizon, overlying a yellowish brown, red and greyish brown, coarsely prismatic clay subsoil, grading to weathering metasandstone below 100 cm.

**L1** Shallow sandy loam on rock (Paralithic, Leptic Tenosol)

Thick, stony loamy sand to sandy loam, forming in weathering schist or phyllite at 50 cm or less.

*Soils of lower slopes and drainage depressions formed on outwash sediments or deeply weathered rock*

**F1** Loam over brown clay (Bleached-Mottled, Hypocalcic, Brown Chromosol)

Thick loamy sand to sandy clay loam surface soil with a strongly bleached A2 horizon, sharply overlying a yellowish brown, grey and red mottled clay subsoil grading to fine grained alluvium.



- F1/F2** Sandy loam over brown clay (Bleached-Mottled, Eutrophic, Brown Chromosol **or** Eutrophic, Brown Sodosol)  
Thick dark brown loamy sand to light sandy clay loam with a bleached A2 horizon, overlying a yellow brown and grey brown sandy clay with coarse prismatic structure, grading to a grey, brown and yellow mottled clayey sand.
- F2a** Sandy loam over poorly structured brown clay (Eutrophic, Brown Sodosol **or** Bleached-Sodic, Eutrophic, Brown Chromosol)  
Thick, dark brown loamy sand to sandy clay loam with a bleached A2 horizon, overlying a brown, yellowish brown and red, coarsely blocky clay subsoil grading to grey and brown coarsely prismatic clay forming in weathering schist or phyllite, deeper than 150 cm.
- F2b** Sandy loam over poorly structured brown clay (Eutrophic, Mottled-Subnatric, Brown Sodosol)  
Thick massive grey loamy sand to loam with a bleached and quartz gravelly A2 horizon, overlying a yellow brown and grey brown sandy clay to clay with prismatic structure, grading to coarse, medium or fine textured micaceous alluvium from about 100 cm.
- M1** Deep sandy loam (Regolithic, Brown-Orthic Tenosol / Eutrophic, Brown Kandosol)  
Thick brown sandy loam to clay loam, overlying a grey to brown silt loam to clay loam with weak prismatic structure, weakly calcareous with depth. The soil is formed in sandy, gritty or clayey alluvial sediments.
- M2** Deep black clay loam (Eutrophic, Black Dermosol)  
Thick black silt loam to clay loam with strong granular structure, overlying a black to dark brown clay with strong blocky structure, becoming yellow and grey mottled with depth.

**Further information:** [DEWNR Soil and Land Program](#)

