SNE Snelling Land System

A land system consisting of creek gullies, slopes (often steep), a few remnant plateau surfaces, and many coastal gullies. The area incorporates the Snelling Escarpment which marks the Snelling fault line. This fault runs north-westerly toward Snelling Beach. The system then follows the north coast, with some interruptions, to the west of Cape Forbin. The system is mostly underlain by phyllite, dirty meta-sandstone or dirty meta-siltstone rock, which is softer and finer grained than the adjacent plateau meta-sandstones, and so forms more fertile and less sandy soils. Native vegetation is mostly dominated by large sugar gums which are indicative of this system.

Area: 117.1 km^2

Annual rainfall: 675 - 825 mm average

Geology: The vast majority of this land system is at a lower level than the central Kangaroo Island plateau, having been stripped down to rocks which are generally softer and finer grained than the ubiquitous meta-sandstone of the central plateau. Much of this land system is rocky or stony and steeply to moderately sloping, with near surface to surface expression of the underlying rock. The underlying rock is primarily middle Cambrian age phyllite and grey quartz phyllonite, early Cambrian age Balquhidder Formation (grey biotite laminated dirty meta-sandstone), with some early Cambrian age Tunkalilla Formation (dark blue-grey iron stained phyllite and siltstone) and Middleton Sandstone (medium grained grey meta-sandstone). Areas of higher elevation remnant plateau occur: these are typically underlain by hard and clean meta-sandstone typical of the central plateau, and if not eroded, are deeply weathered with ironstone gravel. Areas of alluvium occur in river flats and along some drainage lines. Minor areas of recently deposited, shell sand occur at river mouths along the coast (Gantheaume Sand member of the St Kilda Formation).

Topography: The land system is dominated by creek gullies and steep slopes. Only a few areas of level to gently undulating land occur (low level plateau areas). Some remnant plateau areas remain in the form of ridges. The Snelling fault area in the east mostly drains westward via Sall Creek into Middle River or north toward the coast, or via a small eastward flowing upper tributary of the Cygnet River in the very east. The rest of the system (from Snelling Beach to Cape Forbin) either drains directly northward into the sea via coastal gullies, via creek gullies which finish in the sea, or via creek gullies eastward into Middle River and then into the sea. Creeks and gullies include (from west to east): the De Mole River, Whale Gully, Kangaroo Gully, Wreck Gully, Snug Cove Creek, Waterfall Creek, Castle Gully, Sheoak Gully, Valley Creek, Western River (West and East Branches), Horse Gully, Yacca Gully, Water Gully, White Tree Creek, McPherson Creek, the lower Middle River, Goat Hill Creek and Sall Creek

Elevation: Elevation ranges from sea level to approximately 200 m above sea level

Relief: Relief ranges from 20 m to over 100 m in some of the steeper gullies

Main soils:

K2-**K1**	Loam over brown clay on rock
K5-**L1**	Gradational loam on rock and shallow soil on rock
F1	Loam over brown clay
K4-**L1**	Sandy loam over brown clay on hard rock and shallow soil on hard rock

Minor soils:

J2	Ironstone soil
M2	Deep dark clay loam
H1	Carbonate sand

Main features: This land system is mostly non arable due to steep slopes, rockiness, and/or wetness in creek gullies. However, the area mostly has fertile soils, and is one of the more fertile areas of Kangaroo Island. The main soil type is a loam over clay on weathered rock. On the arable land the main limitations are due to waterlogging, acidity and rockiness. Arable sloping land has a potential risk of water erosion and is often cut by drainage lines and gullies.

Soil Landscape Unit summary: Snelling Land System (SNE)

SLU	% of area	Main features #
AGB AGBx AGD AGDx AGE AGEx AGm	0.6 0.2 31.5 4.9 9.8 7.5 14.7	Non arable gullies. Main soils: loams over brown clay on rock **K2**-**K1** (*stony Brown-Red Sodosol-Dermosol*). And shallow rocky soils: gradational loams on rock and shallow soil on rock **K5**-**L1** (*stony Dermosol-Tenosol*). Some upper gully slopes have less fertile, sandier soils formed on meta-sandstone: sandy loam over brown clay on hard rock and shallow soil on hard rock **K4**-**L1** (*rocky Sodosol-Tenosol*). **AGB** – wetter, lower slopes and gullies (slopes 10-40%, relief typically around 30m, 5e, 3-4w) **AGBx** – wetter, coastal lower slopes and gullies (slopes 10-40%, relief typically around 30m, 5e, 3-4w) **AGD** – steep gullies and slopes (slopes 30->100%, relief typically 30-90m, 6e, 2-3w) **AGDx** – steep coastal gullies and slopes (slopes 30->100%, relief typically 30-90m, 6e, 2-3w) **AGEx** – very steep coastal gullies (slopes 50-200%, relief typically around 90m, 7-6e, 2-3w). **AGm** – creek gullies (slopes 10-40%, relief usually <30m, 4-5e, 4-5w). Mostly covered by tall sugar gums. Summary: non arable steep gullies and slopes, and creek gullies, with relatively fertile soils. Native vegetation mostly dominated by tall sugar gums. Bands of very rocky soil formed on harder rock have native vegetation dominated by drooping sheoaks; while patches of soils with ironstone, primarily on remnant plateau areas, are dominated by stringybark gums.
BIB BIC BICg BID	0.2 3.9 2.1 1.4	Slopes and drainage lines. Main soils: loams over brown clay on rock **K2**-**K1** (*stony Brown-Red Sodosol-Dermosol*); and gradational loams on rock with some shallow soil on rock **K5**-**L1** (*stony Dermosol-Tenosol*). Some deeper soils occur: loams over brown clay **F1** (*Brown Sodosol*). Minor to limited areas of ironstone soil **J2** (*Ferric Brown Chromosol-Sodosol-Kurosol*) on upper slopes and isolated crests, with native vegetation dominated by stringybark gums. **BIB** – exposed lower slopes and drainage lines (slopes 2-8%, 2-3e, 2-3w) **BIC** – slopes, drainage lines and a few gullies (slopes 3-20%, typically around 10%, with steeper slopes in gully areas, 3-4e, 3-4w, 1-2g) **BICg** – upper drainage area: slopes and drainage lines; which can have minor gullying along drainage lines and minor rilling on slopes when cleared (slopes 3-20%, 3-4e, 4-3-4w, 2g, 2-1s) **BID** – slopes and drainage lines (slopes 10-20%, 4e, 4-3w). Summary: stony areas, typically with native vegetation dominated by sugar gums.
BkB BkBx BkBw BkBg BkC BkZ BkZx	2.3 0.3 0.4 0.3 1.3 1.3 2.9	Areas with mostly loamy texture contrast soils developed on phyllite, or sometimes on dirty meta-sandstone or meta-siltstone. Main soils: loams over brown clay on rock **K2**-**K1** (*stony Brown-Red Sodosol-Dermosol*); sometimes with gradational loam on rock and shallow soil on rock **K5**-**L1** (*stony Dermosol-Tenosol*). Minor to limited areas of ironstone soil or soils formed on harder rocks may occur. **BkB** – upper slopes and summits (1-4%, 2-3e, 2-3w) **BkBx** – exposed upper slopes and summits (1-4%, 2e, 2-3w) **BkBw** – wetter lower slopes (1-4%, 2-3e, 3-4w) **BkBg** – wetter slopes with drainage lines (slopes 1-4%, 2-3e, 3-4w, 2g) **BkC** – upper slopes (3-10%, 3e, 2-3w) **BkZ** – remnant low level plateau surfaces (slopes 0-3%, 2-1e, 3w) **BkZx** – exposed remnant low level plateau surfaces (slopes 0-3%, 2-1e, 3w) Summary: these are fertile areas with native vegetation dominated by large sugar gums.

CAC CAZ	0.5 0.4	Semi arable plateau areas dominated by stony sandy loam texture contrast soils developed on meta-sandstones. Main soils: mostly sandy loams over brown clay on hard rock and shallow soil on hard rock **K4**-**L1** (*rocky Sodosol-Tenosol*). **CAC** – upper slopes (slopes 3-8%, 3-2e, 2-1w). **CAZ** – exposed stony crests/remnant plateau surfaces (slopes 0-6%, 3-2e, 2w) Summary: less fertile stony areas.
CBC CBZ CBZr	0.3 0.9 0.6	Areas with mostly sandy loam texture contrast soils developed on meta-sandstones. Main soils: sandy loams over brown clay on hard rock, possibly with some, shallow soil on hard rock **K4**-**L1** (*rocky Sodosol-Tenosol*). With some ironstone soil **J2** (*Ferric Brown Chromosol-Sodosol-Kurosol*). Minor to limited low lying patches formed on softer phyllite, dirty meta-sandstone or meta-siltstone may occur: loams over brown clay on rock **K2**-**K1** (*stony Brown Sodosol-Dermosol*) with native dominated by large sugar gums. **CBC** – upper slopes and drainage areas, or just upper slopes (slopes 2-10%, 3-2e, 3-4w). **CBZ** – stony crests/remnant plateau surfaces (slopes 0-2%, 2-1e, 2-3w) **CBZr** – stony and sloping crests/remnant plateau surfaces and upper slopes (slopes 0-5%, 3e, 2-3w) Summary: less fertile areas with native vegetation dominated by stringybark gums, which are often low.
FOB FOBr	2.5 0.4	Areas with mostly texture contrast soils with ironstone gravel. Main soils: ironstone soil **J2** (*Ferric Brown Chromosol-Sodosol-Kurosol*). With some texture contrast soil without ironstone gravel, some of which has weathered meta-sandstone, siltstone or phyllite at a depth of less than one metre: loams over brown clay on rock **K2**-**K1** (*stony Brown-Red Sodosol-Dermosol*); sandy loams over brown clay on hard rock **K4** (*rocky Sodosol*); and/or loams over brown clay **F1** (*Brown Sodosol*). . **FOB** – lower slopes (1-4%, 2-3e, 3-4w, 1-2g). Some areas have sandy topsoil. **FOBr** – slopes (1-3%, 2e, 3w). Summary: less fertile ironstone areas with native vegetation dominated by stringybark gums.
FVZ	0.2	Remnant plateau surfaces mostly with texture contrast soils with ironstone gravel. Main soils: ironstone soil **J2** (*Ferric Brown Chromosol-Sodosol-Kurosol*); and loams over brown clay on rock **K2**-**K1** (*stony Brown-Red Sodosol-Dermosol*) and/or sandy loams over brown clay on hard rock **K4** (*rocky Sodosol*). **FVZ** – remnant plateau surfaces in the form of isolated ridges (1-5%, 2e, 3-2w) Summary: less fertile ironstone areas with native vegetation dominated by stringybark gums.
FYD	0.1	Remnant plateau areas in the form of conical peaks. Main soils: ironstone soil **J2** (*Ferric Red Chromosol*). **FYD** – remnant plateau forming an isolated peak (slopes 10-40%, 4e, 1w) Summary: remnant plateau in the form of isolated peaks with well drained ironstone soils.
HKZ HKO HKOr	5.9 0.2 0.1	Mostly arable low-level plateau surfaces and a few drainage depressions. Vegetation is typically dominated by sugar gums. These areas are closely related to ironstone plateau areas (**F**** land units) but are generally more fertile; and also closely related to **Bk*** areas but have deeper soils. Main soils: loams over brown clay **F1** (*Brown Sodosol*). And ironstone soil **J2** (*Ferric Brown Chromosol-Sodosol-Kurosol*). With some soils formed on rock: loams over brown clay on rock **K2**-**K1** (*stony Brown Sodosol-Dermosol*) and/or sandy loams over brown clay on hard rock **K4** (*rocky Sodosol*). *Relatively low lying plateau areas:* **HKZ** – low-level plateau surfaces (slopes 0-2%, 1-2e, 3-4w). *Drainage depressions:* **HKO** – sluggishly drained drainage depressions with minor salinity (slopes 0-1%, 2-1e, 5-7w, 2-3s). **HKOr** – steeper sluggishly drained drainage depression with minor to moderate salinity (slopes 1-3%, 3-2e, 5-7w, 3-2s). Summary: relatively fertile areas, however, fertility is reduced where ironstone gravel occurs; and waterlogging can be a problem.

WBB	1.2	Rocky coastal cliffs. **WBB** – coastal cliffs (slopes >100%, 7e)
WGE WGe WGp	0.1 0.1 0.02	Low beach dunes and beaches at river mouths. Main soils: carbonate sands **H1** (*Shelly Rudosol*). Some soils with calcreted calcarenite at less than one metre on the landward side of the dunes at mouth of Middle River. **WGE** – low beach dunes and beach (<5m high, 5-7a, 1w). The mouth of Middle River. **WGe** – mostly bare low beach dunes and beach (<5m high, 7-5a, 1w). Western River Cove and Snug Cove. **WGp** – mostly bare sand spreads on cliff slopes >100%. Snug Cove. Summary: non arable dunes and beaches of recent wind deposited origin.
XMU	1.0	River flats. Lower Middle River and Western River flats. Main soils: deep dark clay loams **M2** (*Black-Grey Dermosol*). With some older carbonate sands **H1** (*Shelly Calcarosol*), and minor areas of calcareous sandy loams on calcreted calcarenite (Petrocalcic Calcarosol) near the mouth of Middle River. **XMU** – flats and lower reaches of rivers (slopes <0%, 5-7w) Summary: wet, but mostly fertile river flats. Area subject to flooding.

Classes in the 'Soil Landscape Unit summary' table (eg. 2-1e, 3w, 2y, etc) describe the predominant soil and land conditions, and their range, found in Soil Landscape Units. The number '1' reflects minimal limitation, while increasing numbers reflect increasing limitation. Letters correspond to the type of attribute:

a - wind erosion	e - water erosion	f - flooding	g - gullying
r - surface rockiness	s - salinity	w - waterlogging	y – exposure

Detailed soil profiled descriptions:

Main soils:

K2-**K1** Loam over brown clay on rock (*stony Brown-Red Sodosol-Dermosol*)
Thin to medium thickness dark grey-brown smooth loam, silty loam or fine sandy loam, usually underlain by a clay loamy to light clayey subsurface layer, over a clay subsoil usually with some weathered rock fragments; underlain by weathered rock at shallow to moderate depth. The surface and subsurface layers are often stony, with phyllite, siltstone, sandstone and/or quartz fragments. The subsoil clay can be red to brown, or yellow-brown to olive-brown in less well drained positions. This clay is often slightly dispersive. Soil pH varies from acidic to strongly acidic. These are fertile soils supporting a native vegetation dominated by tall sugar gums. Found in gullies, on slopes, and on some lower level remnant plateau areas.

K5-**L1** Gradational loam on rock and shallow soil on rock (*stony Dermosol-Tenosol*)
Thin to medium thickness dark grey-brown smooth loam, silty loam or fine sandy loam grading into silty loam, clay loam or light clay, overlying weathered rock at shallow to moderate depth. The soil usually contains phyllite, siltstone, sandstone and/or quartz fragments. These are fertile but shallow soils, usually supporting native vegetation dominated by tall sugar gums and often drooping sheoaks. Found in gullies, especially on steeper slopes.

F1 Loam over brown clay (*Brown Sodosol*)
Thin to medium thickness dark grey-brown smooth loam or fine sandy loam, usually underlain by a loamy subsurface layer, over a dispersive olive-brown clay subsoil. Weathered rock (phyllite, siltstone, sandstone or meta-sandstone) occurs at depth. Typically native vegetation on these soils is dominated by sugar gums. (Those developed on hard meta-sandstone are the least fertile and have the sandiest topsoils, and typically have native vegetation dominated by stringybark gums.) Soil pH is acidic. Found on level to gently undulating lower level plateau surfaces.

K4-**L1** Sandy loam over brown clay on hard rock and shallow soil on hard rock (*rocky Sodosol-Tenosol*)
Medium to thick sandy loam or sometimes loamy sand, often with a bleached subsurface layer, over sodic clay usually containing some weathered rock fragments, and overlying weathered or hard meta-sandstone. The topsoil often directly overlies weathered rock or hard rock. The topsoil layers often contain abundant meta-sandstone and quartz fragments. Soil pH is strongly acidic to acidic. Native vegetation is dominated by drooping sheoaks, mallees or low stringybarks. Found on remnant crests and upper slopes.

Minor soils:

J2 Ironstone soil (*Ferric Brown-Red Chromosol-Sodosol-Kurosol*)
Texture contrast soils with sandy loam to fine sandy loam topsoil containing ironstone gravel, overlying mottled brown or red clay subsoil. Soil pH is strongly acidic to acidic. Native vegetation is dominated by stringybark gums. Found on remnant plateau surfaces. Red subsoils occur on the conical shaped remnant peaks.

M2 Deep dark clay loam (*Black-Grey Dermosol*)
Thick to very thick black well structured silty loam overlying sodic black or very dark grey-brown silty light clay. Soil pH grades from neutral to alkaline. Found on the river flats of the lower Middle and Western rivers. Grading towards peat.

H1 Carbonate sand (*Shelly Rudosol-Calcarosol*)
Recently deposited fine shell sand. Deposited as dunes or sand spreads at or near river mouths. Soil pH is alkaline.

Further information: DEWNR Soil and Land Program