

# VIH Victor Harbor Land System

Gentle slopes abutting the ranges in the Victor Harbor - Port Elliot area

**Area:** 29.3 km<sup>2</sup>

**Annual rainfall:** 500 – 675 mm average

**Geology:** The land system lies within an old glacial valley. Alluvium derived from the basement rock ranges of adjacent land systems has covered large areas of the older sediments. Most of the alluvium is clayey but some sandier deposits occur along the Inman River. Sediments of the ancient glacial valleys project through the alluvial cover over about a quarter of the area. These sediments include sandy clays, calcareous clays and weak sandstones. Basement rock outliers of adjacent systems occupy about 5% of the area. Much of the land is mantled by a veneer of aeolian carbonates which have been leached into the subsoils - this is more common in the south where the rainfall is lower.

**Topography:** The landscape is essentially a gently inclined outwash fan skirting the ranges of the Strangways and Giles Land Systems and running down to the coast of Encounter Bay. The Hindmarsh and Inman Rivers have cut through the fans and each has a well defined alluvial flat. The fans are also broken up by rises of basement rock, or more commonly, relict sediments of the old glacial valley.

**Elevation:** 0 m to 140 m

**Relief:** Up to 40 m

**Soils:** The soils are deep over unconsolidated sediments. Typical soils of gentle slopes and flats are hard setting sandy loam texture contrast profiles with dispersive clayey subsoils formed on alluvium. Uniform to gradational sandy loams and clay loams are common. Sandier surfaced texture contrast soils over glacial valley sediments are typical of rises.

**Main soils:**

- D3a** Sandy loam over poorly structured red clay on calcareous alluvium
- F2c** Sandy loam over poorly structured brown clay on glacial valley sediments
- F2a** Sandy loam over poorly structured brown clay on calcareous alluvium

**Minor soils:** *Soils formed on basement rock outwash sediments (non calcareous)*

- D3b** Sandy loam over poorly structured red clay
- F1** Loam over brown clay
- F2b** Sandy loam over poorly structured brown clay
- H3** Deep siliceous sand
- M1** Deep sandy loam
- M2** Deep gradational clay loam

*Soils formed on old glacial valley sediments*

- D5** Loamy sand over red clay
- E3** Grey cracking clay

*Soils in wet and usually saline conditions*

- N2** Wet saline clay loam
- N3** Wet black clay



**Main features:** The Victor Harbor Land System is characterized by gentle slopes with mainly sandy loam texture contrast soils. These have hard setting surfaces and dispersive clayey subsoils. Although deep and relatively fertile, workability, seedling emergence and infiltration are adversely affected, and soils are waterlogged in wet seasons. Water erosion risk is high on bare or cultivated land. Sandier surfaced soils over dispersive clay subsoils occur on rises which occupy about 25% of the area. These soils are prone to waterlogging due to perching of water on the clay. They are less fertile and more erodible than the soils of the gentle slopes. Most soils are marginal for irrigation. Potentially the most productive soils (deep gradational clay loams) occur on the flats of the Hindmarsh River.

**Soil Landscape Unit summary:** 21 Soil Landscape Units (SLUs) mapped in the Victor Harbor Land System

SLU	% of area	Main features #
A-g	0.2	Granite outcrops.
AAB	0.3	Moderately steep hillslopes and rolling low hills with relief of 50-100 m and slopes of 20-30%, formed on metasiltstones and minor metasandstones of the Tappanappa Formation, partially calcified. Rock outcrop is common. Most soils have loamy surfaces overlying weathering rock or red clay subsoils. Apart from depth, variations are due to the presence of soft carbonate accumulations in the subsoil. Main soils: <u>Shallow loam on calcified rock</u> - <b>L1d</b> (E) <u>Shallow acidic loam on rock</u> - <b>L1b</b> (E) <u>Shallow loam over red clay on rock</u> - <b>D1b</b> (L) <u>Acidic loam over red to brown clay on rock</u> - <b>K2</b> (L) The soils are fertile, but variable depth and moderately steep slopes limit use to grazing.
DiC	2.7	Undulating to gently rolling low hillslopes and occasional relatively flat summit surfaces formed on weakly calcified metasandstones, metagreywackes, phyllites and schists of the Tappanappa, Backstairs Passage and Tunkalilla Formations. Slopes range from about 3-16%, relief is up to 50 m. Rock outcrop is sporadic. Watercourses are well defined and sometimes gullied. Main soils: Gently inclined slopes with relief of 20-40 m and slopes of 3-8%.
DnD	1.4	Undulating rises to gently rolling low hills formed on metasiltstones and minor metasandstones of the Tappanappa Formation, partially calcified. Slopes range from 3% to 20% and relief varies from 20 to 80 metres, but is usually less than 50 metres. There is occasional rock outcrop. <b>DnD</b> Moderately inclined slopes with relief of 40-80 m and slopes of 10-20%. Most soils have loamy surfaces overlying red clay subsoils. Variations are due to the presence of soft carbonate accumulations in the subsoil, and the parent rock or sediment. Main soils: <u>Shallow loam over red clay on rock</u> - <b>D1b</b> (V) <u>Shallow loam on calcified rock</u> - <b>L1d</b> (L) on steeper rockier slopes <u>Sandy loam over red clay</u> - <b>D2</b> (L-M) on lower slopes These soils are mostly deep, well drained and inherently fertile. Poor surface soil structure leading to excessive runoff and impaired emergence is a problem in places. There is minor salinity. Overall production potential is high.
HGC	10.7	Undulating rises with slopes of 3 to 10% and relief of less than 30 metres formed on sandy clays and sandstones of Permian glacial valleys, calcified by the input of windblown carbonate (lime), which has leached into the soil. There are three main soils, the common feature being the accumulation of carbonates in the lower part of the profile. Sandy to loamy texture contrast soils are most common with limited areas of grey clay soils. Main soils: <u>Sandy loam over poorly structured brown clay</u> - <b>F2c</b> (E) <u>Loamy sand over red clay</u> - <b>D5</b> (E) <u>Grey cracking clay</u> - <b>E3</b> (L) Although deep, these soils are poorly structured and have moderately low natural fertility. Dispersive clay subsoils at relatively shallow depth restrict their value for irrigation, and they are highly erodible. Productive potential is low.



JHA JHB JHC JHL	1.1 17.4 13.1 2.8	<p>Outwash fans and flats adjacent to the ranges formed on alluvial sandy clays and clays, weakly calcified, derived from the erosion of basement rock materials. Slopes range from 1% to 10%. Weakly defined watercourses cross the fans to the sea.</p> <p><b>JHA</b> Lower Inman River flats with slopes of 0-1%.  <b>JHB</b> Fans with slopes of 1-3%.  <b>JHC</b> Fans with slopes of 3-10%.  <b>JHL</b> Fans with slopes of 2-3% and sporadic saline seepages.</p> <p>The most common soils have texture contrast profiles with sandy to loamy surfaces and subsoils varying from red clays to brown mottled clays most of which are sodic.  Main soils: <u>Sandy loam over poorly structured red clay</u> - <b>D3a</b> (V)  <u>Sandy loam over poorly structured brown clay</u> - <b>F2a</b> (C)  <u>Deep gradational clay loam</u> - <b>M2</b> (M)</p> <p>These soils are deep and relatively fertile but poorly structured. Surfaces set hard and affect workability and seedling emergence. They tend to shed water, and are highly erodible. The dispersive subsoils perch water, causing subsurface waterlogging in wet periods. With sound surface management they can be productive, but irrigation potential is limited.</p>
LKB	1.1	<p>Lower slopes formed on sandy clays and clays derived from the localized reworking of upslope glacial valley sediments. Slopes are up to 6%.</p> <p><b>LKB</b> Slopes of less than 3%</p> <p>The soils are predominantly sandy with clayey subsoils, but there are some heavier types.  Main soils: <u>Thick sand over clay</u> - <b>G3b</b> (V)  <u>Sandy loam over brown clay</u> - <b>F1a</b> (M)  <u>Deep black clay loam</u> - <b>M2b</b> (M)</p> <p>These soils are deep but inherently infertile and imperfectly drained. They are also susceptible to acidification (having low buffering capacities), erosion (to both wind and water) if exposed, and may be water repellent. The land provides good grazing with potential for irrigation of fodder crops, and has some scope for horticultural development where drainage problems can be overcome.</p>
LfA LfE	13.1 1.9	<p>Flats of the lower Hindmarsh River and associated tributaries. Underlying sediments are medium to fine grained.</p> <p><b>LfA</b> Broad river flats.  <b>LfE</b> Narrow drainage depressions.</p> <p>The characteristic soils are deep clay loams associated with sandier texture contrast soils.  Main soils: <u>Deep gradational clay loam</u> - <b>M2</b> (E)  <u>Loam over brown clay</u> - <b>F1</b> (C)  <u>Sandy loam over poorly structured red clay</u> - <b>D3a</b> (C)  <u>Deep sandy loam</u> - <b>M1</b> (L)</p> <p>These soils are deep, generally well structured (except D3) and fertile. Although waterlogging is a problem in places, they are potentially productive for a range of uses.</p>
LpB LpH	2.6 7.2	<p>Gentle slopes formed on clayey sediments derived from adjacent basement rock hills. Watercourses are well defined and severely eroded in places.</p> <p><b>LpB</b> Very gently inclined slopes and valley flats with slopes of 1-3%.  <b>LpH</b> Gently inclined slopes of 3-10% with eroded watercourses.</p> <p>The dominant soils have hard sandy loam surfaces over dispersive clayey subsoils.  Main soils: <u>Sandy loam over poorly structured brown clay</u> - <b>F2b / F2a</b> (E)  <u>Sandy loam over poorly structured red clay</u> - <b>D3b / D3a</b> (E)</p> <p>These soils are deep and moderately fertile, but are limited by poor structure. Surfaces set hard and affect workability and seedling emergence. They tend to shed water, and are highly erodible. The dispersive subsoils perch water, causing subsurface waterlogging in wet periods. With sound surface management they can be productive, but irrigation potential is limited.</p>



MxA	3.3	Gently undulating rises formed on calcreted calcarenite of an old coastal dune. Soils are shallow over calcrete. Low rises on Bridgewater Formation calcarenites, capped by Class III carbonates with variable rubble content. There is up to 20% surface calcrete. Soils are mostly calcareous throughout with abundant soft or rubbly carbonate at shallow depth. Main soils: <u>Deep calcareous sandy loam</u> - <b>A4</b> (E) <u>Shallow calcareous sandy loam</u> - <b>B2</b> (E) <u>Gradational red sandy loam</u> - <b>C1</b> (C) <u>Shallow sand over clay on calcrete</u> - <b>B7a</b> (L) Low to moderate waterholding capacities and occasional rocky reefs are the main limitations. This can lead to patchiness in crops due to variations in moisture stress. Fertility is affected to some extent by nutrient tie-up induced by the calcareous soils.
PuC PuD	3.6 12.2	Rises formed on sandy clays and calcareous clays deposited in old glacial valleys. <b>PuC</b> Rises to 20 m high with slopes of 3-8%. <b>PuD</b> Rises and low hills to 40 m high with slopes of 8-16%. The soils are predominantly sandy with heavy clay subsoils. Main soil: <u>Loamy sand to sandy loam over poorly structured brown clay</u> - <b>F2c</b> (D) These soils are deep but imperfectly drained and of inherently low fertility. The sandy surface is readily waterlogged due to perching of water on the clayey subsoil. Unless surface soils are thick (more than 30 cm), this is a major limitation, particularly for irrigation. The sandy surfaces are highly erodible, especially to water, but also to wind.
WEW	1.3	Gentle slopes and low coastal dunes bordering Basham Beach. No soils data.
XRC	0.4	Wet marginally saline depression. Main soil: <u>Wet black clay</u> - <b>N3</b> (D) This small area is too wet for uses other than summer/autumn grazing.
XZJ	1.7	Flats of the lower Inman River. Only one soil recorded – <u>deep siliceous sand</u> - <b>H3</b> . These flats carry extensive timber, are subject to flooding and are not used for primary production.
ZA-	1.9	Saline lower slopes and depressions associated with the <b>JH*</b> landscapes. Main soils: <u>Wet saline clay loam</u> - <b>N2</b> (V) Saline variants of <u>sandy loam over poorly structured brown clay</u> - <b>F2a</b> (C) This land is too saline for cropping, but capable of supporting productive salt tolerant pasture species.

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

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|--|---------------------------------------|
| (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 formed on basement rock outwash sediments

- D3a** Sandy loam over poorly structured red clay (Calcic, Red Sodosol)  
25 - 55 cm hard brown sandy loam to sandy clay loam with a pale brown or pink gravelly A2 layer, over a hard red and brown mottled medium clay with strong coarse prismatic structure, and soft calcareous segregations from about 70 cm.
- D3b** Sandy loam over poorly structured red clay (Eutrophic, Red Sodosol)  
25 - 55 cm hard brown sandy loam to sandy clay loam with a bleached gravelly A2 layer, over a hard red and brown mottled medium clay with strong coarse prismatic structure, continuing below 100 cm without calcareous segregations.
- F1** Loam over brown clay (Eutrophic, Brown Chromosol)  
40 - 70 cm hard dark loam to clay loam with a bleached A2 layer, over a brown, red and yellowish mottled light clay.



- F2a** Sandy loam over poorly structured brown clay (Calcic, Brown Sodosol)  
25 - 40 cm hard grey sandy loam with a bleached or pale grey A2 layer, over a brown, grey and red mottled clay with coarse prismatic structure and soft carbonates from about 65 cm.
- F2b** Sandy loam over poorly structured brown clay (Eutrophic, Brown Sodosol)  
25 - 40 cm hard grey sandy loam with a bleached A2 layer, over a brown, grey and red mottled clay with coarse prismatic structure continuing below 100 cm without calcareous segregations.
- H3** Deep siliceous sand (Regolithic, Bleached-Orthic Tenosol)  
Very thick loose bleached sand, becoming pale brown with depth, continuing below 100 cm.
- M1** Deep sandy loam (Regolithic, Brown-Orthic Tenosol / Eutrophic, Brown Kandosol)  
Thick grey brown sandy loam to loamy sand with a pale grey A2 layer grading to a dark grey light sandy clay loam, continuing below 100 cm.
- M2** Deep gradational clay loam (Eutrophic, Brown / Black Dermosol)  
25 - 65 cm dark brown to dark grey well structured clay loam grading to a reddish brown to dark grey clay continuing below 100 cm.

*Soils formed on old glacial valley sediments*

- D5** Loamy sand over red clay (Calcic, Red Chromosol)  
30 - 40 cm firm brown loamy sand to sandy loam with a pale grey A2 layer, over a red and brown light to medium clay with coarse blocky structure and soft calcareous segregations from about 60 cm grading to massive sandy clay.
- E3** Grey cracking clay (Epipedal, Grey / Brown Vertosol)  
Medium thickness calcareous grey brown sandy clay grading to a dark grey and yellowish brown mottled heavy clay with strong coarse prismatic structure and abundant soft carbonate from about 50 cm.
- F2c** Loamy sand to sandy loam over poorly structured brown clay (Calcic, Brown Sodosol)  
25 - 40 cm firm loamy sand to sandy loam with a pale grey or bleached massive A2 layer, sharply overlying a dark grey and yellowish brown mottled heavy clay with coarse blocky structure, and soft carbonate from about 65 cm, grading to grey platy clay.

*Soils in wet and usually saline conditions*

- N2** Wet saline clay loam (Dermosolic, Salic Hydrosol)  
20 - 40 cm dark grey clay loam over a black clay with yellowish brown and grey mottles and variable soft or nodular carbonate at depth. These soils are commonly permanently wet and marginally to highly saline.
- N3** Wet black clay (Dermosolic, Oxyaquic Hydrosol)  
Medium thickness black well structured light clay over a black medium clay.

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

