

# FCB Flour Cask Bay Land System

Undulating rises, and some remnant jumbled calcreted dune areas which form part of an old beach ridge. The rises of this system are separated into six distinct areas, three of which are quite small, and they form a line roughly parallel to the coast. This system is surrounded on most sides by low-lying plains with lagoons, but is adjacent to other remnant dune areas in the north-east. Another old beach ridge lies between this system and the ocean. Views of Flour Cask Bay can be seen from various vantage points on these rises.

**Area:** 13.4 km<sup>2</sup>

**Annual rainfall:** 515 – 540 mm average

**Geology:** This south-west to north-east running rise is an old beach ridge, mostly formed from Quaternary age second lowest member Bridgewater Formation. Bridgewater Formation consists of calcreted calcarenite underlain by highly calcareous unconsolidated sediments. In places this Bridgewater material has been 'stripped' or 'dissolved' away, revealing clayey sediments. Recent sand deposits, derived from nearby lagoonal floors and sandy plains overlie the older sediments in places. This area is underlain by early Cambrian age Kanmantoo Group meta-sediments at depth.

**Topography:** Undulating rises. Slopes are commonly 2 - 8%, with about 10% being the steepest slope encountered. Some of the calcreted areas have a remnant jumbled dune topography with dunes from about 5m to 15m high. Sand deposits form low linear dunes, running north-west to south-east, or sand spreads and overlie existing topography in places.

**Elevation:** To 70 m in the extreme north-east, to 10 m in the extreme south-west

**Relief:** Typically 10 - 20 m, with a maximum relief of about 30 m in the north-east

**Main Soils:** **B3-B7** Shallow soil on calcrete  
**G4-G3** Sand over sodic clay

**Minor Soils:** **B8** Very shallow soil on calcrete  
**I1-H3** Very thick sands

**Main Features:** Semi-arable. Topsoils are sandy. Mostly shallow soils over calcrete. Soils over calcrete have limited use due to their shallow depth and rubbly nature. Sandy soils pose a wind erosion risk and are naturally infertile, especially the deeper ones. Where clayey subsoils occur, these are sodic, and have low permeability due to their dispersive nature and associated poor structure. This leads to water movement along the clay subsoil surface toward lower-lying areas. Water is also prone to runoff areas with very shallow soils on sheet calcrete.



**Soil Landscape Unit summary:** Flour Cask Bay Land System (FCB)

SLU	% of area	Main features #
OZD	1.2	<p>Semi-arable sand dunes on very gentle slopes. Main soils: bleached <u>very thick sands I1-H3</u> (<i>Podosol-Tenosol</i>).</p> <p><b>OZD</b> – low linear dunes &lt;5m, running NW-SE. Summary: the main issues are very low fertility, high wind erosion risk, strong water repellence and relatively low waterholding capacity due to the sandy nature of these soils.</p>
OYD	0.6	<p>Semi-arable sand dunes on very gentle slopes; with calcreted areas. Main soils: bleached <u>very thick sands I1-H3</u> (<i>Podosol-Tenosol</i>). With 10-30% <u>shallow soil on calcrete</u> - sandy topsoil over sandy to clay loamy subsoil on calcrete <b>B3-B7</b> (<i>Petrocalcic Tenosol-Chromosol</i>).</p> <p><b>OYD</b> – low linear dunes &lt;5m, running NW-SE. Summary: the main issues are very low fertility, high wind erosion risk, strong water repellence and relatively low waterholding capacity with the deeper sands; and the shallow nature, low water holding capacity and stoniness of the shallow soils on calcrete.</p>
OYJ	1.0	<p>Arable to semi-arable sand dunes on summit surface; with sands on sodic clay and calcreted areas. Main soils: bleached <u>very thick sands I1-H3</u> (<i>Podosol-Tenosol</i>). With 10-30% <u>shallow soil on calcrete</u> - sandy topsoil over sandy to clay loamy subsoil on calcrete <b>B3-B7</b> (<i>Petrocalcic Tenosol-Chromosol</i>). With 10-30% <u>sand over sodic clay G3</u> (<i>Brown Sodosol</i>).</p> <p><b>OYJ</b> – 30-60% low linear dunes &amp; sandy rises &lt;5m, running NW-SE. Summary: the main issues are very low fertility, high wind erosion risk, strong water repellence and relatively low waterholding capacity with the deeper sands; and similar but lesser problems on the sand over clay soils; and the shallow nature, low water holding capacity and stoniness of the shallow soils on calcrete; also the sodic nature of the clayey subsoils in the sand over clay soils.</p>
MqB MqC	0.7 18.0	<p>Semi-arable calcreted slopes and rises with sands on sodic clay. Main soils: <u>shallow soil on calcrete</u> - sandy topsoil over sandy to clay loamy subsoil on calcrete <b>B3-B7</b> (<i>Petrocalcic Tenosol-Chromosol</i>). With 10-40% <u>sand over sodic clay G4-G3</u> (<i>Brown Sodosol</i>)</p> <p><b>MqB</b> – slopes (1.5-3%, 2e) <b>MqC</b> – slopes (3-10%, 3e) Summary: the main issues are the low waterholding capacity and stoniness of the shallow soils on calcrete; and the relative infertility, wind erosion risk, water repellence, and sodic subsoil of the sand over clay soils. In addition there is some water erosion risk on this sloping land.</p>
MpC MpYB	18.0 18.5	<p>Non-arable to semi-arable calcreted slopes, rises and remnant dunes. Main soils: <u>shallow soil on calcrete</u> - sandy topsoil over sandy to clay loamy subsoil on calcrete <b>B3-B7</b> (<i>Petrocalcic Tenosol-Chromosol</i>). With 0-10% sandy topsoil over sodic clay <b>G4-G3</b> (<i>Brown Sodosol</i>). With 0-10% <u>very shallow soil on calcrete B8</u> (<i>Petrocalcic Rudosol</i>).</p> <p><b>MpC</b> – slopes (3-10%, 3e) <b>MpYB</b> – jumbled dune topography (5-15m, 3e) Summary: the main issues are the low waterholding capacity and stoniness of these shallow soils; and some water erosion risk on this sloping land.</p>
MrYA	5.0	<p>Semi-arable calcreted low dune topography with some swale areas on rising ground; with sand deposits. Vague linear to jumbled dune topography running approximately NW-SE. Main soils: <u>shallow soil on calcrete</u> - sandy topsoil over sandy to clay loamy subsoil on calcrete <b>B3-B7</b> (<i>Petrocalcic Tenosol-Chromosol</i>). With 10-30% bleached <u>very thick sands I1-H3</u> (<i>Podosol-Tenosol</i>). With 0-10% sandy topsoil over sodic clay <b>G4-G3</b> (<i>Brown Sodosol</i>).</p> <p><b>MrYA</b> – low dune topography (&lt;5m, 2e) Summary: the main issues are the low waterholding capacity and stoniness of the shallow soils; and the very low fertility, high wind erosion risk, strong water repellence and relatively low waterholding capacity of the deeper sandy soils.</p>



MsC MsYA	5.1 1.7	<p>Semi-arable calcreted slopes, rises and remnant dunes; with sand deposits as linear dunes, running NW-SE, and sands on sodic clay.</p> <p>Main soils: <u>shallow soil on calcrete</u> - sandy topsoil over sandy to clay loamy subsoil on calcrete <b>B3-B7</b> (<i>Petrocalcic Tenosol-Chromosol</i>). With 10-30% sandy topsoil on sodic clay <b>G3-G4</b> (<i>Brown Sodosol</i>). With 10-20% bleached <u>very thick sands</u> as linear dunes <b>I1-H3</b> (<i>Podosol-Tenosol</i>).</p> <p><b>MsC</b> – slopes (3-10%, 3e)  <b>MsYA</b> – low jumbled dune topography (approx. 5m, 2e)</p> <p>Summary: the main issues are the low waterholding capacity and stoniness of the shallow soils; and the infertility, wind erosion risk and water repellence of the sandy soils, especially the deeper ones; and sodic subsoil of the sand over clay soils. In addition there is some water erosion risk on this sloping land.</p>
PcA PcC PcK PcE	0.9 2.9 1.2 0.7	<p>Mostly arable thick, with medium thickness, sandy deposits on slopes &amp; depressions; with some calcreted areas.</p> <p>Main soils: <u>sand over sodic clay</u> - thick with some medium thickness sandy topsoil over sodic clay, with fine carbonate in lower subsoil <b>G3-G4</b> (<i>Brown Sodosol</i>). With 10-30% <u>shallow soil on calcrete</u> – sandy topsoil over sandy to clay loamy subsoil on calcrete <b>B7-B3</b> (<i>Petrocalcic Chromosol-Tenosol</i>).</p> <p><b>PcA</b> – plains, level to very gentle slopes (0-1.5%, 1e)  <b>PcC</b> – slopes (3-10%, 3e)  <b>PcK</b> – plains, level to very gentle slopes with &lt;10% saline seepage (0-1.5%, 1e, 2s).  <b>PcE</b> – depression.</p> <p>Summary: the main issues are infertility, wind erosion risk, water repellence and reduced waterholding capacity due to the sandy nature of the topsoils; some waterlogging in the depression area; and the sodic nature of many subsoils. In addition, in the areas with shallow soils on calcrete the main issues are the low water holding capacity and stoniness. Furthermore there is some water erosion risk on steeper land.</p>
PbA PbB PbC PbL PbE	2.2 3.5 22.1 2.1 1.2	<p>Mostly arable, medium thickness to thick sandy deposits on slopes and flats.</p> <p>Main soils: <u>sand over sodic clay</u> - medium thickness to thick sandy topsoil over sodic clay <b>G4-G3</b> (<i>Brown Sodosol</i>). With 0-10% bleached <u>very thick sands</u> on linear dunes <b>I1-H3</b> (<i>Podosol-Tenosol</i>). With 0-10% <u>shallow soil on calcrete</u> - sandy topsoil over sandy to clay loamy soil on calcrete <b>B7-B3</b> (<i>Petrocalcic Chromosol-Tenosol</i>).</p> <p><b>PbA</b> – plains, level to very gentle slopes (0-1.5%, 1e)  <b>PbB</b> – slopes (1.5-3%, 2e)  <b>PbC</b> – slopes (3-10%, 3e)  <b>PbL</b> – slopes with &lt;10% saline seepage (1.5-3%, 2e, 2s)  <b>PbE</b> – depression.</p> <p>Summary: the main issues are infertility, wind erosion risk and water repellence due to the sandy nature of the topsoils, waterlogging which occurs in lower-lying areas, and the sodic nature of many subsoils.</p>
PfB PfC	0.8 2.1	<p>Mostly arable, medium thickness sandy deposits on rises; with calcreted areas.</p> <p>Main soil: <u>sand over sodic clay</u> - medium thickness sandy topsoil over sodic clay <b>G4</b> (<i>Brown Sodosol</i>). With 10-30% <u>shallow soil on calcrete</u> - sandy topsoil over sandy to clay loamy subsoil on calcrete <b>B3-B7</b> (<i>Petrocalcic Tenosol-Chromosol</i>).</p> <p><b>PfB</b> – slopes (1.5-3.5%, 2e)  <b>PfC</b> – slopes (3-10%, 3e)</p> <p>Summary: the main issues are infertility, wind erosion risk, water repellence and reduced waterholding capacity due to the sandy nature of the topsoils, and the sodic nature of many subsoils. In addition the shallow soils on calcrete have low water holding capacity and many surface stones.</p>

# 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 - gullyng  
r - surface rockiness                      s - salinity                      w - waterlogging                      y - exposure



**Detailed soil profile descriptions:****Main Soils:**

- B3-B7** Shallow soil on calcrete (*Petrocalcic Tenosol-Chromosol*). Shallow, neutral sand to light sandy loam over yellow-brown to brown sandy loam or sandy light clay (sometimes this second layer mostly consists of calcrete fragments); on calcrete. Some soils have highly calcareous subsoils overlying the calcrete. Found on rises, slopes and calcreted dunes. (These soils are often intimately associated with very shallow soil on calcrete.)
- G4-G3** Sand over sodic clay (*Brown Sodosol*). Medium thickness to thick, neutral loamy sand to sand over bleached sand; over sodic yellow-brown to brown clay with some olive and possibly red mottles. The subsoil clay is usually only sodic in the upper B horizon. Occasionally there are calcrete fragments at the top of the clay layer. Sometimes there are ironstone nodules above the clay layer. Often with fine carbonate in lower subsoil. Some of these soils are likely to be Chromosols. Found on slopes, depressions and rises.

**Minor Soils:**

- B8** Very shallow soil on calcrete (*Petrocalcic Rudosol*). Very shallow, neutral sandy soil on calcrete. Areas of calcrete outcrop often occur. These soils are associated with shallow soil on calcrete. Found on rises, slopes and remnant dunes.
- I1-H3** Very thick sands (*Podosol-Tenosol*). Very thick, neutral loamy sand to sand over bleached sand over olive-yellow to yellow-brown sand, usually with some accumulations of iron and organic compounds. Underlain by a substrate of calcrete or sodic clay. Found on low linear dunes or sand spreads.

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

