

# PJU Port Julia Land System

Coastal plains on the east coast of Yorke Peninsula.

**Area:** 109 km<sup>2</sup>

**Landscape:** Coastal plains on the east coast of Yorke Peninsula, stretching from just south of Pine Point to south of Port Vincent. The land has almost no relief; level plains are the norm. However, the system is raised above sea level: cliffs mostly border St Vincent Gulf. This system can be considered in two parts. The main part down the western side is slightly low lying and is dominated by shallow stony soils formed on calcrete and some moderate depth 'sand over clay' profiles. The remaining eastern part is slightly elevated and largely consists of moderate depth soils formed in calcareous loess. Much of the calcrete in the west is remnant 'sand over clay' dune core material. A few isolated 'sand over clay' dunes occur in the north of the system. Clayey sediments (Hindmarsh Clay) underlie soils in some areas, especially the land adjacent to the Black Point area.

Coastal cliffs mostly reveal Quaternary age calcareous loess with rubble and calcrete layers overlying Tertiary age sediments. The Tertiary usually consists of orange sandy clay loam overlying sandstone, or sometimes sandy limestone (north of Port Vincent). Hindmarsh Clay overlies the Tertiary sediments in some areas (eg between Pine Point and Port Julia).

**Annual rainfall:** 370 - 415 mm average

**Main soils:**

- B3** *shallow red loam on calcrete*
- A4-A5** *calcareous loam*
- B2** *shallow calcareous loam on calcrete*
- B7** *shallow sand over clay on calcrete*
- B6** *shallow loam over red clay on calcrete*
- G4** *sand over clay*

**Minor soils:**

- A6** *gradational calcareous loam*
- G3** *thick sand over clay*
- D3** *loam over red clay*

**Main features:** The land system is mostly arable to semi arable. Many soils are very shallow and stony. The main soils are various shallow soils on calcrete, with significant amounts of deeper calcareous loam. Topsoils and mostly loams. Shallow and stony soils limit moisture holding capacity, and hence limit crop production potential. Stones also interfere with many farming practices. Where soils are calcareous, they limit the availability of certain nutrients: deficiencies of the major nutrient phosphorus and the trace element zinc are common, while deficiencies of the trace elements manganese and iron are possible. Temporary trace element deficiencies can occur in cold and wet conditions with susceptible crops. This is especially the case when soils have highly calcareous surfaces. Soils down the eastern side of the system tend to have highly calcareous surfaces, while those down the main western side of the system mostly have non calcareous surfaces.

Toxic accumulations of boron and sodium seem to occur in the subsoils of soils formed in calcareous loess or clay (ie down the eastern side of the system). There are a few areas where the surface expression of saline seepage is evident, in particular inland from Black Point.



Many soils have hardsetting surfaces, especially down the west side of the system, and many soils have dispersive subsoils.

Sandy topsoils, especially on the few dunes that occur, need to be carefully managed to avoid the problem of wind erosion.

### Soil Landscape Unit summary: Port Julia Land System (PJU)

SLU	% of area	Notes
GKA	9.6	Land dominated by sandy texture contrast soil. Main soils: <i>sand over clay G4</i> grading to <i>thick sand over clay G3</i> (especially on low sandy rises) and <i>loam over red clay D3</i> (especially in lows). With some <i>shallow sand over clay on calcrete B7</i> grading to <i>shallow loam over red clay on calcrete B6</i> , and some <i>calcareous loam A4-A5</i> . <b>GKA</b> – gently undulating coastal plain with a few very low sandy rises and a few drainage lows (slopes 0-1.5%).
HFJ	0.2	Land dominated by loamy texture contrast soil formed in clayey sediments. Main soils: <i>loam over red clay D3</i> underlain by weathered yellow sandstone. <b>HFJ</b> – coastal drainage depressions with some gullying (slopes 0-10%).
ICK ICO	3.7 0.3	Land dominated by calcareous soil formed in clayey sediments. Main soils: <i>gradational calcareous loam A6</i> . With some <i>calcareous loam A5</i> , and probably with some <i>sand over clay G4</i> grading to <i>shallow sand over clay on calcrete B7</i> and <i>shallow loam over red clay on calcrete B6</i> and/or <i>shallow calcareous loam on calcrete B2</i> . <b>ICK</b> – relatively low lying plain with some patches of marginal salinity (slopes 0-1%). <b>ICO</b> – coastal depression with drainage lows (slopes 0-1%).
OaC	0.1	Sand over clay sand dunes Main soils: <i>thick sand over clay G3</i> . <b>OaC</b> – sand dune.
ObD	0.4	Sand over clay sand dunes. Main soils: <i>thick sand over clay G3</i> grading to <i>sand over clay G4</i> and <i>shallow sand over clay on calcrete B7</i> . <b>ObD</b> – low sand dune.
O-D	0.03	Reworked sand. Main soils: <i>bleached siliceous sand H2</i> . <b>O-D</b> – low sand dune: reworked dune in the very north of system oriented north-south.
QBC	0.2	Land dominated by shallow calcareous soil on calcrete. Main soils: <i>shallow calcareous loam on calcrete B2</i> and extensive areas of rubbly <i>calcareous loam A4-A5</i> . <b>QBC</b> – mostly non arable coastal slopes (slopes 5-20%).
QCA	2.0	Land dominated by shallow calcareous soil on calcrete. Main soils: <i>shallow calcareous loam on calcrete B2</i> grading to <i>shallow red loam on calcrete B3</i> , and with extensive areas of rubbly <i>calcareous loam A4-A5</i> . <b>QCA</b> – very slightly elevated level plain (slopes <1%)
QnA	8.8	Land dominated by shallow soil on calcrete. Main soils: <i>shallow calcareous loam on calcrete B2</i> and extensive areas of <i>shallow red loam on calcrete B3</i> . With a few patches of <i>shallow sand over clay on calcrete B7</i> in the northern unit. <b>QnA</b> – level stony plain (slopes <1%).
QVA	6.3	Land dominated by shallow calcareous soil on calcrete. Main soils: <i>shallow calcareous loam on calcrete B2</i> grading to <i>shallow red loam on calcrete B3</i> , and with limited to common areas of rubbly <i>calcareous loam A4-A5</i> . <b>QVA</b> – slightly elevated coastal plain (slopes 0-1%).



RCK	12.1	Land dominated by shallow soil on calcrete. Main soils: <i>shallow red loam on calcrete</i> <b>B3</b> , with limited to common areas of <i>shallow calcareous loam on calcrete</i> <b>B2</b> . <b>RCK</b> – slightly elevated plain (slopes 0-1%)
RJA RJA1 RJK	7.3 3.0 9.7	Land dominated by shallow soil on calcrete. Main soils: <i>shallow red loam on calcrete</i> <b>B3</b> . <b>RJA</b> – slightly low lying level stony plain (slopes <1%). <b>RJA1</b> – slightly low lying very level stony plain (slopes <1%). <b>RJK</b> – mostly a slightly low lying level stony plain (slopes <1%).
RRA RRE	6.4 0.1	Land dominated by shallow soil on calcrete. Main soils: <i>shallow sand over clay on calcrete</i> <b>B7</b> grading to <i>shallow red loam on calcrete</i> <b>B3</b> and <i>shallow loam over red clay on calcrete</i> <b>B6</b> . <b>RRA</b> – very stony plain (slopes 0-1%). <b>RRE</b> – closed depression (slopes <1%).
RSA RSK	5.9 0.6	Land dominated by shallow soil on calcrete. Main soils: <i>shallow sand over clay on calcrete</i> <b>B7</b> grading to <i>shallow loam over red clay on calcrete</i> <b>B6</b> . With some <i>loam over red clay</i> <b>D3</b> grading to <i>gradational clay loam</i> <b>C4</b> and <i>sand over clay</i> <b>G4</b> . <b>RSA</b> – plain with a few very low rises (slopes 0-1%); usually very slightly elevated. <b>RSK</b> – somewhat low lying level stony plain (slopes <1%).
ShK	5.9	Land dominated by soils formed in rubbly calcareous loess. Main soils: <i>rubbly calcareous loam</i> <b>A4</b> . With limited to common areas of <i>shallow calcareous loam on calcrete</i> <b>B2</b> . <b>ShK</b> – level to gently undulating coastal plain (slopes <1%).
SMA SMC SMH	9.2 0.8 0.2	Land dominated by soils formed in calcareous loess. Main soils: <i>calcareous loam</i> <b>A4-A5</b> . <b>SMA</b> – gently undulating coastal plain (slopes 0-1%). <b>SMC</b> – coastal slopes with a few drainage lows (5-20%). <b>SMH</b> – coastal slopes with drainage lines with minor gullying (slopes 5-20%).
SOA SOB	3.9 1.3	Land dominated by soils formed in calcareous loess. Main soils: <i>calcareous loam</i> <b>A5-A4</b> . With limited to common areas of <i>gradational calcareous loam</i> <b>A6</b> . <b>SOA</b> – slightly elevated coastal plains (slopes 0-1%). <b>SOB</b> – coastal slopes (slopes 1-2%).
SVA	1.3	Land dominated by soils formed in calcareous loess. Main soils: <i>calcareous loam</i> <b>A4</b> (possibly with some <b>A5</b> ). With limited to common areas of <i>shallow calcareous loam on calcrete</i> <b>B2</b> . <b>SVA</b> – slightly elevated coastal plains (slopes 0-1%).
WAA WAB	0.4 0.2	Coastal cliff and gullies. <b>WAA</b> – coastal gullies with steep slopes (slopes 30-100%). <b>WAB</b> – coastal cliffs (slopes >100%).
WJQ	0.2	Coastal flats, formed by wave action, which are largely overlain by calcareous loess. Main soils: <i>calcareous loam</i> <b>A4</b> and <i>shallow calcareous loam on calcrete</i> <b>B2</b> . <b>WJQ</b> – narrow coastal flat with little apparent salinity: raised old beach areas.
ZA-	0.2	Salinised land. Main soils: <i>saline soil</i> <b>N2</b> ; most likely a saline variant of a <i>gradational calcareous loam</i> <b>A6</b> . <b>ZA-</b> – saline depression (5s).



**Detailed Soil Descriptions:****Main soils:**

- B3** *shallow red loam on calcrete* [Petrocalcic Tenosol]  
Red to red brown very shallow to shallow loam to clay loam on calcrete. Subsoils can be as heavily textured as light clay, and are often dispersive. Surfaces are typically hardsetting. These grade to calcareous **B2** soils.
- A4-A5** *calcareous loam* [Regolithic Hypercalcic-Lithocalcic Calcarosol]  
Grey brown to brown medium thickness calcareous loamy topsoil grading to loamy or clay loamy subsoil with abundant fine carbonate. Profiles often contain abundant hard carbonate rubble. Profiles are underlain by calcareous loess, clayey sediments (soil **A5**), or sometimes calcrete at moderate depth. Subsoils are typically strongly alkaline and dispersive. Lower subsoil and subsoil boron levels can be very high (eg approximately 35 ppm in fine sandy loam subsoils between 50 and 100cm depth). Correspondingly, subsoil sodium and salt levels are also high.
- B2** *shallow calcareous loam on calcrete* [Petrocalcic Calcarosol]  
Grey brown to red brown calcareous loamy to clay loamy soil overlying calcrete at shallow to very shallow depth. Profiles often contain abundant hard carbonate rubble.
- B7** *shallow sand over clay on calcrete* [Petrocalcic Red Sodosol-Chromosol]  
Medium thickness to thin sandy topsoil overlying a red to red brown clayey subsoil, which is underlain by calcrete at shallow to very shallow depth. Subsoils can be dispersive. The sandy topsoils are often water repellent. These soils grade to similar soils with loamy topsoils: soil **B6**.
- B6** *shallow loam over red clay on calcrete* [Petrocalcic Red Chromosol-Sodosol]  
Medium thickness to thin loamy topsoil overlying red clayey subsoil, which is underlain by calcrete at shallow to very shallow depth. Surfaces are often hardsetting, and subsoils can be dispersive.
- G4** *sand over clay* [Hypercalcic-Lithocalcic Red Sodosol-Chromosol]  
Medium thickness to thin loamy sand overlying red to red brown clayey subsoil which grades to clay with abundant fine carbonate. Subsoils can contain hard carbonate rubble. Subsoils can be coarsely structured, and are typically dispersive, at least in their lower part. Calcrete can occur at moderate depth. The sandy topsoils are often water repellent. These soils grade to similar soils with thick to very thick sandy topsoils which are found on sand dunes and low sandy rises: *thick sand over clay* **G3**.

**Minor soils:**

- A6** *gradational calcareous loam* [Pedal Hypercalcic-Lithocalcic Calcarosol]  
Calcareous grey brown to brown medium thickness to thick loamy topsoil grading to clayey subsoil with abundant fine carbonate. Fine carbonate content increases with depth. Subsoils are typically dispersive. Profiles can include hard carbonate rubble. Subsoil boron, sodium, and salt levels are high.
- D3** *loam over red clay* [Hypercalcic-Lithocalcic Red Chromosol-Sodosol]  
Medium thickness to thin loamy topsoil overlying red to red brown clayey subsoil which grades to clay with abundant fine carbonate. Subsoils can contain hard carbonate rubble, and are typically dispersive, at least in their lower part. These grade to similar soils with clay loamy topsoils found in drainage lows: *gradational clay loam* **C4**.

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

