

# PET Petersville Land System

Plains, including low lying plains and elevated plains, broad drainage areas, and drainage depressions

**Area:** 100.5 km<sup>2</sup>

**Landscape:** Plains, including low lying and elevated plains, broad drainage areas, and drainage depressions. This system has two parts: the main southern part and a smaller northern section. Most of the southern part forms a broad shallow depression, with higher elevation land to the west and east. Block faulting has caused this structure. The northern part of the system consists of an elevated plain, with lower lying land to the west, and land sloping away to the east.

The level nature of most of this system means that drainage is relatively poor. The main part of this system is slightly tilted to the west. This means that drainage depressions from the highlands to the east, come to an abrupt halt at the western edge of this part of the system. (The exception to this is the drainage depression of the Winulta Creek which cuts right across the system.) Water flow from the east is then dispersed along the low lying western strip of the system, eventually finding its way to a number of drainage depressions: the Winulta Creek, drainage depressions to the south and north of the main part of the system, and a number of drainage depressions which have their beginnings on the eastern edge of the system and cut-through the slopes and rises to the east. Drainage flow out of the system is toward the southeast. Significant overland flow of water is only usual in very wet seasons.

The soils of the system are mostly underlain by clayey sediments. Much of this clay is probably derived from the underlying bedrock, while some is alluvial/outwash sediment derived from the highlands to the west. These clays can be considered to be Hindmarsh Clay or equivalents, and they mostly give rise to soils with clay loamy and loamy topsoils overlying clayey subsoils. These areas are underlain by various Cambrian and Proterozoic age rocks. In the northeast of the main southern part of the system, there is an area underlain by younger Tertiary age coarse-grained quartz sands/sandstone which have given rise to texture contrast soils with sandy surfaces (as per the adjacent Yaringa Land System).

Accessions of wind-deposited carbonate dust have infused into profiles. Most profiles are calcareous throughout; and many include hard carbonate fragments. Wind-deposited calcareous loess (Woorinen Formation) overlies older sediments in many areas, as does calcrete (Bakara Calcrete). Calcrete mostly occurs on remnant slight rises. It is likely that calcareous loess and calcrete formerly overlaid all of this system, but have since been 'dissolved' and removed by water action from many areas.

**Annual rainfall:** 360 – 415 mm average

**Main soils:**

- A4-A5** *calcareous loam*
- A6** *gradational calcareous clay loam*
- D3** *loam over red clay*
- B2** *shallow calcareous loam on calcrete*

**Minor soils:** **D5-G4** *loamy sand over red clay*



**Main features:**

The land system is mostly arable, however, a few soils are too stony and shallow for cropping. The most common soils are gradational and texture contrast calcareous soils with clayey subsoils (sandy loam surfaces are most common), calcareous loams, and shallow calcareous loam on calcrete. Many soils contain hard carbonate fragments.

Many soils have clayey subsoils which restrict internal drainage. This, when combined with low lying and level landscapes, results in waterlogging being a significant issue. Many subsoils are also dispersive, which further restricts internal drainage.

There is potential for wind erosion, especially where soil surfaces have sandy loam or loamy sand textures.

Toxic accumulations of boron were not found to be a significant issue, however, the bases of many profiles have high boron levels. Toxic levels of sodium in lower subsoils are relatively common.

Where they occur, calcareous soils restrict 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 particularly true for loamy to sandy soils with highly calcareous surfaces.

Soils on sloping land, those on adjacent lower lying areas, and those in drainage depressions have potential for water erosion. This is not a particularly serious issue on this mostly level land system. Flooding may occur in drainage depressions, and possibly on some other low lying patches. Saline seepage affects numerous soils – mostly resulting in raised subsoil salinity, or actual patches of seepage on a few lower slopes.

**Soil Landscape Unit summary:** Petersville Land System (PET)

SLU	% of area	Main features
HHA HHL	0.4 0.9	Land dominated by soils formed in clayey or saprolitic sediments. Main soils: <i>calcareous loam over red clay D3</i> grading to <i>calcareous loamy sand over red clay D5-G4</i> . With some areas of <i>shallow calcareous loam on calcrete B2</i> , and probably some <i>calcareous loam A5-A4</i> . <b>HHA</b> – slightly elevated plain (slopes 0-1%). <b>HHL</b> – slopes (slopes 0.5-2%).
HMO HMOg	1.2 3.2	Drainage depression dominated by soils formed in clayey sediments. Main soils: <i>loam over red clay D3</i> grading to <i>gradational calcareous clay loam A6</i> . Possibly with minor areas of <i>calcareous loam A5</i> . <b>HMO</b> – drainage depression (slopes <1%). <b>HMOg</b> – drainage depression with a drainage line in most parts: Winulta Creek (slopes <1%).
HWK	3.0	Land dominated by soils formed in clayey sediments. Main soils: <i>calcareous loam over red clay D3</i> . With limited to common areas of <i>rubbly calcareous loam A5-A4</i> . <b>HWK</b> – drainage area: relatively low lying plain with drainage ways (slopes 0-1%).
IAE	1.2	Land dominated by calcareous soils formed in clayey or saprolitic sediments. Main soils: <i>gradational calcareous clay loam A6</i> with some <i>loam over red clay D3</i> . <b>IAE</b> – low lying plain (slopes <1%).
IDO	0.2	Land dominated by calcareous soils formed in clayey or saprolitic sediments. The soils in this area are possibly directly underlain by Kulpara Limestone. Main soils: <i>gradational calcareous clay loam A6</i> . Possibly with some uniform clay loamy <i>calcareous loam A4</i> . <b>IDO</b> – depression (slopes <1%).
INA INK	5.6 14.2	Land dominated by calcareous soils formed in clayey or saprolitic sediments. Main soils: <i>gradational calcareous clay loam A6</i> grading to <i>calcareous loam over red clay D3</i> . With



		limited to common areas of rubbly <i>calcareous loam</i> <b>A4-A5</b> . Minor areas of <i>shallow calcareous loam on calcrete</i> <b>B2</b> occur. <b>INA</b> – level to gently undulating plain with some drainage lows (slopes 0-1%). <b>INK</b> – low lying plain with drainage lows (slopes <1%).
IXL	0.4	Land dominated by calcareous soils formed in clayey or saprolitic sediments. Main soils: <i>gradational calcareous clay loam</i> <b>A6</b> possibly with some <i>calcareous loam over red clay</i> <b>D3</b> . With common to extensive areas of <i>calcareous loam</i> <b>A5-A4</b> . <b>IXL</b> – lower slopes with what are probably spots of surface expression of saline seepage (slopes 0-1.5%).
QfA	6.9	Land dominated by shallow calcareous soils on calcrete. Main soils: <i>shallow calcareous loam on calcrete</i> <b>B2</b> , possibly with some <i>shallow loam to clay loam on calcrete</i> <b>B3</b> . With limited to common areas of <i>calcareous loam</i> <b>A5-A4</b> , and <i>loam over red clay</i> <b>D3</b> grading to <i>gradational calcareous clay loam</i> <b>A6</b> . <b>QfA</b> – slightly raised stony plains (slopes 0-1%).
QLA QLB QLO	5.4 1.0 1.9	Land dominated by shallow calcareous soils on calcrete. Main soils: <i>shallow calcareous loam on calcrete</i> <b>B2</b> , possibly with some <i>shallow loam on calcrete</i> <b>B3</b> . With limited to common areas of rubbly <i>calcareous loam</i> <b>A5-A4</b> on slight rises, and <i>gradational calcareous clay loam</i> <b>A6</b> in lows. Possibly with minor areas of <i>loamy sand over red clay</i> <b>D5-G4</b> . <b>QLA</b> – elevated plains/rises with some drainage lows (slopes 0-1.5%). With some stony non-arable areas. <b>QLB</b> – slopes with drainage lows and drainage ways (slopes 0.5-2%). <b>QLO</b> – low lying drainage area with many drainage ways (slopes 0-1%).
QIA	1.1	Land dominated by shallow calcareous soils on calcrete. Main soils: <i>shallow calcareous loam to clay loam on calcrete</i> <b>B2</b> , possibly with some <i>shallow loam on calcrete</i> <b>B3</b> . With limited to common areas of <i>loam over red clay</i> <b>D3</b> grading to <i>gradational calcareous clay loam</i> <b>A6</b> . <b>QIA</b> – slightly raised stony plain (slopes 0-1%).
QRA	1.0	Land dominated by shallow calcareous soils on calcrete. Main soils: <i>shallow calcareous loam on calcrete</i> <b>B2</b> , possibly with some <i>shallow loam on calcrete</i> <b>B3</b> . <b>QRA</b> – non arable slightly raised stony plains (slopes 0-1%).
QXA QXB QXK QXL QXO	1.8 1.8 0.6 0.6 0.8	Land dominated by shallow calcareous soils on calcrete. These areas are largely underlain by Tertiary age quartz sand/sandstone and as such are related to the adjacent land units of the Yaringa Land System. Main soils: <i>shallow calcareous loam on calcrete</i> <b>B2</b> , possibly with some <i>shallow loam on calcrete</i> <b>B3</b> . With areas of <i>loamy sand over red clay</i> <b>D5-G4</b> . And minor to limited areas of rubbly <i>calcareous loam</i> <b>A5-A4</b> . <b>QXA</b> – elevated plains/rises with some slight drainage lows (slopes 0-1.5%). <b>QXB</b> – rises: slopes and crests (slopes 0-2.5%). <b>QXK</b> – gently undulating to level plain (slopes 0-1%). <b>QXL</b> – lower slopes with drainage ways (slopes 0.5-2%). <b>QXO</b> – low lying drainage area dominated by drainage ways (slopes 0-1%).
SdK SdB	20.3 1.4	Land dominated by rubbly soils formed in calcareous loess and in clayey sediments. Main soils: rubbly <i>calcareous loam</i> <b>A4-A5</b> . With common to extensive areas of <i>calcareous loam over red clay</i> <b>D3</b> including some <i>gradational calcareous clay loam</i> <b>A6</b> . And with <i>shallow calcareous loam on calcrete</i> <b>B2</b> . <b>SdK</b> – gently undulating plain with drainage lows and drainage ways (slopes 0-1%). <b>SdB</b> – slopes with drainage lows (slopes 0.5-2%).
SOA SOB SOO	8.8 0.9 9.2	Land dominated by soils formed from calcareous loess which overlie clayey sediments. Main soils: <i>calcareous loam</i> <b>A4-A5</b> : some in the central west of the 'SOO' areas may be directly underlain by Kulpara Limestone. With limited to common areas of <i>gradational calcareous clay loam</i> <b>A6</b> grading to <i>calcareous loam over red clay</i> <b>D3</b> , especially in lows. With minor to limited areas of <i>shallow calcareous loam on calcrete</i> <b>B2</b> . <b>SOA</b> – gently undulating rise/elevated plain with vague drainage lows (slopes 0-1.5%). <b>SOB</b> – slopes (0.5-2.5%). <b>SOO</b> – low lying gently undulating plain/drainage area with drainage lows and a few drainage lines (slopes 0-1%).



ShK	6.2	<p>Land dominated by rubbly soils formed in calcareous loess and in clayey sediments. Main soils: rubbly <i>calcareous loam</i> <b>A4-A5</b>. With extensive areas of <i>calcareous loam on calcrete</i> <b>B2</b>. Also with minor to limited <i>gradational calcareous clay loam</i> <b>A6</b>, possibly including some <i>calcareous loam over red clay</i> <b>D3</b>.</p> <p><b>ShK</b> – relatively low lying gently undulating plain with drainage lows (slopes 0-1%).</p>
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### Detailed soil profile descriptions:

#### Main soils:

##### **A4-A5** *calcareous loam* [Regolithic Hypercalcic-Lithocalcic Calcarosol]

Grey brown to brown to red brown medium thickness calcareous sandy loam, loam or clay loamy topsoil grading to loamy to light clayey subsoil with abundant fine carbonate. Profiles often contain abundant carbonate rubble. Profiles are underlain by calcareous loess or clayey sediments (soil **A5**). Subsoils are typically strongly alkaline and can be dispersive. A few soils in the northeast of the main part of the system have sandy topsoils.

##### **A6** *gradational calcareous clay loam* [Pedal Hypercalcic-Lithocalcic Calcarosol]

Calcareous grey brown, brown or red brown medium thickness to very thick clay loamy, sandy loam or loam topsoil overlying red brown to yellow brown clayey subsoil with abundant fine carbonate. Fine carbonate content increases with depth. Subsoils are often dispersive. These profiles are generally underlain by clayey sediments. Profiles often include some hard carbonate fragments. Mostly found in slight lows.

##### **D3** *loam over red clay* [Effervescent-Sodic Hypercalcic-Lithocalcic Red Chromosol-Sodosol]

Red brown to brown medium thickness to thin sandy loam to loam, or sometimes clay loamy topsoil overlying red clayey subsoil grading to clay with abundant fine carbonate. Subsoils are often dispersive. These profiles are typically underlain by clayey sediments. Profiles often include some hard carbonate fragments. Topsoils are usually calcareous. Typically found in slight lows and drainage depressions.

##### **B2** *shallow calcareous loam on calcrete* [Petrocalcic Calcarosol-Chromosol]

Grey brown to red brown calcareous loams, clay loams, and probably sands, overlying calcrete at shallow depth. Profiles can contain abundant hard carbonate rubble. Subsoils can be as heavily textured as light clay. Often found on remnant slight rises.

#### Minor soils:

##### **D5-G4** *loamy sand over red clay* [Effervescent-Sodic Hypercalcic Red Sodosol]

Brown medium thickness to thin loamy sand topsoil overlying red sandy clay subsoil grading to clay with abundant fine carbonate. Subsoils are typically dispersive. Profiles contain some fine quartz fragments, and are typically underlain at depth by Tertiary age quartz sand/sandstone. Topsoils are usually calcareous. Predominantly found in an area in the northeast of the main southern part of the system.

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

