bt	BLACKTOWN	Residual

Source: Soil Landscapes of the Penrith 1:100,000 Sheet *report*

Landscape—gently undulating rises on Wianamatta Group shales and Hawkesbury shale. Local relief to 30 m, slopes are usually <5%. Broad rounded crests and ridges with gently inclined slopes. Cleared eucalypt woodland and tall open-forest (wet sclerophyll forests).

Soils—shallow to moderately deep (<100 cm) Red and Brown Podzolic Soils (Dr3.21, Dr3.11, Db2.11) on crests, upper slopes and well-drained areas; deep (150–300 cm) Yellow Podzolic Soils and Soloths (Dy2.11, Dy3.11) on lower slopes and in areas of poor drainage.

Limitations—moderately reactive highly plastic subsoil, low soil fertility, poor soil drainage.

LOCATION

Occurs extensively on the Cumberland Lowlands between the Georges and Parramatta Rivers in the south-west. Examples include Strathfield, Auburn and Belmore. Isolated examples are found north of Parramatta River on the Hornsby Plateau at Chatswood, Crows Nest, Duffys Forest, Dundas, Naremburn, Neutral Bay, St. Ives and St. Leonards.

LANDSCAPE

Geology

Wianamatta Group— Ashfield Shale consisting of laminite and dark grey siltstone and Bringelly Shale which consists of shale, with occasional calcareous claystone, laminite and coal.

This unit is occasionally underlain by claystone and laminite lenses within the Hawkesbury Sandstone such as at Duffys Forest.

Topography

Gently undulating rises on Wianamatta Shale with local relief 10–30 m and slopes generally <5%, but up to 10%. Crests and ridges are broad (200–600 m) and rounded with convex upper slopes grading into concave lower slopes. Rock outcrop is absent.

Vegetation

Almost completely cleared tall open-forest (wet sclerophyll forest) and open-woodland (dry sclerophyll forest). Remaining traces of the original wet sclerophyll forest containing Sydney blue gum *Eucalyptus saligna* and blackbutt *E. pilularis* are located at Ashfield Park. The original woodland and open-forest in drier areas to the west were dominated by forest red gum *E. tereticornis*, narrow-leaved ironbark *E. crebra* and grey box *E. moluccana*. This has been almost completely cleared. At Duffys Forest there is an open-forest dominated by ash *E. sieberi* with a dry sclerophyll shrub understorey.

Land use

The dominant land uses are intensive residential and light and heavy industry. Examples of residential areas include Newtown, Petersham, Strathfield and Belmore. Examples of industrial areas include Enfield, Lidcombe and Clyde.

Existing Erosion

No appreciable erosion occurs on this unit as most of the surface is covered by tiles, concrete, bitumen or turf.

Associated Soil Landscapes

Birrong (**bg**) soil landscape occurs along drainage depressions.

SOILS

Dominant Soil Materials

bt1—Friable brownish-black loam. This is a friable brownish-black loam to clay loam with moderately pedal sub-angular blocky structure and rough-faced porous ped fabric. This material occurs as topsoil (A1 horizon). Peds are well defined sub-angular blocky and range in size from 2–20 mm. Surface condition is friable. Colour is commonly brownish-black (10YR 2/2) but can range from dark reddish-brown (5YR 3/2) to dark yellowish-brown (10YR 3/4). The pH ranges from slightly acid (pH 5.5) to neutral (pH 7.0). Rounded iron indurated fine gravel-sized shale fragments and charcoal fragments are sometimes present. Roots are common.

bt2—Hardsetting brown clay loam. This is a hardsetting brown clay loam to silty clay loam with apedal massive to weakly pedal structure and slowly porous earthy fabric. It commonly occurs as an A2 horizon. Peds when present are weakly developed, sub-angular blocky and are rough faced and porous. They range in size between 20–50 mm. Colour is commonly dark brown (7.5YR 4/3) but can range from dark reddish-brown (2.5YR 3/3) to dark brown (10YR 3/3). The pH ranges from moderately acid (pH 5.0) to slightly acid (pH 6.5). Platy ironstone gravel-sized shale fragments are common. Charcoal fragments and roots are rarely present.

bt3—Strongly pedal, mottled brown light clay. This is a brown light to medium clay with strongly pedal polyhedral or subangular-blocky structure and smooth-faced dense ped fabric. This material usually occurs as subsoil (B horizon). Texture often increases with depth. Peds range in

size from 5–20 mm. Colour is usually brown (7.5YR 4/6) but may range from reddish-brown (2.5YR 4/6) to brown (10YR 4/6). Red, yellow or grey mottles are commonly present and often become more numerous with depth. The pH ranges from strongly acid (pH 4.5) to slightly acid (pH 6.5). Fine to coarse gravel-sized shale fragments are common and widespread and often occur in stratified bands. Both roots and charcoal fragments are rare.

bt4—Light grey plastic mottled clay. This is plastic light grey silty clay to heavy clay with moderately pedal polyhedral to sub-angular blocky structure and smooth-faced dense ped fabric. This material usually occurs as deep subsoil above shale bedrock (B3 or C horizon). Peds range in size from 2–20 mm. Colour is usually light grey (10YR 7/1) or, less commonly, greyish yellow (2.5Y 6/2). Red, yellow or grey mottles are common. The pH ranges from strongly acid (pH 4.0) to moderately acid (pH 5.5). Strongly weathered ironstone concretions and rock fragments are common. Gravel-sized shale fragments and roots are occasionally present. Charcoal fragments are rare.

Occurrence and Relationships

Crests. On crests and ridges up to 30 cm of friable brownish-black loam (**bt1**) overlies 10–20 cm of hardsetting brown clay loam (**bt2**) and up to 100 cm of strongly pedal, brown mottled light clay (**bt3**) [Red Podzolic Soils (Dr 3.21, 3.11) and Brown Podzolic Soils (Db 2.11)]. **bt1** material is occasionally absent. Boundaries between the soil materials are usually clear. Total soil depth is <100 cm.

Upper slopes and midslopes. Up to 30 cm of **bt1** overlies 10–20 cm of **bt2** and 20–50 cm of **bt3**. This in turn overlies up to 100 cm of light grey plastic mottled clay (**bt4**). Occasionally the **bt1** material is absent. The boundaries between the soil materials are usually clear. Total soil depth is <200 cm [Red Podzolic Soils (Dr 3.21), Brown Podzolic Soils (Db 2.21)].

Lower sideslopes. Up to 30 cm of **bt1** overlies 10–30 cm of **bt2** and 40–100 cm of **bt3**. Below **bt3** there is usually >100 cm of **bt4**. The boundaries between the soil materials are clear. Total soil depth is >200 cm [Yellow Podzolic Soils (Dy 2.11, Dy 3.11)].

LIMITATIONS TO DEVELOPMENT

Urban Capability

High capability for urban development with appropriate foundation design.

Rural Capability

Small portions of this soil landscape that have not been urbanised are capable of sustaining regular cultivation and grazing.

Landscape Limitations

Moderately reactive soil
Seasonal waterlogging

Soil Limitations

bt1 Low wet strength
High organic matter
Low fertility
Sodicity (localised)
Strongly acid

bt2 Low wet strength
Hardsetting
Low fertility
Sodicity (localised)
Strongly acid
High aluminium toxicity

bt3 High shrink-swell (localised)
Low wet strength
Low permeability
Low available water capacity
Salinity (localised)
Sodicity (localised)
Very low fertility
Strongly acid
Very high aluminium toxicity

bt4 High shrink-swell (localised)
Low wet strength
Stoniness
Low available water capacity
Low permeability
Salinity (localised)
Sodicity (localised)
Very low fertility
Strongly acid
Very high aluminium toxicity
High erodibility (localised)

Fertility

General fertility is low to very low. Soil materials have low to moderate available water capacity, low CEC values, hardsetting surfaces (**bt2**), very low phosphorus and low to very low nitrogen levels. The subsoils (**bt3**, **bt4**) may be locally sodic with low permeability. When **bt1** is present its higher organic matter content and moderate nitrogen levels result in higher general fertility.

Erodibility

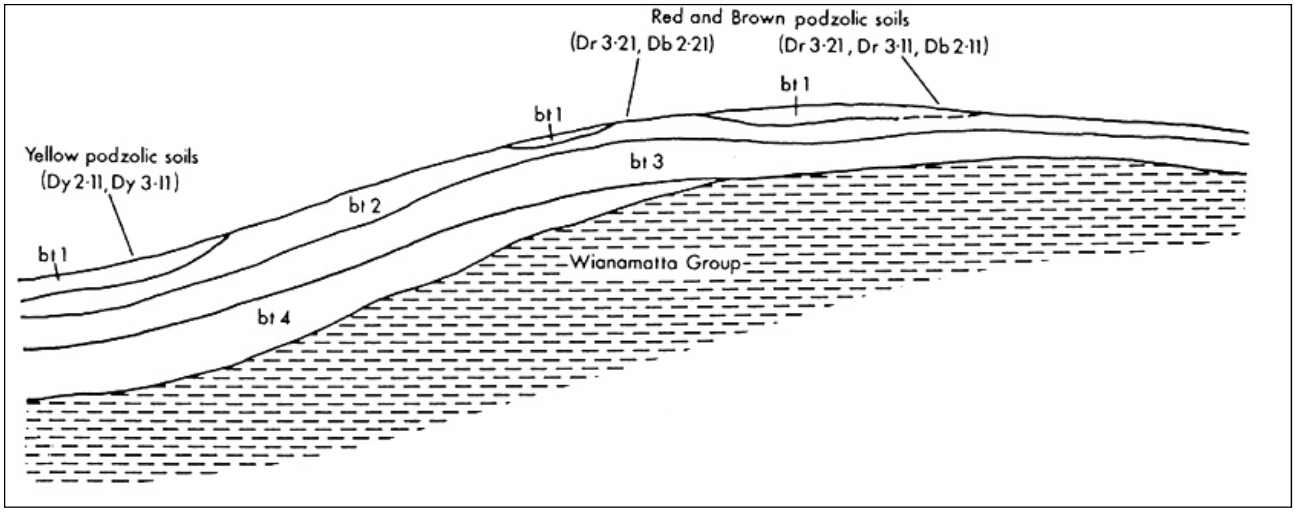
Blacktown soil materials have moderate erodibility. The topsoils (**bt1**, **bt2**) are often hardsetting and they have high fine sand and silt content, but they also have high to moderate organic matter content. The subsoils (**bt3**, **bt4**) are very low in organic matter. Where they are also highly dispersible and occasionally sodic the erodibility is high.

Erosion Hazard

The erosion hazard for non-concentrated flows is generally moderate, but ranges from low to very high. Calculated soil loss during the first twelve months of urban development ranges up to 73 t/ha for topsoil and 68 t/ha for exposed subsoil. Soil erosion hazard for concentrated flows is moderate to high.

Surface Movement Potential

The deep clay soils are moderately reactive. These are generally found on sideslopes and footslopes. Shallower soils on crests are slightly reactive.



Schematic cross-section of Blacktown soil landscape illustrating the occurrence and relationship of the dominant soil materials.