ie ILLAWARRA ESCARPMENT Colluvial

Landscape—steep to very steep slopes on Quaternary talus. Relief 100–500 m. Gradients 20–50%. Large landslips are common. Mostly uncleared tall open-forest and closed-forest.

Soils—deep colluvial Red Podzolic Soils (Dr5.21) and Brown Podzolic Soils (Db4.21) occur on slopes. Lithosols (Uc5.11) occur where the talus is recent.

Limitations—mass movement and rock fall hazard. Steep slopes and extreme water erosion hazard. Reactive, low wet bearing strength (subsoils), low soil fertility.

LOCATION

Steep slopes, benches and debris mantle of the Illawarra Escarpment. Examples include Minnamurra Falls Reserve and Macquarie Pass.

LANDSCAPE

Geology

Quaternary talus—blocks of sandstone, deep colluvial detritus and soil materials. These materials overlie benches and smaller scarps cut from the Narrabeen Group, the Illawarra Coal Measures and the Shoalhaven Group.

Topography

Debris mantle covering the upper slopes and benches of the Illawarra Range. Local relief is 100–500 m. Steep to very steep long slopes with gradients 20–50% with rock and colluvial benches. Large surface and subsurface sandstone boulders 2–25 m wide are commonplace. Drainage lines are parallel and incised. Below the escarpment bedrock outcrop is absent, and large landslips are very common.

Vegetation

Vegetation is a mixture of tall open-forest and closed-forest. The common species in the tall open-forest include brown barrel (*Eucalyptus fastigata*), gully gum (*Eucalyptus smithii*), red bloodwood (*Eucalyptus gummifera*), budawang ash (*Eucalyptus dendromorpha*), thin-leaved stringybark (*Eucalyptus eugenioides*) and bleeding heart (*Omalanthus populifolius*).

The common species in the closed-forest include sassafras (*Doryphora sassafras*), red cedar (*Toona australis*), coachwood (*Ceratopetalum apetalum*), black apple (*Planchonella australis*), native tamarind (*Dipolglottis cunninghamii*), cabbage gum (*Eucalyptus amplifolia*), brown beech (*Pennantia cunninghamii*), pigeonberry ash (*Elaeocarpus kirtonii*), native laurel (*Cryptocarya glaucescens*), rough tree-fern (*Cyathea australis*), prickly tree-fern (*Cyathea leichhardtiana*), moreton bay fig (*Ficus macrophylla*), small-leaved fig (*Ficus obliqua*) and sandpaper fig (*Ficus coronata*).

Land Use

Undisturbed forest, recreation areas such as Minnamurra Falls Reserve and access to Cambewarra Mountain Lookout and to Kangaroo Valley.

Existing Erosion

Mass movement including major rock fall slumping, landslips and batter failures are common occurrences. Minor gully erosion (<50 cm) and sheet erosion are widespread after heavy rain.

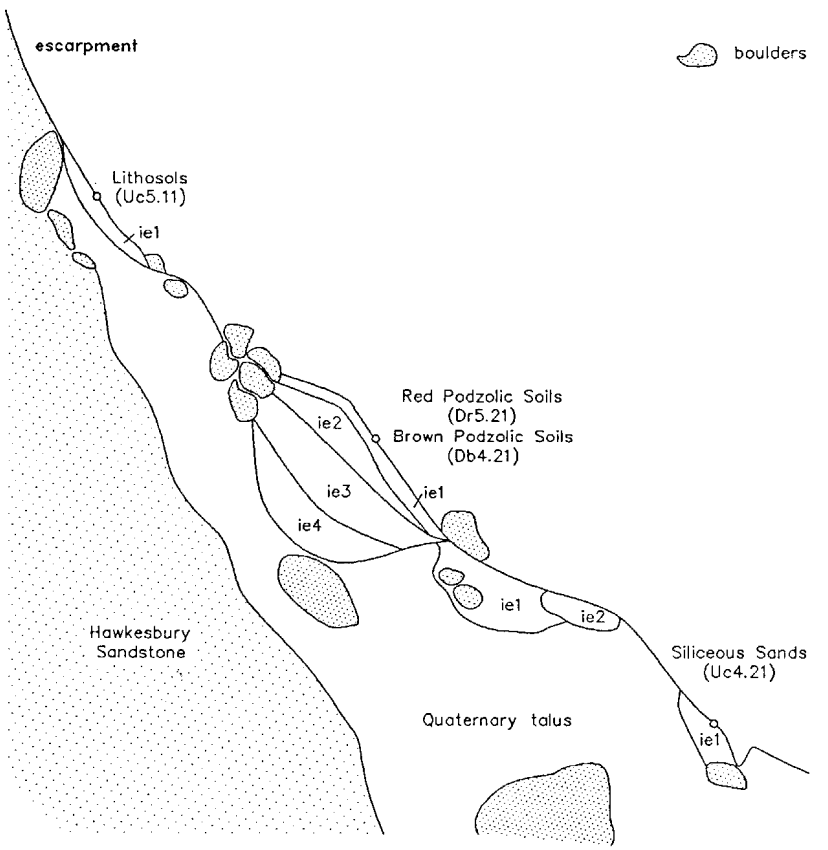
SOILS

The distribution of soils is very complex and reflects the variability of the parent material. Only the common soil materials and their occurrences have been described.

Dominant Soil Materials

ie1—Friable dark brown loamy sand (topsoil)

Colour dark brown (10YR 3/3) to brownish black (7.5YR 3/1) to greyish brown (7.5YR 4/2)



■ *Schematic cross-section of Illawarra Escarpment soil landscape illustrating the occurrence and relationship of the dominant soil materials.*

Texture	loamy sand to sand
Structure	weakly pedal, 20–50 mm crumb to polyhedral peds
Fabric	sandy to rough-faced, porous
pH	4.5–6.0
Stones	>10% 2–200 mm sub-angular and/or sub-rounded, dispersed
Roots	common, in-ped

ie2—Brown sandy loam (topsoil)

Colour	brown (7.5YR 4/4) to dull yellowish (10YR 4/3) to reddish brown (5YR 4/8)
Texture	sandy loam to fine sandy loam
Structure	weakly to moderately pedal, 20–50 mm polyhedral to sub-angular blocky peds
Fabric	rough-faced, porous
pH	4.5–5.5
Stones	>10% 2–200 mm sub-angular and/or sub-rounded, dispersed
Roots	few

ie3—Bright brown sandy clay loam (subsoil)

Colour	bright brown (7.5YR 5/8) to dull yellowish brown (10YR 4/3)
Texture	sandy clay loam
Structure	moderately pedal, 20–50 mm polyhedral to sub-angular blocky peds
Fabric	rough-faced, porous
pH	4.0–5.5
Stones	>10% 2–200 mm sub-angular and/or sub-rounded, dispersed
Roots	nil

ie4—Mottled dark reddish brown sandy clay (subsoil)

Colour	dark reddish brown (2.5YR 3/6) to dark brown (7.5YR 4/6) red, white and/or orange mottles (<30%)
Texture	sandy clay
Structure	moderately pedal, 20–50 mm sub-angular blocky peds
Fabric	rough-faced, porous
pH	4.5
Stones	>10% 2–200 mm sub-angular and/or sub-rounded, dispersed
Roots	nil

Occurrence and Relationships

Soils are highly variable. Soil materials in this landscape may include the following:

Recently deposited talus. Up to 50 cm friable dark brown loamy sand **(ie1)** overlies unconsolidated colluvium or bedrock [Lithosols (Uc5.11)]. This occurs directly below cliffs.

Slopes. Up to 30 cm of brown sandy loam **(ie2)** overlies <30 cm brown sandy clay loam **(ie3)**. Up to 60 cm mottled dark reddish brown sandy clay **(ie4)** is overlain by **ie3**. Boundaries are clear to diffuse [Red Podzolic Soils (Dr5.21), Brown Podzolic Soils (Db4.21)]. Total depth is <120 cm.

LIMITATIONS TO DEVELOPMENT

Soil Limitations

ie1 High permeability
Low available water-holding capacity
Stoniness
Strongly acid

ie2 High permeability
Low available water-holding capacity
Stoniness
Strongly acid

ie3 Low permeability
Low available water-holding capacity
Stoniness
Strongly acid

ie4 Strongly acid
Stoniness
Low permeability

Fertility

Fertility of individual soil materials is low. General soil fertility is moderate. Soils are acid, have moderate CEC and low to moderate nutrient status with low to moderate available water capacities. Although the soils are stony, they are generally very deep and well structured, allowing large soil volumes to be available to roots.

Erodibility

ie1 has low erodibility consisting of highly permeable coarse sand grains. **ie2** and **ie3** have moderate erodibility especially when vegetation is removed by bushfires.

Erosion Hazard

The erosion hazard for non-concentrated flows is extreme. Calculated soil loss during the first 12 months of urban development ranges up to 1 415 t/ha for topsoil and 1 230 t/ha for exposed subsoil. Soil erosion hazard for concentrated flows is high to extreme.

Surface Movement Potential

The topsoils **(ie1, ie2, ie3)** are stable, with **(ie4)** slightly reactive. Potential movements are offset by continuously poor drainage. Settlement and mass movement are a hazard to foundations.

Landscape Limitations

Steep slopes
Mass movement hazard
Rock fall hazard
Shallow soil (localised)
Rock outcrop
Extreme water erosion hazard

Urban Capability

Generally high to severe limitations for urban development.

Rural Capability

Generally high to severe limitations for regular cultivation and grazing.