mc MANGROVE CREEK Estuarine (Assoc.)

Landscape—vegetated tidal flats in estuarine areas on Holocene sediments. Relief <3 m. Slopes <3%. Mangrove open-scrub, saltmarsh herbland, sedgeland and low open-forest.

Soils—deep (>150 cm) Siliceous Sands (Uc1.21) and Calcareous Sands (Uc1.11) and Solonchaks (Uc1.11) occur on mangrove flats. Humic Gley Soils (Uc4.53) and Solonchaks (Uc1.11) occur on saltmarshes.

Limitations—regular tidal flooding and waterlogging, saline soil, very low soil fertility.

LOCATION

Vegetated tidal flats in estuarine areas on Holocene sediments on the Coastal Plain. Examples occur at Mangrove Island, Minnamurra River and Crookhaven River and Greenwell Point.

LANDSCAPE

Geology

Holocene sediments—silty to peaty quartz sand, silt and clay. Common shell layers in sandy mud and muddy sand.

Topography

Local relief <3 m and slopes <3%. These tidal flats and creeks in coastal inlets and estuaries are regularly inundated by brackish tidal waters. Four shore parallel zones are recognised, each zone with a different drainage and inundation pattern. At the lowest elevation is the mudflat zone. In order of increasing elevation are the mangrove zone, the saltmarsh zone and littoral forest zone. Minor differences in topography often result in a mosaic of zones.

The mudflat zone is inundated except at low tide. It is characterised by rapidly migrating, shallow (<70 cm), non-directional, meandering channels with reversible flows which widen rapidly in the downstream direction.

The mangrove zone is inundated only during high tide, and the saltmarshes are inundated only during spring flood tides. These zones have non-directional, often interrupted drainage. The forest zone is rarely flooded and has interrupted or absent drainage. Clarke and Hannon (1967, 1969, 1970 and 1971) have described the plant ecology of tidal flat communities.

Vegetation

Mainly open-scrub where the common species are grey mangrove (*Avicennia marina*), river mangrove (*Aegiceras corniculatum*) and scattered decorative paperbark (*Melaleuca decora*).

Shoreward of the mangroves the low open-forest is dominated by swamp oak (*Casuarina glauca*) and less commonly swamp mahogany (*Eucalyptus robusta*), forest red gum (*Eucalyptus tereticornis*) and bangalay (*Eucalyptus botryoides*). This open-forest often has an understorey of sand couch (*Sporobolus virginicus*).

Saltmarsh is found in areas less frequently inundated. Common species of saltmarsh include sea-blite (*Suaeda australis*), glasswort (*Salicornia quinqueflora*), sand couch (*Sporobolus virginicus*), streaked arrowgrass (*Triglochin striata*) and sea rush (*Juncus kraussi*).

Land Use

Mangroves and saltmarshes are recognised as important breeding areas for commercial fish and crustaceans (West 1985) and for some species of water birds. Oyster leases are located on the seaward edges of tidal flats at Minnamurra and Greenwell Point.

Existing Erosion

There is little appreciable erosion. Minor wave erosion is caused by powerboats (Scholar 1974). Sediments eroded from surrounding catchments are often deposited on this unit, enlarging the mangrove communities (West 1985).

SOILS

Dominant Soils Materials

mc1—Greasy smelly organic mottled dark brown silty loam (topsoil)

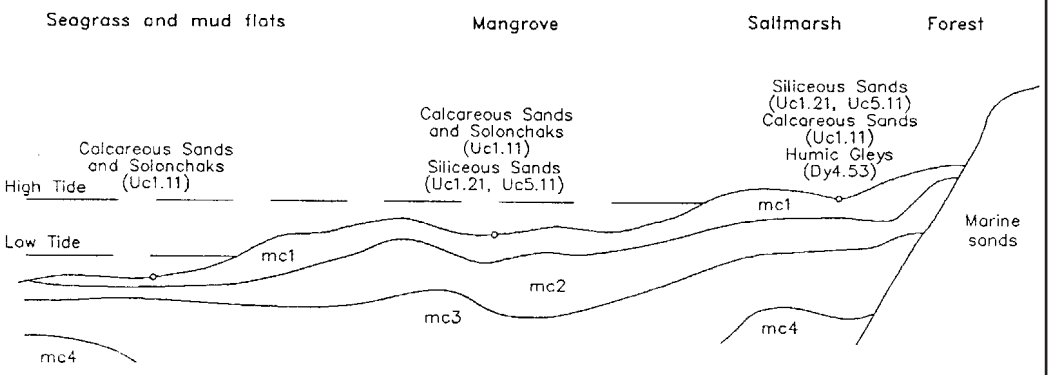
Colour	dark brown (10YR 3/3) to yellowish grey (2.5Y 4/1) with dark red mottles (50%)
Texture	silty loam
Structure	apedal massive
Fabric	earthy
pH	7.0–8.5
Stones	nil
Roots	nil

mc2—Shelly organic black sandy loam (subsoil)

Colour	black (10YR 2/1) to dull yellowish brown (10YR 4/3)
Texture	sandy loam
Structure	apedal massive
Fabric	sandy
pH	5.0–8.5
Stones	nil
Roots	common

mc3—Shelly greyish yellow sand (subsoil)

Colour	dark greyish yellow
Texture	sand
Structure	apedal single-grained
Fabric	sandy
pH	6.5–9.0
Stones	quartz pebbles common
Roots	rare



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

mc4—Gleyed mottled sandy clay (subsoil)

Colour	grey (5Y 5/1) with orange brown mottles (40%)
Texture	sandy clay
Structure	apedal massive
Fabric	sandy
pH	7.5–9.0
Stones	nil
Roots	rare

Associated Soil Materials

Charcoal Sands. Up to 80% charcoal fragments within a sandy loam matrix

Midden Materials. Large quantities of oyster and other mollusc shells occur in the soil materials. These are Aboriginal sites and should not be disturbed.

Occurrence and Relationships

Mangrove Flats. Up to 30 cm greasy smelly organic mottled dark brown silty loam **(mc1)** overlies <50 cm shelly organic black sandy loam **(mc2)** and >100 cm shelly greyish yellow sand **(mc3).** The boundaries are gradual to diffuse [Siliceous Sands (Uc1.21, Uc5.11), Calcareous Sands (Uc1.11) and Solonchaks (Uc1.11)]. Total soil depth is >200 cm.

Saltmarshes. Up to 20 cm **mc1** overlies <20 cm **mc2** and <50 cm **mc3** which in turn overlies >200 cm gleyed mottled sandy clay **(mc4).** Boundaries are gradual to diffuse [Humic Gley Soils (Uc4.53) and Calcareous Sands (Uc1.11)]. Total soil depth is >300 cm.

LIMITATIONS TO DEVELOPMENT

Soil Limitations

mc1 Low wet bearing strength
Strongly saline
Low permeability
High organic matter
Very low fertility
Acid sulphate potential
Strongly sodic

mc2 High organic matter
Strongly sodic
Strongly saline
Low wet bearing strength
Very low fertility
Very strongly acid
Acid sulphate potential
Potential aluminium toxicity

mc3 High organic matter
Strongly saline
Strongly sodic
Very low fertility
Strongly acid
Acid sulphate potential
Low wet bearing strength

mc4 Low wet bearing strength
Strongly saline
Strongly sodic
Low permeability
Low available water-holding capacity
Low fertility
Acid sulphate potential
Moderately alkaline

Fertility

The general fertility is very low. The soil materials are strongly saline and are frequently inundated by tidal waters. These soils should not be drained as this will result in organic sulphur compounds being oxidised. The sulphuric acid produced results in the soils becoming extremely acid.

Erodibility

mc1 and **mc2** have very low erodibility. They consist of sands strongly bound by abundant organic fibrous matter. **mc3** has very low erodibility consisting predominantly of well-drained coarse sands. **mc4** has a moderate erodibility as it has a low organic matter content and consists of fine and coarse sand grains imbedded in a clay matrix. **mc4** clays are highly dispersible in freshwater, where they are highly erodible.

Erosion Hazard

The erosion hazard for non-concentrated flows is low. Calculated soil loss for the first 12 months of urban development ranges up to 10 t/ha of topsoil and 20 t/ha of exposed subsoil. The erosion hazard for wave and concentrated flows is also low.

Surface Movement Potential

These materials become highly reactive following draining and leaching. Both drained *in situ* material and deposited fill composed of these materials should be tested to determine surface movement potential prior to construction.

Landscape Limitations

Flood hazard
Waterlogging
Permanently high watertable
Wave erosion hazard

Urban Capability

Generally high to severe limitations for urban development.

Rural Capability

Generally high to severe limitations for regular cultivation and grazing.