

Appendix 1 Publicly available information on soils on the route of the pipeline.

Soil Information From Kovacs et al

NKB—kb KOORAWATHA-BILLIMARI SOIL LANDSCAPE

GENERAL:

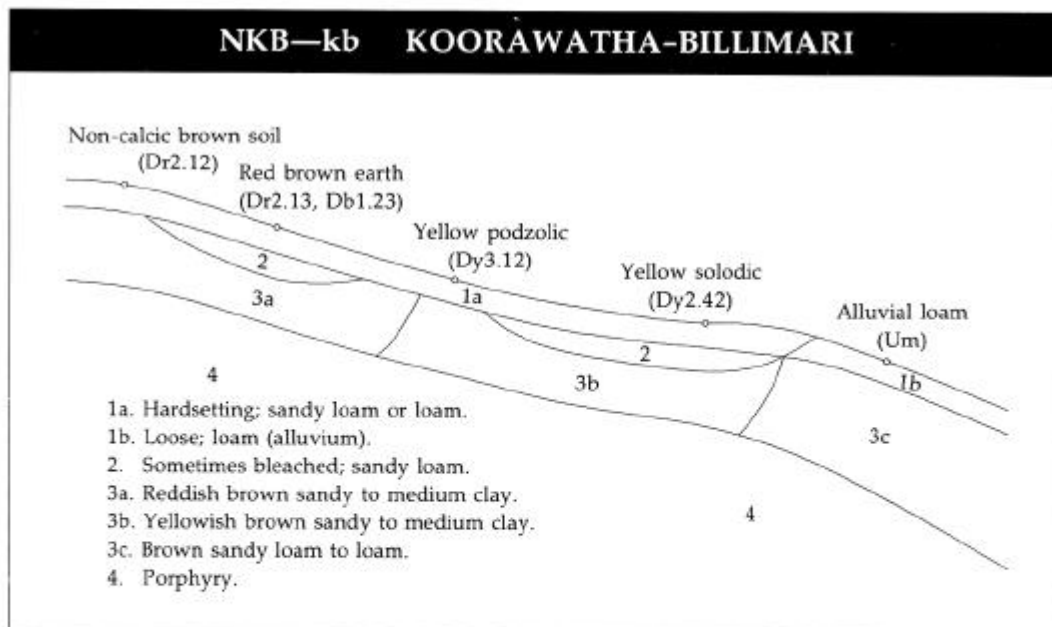
This soil landscape comprises the gently undulating rises around Wattamondara, extending almost to the Belubula River in the north. It includes several major drainage lines, the Lachlan River, Molongla, Pipe Clay, Back and Crowther Creeks. Non-calcic brown soils (Dr2.21) and red-brown earths (Dr2.13, Db1.23) occur midslope in the landscape. Yellow podzolic soils (Dy3.12) occur further downslope. Red-brown earths occur on the terraces. Yellow solodic soils (Dy2.42, Dy3.42) and alluvial sands and loams (Uc, Um) occur in drainage lines. Much of the landscape has been derived from old alluvial deposits and is subject to waterlogging.

ASSOCIATED SOIL LANDSCAPES: Canowindra and Lachlan.

CLIMATIC ZONE: 10A.

LANDFORM:

Gently undulating rises, with level plains adjacent to drainage lines. The elevation ranges from 280–320 m, with local relief from 10–20 m. Very gentle slopes range from 1–3%, except close to drainage lines where the terrain is level. Drainage runs north to meet the Lachlan River. Minor drainage lines are from 800–1 400 m apart. Old terraces and alluvial fans are evident.



NATIVE VEGETATION:

A grey box-yellow box community dominates this soil landscape. Blakelys red gum is also common. River red gum and river she-oaks grow along the main drainage lines.

GEOLOGY:

Geological Formation: Alluvium and Canowindra Porphyry.

Parent Rock: Alluvium, porphyry, shale.

Parent Material: Alluvium.

GENERAL SOIL DESCRIPTIONS:

NON-CALCIC BROWN SOILS

Topsoil: Dark reddish brown loam to sandy loam with weak structure to single-grained; pH 6.5; to 80 cm depth.

Subsoil: Clear change to reddish brown sandy clay with moderate structure; pH 7.0.

YELLOW PODZOLIC SOILS

Topsoil: Dark reddish brown sandy loam with weak structure; pH 7.0; to 30 cm depth.

Subsoil: Clear change to dull reddish brown medium clay with strong structure; pH 6.5; orange and grey mottles present.

YELLOW SOLODIC SOIL/RED-BROWN EARTH INTERGRADES

Topsoil: Dull brown sandy loam with weak platy peds; pH 6.0; to 10 cm depth.

Subsoil: Gradual change to bright reddish brown medium clay with strong peds; pH 8.0.

RED-BROWN EARTHS

Topsoil: Dull reddish brown to reddish brown sandy loam to light sandy clay loam with weak structure; pH 6.0.

A₂ horizons may occur; bleached; to 7 cm depth.

Subsoil: Clear change to brown clay loam to clay with strong structure; calcium carbonate present; pH 7.5.

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	Non-calciic brown soils and red-brown earths	Yellow podzolic soils
Dominance	Common	Minor
Landform element	Stream channel (old)	Lower slope
Surface condition	Hardsetting	Hardsetting
Drainage	Moderately well drained	Imperfectly drained
Soil permeability	Moderately permeable	Moderately permeable
Watertable depth	+150 cm	+100 cm
Available water-holding capacity	Moderate	Moderate
Depth to bedrock	+100 cm	+50 cm
Flood hazard	Low to moderate	Low to moderate
pH (topsoil)	6.0–6.5	7.0
Fertility (chemical)	Low	Low
Known nutrient deficiencies	N, P	N, P
Soil salinity	Low	Low
Erodibility (topsoil)	Moderate	Moderate
Erodibility (subsoil)	Moderate	Low
Erosion hazard	High	High
Structural degradation hazard	High	High
Land capability classification	II	II
U.S.C.S. (subsoil)	CL, CH	CL
Shrink-swell potential	Low to moderate	Low
Mass movement hazard	Nil	Nil
Existing land use	Grazing on improved pastures; cropping; olive plantations on old alluvial terraces; irrigated crops	Grazing improved and unimproved pastures
Soil erosion	Minor gully and rill erosion	

TABLE 10.3 Topsoil and Subsoil Erodibilities of the Dominant Soil Groups (Continued)

Dominant Soil	Principal Profile Forms	Soil Landscapes	Topsoil Erodibility	Subsoil Erodibility
Red solodic soil	Dr2.42 Dr2.43	Dulladerry Raglan, Curumbenya	L M	M M-H
Siliceous sand	Uc1.21, Uc5.11	Duckmaloi, Gumble, Rocks Wyangala	L M	M H
Shallow sand (loamy)	Um		L	M
Shallow soil (sandy)	Ucl		L	M
Soloth	Dy3.31, Dy2.41 Dy3.41, Dy3.21	Trunkey Mullion Creek, Gumble	H H	M H
Terra rossa	Dr4.13	Grove Creek, Limekilns	L L	M H
Wiesenboden	Ug5.16, Ug5.17	Panorama	L	M-H
Yellow earth	Gn2.21, Gn2.24	Vulcan, Vittoria-Blayney, North Orange	M	H
Yellow podzolic soil	Dy2.11, Dy3.41	Capertee, Lake Oberon, Mayfield	L	M
	Dy2.21	Trunkey, Rockley	M	L
	Dy2.11	Crowther	M	H
Yellow solodic soil	Dy2.42, Dy3.43, Dy2.41	Mookerawa, Curumbenya Dulladerry, Carcoar-Barry, Manildra	M L	M M
		Trunkey, Vittoria-Blayney, Manildra	M	M-H
		North Orange	H	M
		Raglan	L-M	M-H
		Nangar	H	H
Yellow solodic soil	Dy3.43	Spring Hill	H	M-H

L — Low
M — Medium
H — High

acidic. Soils on Carcoar Granite have weakly structured subsoils. Red podzolic soils are low to moderate in chemical fertility and respond well to pasture improvement.

SILICEOUS SANDS

These soils occur mainly on siliceous granites on hillcrests and slopes and on coarse-grained intermediate igneous rocks of Quarry soil landscape.

They are weakly differentiated with shallow loamy sand to sandy loam, or even to sandy clay loam topsoils where organic content is high and have earthy to sandy fabrics. There are bleached sands (Uc2.21) which occur on Bathurst granites, with bleached A₂ horizons. Siliceous sands are chemically infertile but in some areas will support improved pasture only with heavy fertiliser application.

SOLODIC SOILS

Brown Solodic Soils

These soils occur on Dulladerry Rhyolite and are between the yellow and red solodic soils in the Dulladerry and Greydene soil landscapes. On some better drained positions in the west they are associated with other yellow solodic soils in the Canowindra soil landscape. They also occur on the lower slopes and in some drainage lines where drainage is restricted. Texture of topsoil ranges from loamy sand to fine sandy loam. A₂ horizons are bleached. The sandy clay loam to sandy clay B horizons have strong prismatic and columnar structure. Some mottling occurs, with soil reaction trends being from acid to neutral.

These soils are low in chemical fertility. Their main use is for pastures although some cropping occurs in the west. Susceptibility to gully erosion is high.

Red Solodic Soils

These soils are not as widespread as the yellow solodic soils and occur on Raglan, Dulladerry and Greydene soil landscapes. There are also minor occurrences in Bathurst and Manildra soil landscapes. In Bathurst Granite, they are found on the granodioritic phase on the mid to lower slopes, and on Dulladerry Rhyolite in areas with better drainage. The soils are strongly differentiated with the topsoils mainly sandy loam, with some loamy sands and loams. A₂ horizons are bleached and are massive or have weak structure. B horizons range from sandy clay loams to heavy clays with moderate to strong structure. The pH ranges from neutral to alkaline. These soils have low chemical fertility but can be used for grazing native pastures when cleared.

Yellow Solodic Soils

These soils are commonly found on lower slopes and in imperfectly to poorly drained depressions. They occur on many different parent materials and landforms. They are strongly differentiated with well developed bleached A₂ horizons and coarse, strongly structured B horizons. Topsoils are mainly sandy loams to fine sandy loams, with some fine sandy clay loams to loams, fine sandy. A₂ horizons are generally massive. B horizons range from coarse blocky to columnar structure, and are sandy clays to heavy clays. Mottling can occur, with manganese and iron nodules. pH ranges from neutral to alkaline. In some cases, intergrades with yellow podzolic soils have more acid soil reaction trends. Exchangeable sodium data aid in their classification and provide more information about their dispersibility.

A small group of yellow solodic soils with massive B horizons occurs on Bathurst and Carcoar Granites. Their subsoils are light sandy clay loams to sandy clay loams. These soils are susceptible to all forms of water erosion. A horizons are hydrophobic and become powdery when cultivated. B horizons often restrict infiltration thus resulting in the lateral movement of water through the A₂ horizon. Gullies with depths often greater than 3 m are associated with these soils. B horizons have a characteristically "wormy" appearance when exposed. In the west, saline areas are associated with these soils.

Grazing of unimproved pastures is the main land use due to chemical infertility.