AN1: Spolic Anthroposol

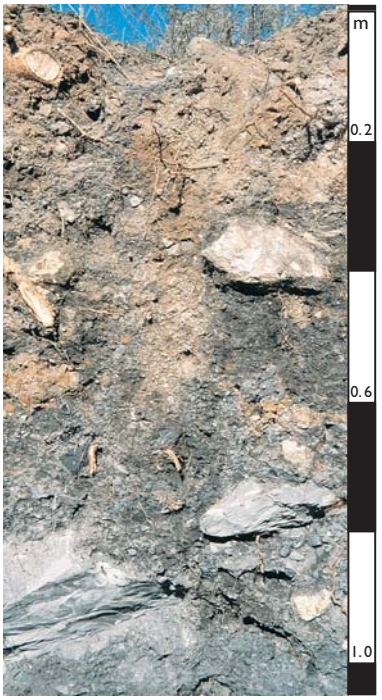
General description of the soil

Soil forming or formed on mineral materials moved by earth moving equipment for mining and capped by pre-existing soil to aid plant growth.

Distribution:	Associated with mining particularly in the Hunter Valley of New South Wales, and Central Queensland.
Typical land use:	Open-cut mining.
World Reference Base:	Affinities with Anthrosols.

Environment and location of the example profile

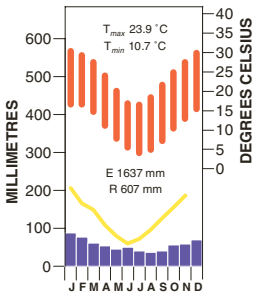
Landform:	Hillcrest. Minimal slope.
Parent material or substrate:	Fill, shale and sandstone.
Drainage class:	Moderately well-drained.
Surface condition:	Firm, hardsetting on drying.
Site disturbance:	Human-constructed landform and site.



Mine spoil supporting plantation species, Hunter Valley, New South Wales

Site location

Site climate



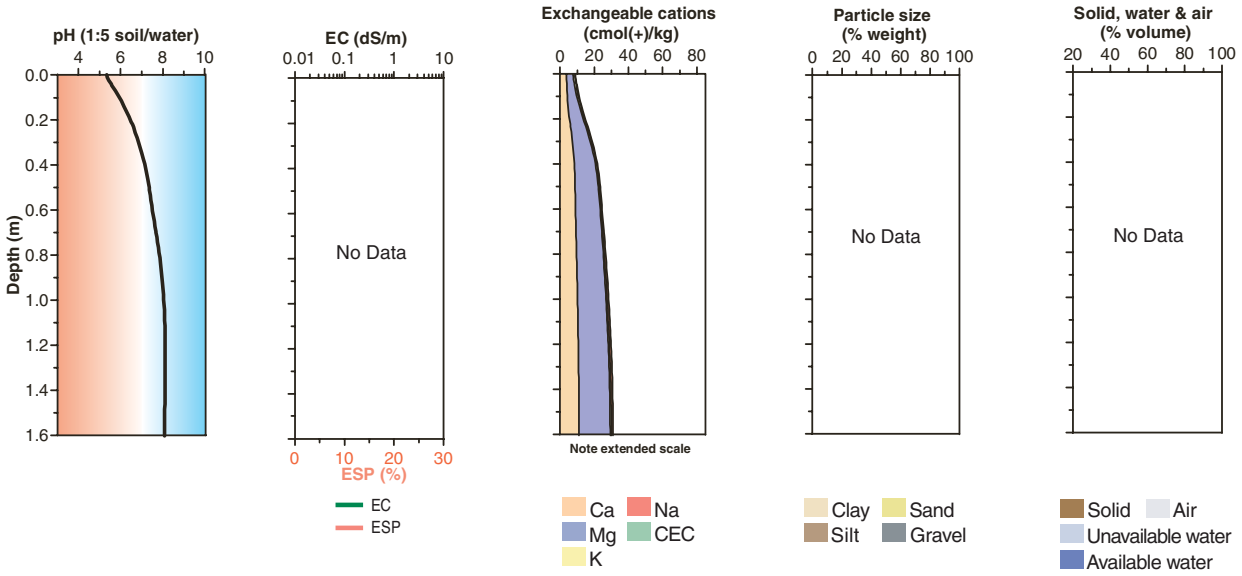
Soil morphology

Horizon	Depth (m)	Colour	Mottles	Texture	Structure			Consistence	Coarse fragments	Segregations	Boundary
					Grade	Shape	Size				
A1	0.00–0.04	dark brown (10YR 3/2)	organic staining	sandy clay loam	weak	polyhedral	2–5 mm	weak (moderately moist)	10–20% shale fragments (20–60 mm)	–	clear
B2	0.04–0.22	dark brown (7.5YR 4/2)	–	sandy clay loam	massive	–	–	firm (moderately moist)	10–20) shale fragments (20–60 mm)	–	abrupt
C1	0.22–0.66	very dark grey (10YR 4/1)	–	clay	massive	–	–	firm (moderately moist)	50–90% shale fragments (60–200 mm)	massive densipan	clear
C2	0.66–1.20	greyish yellow (10YR 6/2)	–	clay	massive	–	–	firm (dry)	50–90% shale fragments (60–200 mm)	massive densipan	diffuse
C3	1.20–2.00	yellowish brown (10YR 3/1)	–	thin, discontinuous layers of coal–rich gravel	massive	–	–	firm (dry)	50–90% shale fragments (60–200 mm)	massive densipan	distinct layers probably due to drag–line deposition

Soil chemical and physical properties

Horizon	Sample Depth (m)	pH H_2O[G]	pH $CaCl_2$[H]	Elect. Cond. dS/m	$CaCO_3$ %	Org. C %[A]	Extr. P mg/kg	Tot. P %[D]	Tot. K %	Cation exchange properties[I] cmol(+)/kg							ESP %	Bulk dens. Mg/m^3	Particle size %			
										Ca	Mg	K	Na	H+Al	CEC	ECEC			CS	FS	Silt	Clay
A1	0.00–0.04	5.3	4.9			4.5		0.037		3.6	3.6	1.1	0.3									
B2	0.04–0.22	6.3	5.7			3.0		0.020		3.6	6.1	0.6	0.5									
C1	0.30–0.50	7.2	6.6			2.9		0.031		9.0	12.7	0.7	0.5									
C1	0.50–0.70	7.5	6.6			2.5		0.026		8.9	14.6	0.6	0.5									
C2	1.00–1.20	8.1	6.7			0.8		0.032		10.1	16.6	0.6	1.0									
C3	1.40–1.60	8.1	6.9			0.8		0.030		11.0	18.3	0.7	0.9									

Key profile properties



General qualities of the soil

Infiltration:	Moderate but prone to sealing.
Available water store:	Small to moderate depending on the content of large rocks.
Permeability:	Moderate.
Physical root limitations:	Hardsetting surface due to mixing of original A and B horizons. High rock content may act as a barrier for some species but for others provide preferential paths for roots. Note that rock fragments break down very quickly due to the release in pressure.
Erosion hazard:	Moderate depending on the materials used for the top dressing (e.g. disturbed Sodosols will be highly erodible).
Nutrient availability:	Likely to be minimal organic carbon, and low exchangeable calcium may also be a problem.
Toxicities:	Depends on the rock content. Oxidation of iron sulfides will produce a very low pH whereas the presence of sodic/saline material can lead to high pH.

Large areas of Anthroposols created by open-cut coal mining and subsequent rehabilitation, Hunter Valley, New South Wales

Acknowledgements: Soil image, soil description and laboratory data: State Forests, New South Wales. Profile RA02 from Ryan, Birk & Walker (1995). Landscape image: Roger Skinner, Coal & Allied.