

3.10 Geology and soils

This Section describes the geology and soils of the study area based on previous desktop geotechnical studies completed for the Project (Maunsell 2006a, 2007b). The impacts of the Project on the geology and soils of the area are discussed in Section 9.3.

The existing rail line traverses gently undulating land with an approximate elevation of 30 metres Australian height datum (AHD). The geology of the study area (as indicated on the *1:100,000 Geological Series Sheet 9030 for Penrith*; NSW Department of Mineral Resources 1987) is characterised by Bringelly Shale, with the exception of a 600-metre section of the rail line, between 300 and 900 metres north of Quakers Hill Station, which is underlain by alluvial deposits (refer Table 3-33). A siltstone deposit parallels the western boundary of the existing rail corridor between Schofields and Vineyard stations at a distance of approximately 100 metres from the rail corridor (refer Table 3-33). No weathered shale outcrops were identified in the study area between Quakers Hill and Schofields stations; however, numerous weathered shale and siltstone outcrops were identified between Schofields and Vineyard stations.

Table 3-33 Geological units identified in the Project area

Geological unit	Location	Expected composition
Alluvial deposits	Between 300 and 900 metres north of Quakers Hill station	Fine-grained sand, silt and clay
Bringelly Shale	Remainder of the railway corridor	Shale, carbonaceous claystone, claystone, laminate, fine- to medium-grained lithic sandstone, rare coal and tuff
Siltstone	Parallel to the western boundary of the rail corridor between Schofields and Vineyard stations at a distance of approximately 100 metres from the rail corridor	Fine-grained sand, silt and clay containing ferricrete and silcrete bands

Source: Maunsell (2007b, 2006)

Soils along the railway line (as indicated on the *1:100,000 Soil Landscape Series Sheet 9030 for Penrith*; Hazelton et al. 1989) predominantly comprise the Blacktown soil landscape, with exception of a section of the rail line, between 300 metres and 1,000 metres north of Quakers Hill Station, which comprises the South Creek soil landscape. Blacktown landscape soils tend to be characterised by moderate erodibility, poor drainage and moderate reactivity, while South Creek landscape soils are highly erodible and subject to frequent flooding.

Geotechnical studies completed for the Project (Maunsell 2007b, 2006a) identified localised areas of erosion at cuttings along the existing rail line. Evidence of erosion, spalling and fretting of cut faces was also identified at these locations. Fill material is present in some locations along the rail corridor, predominantly within the existing embankments. Fill may also be present associated with land surrounding the rail corridor. As the origin and placement of fill material is unknown, it is likely that it has a variable composition, sheer strength, relative density and quality.

The rail corridor traverses areas of moderate to high salinity potential. No acid sulfate soils were identified within the study area (refer Section 3.11).