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## Impact of Geology on the Stability of Minna-Lambata Road, North Central Nigeria

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### ABSTRACT

The rocks and soils underlying Lambata-Minna road in central Nigeria were mapped with a view to determining their impact on the stability of the road flexible pavement built on them. Vertical electrical soundings were executed along the road to determine the soil profile of the road. The geophysical studies revealed that the soil profiles of the road are composed of laterite, sand and clayey soils at various depths.

Groundwater table of wells along the roads were observed to determine the variation in seasonal groundwater variation. 35 water samples were collected from wells along the road and subjected to hydrochemical analysis. A total of 47 soil samples were collected and subjected to geotechnical analyses. Field mapping and petrographic study revealed that Lambata-Minna road is underlain by migmatites, gneisses, granites, marble, granodiorite and schist. The physicochemical tests revealed that the groundwater occurring within migmatite/schist terrain have higher ionic concentration and physical properties with corresponding higher percentage variation of groundwater fluctuation. Grain size distribution test revealed that the soils occurring along the road are gravelly. The permeability of the soils is generally low and do not vary with the underlying different lithology. Results of the grain size distribution, Atterberg limits, compaction and CBR reveals that soils underlying the granites are generally more competent than those underlying the migmatite. The consistent failure of the Lambata-Minna road portion underlain by migmatite gneiss and granite is because the soils occurring

## SECTION A: SUBSOIL GEOTECHNICAL INVESTIGATION

within those terrains have poor geotechnical properties to serve as either sub-grade, sub-base or base material in their natural state.

**KEYWORDS:** geology, stability, Lambat-Minna, groundwater, foundation.