

Chapter 6

Superficial Deposits

Classification and Distribution

Superficial deposits occur mostly in the low-lying ground, forming extensive flood plains stretching from Tuen Mun north through Yuen Long to Lok Ma Chau (Figure 12). Debris flow deposits occur upslope of the alluvial plains filling the floors of small side-valleys, but are also found beneath alluvial deposits filling irregularities in the karst marble surface. Marine deposits over 4 m in thickness are limited to the area adjacent to Deep Bay and the Sham Chun River. Alluvial deposits are the most important sub-division of the superficial sediments, and are invariably represented in sections or borehole cores. They comprise clays, silts, sands and gravels, with the arenaceous sediments locally forming lenses which serve as aquifers in the urban areas of the district. The contained groundwater has been used for both flushing and drinking purposes.

Much of the urban area has been covered by fill, usually comprising weathered granite, sandstones and siltstones, or, more recently, marine sand (Figure 13).

Clay Residues

One of the oldest superficial deposits of the district occurs immediately above the marble bedrock, and is usually confined to the base of hollows within the karst topography. It comprises brown and dark grey silty clay rich in sericite and pyrite, together with weathered fragments of siltstone, marble and quartz. These deposits vary from a few metres to only a few centimetres, being thickest above the dark grey marble (Long Ping Member), with some 3 m proved in BGS 12 at a depth of 38.34 m. Radiocarbon dates obtained from clay residue samples in this borehole ranged from 37 000 to 39 000 years BP (Appendix 7).

The clay residue is the only remaining representative deposit of the karstification process, other fractions having been transported in solution laterally out of the area or vertically down into the epikarst. It is the only deposit which may be accurately called completely weathered marble. However, there may be some mixing with fine clays and micas derived from the surrounding completely weathered metamorphic rocks or the derived boulders from such rocks in the debris flow deposits (see below), and these origins could explain the common occurrence of sericite.

Debris Flow Deposits

Deposits belonging to this classification, generally referred to as colluvium in Hong Kong (GCO, 1988b), are soil accumulations, usually of locally derived material, which have flowed downslope during periods of high rainfall. Such flows may be initiated on slopes inclined at only a few degrees.

Debris flow deposits commonly occur over the irregular karst topography of the marble subcrop in the vicinity of Yuen Long town. They comprise a structureless, silt, clay and sand matrix with embedded subangular fragments of weathered country rock. The colour of the matrix varies from yellowish brown, through brownish grey to pink; white kaolin streaks and spots are common. The rock fragments show a weathered rind. The maximum recorded thickness of debris flow deposits is nearly 50 m in BGS 1, but the close proximity of highly weathered volcanic rocks faulted against marble make identification uncertain. The thickness of 5 to 10 m proved in BGS 3 and BGS 9 is more typical.

Alluvium

The alluvial deposits of the district are generally thicker and more widespread than any of the other superficial deposits, reaching a maximum recorded thickness of 38 m in BGS 24. They were laid down in the Quaternary period and comprise clays and silts with interbedded sands and gravels. The sands and gravels are commonest towards the base of the sequence, and thicknesses of 10 m were recorded in boreholes by the Sham Chun River between Fairview Park and Lok Ma Chau.

The sands at higher levels are greyish white to yellow in colour, well-sorted and medium- to coarse-grained. Radiocarbon dating of a sample containing carbonaceous fragments (at 20.2 m depth in BGS 12) gave an age date of 26 000 to 27 000 years BP. Clays and silts vary in colour from pale grey to yellowish brown with red and pink mottling. Organic alluvial clay samples collected by K. W. Lai (Langford *et al.*, 1989) in the Yuen Long area gave dates ranging from 15 000 to 33 000 years BP.

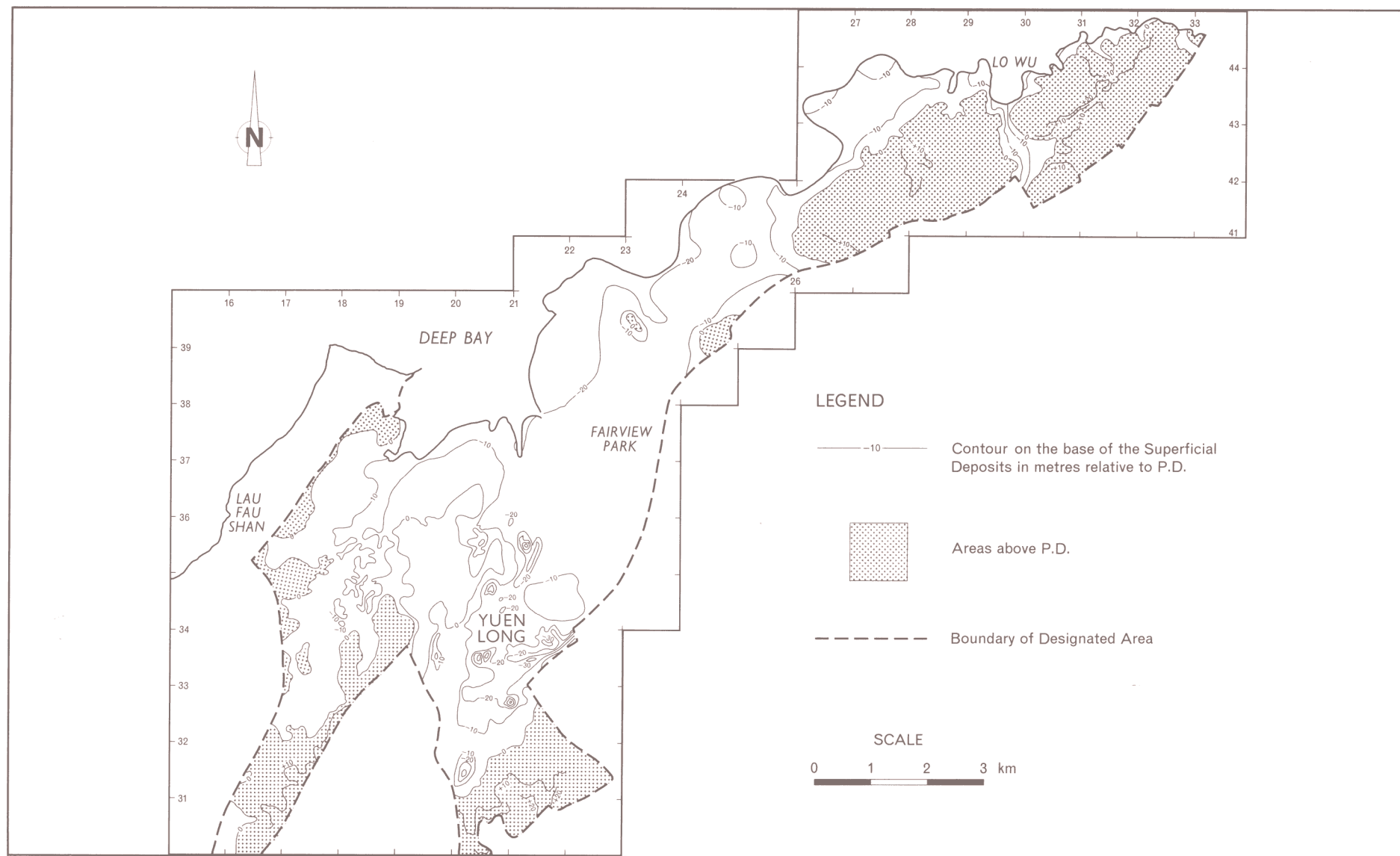


Figure 12 - Contours on the Base of the Superficial Deposits

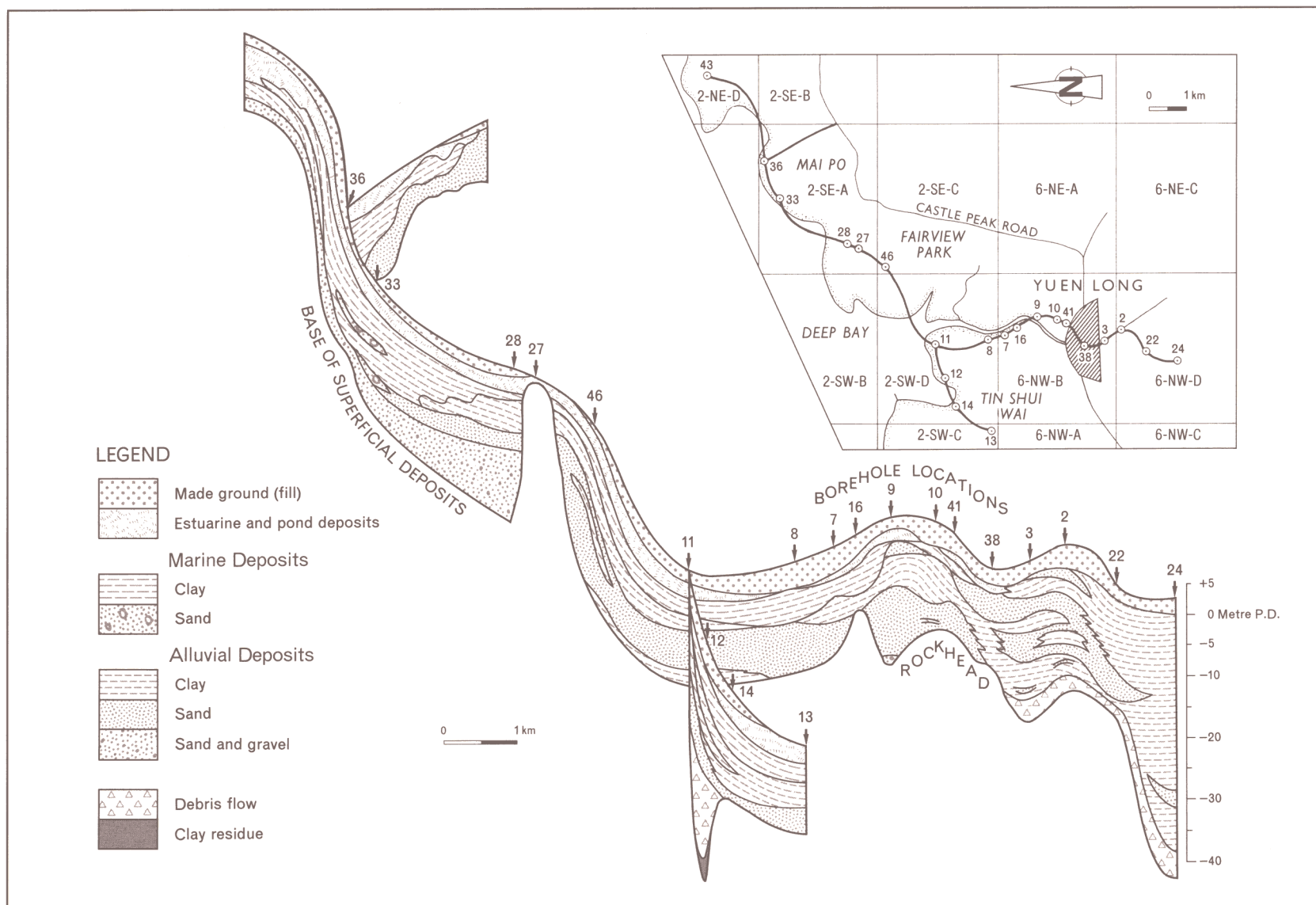


Figure 13 - Ribbon Section Showing the Superficial Deposits Typical of the District

The alluvial deposits were laid down under various conditions of deposition. During periods of active erosion of nearby hills, coarse arenaceous material was deposited not far from the source. At other times, a quieter environment existed, allowing far-travelled silts and muds to be laid down. Contours drawn on the base of the alluvial deposits for a site [2105 3355] in southern Yuen Long suggest a palaeogeography of meandering channels separated by ridges and islands of higher ground with a relief of some 8 m. Plant debris accumulated along the margins of some of the channels, probably on the lee side of the meanders. Sporadic areas of standing water are indicated by lacustrine or pond deposits (Figure 14).

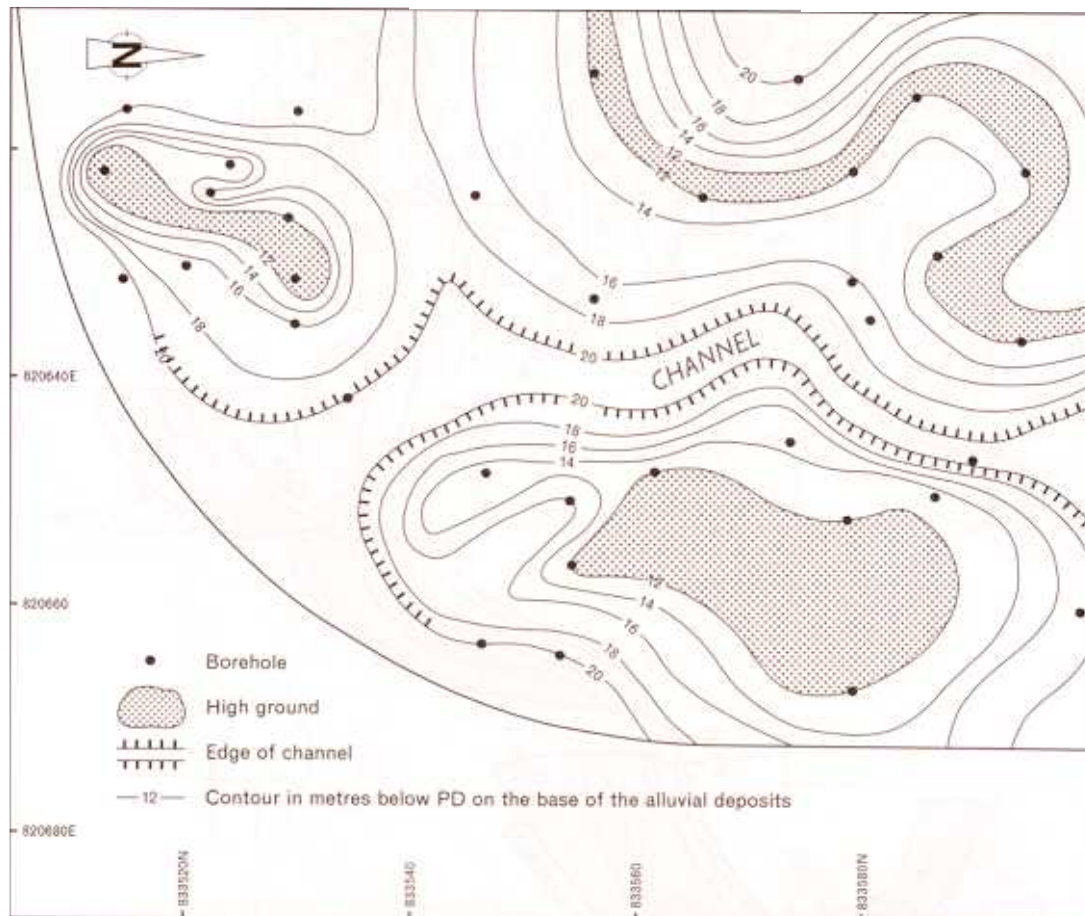


Figure 14 - Contour Map Showing the Base of the Alluvial Deposits Suggesting a Palaeogeography of Meandering Channels

Evidence from sites in Yuen Long suggests a correlation between rockhead channels and major structural lines of weakness, and there is a northeasterly grain to some of the alluvial patterns of drainage (Figure 15). Detailed information available from a site adjacent to Wang Lok Street on the Yuen Long Industrial Estate has shown that alluvial sands tend to thicken above a doline due to a depression in the surface of the underlying debris flow deposits (Figure 16).

Marine Deposits

The Hang Hau Formation (Strange & Shaw, 1986) is of Holocene age and forms the seabed over much of the marine part the district. This deposit occurs inland as far as Yuen Long and the Castle Peak Road (Figure 17). The marine deposits are usually very soft to soft clays, but in the present district firm to stiff silty clays with some fine lamination are also present. They are an olive grey colour and commonly contain shell fragments (mostly *Paphia undulata*, *Bassina calophylla*, small gastropods and echinoid spines). The clays thicken northwards (Figure 17) and generally exceed 4 m along the margin of Deep Bay. An embayment of thicker sediments occurs near Mai Po where they exceed 10 m. North of Tin Shui Wai, two marine incursions are separated by a non-marine interval (BGS 12). Radiocarbon dating of samples from the lowest deposit gave ages of 21 000 to 22 000 years BP, which correlates with the Chek Lap Kok Formation of late Pleistocene age.

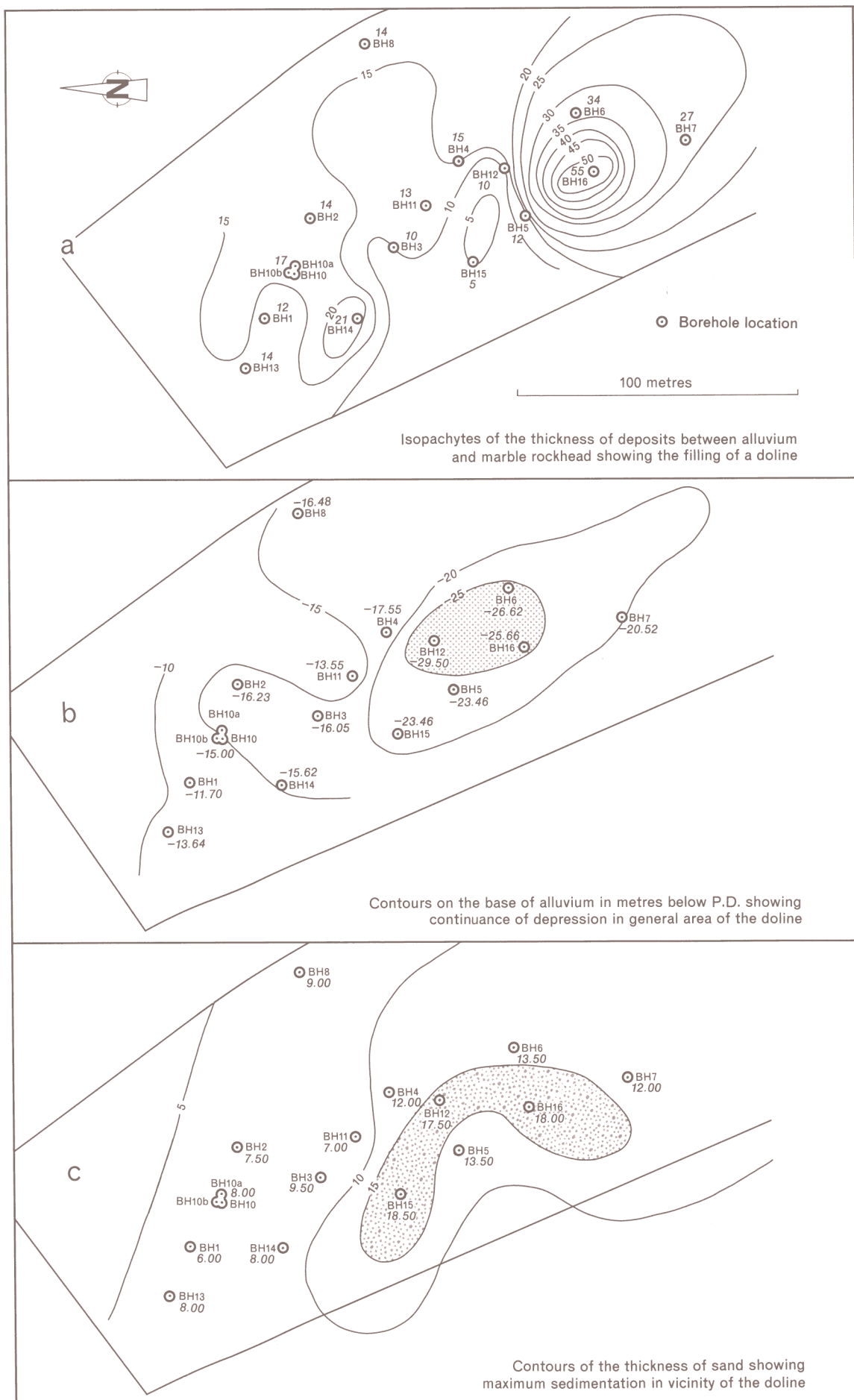


Figure 15 - Contours and Isopachytes of Superficial Deposits Overlying Marble of Site YLTL 313 on the Yuen Long Industrial Estate

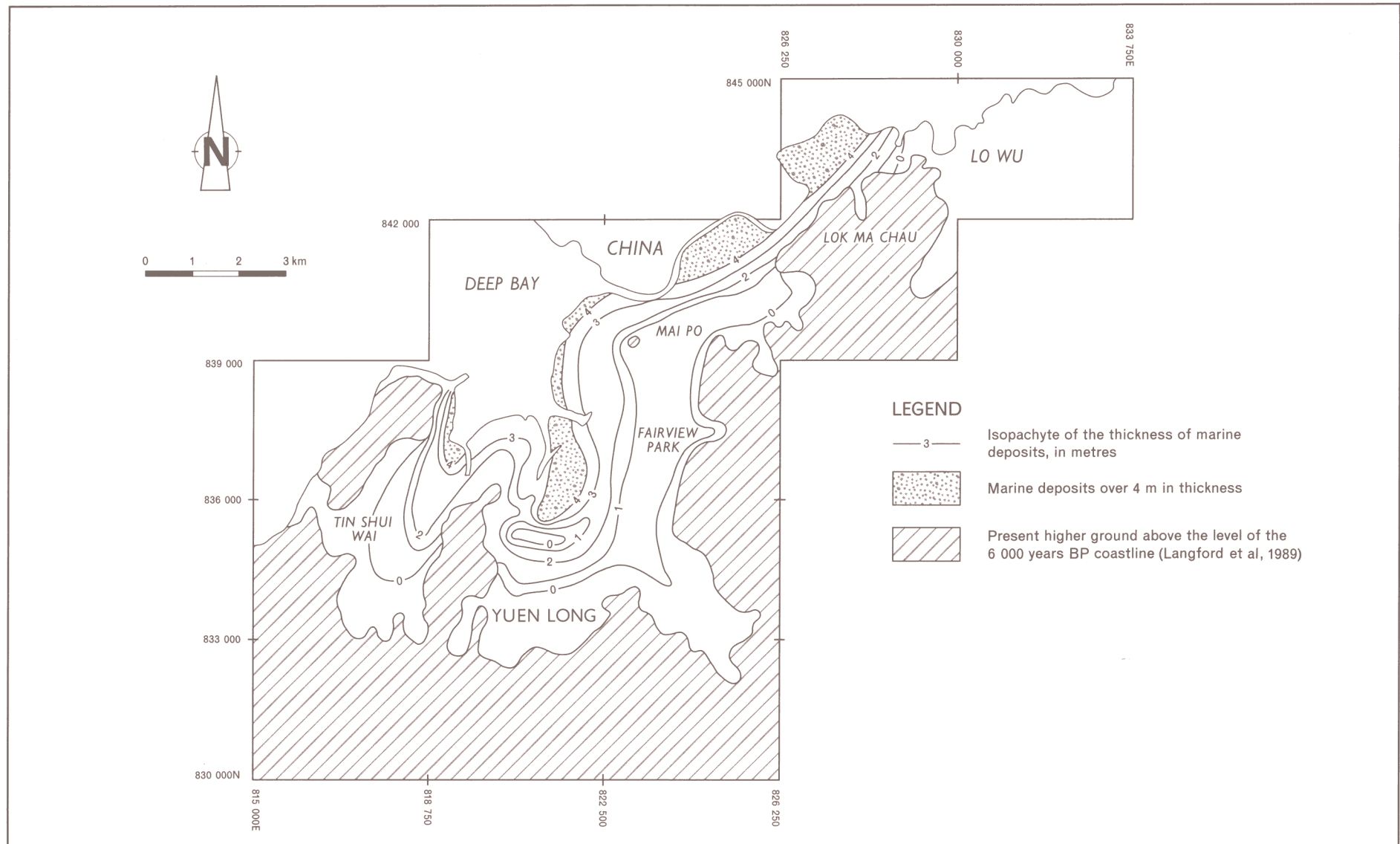


Figure 16 - Generalised Thickness of Marine Deposits in the District

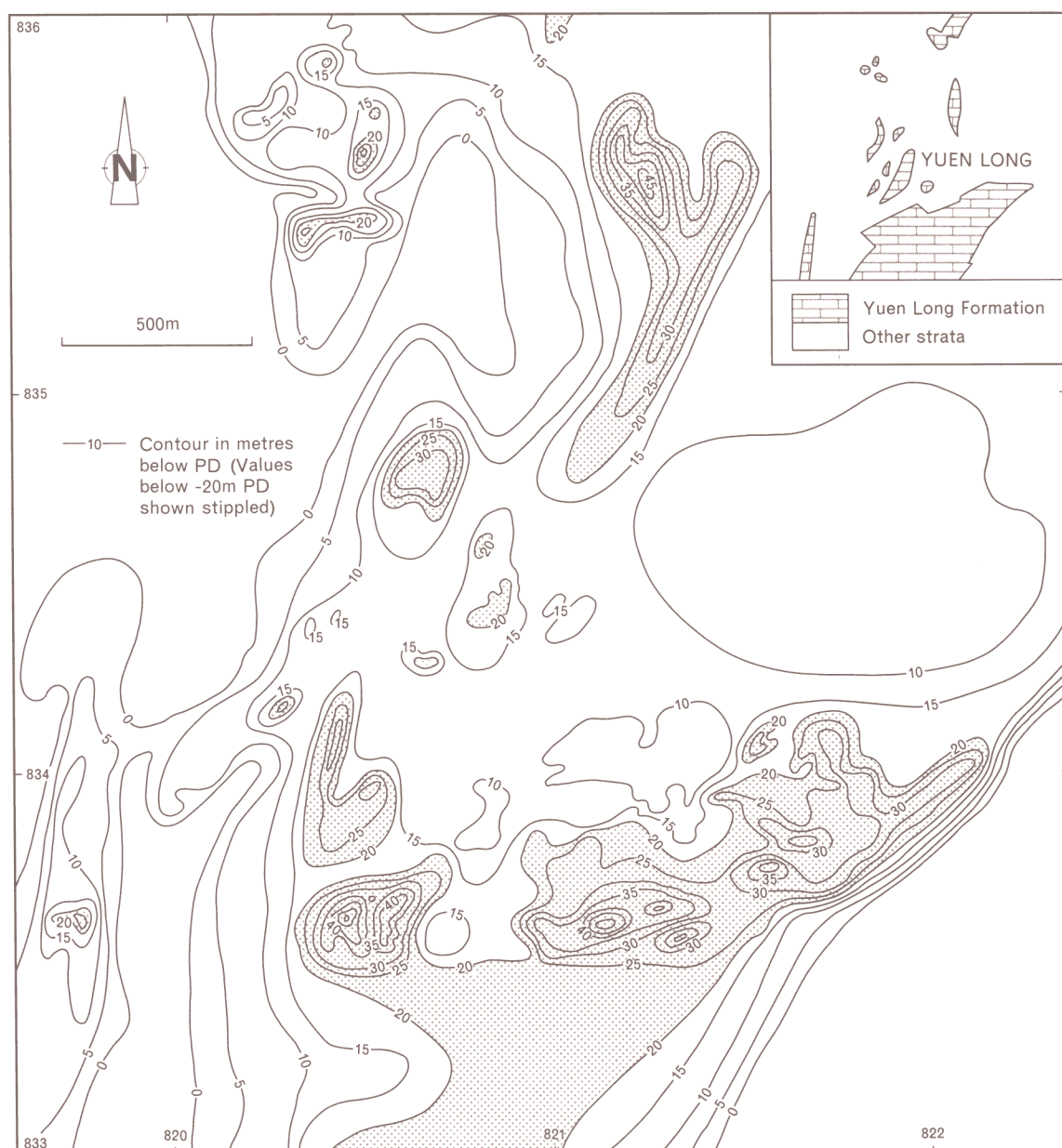


Figure 17 - Generalised Rockhead Contours of the Carboniferous Strata around Yuen Long Between Marble and Granodiorite Located at Site YLTL313, Yuen Long Industrial Estate

Marine sands, characterised by their shell content, were proved near Mai Po in boreholes BGS 33 and 36. They have similar grain size and sorting coefficients to the alluvial sands. Beach deposits, including sand and gravel, occur along the old coastline east of Tin Shui Wai [1950 3610].

Estuarine Deposits

The estuarine deposits are brownish grey clayey silts with plant remains and organic clays containing shell fragments. They occur in the low-lying areas from Deep Bay northeastwards to Lok Ma Chau. Estuarine deposits represent a building up to sea level of the surrounding area by the establishment of mangroves and other silt-trapping vegetation resistant to saline conditions, and are regarded as Holocene in age. The greatest recorded thickness of estuarine deposits was noted in a borehole near the Sham Chun River, where some 6 m have been proved (BGS 43).