HONG KONG GEOLOGICAL SURVEY *SHEET REPORT NO. 6*

# Geology of Tung Chung and Northshore Lantau Island

Geotechnical Engineering Office
Civil Engineering Department
HONG KONG

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# Geology of Tung Chung and Northshore Lantau Island

1:5 000 Sheets 9-SE-A, 9-SE-B
Offshore Part Sheets 9-NE-D, 10-NW-A, 10-NW-B, 10-NW-C &
10-NW-D, & Study of Ground Conditions at Tung Chung New Town

R.J. Sewell & P.A. Kirk

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Prepared by:

Geotechnical Engineering Office
Civil Engineering Department
Civil Engineering Building
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Homantin, Kowloon
Hong Kong

Cover: Oblique aerial view of Tung Chung New Town from above Chek Lap Kok taken in June 1998.

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# Foreword

This report and associated 1:5 000-scale maps specifically relate to development areas in the vicinity of Tung Chung New Town and parts of proposed development areas for Northshore Lantau Island.

The report forms part of the published results of a programme of systematic geological mapping of Hong Kong that began in 1982. It complements geological information contained in the Hong Kong Geological Survey Memoir No. 6 – Geology of Lantau District, and in two Hong Kong Geological Survey Sheet Reports (No. 2 – Geology of Chek Lap Kok, and No. 4 – Geology of North Lantau Island and Ma Wan). These reports have greatly enhanced our understanding of the stratigraphy, structure, and geological history of Hong Kong's rocks. At the same time, they have allowed a geological database, necessary for the continuing economic development of the Hong Kong Special Administrative Region, to be established and developed.

The mapping programme was undertaken by the Hong Kong Geological Survey, which is a section of the Planning Division of the Geotechnical Engineering Office, Civil Engineering Department. The section was led by Dr C.J.N. Fletcher and the Division was under the direction of Dr R.P. Martin during the mapping project reported here. The report was subsequently written and compiled by Dr R.J. Sewell and Mr P.A. Kirk, at which time the section was led by Dr S.D.G. Campbell and the Division was under the direction of Mr H.N. Wong.

The 1:5 000-scale onshore geological survey of Tung Chung was conducted by Mr P.A. Kirk, who also managed a consultancy, on behalf of the Territory Development Department, and undertaken by members of the British Geological Survey, to study complex ground conditions at Tung Chung New Town. Some of the information from the consultant's study is incorporated in this report. Much helpful advice and review comments were also given by GEO colleagues, including Mr K.W. Lai and Dr X.C. Li.

The Survey benefitted from the co-operation of many organizations and individuals. In particular, the co-operation of Mott Macdonald (Hong Kong) Ltd, Scott Wilson (Hong Kong) Ltd, the Airport Authority, Electronic and Geophysical Services Ltd, and Cosine Ltd., is gratefully acknowledged.

This report and the accompanying map sheets will be of interest and value to earth scientists, engineers, planners, developers and educators.

**R. K. S. Chan**
Head of the Geotechnical Engineering Office
July 2002

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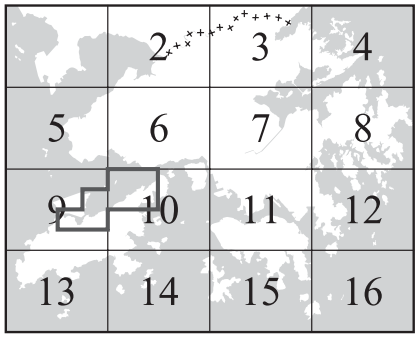
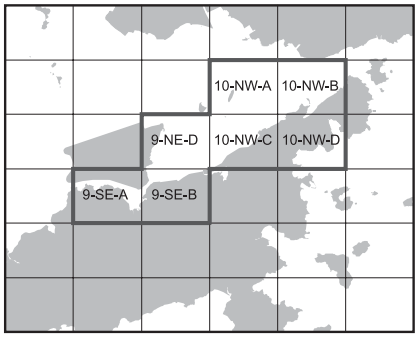
# Map and Report Series Notes

- This report describes the geology of central Lantau Island in the vicinity of Tung Chung New Town and the offshore parts of the North Lantau coast between Chek Lap Kok and Yam O. The report should be read in conjunction with the 1:5 000-scale Geological Maps 9-SE-A and 9-SE-B (revised 2002). The 1:20 000-scale Geological Map Sheet 9 (Chek Lap Kok), and Memoir 6, Geology of Lantau Island, also include relevant information on the geology of the area.

- This report forms one of a series that records findings of the Hong Kong Geological Survey. An index of the 1:5 000-scale Geological Maps to which this report relates is shown below.




*1 : 20 000 Maps*




*1 : 5 000 Maps*

- The symbols for major rock units on the maps have been revised from the first edition maps in order to be consistent, where possible, with the symbols used in the recently published 1:100,000-scale geological map (Sewell *et al*., 2000). A prefix is used to indicate the age of the rocks, followed by lower-case letters to indicate: (i) the group, where appropriate, and/or (ii) the formation name. Prominent stratigraphic beds within the Mesozoic volcanic succession are indicated by a lower-case letter (or letters) denoting the dominant lithology.

- The symbols for superficial deposits on the maps comprise a prefix to indicate the age of the sediments, followed by superscripted lower-case letters to indicate environment of deposition and upper-case letters to indicate material. Ages of the sediments are interpreted as Pleistocene (Qp), Holocene (Qh) and Quaternary undivided (Q). The environments of deposition seen in the district are interpreted to be colluvial (Df), alluvial (a), beach (b), intertidal (i), and marine (m). The materials of colluvium (Df, slope debris) include boulders, cobbles, gravel, sand, and silt. The materials of alluvial, beach, intertidal, and marine environments, are dominantly sand (S) and mud (M).

- Onshore superficial deposits are not generally considered mappable if less than 2 m thick. This minimum thickness is also used as a mapping criterion for offshore sediment.

- Most place names referred to in the text are shown on Figure 2. Grid references cited for specific localities are based on the Hong Kong 1980 Metric Grid as shown on the 1:5 000-scale Geological Maps. Eight-figure references indicate positions to the nearest 10 m, with Eastings followed by Northings, eg 2200 2230.

- All onshore and offshore levels and depths are reduced to Hong Kong Principal Datum (PD), which is 1.2 m below Mean Sea Level and 0.15 m above Admiralty Chart Datum.

- Samples in the SAR-wide rock collection archived by the Hong Kong Geological Survey are prefixed HK followed by the serial number, eg HK 9872.

- Boreholes are generally referred to by the drilling contractor's number followed by the Geotechnical Information Unit (GIU) accession number, or Works Order number (WO), for the relevant ground investigation report, eg 5SW32/13464. The GIU is located in the Civil Engineering Library of the Civil Engineering Department and is maintained by the Geotechnical Engineering Office, Civil Engineering Department.

- The system used in this report for grain-size description and classification is summarized in Table 1.

**Table 1 - Grain Size Description and Classification of Rocks and Superficial Deposits in Hong Kong**

| Superficial Deposits | | Grain Size mm | Solid Rocks | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sedimentary Rocks | | Pyroclastic Rocks | Igneous Rocks | | | | | | | Metamorphic Rocks | |
| | | | | | | Acid | | | Acid-Intermediate | | | Intermediate | Basic | Other | Foliated | Other |
| Boulders | | 200 | Sedimentary Breccia, Conglomerate | | Pyroclastic Brecia, Agglomerate | Very Coarse | Pegmatite | | Quartz Syenite | Syenite | Quartz Monzonite | | Gabbro | | Schist | Quartzite, Marble, Hornfels, Fault gouge, Fault breccia |
| Cobbles | | 60 | | | | | | | | | | | | | | |
| Gravel | Coarse | 20 | | | Lapilli- Tuff | Coarse | | | | | | | | | | |
| | Medium | 6 | | | | Medium | Granite | Granodiorite | | | | | | | | |
| | Fine | 2 | | | | | | | | | | | | | | |
| Sand | Coarse | 0.6 | Sandstone | | Coarse Ash Tuff | Fine | | | | | | | Microgabbro | Lamprophyre | | |
| | Medium | 0.2 | | | | | Aplite, Microgranite | Micro-granodiorite | | | | | | | | |
| | Fine | 0.06 | | | | | | | | | | | | | | |
| Mud | Silt | | Siltstone | Mudstone | Fine Ash Tuff | Very Fine, Aphanitic | Rhyolite | Dacite | Quartz Trachyte | Trachyte | Quartz Latite | Andesite | Basalt | | Mylonite, Phyllite | |
| | Clay | 0.002 | Claystone | | | | Rhyodacite | | | | | | | | | |