

Development in the Designated Area of Northshore Lantau

Background

Hong Kong Geological Survey Sheet Report No. 6, published by the Geotechnical Engineering Office (GEO) of the Civil Engineering Department (CED) in July 2002, provides information on the geology of Tung Chung and Northshore Lantau Island. Other information on the geology of the area, including previous geological studies as well as relevant onshore and marine ground investigation data, is available for inspection in the Geotechnical Information Unit of the Civil Engineering Library.

2. The Northshore Lantau area is underlain mainly by medium-grained granite, intruded by numerous rhyolite dykes. However, the following complex geological conditions are known to exist within the area:

- (i) metasedimentary rocks (comprising marble, metasandstone and metasiltstone) that are subject to dissolution and give rise to cavities, cavity-fill deposits and residual soils (these geological terms are described in detail in the appendix to Hong Kong Geological Survey Sheet Report No. 6);
- (ii) soft or loose or weakly lithified superficial deposits that occupy depressions in the subcrop surface, most of which lie directly above or adjacent to metasedimentary rocks; and
- (iii) anomalously deep, or steeply inclined, rockhead in igneous rocks.

3. The complex geology can have significant effects on foundation design and construction in terms of both development costs and construction programme, owing to the practical difficulties associated with the installation of long piles through the difficult ground conditions. In two extreme cases, this has led to the abandonment of planned residential tower blocks at the Tung Chung New Town reclamation at sites where the existence of cavity-fill deposits and a deep, and locally steeply dipping, rockhead rendered the foundation works too costly, time consuming and difficult to build.

4. The nature of the problem suggests that there is scope for optimization of foundation design, given adequate ground investigation. In some cases, foundations might prove to be so costly that adjustment of the layout of the development or site abandonment is warranted. It is therefore considered necessary to adopt special measures for developments within the Designated Area in order to ensure that deep foundations in the area are properly designed and constructed.

Boundary of Designated Area

5. The affected area is referred to as “the Designated Area of Northshore Lantau”. The plan illustrating the extent of the Designated Area is available for inspection in the Geotechnical Information Unit of the Civil Engineering Library. A small-scale location plan of the Designated Area is shown in Appendix A.

Administrative Procedures and General Guidance

Ground Investigation (GI)

6. APs/RSEs should follow the administrative procedures including supervision requirements for the GI works in accordance with PNAP 132. In addition, the GEO will provide useful advice/information on geological conditions in the Designated Area to facilitate development. APs/RSEs are strongly encouraged to seek advice/comments from the Chief Geotechnical Engineer/Mainland West of the GEO on their GI proposals within the Designated Area before commencement of the GI works.

7. GI for a site within the Designated Area is best carried out in stages and must be adequate to allow an assessment of whether the ground conditions will effect the proposed development. Some deep drillholes will be required for this purpose. It is also advisable to carry out the initial stages of the GI prior to the finalization of general building plans for the site because, in certain circumstances, adjustments to the locations of certain structures may be the most economical means of dealing with serious geotechnical problems posed by difficult ground conditions.

Design and Construction of Deep Foundations

8. The following documents shall be submitted with the foundation plans for buildings works in the Designated Area:

(i) an explanatory guide to the submission;

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- (ii) a report containing the results of ground investigation including details of the equipment and procedures used;
- (iii) a report containing critical examination and interpretation of (ii) above, a schedule of the geotechnical design assumptions, discussion of anticipated geotechnical problems and containing geotechnical requirements for the design and construction of the foundation works including testing, inspecting and maintenance requirements; and
- (iv) design calculations for foundation works.

9. General guidance on the design and construction of piled foundation works is given in PNAP 66.

10. The AP or RSE shall arrange for qualified supervision of the foundation works in the Designated Area. The requirements for qualified supervision are to be imposed by the Building Authority with due regard to the type and complexity of the works.

Geotechnical Information

11. Technical guidance on foundation works in the Designated Area of Northshore Lantau is given in GEO Technical Guidance Note No. 12, which is available on the CED website. Ground investigation works shall be carried out in accordance with the standards and provisions set down in the latest editions of "Guide to Site Investigation" and other GEO guidance documents as may become available from time to time. Furthermore, a review of the principles and practice related to the design and construction of piles in Hong Kong is provided in GEO Publication No. 1/96.



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THE DESIGNATED AREA OF NORTHSORE LANTAU

