

### Foundation Works (Mini-piles)

In giving this approval of plans, I hereby impose the following conditions under item 6 in section 17(1) of the Buildings Ordinance (BO):

- (a) Test installation of pile no.(s) \_\_\_\_\_ *[please refer to approval letter for details]* \_\_\_\_\_ should be carried out to verify the design assumptions before commencing to install any other piles. The Buildings Department (BD) should be notified of the time and date of the installation so that the test installation may be witnessed by a representative from the Department.
- (b) *Predrilling* – Predrilling at locations in close proximity of the piles should be carried out to better identify the quality of the founding material during construction of the piles and to confirm the appropriate founding levels. The number of predrill boreholes required should be such that the pile tip of every such pile should be within 5 m from a predrill borehole. The predrilling should be sunk to at least 5 m below the rock head of the specified category in accordance with the Code of Practice (CoP) for Foundations 2017 or the designed length of the rock socket of the nearest pile, whichever is the deeper. The records of predrilling works should be submitted within 21 days upon completion of the predrilling works.
- (c) *Post-construction proof drilling* – Upon completion of the piles, some additional proof drill holes should be sunk to at least 5 m below the as-built top level of the rock socket of the nearest pile or to the as-built bottom level of the rock socket, whichever is the deeper, to verify the rockhead profile and hence assess the adequacy of the socketed length of these piles. The number of such proof drill holes should be at least 2 for sites with 100 or less piles; or 1% of the number of piles for sites with more than 100 piles (any fraction of a proof drill hole so calculated should be construed as one additional proof drill hole).
- (d) *Test on bearing strata* – Test to verify the uniaxial compressive strength (UCS) or equivalent point load index strength (PLI<sub>50</sub>) of the founding material for piles socketed in Cat 1(c) or better rock should be carried out. The number of tests conducted should be such that there is at least 1 such test performed on rock specimen taken within 5 m of every installed pile. Testing should be carried out by a laboratory\* accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS)^.
- (e) Sampling and testing of steel reinforcing bars should be carried out in accordance with CS2:2012. Testing should be carried out by a laboratory\* accredited under the HOKLAS^. The test results@ should be submitted within 60 days of the delivery of the steel reinforcing bars to the site. The test reports should be appended with a statement signed by the registered structural engineer (RSE) to confirm the following:
  - (i) All steel reinforcing bars used for the construction and the test specimens covered by the test reports are in accordance with the types and grades of steel shown in the approved plans.

- (ii) Sampling and testing of steel reinforcing bars used have been carried out in accordance with CS2:2012.
  - (iii) The acceptance criteria appropriate to each type and grade of steel reinforcing bars used have been complied with.
  - (iv) All steel reinforcing bars tests have been carried out by a laboratory\* accredited under the HOKLAS^.
- (f) The requirements of sampling and testing of grout are as follows:
- (i) For each grout mix one sample of grout shall be provided from each 10 batches of grout, or every 10 m<sup>3</sup> from the amount of grout produced in a day, whichever is the lesser, to determine the crushing strength of the grout. Samples shall be provided not more than 1 hour after the grout has been mixed and shall be protected from weather before test cubes are made.
  - (ii) Compression testing of grout test cubes should be carried out in accordance with the methods specified in CS1:2010 using 100 mm size cubes. Testing should be carried out by a laboratory\* accredited under the HOKLAS^. Test results@ should be reported on a HOKLAS Endorsed Certificate and appended with a statement signed by the RSE to confirm that the acceptance criteria set out in clause 10.3.4.2(b) of the CoP for Structural Use of Concrete 2013 have been complied with, and should be submitted within 21 days after testing.
- (g) Qualified site supervision of the sampling of cement grout and making and curing of test cubes by experienced and competent persons should be provided to ensure that the works are carried out in accordance with the plans approved and that the required standards are complied with.

2. You are reminded that site supervision of the foundation works by a team of supervisors shall be provided each by the authorized person, the RSE and the registered specialist contractor in accordance with the Technical Memorandum for Supervision Plans 2009 and the CoP for Site Supervision 2009 to ensure that the quality of the foundation works is up to standard and that the works are carried out in accordance with the plans approved and in such a manner as not to render inadequate the margin of safety of, or impair the stability of, or cause danger to any building, structure, land, street or services. Details of site supervision for the foundation works shall be included in the supervision plan and submitted prior to or at the time of application for consent to the commencement of the foundation works.

3. Under regulation 10 of the Building (Administration) Regulations (B(A)R), one set of foundation record plans and report together with the Form BA14 stipulated in regulation 25 of the B(A)R to certify the completion of the foundation works are required to be submitted. The record plans should include details of the characteristic features of the site and the identification, location, size, depth and level of each pile as constructed. The report should include, for each pile, the date of construction, the quality and quantity of materials used, the grouting records, the excavation records, the results of rock specimen tests, the predrilling and post-construction proof drilling records and should also be accompanied by an assessment

report with a rockhead contour plan prepared based on the ground investigation, the predrilling and the post-construction proof drilling.

4. Your attention is also drawn to PNAP APP-18, the Technical Memorandum for Supervision Plans 2009 and the CoP for Site Supervision 2009 regarding the requirements on predrilling and post construction proof drilling works.

5. Consent to the commencement and carrying out of the pile cap and superstructure works will not be given until the records of predrilling, post-construction proof drilling, test reports on the bearing strata, steel reinforcing bars testing and grout compression test as specified in paragraphs 1(b) to 1(f) above, and the foundation record plans, report and Form BA14 specified in paragraph 3 above have been submitted and found satisfactory, and that the required proof tests have also been satisfactorily carried out by a laboratory\* accredited under the HOKLAS<sup>^</sup>.

6. All significant signs of distress during the construction works should be reported promptly to the BD. Where the ground settlement reaches or exceeds the trigger value of the “Alarm Level” defined in the monitoring scheme, the Chief Highway Engineer/Research and Development, Highways Department (Attention: Land Surveyor/Geographic Information System, telephone number: 2762 3498, fax number: 2714 5290, email: lsgis.rnd@hyd.gov.hk) should be notified promptly together with the relevant details of the monitoring.

\* A Directory of Accredited Laboratories in Hong Kong is obtainable from the Hong Kong Accreditation Service (HKAS) Executive, Innovation and Technology Commission.

A laboratory’s accreditation for an individual test or calibration may be granted, modified or withdrawn at any time. Up-to-date information on accredited laboratories and their scopes of accreditation are available on the internet at the HKAS website at <http://www.itc.gov.hk/hkas/>.

<sup>^</sup> Test to be carried out by a laboratory\* accredited under the HOKLAS or by other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with the HOKLAS for the particular test concerned.

@ Test carried out by an accredited laboratory should be within its scope of accreditation. To ensure this, test results should be reported on a HOKLAS Endorsed Certificate or equivalent Certificate/Report issued from other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with the HOKLAS.