Ref: BD _____

Address: _____

Appendix _____ to approval dated _____

**Prestressed Concrete Works**

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) 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 Hong Kong Laboratory Accreditation Scheme (HOKLAS) for the particular test concerned. 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.

(b) Sampling of concrete and compression testing of concrete test cubes should be carried out in accordance with the methods specified in CS1:2010. Testing should be carried out by a laboratory* accredited under HOKLAS for the particular test concerned. Test results[@] should be submitted within 21 days after testing. The test reports should be appended with a summary which contains information on locations of the concerned structural elements, concrete grades and dates of cast. The summary should also include previous summary information of concrete cube test reports in chronological order. The test reports should also be appended with a statement signed by the RSE to confirm the following:

(i) All concrete used for the construction and concrete cubes covered by the test reports are in accordance with the concrete grades shown in the approved plans.

(ii) Concrete cube sizes, rates of sampling fresh concrete for testing and acceptance criteria for compressive strength set out in clause 10.3.4.2 of

the Code of Practice (CoP) for Structural Use of Concrete 2013 have been complied with.

(iii) All concrete cube tests have been carried out by a laboratory* accredited under HOKLAS or by other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with HOKLAS and in accordance with the methods specified in CS1:2010.

(c) Sampling and testing of grout should conform to the following requirements:

(i) For each grout mix one sample of grout shall be provided from each 10 batches of grout, or every 10 $m^3$ 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 HOKLAS for the particular test concerned. 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.

(d) Concrete should be obtained from concrete suppliers certified under the Quality Scheme for the Production and Supply of Concrete (QSPSC). The certificates of QSPSC, including (i) the certificate of the concrete supplier; and (ii) the certificate of product conformity from the supplying batching plant, issued by the Hong Kong Quality Assurance Agency, should be submitted together with the first batch of concrete cube test results within 21 days after testing. For those exception project[%], the concrete of which may not be from concrete suppliers under QSPSC, the required documents to prove that the concrete supplier is operating under an approved quality system should be submitted at least one week prior to the commencement of reinforced concrete works.

2. The following conditions in respect of qualified supervision of works are imposed under item 6 in section 17(1) of the BO:

(a) Qualified site supervision of the prestressed concrete works, including sampling of concrete, steel reinforcing bars and cement grout and making and curing of test cubes, by experienced and competent persons as defined in 2(b) and 2(c), 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.

(b) The RSE should assign a quality control supervisor to supervise the works, determine the necessary frequency of inspection by the quality control supervisor which should not be less than once a week, and devise inspection

check lists. The minimum qualifications and experience of the quality control supervisor is to be the same as the technically competent person (TCP) of grade T3 under the RSE's stream, as stipulated in the CoP for Site Supervision 2009.

(c) The registered general building contractor (RGBC)/registered specialist contractor (RSC) should assign a quality control co-ordinator to provide full time on site supervision of the works and devise inspection check lists. The minimum qualifications and experience of the quality control co-ordinator is to be the same as the TCP of grade T1 under the RGBC's/RSC's stream, as stipulated in the CoP for Site Supervision 2009.

(d) The names and qualifications of the supervisory personnel representing the RSE and the RGBC/RSC respectively should be recorded in an inspection log book. The date, time, items inspected and inspection results should be clearly recorded in the log book. The log book should be kept on site for inspection by representatives of the Buildings Department (BD).

3. Where steel reinforcing bar (rebar) products such as cut and bent rebars, reinforcement cages and the like are fabricated off-site in a prefabrication yard, the following conditions in respect of qualified supervision of *off-site rebar prefabrication* works (referred hereafter as "Prefabrication Works"[+]) are imposed under item 6 in section 17(1) of the BO:

(a) Qualified site supervision of the Prefabrication Works[+], including sampling of steel reinforcing bars, by experienced and competent persons as defined in 2(b) and 2(c), 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.

(b) The names and qualifications of the supervisory personnel representing the RSE and the RGBC/RSC respectively should be recorded in an inspection log book. The date, time, items inspected and inspection results should be clearly recorded in the log book. The log book should be kept in the prefabrication yard and a copy of it should be kept on site for inspection by representatives of the BD.

4. Under regulation 10 of the Building (Administration) Regulations, the following documents are required to be submitted:

(a) A copy of the mill certificate of the prestressing steel used, which should be submitted within 60 days of the delivery of the prestressing steel to the site^ and appended with a statement signed by the RSE to confirm that the requirements of chemical composition and mechanical properties appropriate to the type of prestressing steel have been complied with.

(b) Prestressing and grouting records, which should be submitted within 21 days after prestressing and grouting to confirm that the prestressing operations have been carried out satisfactorily.

[#]5. Where different concrete grades are used in the construction of superstructure/basement elements, the following condition in respect of quality supervision and control of in-situ reinforced concrete works is imposed under item 6 in section 17(1) of the BO:

(a) Rebound hammer tests (RHT) should be carried out to the structural concrete elements with higher concrete grade at an early age in accordance with the qualified supervision and testing requirements specified in the Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers (PNAP) APP-167. The RHT records should be kept on site for inspection by the TCP under RSE's stream and representatives of the BD.

#6. As specified in the PNAP APP-167, the RSE and RGBC/RSC should take the necessary follow-up actions when the results of RHT mentioned in paragraph 5 above reach alert level of the concrete strength at early age.

# Delete if not involving superstructure or basement works with the use of different concrete grades.

* 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/.

@ The 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.

*Laboratory/Organisation/Testing Agency for carrying out the test(s) should be independent of the Registered General Building Contractor (RGBC)/Registered Specialist Contractor (RSC).*

% Pursuant to clause 11.7.1 of the CoP for Structural Use of Concrete 2013, exceptional projects include those located at remote areas (such as outlying islands) or where the volume of concrete involved is less than 50 $m^3$. For these exceptional projects, the concrete should be obtained from a supplier operating under an approved quality system.

^ The 'site' refers to the prefabrication yard for cases covered by paragraph 3 above.

+ Prefabrication Works refer to the fabrication works of steel rebar products, such as cut and bent rebars, reinforcement cages and the like, covered by this approval of plans carried out in the prefabrication yard.