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Building Engineering Group

02 Jun 2014

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Dear Sir/Madam

## **EARLY PRE-CONSULTATION OF STRUCTURAL CONCEPT FOR COMPLEX BUILDINGS**

This circular is to advise the industry to come for early pre-consultation with BCA on the structural concept of complex buildings before building plans and structural plans for foundation works are submitted for approval, if the proposed development falls under the **complex buildings criteria shown in Annex A**.

### **Background**

2 In recent years, BCA has observed an increasing number of buildings with complex structural design and form. Specific consideration needs to be given to the design and construction of such structures to make sure that they are robust, buildable and can be built safely.

3 Sometimes, when the structural concept and design of buildings are submitted or presented to BCA, the building (architectural) plans have been finalised and/or approved. Should there be a need to change or enhance the structural system of the building, Qualified Persons (QPs) for structural works may face difficulty in doing so.

4 Following consultation with industry members, comprising Professional Engineers from the Institution of Engineers Singapore and the Association of Consulting Engineers Singapore, there was consensus that early involvement and consultation with BCA on the structural concept would be beneficial, especially for complex building form.

### **Early Pre-consultation of Structural Concept**

5 To facilitate early review of the structural concept for complex buildings, **BCA will be introducing a new pre-consultation process and would like to urge QPs for structural works involved in such projects to come for early pre-consultation with BCA** preferably at the conceptual design stage before the architectural plans have been firmed up.

6 For the early pre-consultation, the QP for structural works should provide the following details:-

- the structural concept and design of the complex buildings;
- issues affecting building performance, e.g. deflection, vibration and acceleration and long-term effects; measures to prevent disproportionate collapse, etc;
- the proposal on how buildability requirements can be met; and
- tentative methods of construction.

7 Parties involved in the project, namely the Developer, Architect, Accredited Checker and Builder (if they are on board) should also attend the session. A Pre-consultation Completion letter will be issued after the session when queries and comments, if any, from BCA are adequately addressed.

8 Given that structural safety and construction issues can be highlighted and addressed beforehand, this early pre-consultation process would pave the way for smoother plan approvals subsequently. In addition, it would help such projects in achieving a more robust building design to prevent building from disproportionate collapse, and at the same time meeting buildability requirements and raising construction productivity.

### **Revised Submission Process for Approval of Building and Structural Plans**

9 During submission of structural plans for foundation works or building plans, QPs for structural or architectural works (whichever the case might be) will have to indicate, on the relevant application forms shown in Annex B, whether their project falls under the complex buildings criteria. The current forms will be amended accordingly and the changes will take effect on the implementation date. The QPs for architectural works will have to submit form in Annex C which is to be completed by the QP for structural works to determine if their project involves any complex building structure, together with the first building plan submission.

10 For a complex building project, the respective QPs will also have to indicate on the application form whether early pre-consultation has been made prior to the submission. If QPs fail to arrange for early pre-consultation, it may slow down the approval process for plan submission. Hence, to enable a smoother and faster processing of plans, QPs are advised to plan ahead and come for an early pre-consultation with BCA.

### **Arrangement for Early Pre-consultation with BCA**

11 For projects with complex building structures, QPs for structural works can make arrangement for early pre-consultation with BCA by sending the request form shown in Annex D to our Building Engineering Group, together with relevant information and details of their projects (refer to Annex E).

12 The request for early pre-consultation should be sent to our Building Engineering Group:

i) By Email: [preconsultation@bca.gov.sg](mailto:preconsultation@bca.gov.sg)

Or

ii) By Mail / Fax:  
5 Maxwell Road  
#05-00 Tower Block MND Complex  
Singapore 069110  
Fax: 63257482

Or

iii) By Hand: BCA Service Counter

### **Implementation**

13 The early pre-consultation process will be implemented from **2 Jan 2015** and it applies to all new projects with complex buildings where building plans or structural plans for foundation works are submitted on or after this date.

**Clarification**

14 We would appreciate it if you could bring the contents of this circular to the attention of your members. Should you need any clarification, please contact either Er. Dr Tran Chi Trung (Tel. 63257484, email: tran\_chi\_trung@bca.gov.sg) or Er. Chin Wee Keong (Tel. 63257788, email: chin\_wee\_keong@bca.gov.sg).

Thank you.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Lim Beng Kwee', written in a cursive style.

ER. LIM BENG KWEE  
DIRECTOR, BUILDING ENGINEERING GROUP  
for COMMISSIONER OF BUILDING CONTROL

## ANNEX A

### **CRITERIA FOR COMPLEX BUILDING**

A building is deemed to be complex if it consists of one or more of the following:

- 1) Multiple level transfer structures (2 or more transfer floors each carrying 3 or more floors) or cantilevered transfer structures (carrying 5 or more floors);
- 2) Non-vertical/inclined structural elements (with offset of floor plate more than 3m from the edge of the floor above or below);
- 3) Structures with unconventional geometry (e.g. dome or arch-shaped); or
- 4) Large span structures (with span more than 40m) or large cantilever span structures (where cantilever span is more than 8m).

These criteria do not apply to infrastructures, such as bridges, viaducts, tunnels, and MRT/LRT stations.

**ANNEX B-1**

New under section III of the BPD BP03 form “Application for Approval of Building Plans”.

(8) I confirm that the project:

i)  does not involve any complex building structure.

ii)  involves one or more of the following complex building structures:

- Multiple level transfer structures (2 or more transfer floors each carrying 3 or more floors) or cantilevered transfer structures (carrying 5 or more floors).
- Non-vertical/inclined structural elements (with offset of floor plate is more than 3m from the edge of the floor above or below).
- Structures with unconventional geometry (e.g. dome or arch-shaped).
- Large span structures (with span more than 40m) or large cantilever span structures (where cantilever span is more than 8m).

Obtained a letter from our Building Engineering Group after completing pre-consultation session on the structural concept of the complex buildings. The Pre-consultation Completion Letter Reference No. is \_\_\_\_\_.

(Note: If such pre-consultation has not been made, please arrange for it before any building or foundation plans can be processed).

(9) ETTV plans and calculations are –

- i) not applicable;
- ii) applicable and a set of these calculations are attached.

(10) Alternative solutions are :

- i) adopted (schedule of alternative solution attached);
- ii) not adopted.

(11) Under the Building Control (Buildable Design) Regulations, submission of buildability score is –

i)  Applicable  a set of these calculations (Form BPD\_BS01) is attached.  
The buildability score is \_\_\_\_\_ for GFA of \_\_\_\_\_ m<sup>2</sup>.  
The planning permission was 1<sup>st</sup> applied on \_\_\_\_\_ (state the date).

Buildability score submitted in the previous BP submission and is unchanged

ii)  Not applicable:  Planning Permission requirements:  
 GFA < 2000m2 (planning permission applied after 1 Jan 2004).  
 GFA < 5000m2 (planning permission applied before 1 Jan 2004).  
 Planning permission applied before 1 Jan 2001.

Waiver obtained.

Exempted.

**ANNEX B-2**

New under section D of the BEV/A1 form “Application for Approval of Structural Plans”.

<b>C. DECLARATION BY DEVELOPER – APPOINTMENT OF ACCREDITED CHECKERS</b>					
1	<p>I have appointed the following Accredited Checker (AC) under Section 8(1)(e) of the Building Control Act:</p> <p>(i) AC in an Accredited Checking Organisation (ACO):</p> <p style="margin-left: 20px;">Name of AC _____, AC Registration No.: _____</p> <p style="margin-left: 20px;">Name of ACO _____, ACO Registration No.: _____</p> <p>or (ii) AC acting on his own behalf:</p> <p style="margin-left: 20px;">Name of AC _____, AC Registration No.: _____</p> <p style="margin-left: 20px;"><i>(Note: AC not in an ACO is restricted to project with a value of building works up to \$15 million)</i></p>				
2	<p>I have appointed the following Specialist Accredited Checker under section 8(1)(f)(i) of the Building Control Act:</p> <p>Name of Specialist AC _____, Specialist AC Registration No.: _____</p>				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top; padding: 5px;">Name &amp; Address of Developer</td> <td style="width: 50%; border: none; vertical-align: top; padding: 5px;"> <div style="border-bottom: 1px solid black; margin-bottom: 5px; text-align: center;">Signature of Authorised Signatory</div> <div style="border-bottom: 1px solid black; margin-bottom: 5px; text-align: center;">Name &amp; Designation ( if developer is a company)</div> </td> </tr> <tr> <td style="border: none; vertical-align: top; padding: 5px;">UEN: _____ Tel No.: _____ Fax No.: _____</td> <td style="border: none; vertical-align: top; padding: 5px;">NRIC No.: _____ Date: _____</td> </tr> </table>		Name & Address of Developer	<div style="border-bottom: 1px solid black; margin-bottom: 5px; text-align: center;">Signature of Authorised Signatory</div> <div style="border-bottom: 1px solid black; margin-bottom: 5px; text-align: center;">Name &amp; Designation ( if developer is a company)</div>	UEN: _____ Tel No.: _____ Fax No.: _____	NRIC No.: _____ Date: _____
Name & Address of Developer	<div style="border-bottom: 1px solid black; margin-bottom: 5px; text-align: center;">Signature of Authorised Signatory</div> <div style="border-bottom: 1px solid black; margin-bottom: 5px; text-align: center;">Name &amp; Designation ( if developer is a company)</div>				
UEN: _____ Tel No.: _____ Fax No.: _____	NRIC No.: _____ Date: _____				
<b>D. DECLARATION BY THE QUALIFIED PERSON FOR STRUCTURAL WORKS</b>					
1	<p>I confirm that I am appointed as the Qualified Person for structural works under section 8(1)(a) or 11(1)(d)(i) of the Building Control Act in respect of the works described above by _____.</p>				
2	<p>The status of the Planning Approval is as follows:</p> <p><input type="checkbox"/> WP is attached    <input type="checkbox"/> PP is attached    <input type="checkbox"/> URA lodgement is attached    <input type="checkbox"/> WP/PP will be submitted    <input type="checkbox"/> not required</p>				
3	<p>I confirm that the project:</p> <p>i) <input type="checkbox"/> does not involve any complex building structure.</p> <p>ii) <input type="checkbox"/> involves one or more of the following complex building structures:</p> <p style="margin-left: 20px;"><input type="checkbox"/> Multiple level transfer structures (2 or more transfer floors each carrying 3 or more floors) or cantilevered transfer structures (carrying 5 or more floors).</p> <p style="margin-left: 20px;"><input type="checkbox"/> Non-vertical/inclined structural elements (with offset of floor plate is more than 3m from the edge of the floor above or below).</p> <p style="margin-left: 20px;"><input type="checkbox"/> Structures with unconventional geometry (e.g. dome or arch-shaped).</p> <p style="margin-left: 20px;"><input type="checkbox"/> Large span structures (with span more than 40m) or large cantilever span structures (where cantilever span is more than 8m).</p> <p style="margin-left: 20px;"><input type="checkbox"/> Obtained a letter from our Building Engineering Group after completing pre-consultation session on the structural concept of the complex buildings. The Pre-consultation Completion Letter Reference No. is _____.</p> <p style="margin-left: 20px;"><i>(Note: If such pre-consultation has not been made, please arrange for it before any building or foundation plans can be processed).</i></p>				
4	<p>Under the Building Control (Buildable Design) Regulations, submission of buildability score is:</p> <p><input type="checkbox"/> Applicable    <input type="checkbox"/> a set of these calculations (Form BEV_BS02) are attached.</p> <p style="margin-left: 40px;">The structural buildability score is _____ for GFA of _____ m<sup>2</sup></p> <p style="margin-left: 40px;">The planning permission was 1<sup>st</sup> applied on _____ (state the date)</p> <p style="margin-left: 40px;"><input type="checkbox"/> will be submitted at the first superstructural submission</p> <p style="margin-left: 40px;"><input type="checkbox"/> buildability score submitted in previous ST submission</p> <p style="margin-left: 40px;"><input type="checkbox"/> buildability score submitted in previous BP submission and is unchanged</p> <hr style="border-top: 1px dashed black;"/> <p><input type="checkbox"/> Not Applicable    <input type="checkbox"/> Planning Permission application:</p> <p style="margin-left: 40px;"><input type="checkbox"/> GFA &lt; 2000m<sup>2</sup></p> <p style="margin-left: 40px;"><input type="checkbox"/> GFA &lt; 5000m<sup>2</sup> (planning permission applied before 1 Jan 2004)</p> <p style="margin-left: 40px;"><input type="checkbox"/> Planning permission applied before 1 Jan 2001</p> <p style="margin-left: 40px;"><input type="checkbox"/> waiver obtained</p> <p style="margin-left: 40px;"><input type="checkbox"/> exempted</p>				
5	<p>I confirm that the provision of Household Shelter is:</p> <p><input type="checkbox"/> Applicable    I will obtain Notice of Approval of shelter plans from Special Function Division of BCA</p> <hr style="border-top: 1px dashed black;"/> <p><input type="checkbox"/> Not Applicable    <input type="checkbox"/> There is no residential dwelling house or flat in the building works</p> <p style="margin-left: 40px;"><input type="checkbox"/> It is addition and alteration works</p> <p style="margin-left: 40px;"><input type="checkbox"/> QP has sought advice with SCDF and obtained a confirmation in writing from SCDF that provision of HS is not required for the reconstruction works</p>				

This form may take you 10 minutes to complete.

<b>VERIFICATION BY QUALIFIED PERSON FOR STRUCTURAL WORKS ON WHETHER PROJECT FALLS UNDER COMPLEX BUILDING CRITERIA (THIS IS TO BE ATTACHED DURING FIRST PLAN SUBMISSION)</b>	
<b>A. PROJECT DETAILS</b>	
1	Project Reference No.: _____ Project Title: _____ _____ Lot/Plot: _____ TS/MK: _____ House No: _____ Road: _____
2	As the QP for Structural Works of the above project, I have reviewed and confirmed that the project: <ul style="list-style-type: none"> <li>i) <input type="checkbox"/> does not involve any complex building structure.</li> <li>ii) <input type="checkbox"/> involves one or more of the following complex building structures:                             <ul style="list-style-type: none"> <li><input type="checkbox"/> Multiple level transfer structures (2 or more transfer floors each carrying 3 or more floors) or cantilevered transfer structures (carrying 5 or more floors).</li> <li><input type="checkbox"/> Non-vertical/inclined structural elements (with offset of floor plate is more than 3m from the edge of the floor above or below).</li> <li><input type="checkbox"/> Structures with unconventional geometry (e.g. dome or arch-shaped).</li> <li><input type="checkbox"/> Large span structures (with span more than 40m) or large cantilever span structures (where cantilever span is more than 8m).</li> <li><input type="checkbox"/> Obtained a letter from our Building Engineering Group after completing pre-consultation session on the structural concept of the complex buildings. The Pre-consultation Completion Letter Reference No. is _____.</li> </ul> </li> </ul> <p>Note: If such pre-consultation has not been made, please arrange for it before any building or foundation plans can be processed. These criteria do not apply to infrastructures, such as bridges, viaducts, tunnels, and MRT/LRT stations.</p>
<b>B. DECLARATION BY THE QUALIFIED PERSON FOR STRUCTURAL WORKS</b>	
_____ Address of Qualified Person  UEN: _____ Tel No.: _____ Fax No.: _____ H/P No. : _____	_____ Stamp & Signature of Qualified Person  Date: _____

This form may take you 10 minutes to complete.

<b>REQUEST FORM FOR EARLY PRE-CONSULTATION OF STRUCTURAL CONCEPT FOR COMPLEX BUILDINGS</b>	
<b>A. PROJECT DETAILS</b>	
1	<p>Project Reference No.: _____</p> <p>Project Title: _____</p> <p>_____</p> <p>Lot/Plot: _____ TS/MK: _____</p> <p>House No: _____ Road: _____</p> <p>Usage: Residential/ Commercial/ Industrial / Institutional and others</p> <p>No. of Storey: _____ Est. Project Cost: _____</p> <p>Developer/Owner: _____</p> <p>QP for Structural Works: _____</p> <p>QP for Architectural Works: _____</p> <p>Builder: _____</p>
<b>B. REQUEST FOR EARLY PRE-CONSULTATION</b>	
2	<p>Building Engineering Group Building and Construction Authority</p> <p>Attention: Er. Dr Tran Chi Trung / Er. Chin Wee Keong</p> <p>Dear BCA Officer</p> <p>I would like to request for an early pre-consultation with BCA for the project which involves the following complex structures: <u>Tick where applicable:</u></p> <p><input type="checkbox"/> Multiple level transfer structures (2 or more transfer floors each carrying 3 or more floors) or cantilevered transfer structures (carrying 5 or more floors).</p> <p><input type="checkbox"/> Non-vertical/inclined structural elements (with offset of floor plate is more than 3m from the edge of the floor above or below).</p> <p><input type="checkbox"/> Structures with unconventional geometry (e.g. dome or arch-shaped).</p> <p><input type="checkbox"/> Large span structures (with span more than 40m) or large cantilever span structures (where cantilever span is more than 8m).</p> <p>Endorsement of QP for Structural Works _____ QP's contact no. and email _____</p> <p>_____ Date: _____</p> <p>Note: The QP is to sign and send/email the form to the Building Engineering Group. These criteria do not apply to infrastructures, such as bridges, viaducts, tunnels, and MRT/LRT stations.</p>



## ANNEX E

### **Information and details of complex buildings to be submitted for Early Pre-consultation Of Structural Concept**

- Architectural layout plans and drawings showing the proposed development and building
- Structural plans and drawings showing overall structural concepts, including structural systems, framing layout and details
- Structural modelling, analyses and designs, including checks on robustness of buildings and design of critical elements
- Issues affecting building performance, e.g. deflection, vibration and acceleration and long-term effects; measures to prevent disproportionate collapse etc
- Preliminary Buildable Design score computation and highlighting any transfer beams, inclined columns, complex building forms and high voids (where relevant)
- Tentative methods of construction for the complex building structures

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