

International Building Design Competition 2020

D E S I G N B R I E F

Organised by: Building and Construction  Authority

In Partnership with:

SINGAPORE
POLYTECHNIC | **SP**



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General Brief

The International Building Design Competition 2020 is organised by Singapore Building and Construction Authority (BCA), in partnership with Singapore Polytechnic (SP), National University of Singapore (NUS), Nanyang Technological University (NTU) and Singapore University of Technology and Design (SUTD).

This document contains the design brief, submission requirements and the various parameters defined for the competition. All the information herein is meant for the use of this particular competition only and shall not be used for any form of reference in actual design or construction project in future, if any, for the particular site.

The organising committee does not warrant or guarantee the information contained here and provided during the course of the competition. Any reliance on the information is at the parties' own risk. The organising committee, shall not be held liable for any consequences, loss or damage which may arise or result from any misuse by any parties or reliance on the information for any purposes in the future.

Competition Details & Requirement

This year's theme, "**Sustainable & Intelligent City**" stresses the importance of designing sustainable and smart building or buildings in the urban Singapore context.

The competition is to design mixed-use development that integrates residential, retail, commercial, community, and transportation usages under one roof to a totally new level, so as to maximise the land use in our land-scarce island state.

The maximum height of the development should not exceed 24 storeys, and a maximum of 60,000 sqm gross floor area (GFA) including usable space, public circulation and service area. The maximum site area is approximately 9,200 sqm (commercial = 40%, residential = 60%).

The key aspects for the design competition this year is to generate **design options** through a synergetic approach encompassing the following:

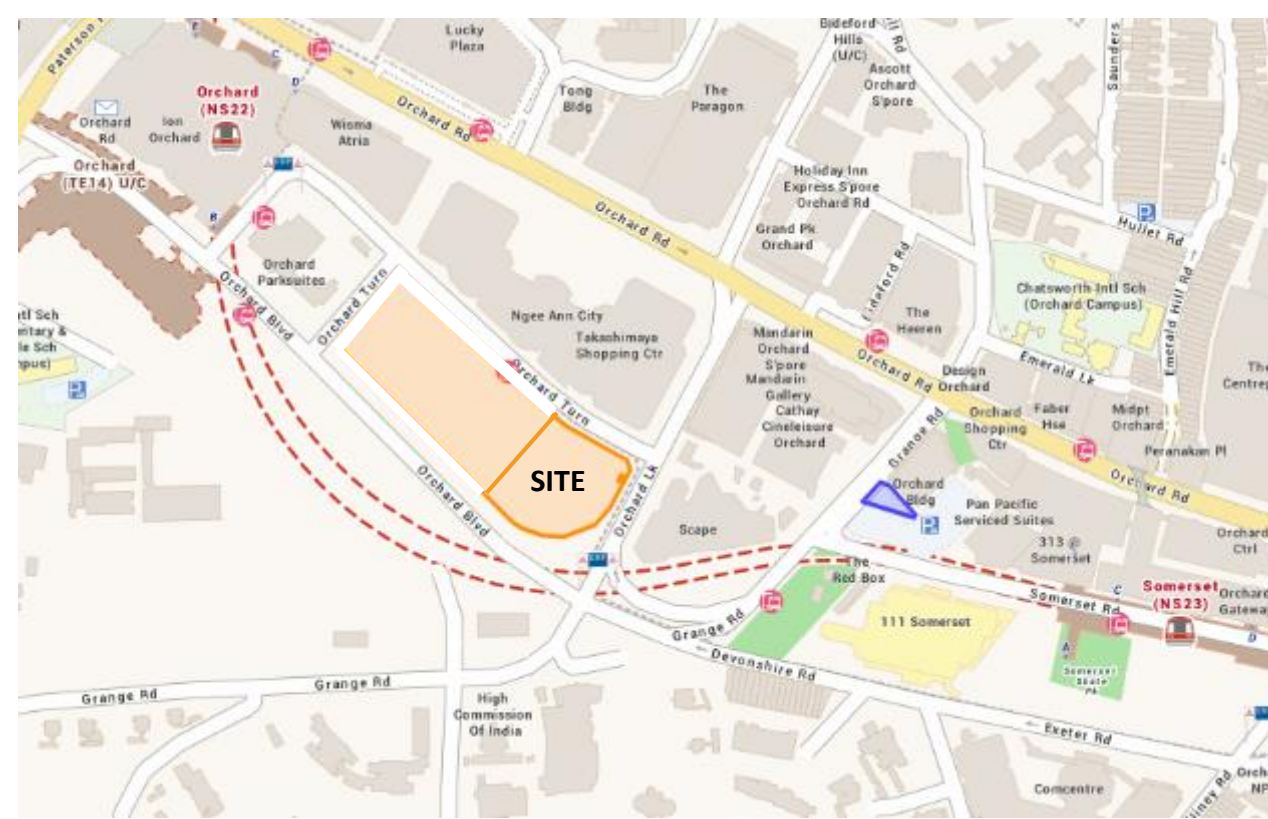
- Sustainable Building Design
- Design for Manufacturing and Assembly (flexible PPVC moulds & standardised components at different areas, such as DfMA wall components with adjustable moulds, adaptable for different height requirements for residential and commercial areas)
- Integrated Digital Delivery

Competition Site

The site chosen for the International Building Design Competition 2020 is bounded by Orchard Link, Orchard Turn and Orchard Boulevard, opposite Ngee Ann City.

Description of site

The location of the site is in the shopping precinct of Orchard Road. The urban site is flanked by existing buildings such as Ngee Ann City, and SCAPE.



The spatial and technical requirements:

Site Area: 9,200 sqm

Total Gross Floor Area: 60,000 sqm (residential 60%, commercial 40%)

Residential: 36,000 sqm

Type	Unit Mix	Approx. Area (Sqm)
Type A – 1 bedroom	15%	55
Type B – 2 bedroom	45%	75
Type C – 3 bedroom	30%	100
Type D – 4 bedroom	10%	115
Car parking provision	Refer to Appendix A (after page 73) of link, under Zone 1 'Upper Bound' column. In cases where there are no values in 'Upper Bound', please refer to 'Lower Bound' column. https://www.corenet.gov.sg/media/2268535/cop-on-vehicle-parking-provision-in-development-proposals-2019-edition.pdf	-

Commercial: 24,000 sqm

Type	Remarks	Percentage
Retail	Refer to Appendix A (after page 73) of link, under Zone 1 'Upper Bound' column. In cases where there are no values in 'Upper Bound', please refer to 'Lower Bound' column. https://www.corenet.gov.sg/media/2268535/cop-on-vehicle-parking-provision-in-development-proposals-2019-edition.pdf	50 – 60%
F & B		30 – 40%
M & E		10 – 15%
Car parking provision		-

Maximum building height : 100m AMSL

Building Storeys : maximum 24 storeys

Minimum Platform Level : 108.00 PL

Considerations to be given for provision of open spaces at nearby green areas

Building Layout: Utilising Zero Energy Building or Super Low Energy (ZEB/SLE), considerations for bio-climatic factors

Green Building Design

Green building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from siting to design, construction, operation, maintenance, renovation and deconstruction.

1. Energy efficiency (ZEB or SLE)
2. Water efficiency (Urban Water Design)
3. Environmental protection (Low impact)
4. Indoor environmental quality, (User well being)
5. Other **green** and innovative features that contribute to better **building** performance

Design for Manufacturing and Assembly (DfMA)

The mixed-use building or buildings can be designed and constructed virtually in Building Information Modelling (BIM) using computational approach for DfMA (Design for Manufacture and Assembly). It is mandatory for at least one of the repeatable components, such as the façade panelisation, to be designed using DfMA approach. The DfMA approach is to produce components in factory and assembled on site, to save time, effort and resources.

The following parameters should be taken into considerations for time and cost planning purpose:

1. Equipment for hoisting (Type, Number of crane, Loading capacity)
2. Production rate of factory (modules per day / hoisting time per module)
3. Site storage capacity
4. Project Construction timeline (timeline saving / manpower saving)
5. Volume and type of DfMA Components

Integrated Digital Delivery (IDD)

IDD is the use of digital technologies to integrate work processes and connect stakeholders working on the same project throughout the construction and building life-cycle. This includes design, fabrication and assembly on-site, as well as the operations and maintenance of buildings.

IDD covers the following four areas:

Area	Purpose
Digital Design	Achieve design objectives through collaborative and coordinated design, to meet client's, regulatory and downstream requirements
Digital Fabrication	Translate design to standardised components for automating off-site production
Digital Construction	Just-in-time delivery, installation and monitoring of on-site activities to maximise productivity and minimise rework
Digital Asset Delivery and Management	Real-time monitoring for operations and maintenance to enhance asset values

Source: <https://www1.bca.gov.sg/buildsg/digitalisation/integrated-digital-delivery-idd>

Registration

1. Registration starts from **5 March 2020 to 25 June 2020**.
2. The participating schools must be a registered tertiary institution in their respective countries.
3. Each school may send more than 1 team.
4. Each Participating Team shall have minimum 3 members and up to maximum of 8 members (including the team leader).
5. Students below 18 years old shall obtain consent from their respective institutes and parents to participate in the competition.
6. The Participants are required to update the Organiser on any replacement of team member latest by 01 June 2020.
7. The Organiser reserves the right to reject any Participant who does not meet the eligibility criteria.
8. The Organiser reserves the right to cancel and/or modify the terms and conditions, at any time, during the competition.

Timeline

Target Date	Item
05 March (Thu)	Teaser and topic release
07 Mar to 22 May	Online Workshops & Demos
29 Jun (Mon)	Submission of entries
06 Jul (Mon)	Shortlist of entries
13 Jul (Mon)	Shortlisted teams will be notified via email
20 Jul (Mon)	Shortlisted teams to upload a 15-mins presentation online
24 Jul (Fri)	Online Q&A session with judges
01 Sep (Tue)	Results release

During Competition

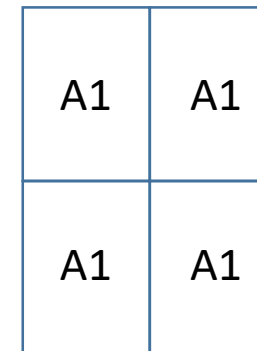
The Participating Teams shall complete the competition at their own premise. Teams are advised to take all necessary precautions to ensure that the competition areas, equipment and machines are safe for use by the team members. The Organisers shall not be held responsible for any mishap that may befall the Participants during the competition.

I. Submission Requirement – A1 softcopy (deadline 29 June 2020 12:00pm (Singapore time zone))

4 nos. of A1 size presentation panels in jpeg format (200 dpi)* Configuration as shown.

Participating teams are to ensure that the following areas are covered in the layout boards:

- Design concept / rationale, reference to design theme
- Lean and sustainability
- Design for Manufacturing and Assembly
- Integrated Digital Delivery



These are the list of deliverables that **must** be included in the layout boards:

1. 1:2000 scale Location plan with simple shadow analysis
2. 1:1000 scale Site plan with simple shadow analysis
3. 1:500 scale Key floor plans with explanation
4. 2 x 1:500 scale sectional perspectives, explaining how you plan the DfMA module and maintenance considerations
5. External rendered image and/or bird's eye view of the proposed design, showing site context
6. Internal perspective renders showing innovative space planning that ties in with DfMA approach and resolving DfMA joints
7. Perspective renders showing key features of lean and sustainability strategies
8. 1:50 scale, 1:20 scale or 3D digital models or larger scale construction details for façade paneling, DfMA construction joints to reveal relationship of the structural components and mechanical & electrical services with other considerations such as façade with night lighting
9. 1 x night render of external perspective view or sectional perspective view
10. Infographics / images that describes:
 - Concept design with relation to the design theme
 - The key features of lean and sustainable approach with environmental con(climate studies/solar shading/ventilation); and social & economical considerations
 - the software, tool technologies and innovative strategies and approach for Integrated Digital Delivery (IDD) – Digital Design, Digital Fabrication, Digital Construction & Assembly to Digital Delivery
 - Computational BIM applications in the project for user-defined algorithms to manipulate BIM data from digital design, digital fabrications, digital construction & assembly to digital assets delivery
 - Computational design and BIM applicable for construction details
 - The key features of Design for Manufacturing and Assembly
 - The use of augmented reality and virtual reality or other technologies and innovative approaches
 - Construction planning and sequence

II. Submission Requirement – Powerpoint slides *

Project Delivery (25%) – 3 slides

Quality of submission and Presentation (10%)

Please demonstrate the teamwork, roles and responsibilities among the team players (5%)

- Showcase your team chart for the roles and responsibilities by each member **(1slide)**

Overall design quality (10%)

- Explain your key concept, background research with infographics and simple description **(1slide)**
- Demonstrate the team effort with a maximum 2.0 minutes video (AVI, MPEG) **(1slide)**

Lean & Sustainability (35%) – 7 slides

Please demonstrate the lean and sustainability considerations in the design:

- How did your team improve the DfMA with reduced PPVC, reused materials and precast modules? How do you incorporate modular design (spatial and components) for flexible usage and downstream requirement upfront (e.g. design for maintainability)? (10 %) **(2slides)**
- Please demonstrate the computational approach to automated the analysis and identify the critical path of the overall construction Programme that links with the cost estimation, time, tasks or work breakdown structure)? (10%) **(2slides)**
- Please demonstrate the simulation, analysis of natural daylight, ventilation and solar performance for minimized energy consumption, maximized passive design performance and optimized renewable energy outcome for high performance building to positive energy building. (15%) **(3slides)**

Technology & Innovation (20%) – 4 slides

Please demonstrate the use of technologies and innovative approaches to improve design process and outcome:

- To use programming approach for:(10%) **(2slides)**
 - Specific tasks such as design analysis, automated documentation, etc.
 - Design optimization by generating and evaluating different options
- To use Augmented Reality (AR), Virtual Reality to visualize to visualize the design, assembly processes and work sequences (10%) **(2slides)**

Collaboration & Conflict Resolution (20%) – 4 slides

Please demonstrate the ability to share and coordinate models across different disciplines and to manage design changes effectively:

- To eliminate major clashes across 3 disciplinary BIM models (10%) **(2slides)**
- To use one of the commercially available collaborative platforms to share models and track design issues and changes online with timely resolution (10%) **(2slides)**

Summary – 2 slides (Score under Project Delivery - Quality and Presentation 10%)

- What are the key challenges your team encountered and how did your team strategically resolve it together? **(1slide)**
- What have you learned from participating this competition? **(1slide)**

Sub-topic (Note)

- Please provide a max. 20 page presentation with the Video added in page 3. with presentation structure and sequence to follow page 1.
- Please use simple infographics with good layout with key words and simplified description for ease of understanding by the panel judges.
- Please use this template for the presentation slides, and follow the font type, font size Topic – 24, Sub-topic 18, Description min.12, max. 14
- Thank you and wishing you all the best.

III. Submission Requirement – report, video, script

These items are to be submitted:

1. Maximum of 10 pages of consolidated A4 report.***
2. A 4 minute video file in avi format**
3. Scripts for the computational design, analysis and optimisation.

Notes:

*PPT Slides should be structured according to Judging Criteria.

** Multimedia to showcase

Part 1 Documentation of overall competition process (max, 1min)

Part 2 Documentation of the 3 areas – Green Building Design, DfMA and IDD approach (max. 3mins)

***A4 Report

- Font: Calibri, min. size 10
- Exclude content page
- Any additional information can be attached as appendix (max. 5 pages)
- Scripts may be shared to public.

Please note that IBEW logo to be incorporated within the A1 panels, powerpoint slides and A4 report.

Online Submissions

Please **self-create a cloud-based account (e.g. Google drive)** and **store the requested deliverables in the drive**, and send the **shared link** by the stipulated time to:

- bca_clvc@bca.gov.sg
- ibewibew1111@gmail.com

Notes:

- *Please ensure that you have tested the links before sending it. We are not responsible for broken links.*

Submission Dates and Timing

- **29 June 2020, 12.00 pm** for ALL participants / teams
- **Singapore time zone, UTC+08:00**

Final Presentation

All shortlisted teams will be notified by **13-July-2020** by email and to upload a 15-mins presentation by **20-July-2020**. A 10-mins online Q&A session will be scheduled on **24-July-2020**, time to be advised nearer to date.

Overseas participants can make their final presentation using online means such as Skype or equivalent. If online presentation means is not possible, participants can send in 15mins' video recorded presentation.

Presentation:

- Each team is given **ONLY 15 minutes for presentation**

Awards & Prizes

Awards	Prizes
1 st Prize	\$8,000
2 nd Prize	\$6,000
3 rd Prize	\$4,000
5 Merits	\$1,000
Innovation Award	\$1,000
6 Consolations	\$500

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Please demonstrate the lean and sustainability considerations in the design:

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- Please demonstrate the computational approach to automated the analysis and identify the critical path of the overall construction Programme that links with the cost estimation, time, tasks or work breakdown structure)? (10%) **(2slides)**
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Assessment Criteria

Scoring Criteria	(%)
Technology & Innovation (20%) To demonstrate the use of technologies and innovative approaches to improve design process and outcome: <ul style="list-style-type: none"> To use programming approach for:(10%) <ul style="list-style-type: none"> Specific tasks such as design analysis, automated documentation, etc. Design optimization by generating and evaluating different options To use Augmented Reality (AR), Virtual Reality to visualize to visualize the design, assembly processes and work sequences (10%) 	20
Lean & Sustainability (40%) To demonstrate the lean and sustainability considerations in the design: <ul style="list-style-type: none"> How did your team improve the DfMA with reduced design types of PPVC, reused materials and precast modules? How do you incorporate modular design (spatial and components) for flexible usage and downstream requirement upfront (e.g. design for maintainability)? (15%) standardized components for different applications Exploration of other forms of DfMA approach To demonstrate the simulation, analysis of natural daylight, ventilation and solar performance for minimized energy consumption, maximized passive design performance and optimized renewable energy outcome for high performance building to positive energy building. (15%) To demonstrate the computational approach to automated the analysis and identify the critical path of the overall construction Programme that links with the cost estimation, time, tasks or work breakdown structure)? (10%) 	40
Collaboration & Conflict Resolution (20%) To demonstrate the ability to share and coordinate models across different disciplines and to manage design changes effectively: <ul style="list-style-type: none"> To eliminate major clashes across 3 disciplinary BIM models (10%) To use one of the commercially available collaborative platforms to share models and track design issues and changes online with timely resolution (10%) To demonstrate the teamwork, roles and responsibilities among the team players 	20
Project Delivery (20%) Quality of submission and Presentation (10%) <ul style="list-style-type: none"> Showcase your team chart for the roles and responsibilities by each member Overall design quality (10%) <ul style="list-style-type: none"> Explain your key concept, background research with infographics and simple description Demonstrate the team effort with a maximum 2.0 minutes video (AVI, MPEG) 	20
Total	100
Integrated Digital Delivery / Building Information Modeling to be incorporated in the presentation panels.	

Post-Competition

1. All materials submitted during the International Building Design Competition 2020 shall not be returned.
2. The Organisers shall retain and hold exclusive rights, including media rights, over all deliverables, including the models, materials and projects created and submitted during the International Building Design Competition 2020.
3. All results will be released in September 2020 to the participants.
4. All decisions made by the Organisers and Judges are final. No correspondence or appeals shall be entertained.