Narratives for a Resilient Future

International Building
Design Competition 2023
(IBDC 2023)

Content

Forward

The International Building Design Competition 2023 (IBDC 2023) is jointly organised by Ngee Ann Polytechnic (NP) and Institute of Technical Education (ITE), supported by the Building and Construction Authority (BCA), and in partnership with the following Institutes of Higher Learning:

- Nanyang Polytechnic (NYP)
- Nanyang Technological University (NTU)
- National University of Singapore (NUS)
- Republic Polytechnic (RP)
- Singapore Institute of Technology (SIT)
- Singapore Polytechnic (SP)
- Singapore University of Technology and Design (SUTD)
- Temasek Polytechnic (TP)

Objectives

IBDC 2023 hopes to provide a platform for students to learn and apply their knowledge on the three key areas identified under the Built Environment Industry Transformation Map. The three areas are:

1. Integrated Planning and Design (IPD)
2. Sustainable Urban System (SUS)
3. Advanced Manufacturing & Assembly (AMA)

The IBDC challenges the participants to address the above 3 areas to come up with innovative, sustainable and in-demand proposal that is holistic and resilient. It also aims to promote a better understanding and appreciation of technologies like Computational Building Information Modelling (BIM) as students are required to apply visual programming and/or programming setup with BIM in their proposal.

https://www1.bca.gov.sg/about-us/news-and-publications/media-releases/2022/09/06/built-environment-industry-transformation-map-to-facilitate-integration-and-collaborative-breakthrough-across-the-entire-value-chain

Design Brief

Introduction

IBDC 2023 will adopt an **‘open theme approach’.**

That means participants can select a project **site of their choice** in their own country, and **decide on their preferred building typology** for the competition.

The proposed Gross Floor Area should be **at least 5000sqm**.

Participants may also use their existing school project for the competition as long as the competition criteria are met.

Design Brief

Integrated Planning and Design (IPD)

- IPD under Refreshed Built Environment Industry Transformation Map (ITM) https://www1.bca.gov.sg/about-us/news-and-publications/media-releases/2022/09/06/built-environment-industry-transformation-map-to-facilitate-integration-and-collaborative-breakthrough-across-the-entire-value-chain
- Integrated Digital Delivery https://www1.bca.gov.sg/buildsg/digitalisation/integrated-digital-delivery-idd
- CDE Standards – https://www1.bca.gov.sg/buildsg/digitalisation/integrated-digital-delivery-idd/cde-data-standard
- IDD Essential Use Cases – https://www1-bca-gov-sg-admin.cwp.sg/docs/default-source/idd/idd-essential-use-cases.pdf?sfvrsn=d0d1b485_2

One of the key transformation areas is on Integrated Planning and Design (IPD), where stronger collaboration across the building life cycle can optimise resources. This will build on existing efforts for Integrated Digital Delivery (IDD), which allows project stakeholders to collaborate with one another through digital platforms. Design considerations for the building's entire life cycle, including Facilities Management (FM), are factored in at the design stage, enabled by digitalisation, Common Data Environment (CDE) standards and progressive procurement.

Integrated Planning and Design (IPD) aims to:

- Drive collaboration across value chain to enable better planning from the onset, and optimise building design for downstream construction and maintenance
- Create a conducive environment for collaboration and regulatory submissions through common data standards, with a data-rich Building Information Modelling model that is used across the project lifecycle

Design Brief

Sustainable Urban System (SUS)

Sustainable Urban Systems (SUS), will facilitate the ramping up of decarbonisation efforts in the industry for a more sustainable and liveable Built Environment. SUS aims to achieve low emissions buildings and districts with efficient building management enabled by Integrated, Aggregated and Smart FM. Some areas of consideration includes:

- Energy efficiency (Zero Energy Building - ZEB or Super Low Energy - SLE)
- Water efficiency (Urban Water Design)
- Environmental protection (Low impact)
- Indoor environmental quality (User well-being)
- Other sustainable and innovative features that contribute to better building performance

https://www1.bca.gov.sg/buildsg/sustainability/green-mark-certification-scheme/green-mark-2021

Design Brief

Advanced Manufacturing & Assembly (AMA)

Advanced Manufacturing and Assembly (AMA) enhances the efficiency of the supply chain and construction process by mainstreaming Design for Manufacturing and Assembly (DfMA). This helps firms reduce their reliance on foreign manpower and raise productivity.

The Design for Manufacturing and Assembly (DfMA) approach is to produce components in a factory environment and the parts are assembled on site, to save cost, time, effort and resources.

The following parameters should be taken into consideration for time and cost planning purposes:

1. Equipment for hoisting (type, number of cranes, loading capacity)
2. Production rate of factory (modules per day / hoisting time per module)
3. Site storage capacity
4. Project Construction timeline (timeline savings / manpower savings)
5. Modularisation and standardisation of DfMA components (no. of module types, no. of components with standard/modular dimensions)
6. Volume and type of DfMA Components

- Transforming the Industry using DfMA https://www1.bca.gov.sg/buildsg-emag/articles/transforming-the-industry-using-dfma-one-module-at-a-time

- Design for Manufacturing and Assembly (DfMA) https://www1.bca.gov.sg/buildsg/productivity/design-for-manufacturing-and-assembly-dfma

Design Brief

Assessment Criteria

1

1. Integrated Planning and Design (IPD) ---------- 20%
2. Sustainable Urban Systems (SUS) ---------- 40%
3. Advanced Manufacturing & Assembly (AMA)-- 20%
4. Teamwork, Overall Project Quality & Learning Outcome ---------- 20%

Total --- 100%

Criteria (Weightage)	Requirements & Deliverables
Integrated Planning and Design (IPD) (20%)	Demonstrate the use of the Integrated Digital Delivery approach to drive Integrated Planning & Design (IPD) for better collaborative outcomes with cross-disciplinary and cross-phase applications and use cases, such as using Digital technologies, collaborative platforms and innovative approaches for automation and improvements of project life cycle's integration, processes and outcomes. Participants can consider the use of Augmented Reality & Virtual Reality, Game Engine and innovative methods such as computational BIM, e.g. Revit-Dynamo, Grasshopper-Rhino-ArchiCAD, Navisworks, aecoSIMGenerative Components, Mobius Modeller, Robotic Process Automation, etc. tools with Common Data Environment (CDE) and data standards setup for data-driven outcomes to capture downstream requirements studies at upfront design stages. **(Continue on next page)**

Design Brief

Assessment Criteria

1

1. Integrated Planning and Design (IPD) ---------- 20%
2. Sustainable Urban Systems (SUS) ---------- 40%
3. Advanced Manufacturing & Assembly (AMA)-- 20%
4. Teamwork, Overall Project Quality & Learning Outcome ---------- 20%

Total --- 100%

Criteria (Weightage)	Requirements & Deliverables
Integrated Planning and Design (IPD) (20%)	**(Continue from previous page)** Examples: i. To set up interdisciplinary parametric BIM modelling and data standards requirements for optimised building performance and lower embodied carbon use and studies, e.g. to minimise solar heat gain of building façade design during the summer period and reduce embodied carbon by optimising low carbon factor of building materials used through a collaborative approach; ii. To engage a rule-based parametric model for minimum building life cycle cost and maintainability needs, e.g. optimum building inspection cycles with modular facade for cost effective construction and maintainability, such as having the shortest route reaching to whole building for efficient façade maintenance.

Design Brief

Assessment Criteria

2

1. Integrated Planning and Design (IPD) ---------- 20%
2. Sustainable Urban Systems (SUS) ---------- 40%
3. Advanced Manufacturing & Assembly (AMA)-- 20%
4. Teamwork, Overall Project Quality & Learning Outcome ---------- 20%

Total --- 100%

Criteria (Weightage)	Requirements & Deliverables
Sustainable Urban Systems (SUS) (40%)	Demonstrate the lean and sustainability considerations in the design: 1. Simulations including analysis of natural daylight, ventilation and solar performance studies with relevant computational methods & tools. Consider Energy efficiency (Zero Energy Building - ZEB or Super Low Energy - SLE); water efficiency; environmental protection, indoor environmental quality and other sustainable and innovative features. 2. Lean approach: Just-in-time analysis with identified critical path in the overall construction programme in BIM-based environment. 3. Practicality & Realism with Carbon Life Cycle: i. Demonstrate how the team identifies and addresses the project constraints, e.g. planning parameters, site accessibility, relevant key building codes and compliances considered in the design ii. Demonstrate the carbon accountability in the design, construction and downstream operational life cycle carbon management 4. Streamline operations and improve maintenance of buildings enabled by Integrated, Aggregated and Smart Facilities Management

Design Brief

Assessment Criteria

3

1. Integrated Planning and Design (IPD) ---------- 20%
2. Sustainable Urban Systems (SUS) ---------- 40%
3. Advanced Manufacturing & Assembly (AMA)-- 20%
4. Teamwork, Overall Project Quality & Learning Outcome ---------- 20%

Total --- 100%

Criteria (Weightage)	Requirements & Deliverables
Advanced Manufacturing & Assembly (AMA) (20%)	Demonstrate the AMA approach and the ability to share and coordinate models across different disciplines and to manage design changes effectively. Teams can consider the computational BIM approach for DfMA, PPVC, modular design and standardization etc. Teams are also encouraged to demonstrate how they can eliminate major clashes across 3 disciplinary BIM models in a common data environment; to share models and track design issues/ changes. Teams can also demonstrate Automation of fabrication in factories to improve productivity, quality and work environment.

Design Brief

Assessment Criteria

4

1. Integrated Planning and Design (IPD) ---------- 20%
2. Sustainable Urban Systems (SUS) ---------- 40%
3. Advanced Manufacturing & Assembly (AMA)-- 20%
4. Teamwork, Overall Project Quality & Learning Outcome ---------- 20%

Total --- 100%

Criteria (Weightage)	Requirements & Deliverables
Teamwork, Overall Project Quality & Learning Outcome (20%)	Teamwork • Showcase your team organisation chart for the roles and responsibilities of each member Overall Project Quality • Explain your key concept, project innovations & design creativity, project size & complexity, and the background research, in simple point form descriptions and infographics • Demonstrate the project and team effort Learning Outcome • Elaborate the three key challenges your team encountered and how did your team strategically resolve it together and the learning outcome.

Design Brief

Submission Requirements

The following are the submission deliverables:

1. 4XA1 (or 2XA0) Presentation Panels
   Refer to page 15 for more details
2. Presentation Slides (Max 15 Slides)
   Refer to page 16 & 17 for more details
3. Video (AVI or MP4) – Max 4 mins
   Refer to page 18 for more details
4. A4 report– Max 10 Pages
   Refer to page 18 for more details
5. Native BIM Model and scripts for the computational design, analysis and optimisation
   Refer to page 18 for more details

*** Total file size of the above should not exceed 650 MB**

Design Brief
Submission Requirements

1

Presentation Panels

Maximum 4XA1 boards

Maximum 4 X A1 size presentation panels in jpeg or pdf format.

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

- Design concept / rationale, reference to your design theme
- Sustainable Urban Systems (SUS)
- Advanced Manufacturing and Assembly (AMA)
- Integrated Planning and Design (IPD)

These are the list of deliverables that may 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. Sectional perspectives, explaining how you plan the DfMA modules and maintenance considerations
5. External rendered image and/or bird's eye view of the proposed design, showing site context
6. Drawings/ perspective showing innovative space planning that ties in with DfMA approach and resolving DfMA joints and key features of lean and sustainability strategies
7. 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
8. Infographics / images that may include the following:
   - Concept design with relation to your own design theme
   - The key features of lean and sustainable approach with environmental considerations (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
   - The Common Data Environment (CDE) established for the project
   - 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 to capture maintainability upfront
   - Construction planning and sequence

Design Brief
Submission Requirements

2 Presentation Slides (Max 15 Slides)

Your slides (15 slides) should include the following:

a) Introduction & Design Concept- 2 Slides
- Building typology, Site location & context.
- Explain your key concept, background research with infographics and simple description

b) Teamwork & Overall Project Quality – 2 slides
- Demonstrate the teamwork, roles and responsibilities among the team members.
- Showcase your team chart for the roles and responsibilities by each member

c) Integrated Planning and Design (IPD) & Innovation - total 2 slides
- Demonstrate the use of technologies and innovative approaches to improve design process and outcome:
- To use Augmented Reality (AR), Virtual Reality to collaborate, coordinate and visualize the design, streamline assembly processes, work sequences and cross phases design integration
- To use visual programming and/or programming approach for automation and analysis

- Example:
  to set up interdisciplinary parametric BIM modelling requirements for optimised building performance studies, e.g. to minimise solar heat gained of building façade design during summer period; and/or
  to engage rule-based parametric model for minimum building life cycle cost,

e.g. shortest maintenance route to whole building façade, and/or least building inspection cycles with modular facade components.

(Continue on next page)

Design Brief
Submission Requirements

2 Presentation Slides (Max 15 Slides)

(Continue from previous page)

d) Lean, Sustainability & Practicality - total 5 slides

- Demonstrate the lean, sustainability and practicality considerations in the design:
- The computational approach to automated the analysis and identify the critical path of the overall construction Programme
- 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.
- The practicality & realism in your design. Demonstrate how the team identify and address the project constraints, e.g. planning parameters, site accessibility, relevant key building codes etc
- The carbon accountability in the design, construction and downstream operational life cycle carbon management

e) AMA, Collaboration & Conflict Resolution - total 3 slides

Demonstrate the computational approach for repeatable building components, such as the façade panels for AMA.

- 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)?
- How did your team shared and coordinated the models across different disciplines and to manage design changes effectively? How to eliminate major clashes across 3 disciplinary BIM models with commercially available collaborative platforms and in an common data environment. How to track design issues and manage changes online for timely resolution with tools and innovative approach

f) Learning Outcome - total 1 slide

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

Note: use simple infographics with good layout with key words and simplified description

Design Brief
Submission Requirements

3 Video (AVI or MP4 format) Max 4 mins

4 A4 report– Max 10 pages

5 Native BIM Model and scripts for the computational design, analysis and optimisation

Video

- Maximum 4 mins
- Can be AVI or MP4 format
- Demonstration of key features such as Sustainability, AMA and IPD, Computational BIM achievements
- Demonstration of team work and work processes
- Video walk-through/ fly though of design proposal
- Any other information not shown on panel and/or power point slides

A4 Report

- Maximum 10 pages (Exclude content page)
- Include Salient points of the project write-up & elaboration of the design proposal
- Any other information not shown on panel/ power point slides/ video
- Font: Calibri, min. size 10

Native BIM Model and scripts for the computational design, analysis and optimisation

- Include all the BIM Model & scripts used
- Scripts may be shared to public

Design Brief

Online Submission Instructions

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:

- **TO: ibewibew1111@gmail.com**
- **CC: internationalbuildingdc@gmail.com**

Important Notes:

- *Please ensure that you have tested the links before sending it.*
- *Broken links will not be accepted.*
- *Your folder should contain only the required 5 items listed in the submission requirements; all additional materials will not be considered for judging and should not be included in the folder.*
- *The IBDC 2023 organiser will download your submission folder at the end of the deadline and further addition to your folder will not be considered*

Competition Deadline

Competition Entry Submission Deadline:

14 Jul (Fri) 2023, 2359 hrs, Singapore Time (GMT +8)

for ALL participating teams

Registration, Competition details

Registration Process

Registration Period:
13 Mar – 30 Jun 2023

Registration form URL:

https://go.gov.sg/registrationibdc2023

Visit the IBDC 2023 website for more information:

https://ibdcenquiries.wixsite.com/ibdc2023/

Registration, Competition details

Timeline

Note:
Dates may be subjected to changes. Such changes, if any, would be made aware to the competitors in advance

Sn	Item	Key Dates
1	Release of Competition details, rules and other information on Competition Website	13 Mar (Mon) 2023
2	Registration period	13 Mar (Mon) – 30 Jun (Fri) 2023
3	Deadline for submission of entries	14 Jul (Fri) 2023, 2359 hrs SGT
4	Notification of shortlisted teams	28 Jul (Fri) 2023
5	Final judging and Q&A *(to be confirmed closer to date whether judging session will be virtual or physical)*	11 Aug (Fri) 2023
6	Notification of winning teams	18 Aug (Fri) 2023
7	Prize Presentation	TBC

Registration, Competition details

Final Judging and Q&A

- All shortlisted teams will be notified by 28 Jul (Fri) 2023 by email.
- All shortlisted teams (including overseas teams) will be required to make their final presentations on 11 Aug (Fri) 2023.
- The exact details (e.g. timing, virtual presentation link or physical presentation, etc) will be advised closer to date.

Note:
Dates may be subjected to changes. Such changes, if any, would be made aware to the competitors in advance

Registration, Competition details

Prizes

Awards	Cash Prizes (SGD)
1st Prize	$8,000
2nd Prize	$6,000
3rd Prize	$4,000
Special Mention Prizes	$2,000
Consolation Prizes	$500

Registration, Competition details

Terms & Conditions

By participating in the International Building Design Competition (IBDC) 2023, participants agree to the full list of Terms and Conditions on https://ibdcenquiries.wixsite.com/ibdc2023, which includes but is not limited to the following:

a) The Participant accepts all risks of personal injury or property damage of any nature whatsoever that may arise from his/their making or creation of the Competition entry or participation in the IBDC 2023 and will not in any way hold the Organisers responsible for any liability, loss, damage, expense and cost which he/they may sustain or incur as a result of his/their participation

b) Each Participant agrees to keep the Organisers and its respective directors, officers, employee and agents indemnified against any and all such claims by third parties for any losses or damages arising from the Participant's submission of Competition entry and the Participant's participation in the IBDC 2023.

c) The Organisers shall not be responsible for any loss, damage, cost or expense howsoever arising incurred by a Participant in connection with the IBDC 2023, including the collection and subsequent use of the awarded prize.

Registration, Competition details

Post Competition

1. All materials submitted for the International Building Design Competition 2023 will not be returned to participants.

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 2023.

3. Winners will be notified on 18 Aug (Fri) 2023 and be invited for the Prize Presentation (Date & Time to be advised).

4. If winners are not located in Singapore, they may be asked to film a short Thank You video instead.

5. Date and details of the Prize Presentation are subject to change without prior notice.

6. All decisions made by the Organisers and Judges are final. No correspondence or appeals will be entertained.

Competition Website

Refer to the competition website for more information and latest updates

https://ibdcenquiries.wixsite.com/ibdc2023