

Annex A: About the BCA Design Engineering and Safety Awards 2021

The BCA Design and Engineering Safety Awards 2021 give recognition to the Qualified Person for Structural Works [QP(ST)], QP(ST)'s firm and the project team for ingenious design processes and solutions in overcoming project challenges to ensure safety in design, construction and maintenance of building and civil engineering projects locally and overseas.

The Award aims to:-

- a) Inculcate a strong safety culture among building professionals in developing our built environment
- b) Give recognition to QP(ST)s and their firms for engineering achievements
- c) Provide an avenue through which competition for work excellence can be enhanced.

The Awards are given out for the following categories:

- Residential
- Commercial
- Institutional and Industrial
- Civil Engineering
- Small Scale Projects (Project cost <\$30 million)
- Overseas

Annex B: BCA Design Engineering and Safety Awards winners

Commercial Category

1) Tekka Place - Excellence

	Qualified Person	Er. Aaron Foong Kit Kuen
	C&S Consultant	KTP Consultants Pte Ltd
	Builder	Lum Chang Building Contractors Pte Ltd
	Developer	Corwin Holding Pte Ltd
	Architectural Consultant	ONG & ONG Pte Ltd

The Tekka Place is an integrated hospitality and retail re-development being built on the site of the former *The Verge Mall* at 2 Serangoon Road. The project comprises a new ten-storey Main Block (MB) with link bridges across Clive St connecting to the seven-storey existing Annex Block (AXB) with a new rooftop deck. The MB is a new reinforced concrete mid-rise structure founded on bored pile foundation with the new perimeter superstructure columns supported by the repurposed existing Diaphragm Wall which was also effectively reused for earth retention in the basement. The AXB underwent thoughtful addition and alteration works to maintain most of its existing reinforced and prestressed concrete structures in a sustainable manner.

Challenges

- To achieve sustainable redevelopment of the Main Block into a new mixed-use commercial hotel and retail by way of overcoming the constraints from the existing building with two basements seated on soft soil geology located within the LTA Railway Protection Zone and hemmed in by conserved shophouses.

- Making a conscious decision to sustainably retain the existing Annex Block structures by upgrading of the spatial quality with double volume spaces on the lowest floor for commercial activities and increasing the load carrying capacity at the roof level supported by the existing critical prestressed transfer structures at the lower levels.

Solutions and Features

- Rigorous engineering analysis with carefully considered loading scenarios and innovative re-designing out of the as-built structural capacities to drive an overall sustainable approach in the re-development.
- On the Main Block, the engineering-driven solution by informed repurposing of the existing basement diaphragm wall and capping beam structures achieved a sustainable design of the new sub-structure works with flexibility to support new load intensities from the perimeter columns of the new superstructures.
- On the retained Annex Block, in enabling the increased loadings from an entirely new rooftop deck, innovative engineering solution by stitching of existing prestressed structures have avoided the need to disrupt and reconstruct the existing system of prestressed transfer beam, transfer column and foundation.

Institutional and Industrial Category

2) State Courts - Excellence

	Qualified Person	Er. Loh Kar Kheng
	C&S Consultant	CPG Consultants Pte Ltd
	Builder	Samsung C&T Corporation
	Developer	State Courts of Singapore
	Architect	CPG Consultants Pte Ltd
	Architectural Design Consultant	Serie + Multiply Consultants Pte Ltd

The new 35-storey State Courts Towers comprises two towers, the ‘Court Tower’ and a very slender ‘Office Tower’. At 178 metres high, it is the tallest government building in Singapore to date. The Court Tower has an open frame building facade, with courtrooms stacked on each other, resulting in aesthetically pleasing slender Court Tower Columns, consisting of long span floor slabs/beams and columns sizes befitting the facade.

Challenges

- As the site is in close proximity to a conserved building, an underground MRT station, and a building which is gazetted as a National Monument, the construction of a deep basement construction (consisting of 3 basements) requires intricate planning and execution during construction.

- To counter the wind tunnelling effect that the narrow open space between the two towers would create on the link bridges as the interaction between the towers and bridges may affect the building's deflection as well as human comfort.

Solutions and Features

- Circulation spaces linking the two towers are utilised structurally with 39 link bridges linking the two towers together, with the Court Tower providing lateral stability to the Office Tower.
- The link bridges are prefabricated and delivered to site as one unit before being hoisted and placed in position on temporary supporting corbels before final connections are made safely.
- Steel-Concrete composite columns with twin H-sections orientated along weaker axis were used for slender Court Tower columns. Grade 460 steel was used for columns and was cast with high strength self-compacting concrete.
- A deep deck system (CAP Deck) which can span longer, was used for floor system supported by composite beams resulting in material/cost savings and reduced construction time.
- A robust earth retaining structure comprising Diaphragm walls and a semi-top down construction method was adopted for basement construction to minimise wall deflection, ground movement and water drawdown. This had resulted in safe construction of 3 levels of basement, with minimal impact to the neighbouring buildings which are susceptible to soil movement.

Institutional and Industrial Category

1) Eunoia Junior College - Excellence

	Qualified Person	Er. Ee Hwee San Joanne
	C&S Consultant	CPG Consultants Pte Ltd
	Builder	Kimly Construction Pte Ltd
	Developer	Ministry of Education
	Architectural Consultant	CPG Consultants Pte Ltd

Eunoia Junior College is a 10 and 12-storey building, with a 5-storey high elevated sports running track and field, located next to Kallang River.

Challenges

- On a smaller site at 4 hectares which is about a third of the conventional site area for junior colleges.
- To design and construct an elevated sports running track and field over future Cross Island Line Rail tunnels and overhangs the Kallang River with 3 mega tree columns sitting in the river.

Solutions and Features

- Innovative hybrid timber – Concrete slab system Cree and unitized façade system with internal Cross Laminated Timber, adopting extensive off-site fabrication for the superstructure of the teaching blocks. The prefabricated components were erected on site with simple connections. These systems are extremely lightweight, highly buildable and productive. They are highly environmentally sustainable as

well as meeting the specific requirements such as strength, fire, waterproofing and durability.

- Design transfer piled raft system with tensioned piles located at the zones available for piling to support the elevated sports track and field. The piles were designed to accommodate future tunnelling and address any volume lost effect.
- Long span (up to 36m) precast half-shell post-tensioned beams were adopted, to give more column free space required below the sports running track and field.
- Adopt precast with cast-in I-beam for bolted connection for the 13.3m branch columns to the mega tree columns supporting the sports running track and field.
- Extensive use of precast such as double-tee slabs and planks at the elevated field deck and beam, slab, column, and wall system for teaching blocks.