



BCA AWARDS 2023

Recognising Excellence in the Built Environment





BCA AWARDS 2023

Recognising Excellence in the Built Environment

**DESIGN AND ENGINEERING
SAFETY AWARD**



DESIGN & ENGINEERING SAFETY AWARD



The BCA Design & Engineering Safety Award (DESA) gives 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:-

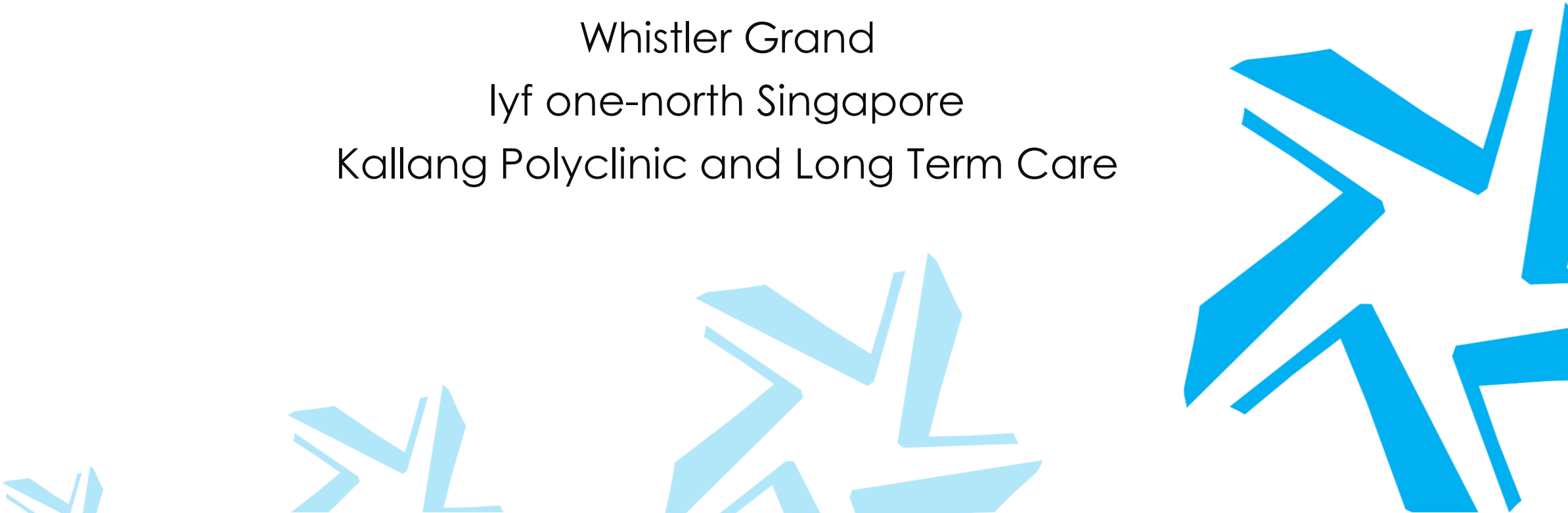
- a) Inculcate a strong safety culture among building professionals in developing our built environment
- b) Give recognition to QP(ST)s and their firms for engineering achievements
- c) Provide an avenue through which competition for work excellence can be enhanced.

The Award will be given out in 4 categories with only 1 winner in each category, namely:

- Residential
- Commercial
- Institutional and Industrial
- Civil Engineering

Award Winners of BCA DESA 2023

Whistler Grand
lyf one-north Singapore
Kallang Polyclinic and Long Term Care



Whistler Grand

Winner of Residential Category

BCA DESIGN AND ENGINEERING SAFETY AWARD 2023



Qualified Person

Engineer Heng Kim Huat

C&S Consultant

TW-Asia Consultants Pte Ltd

Builder

Woh Hup (Private) Limited

Developer

CDL PEGASUS PTE LTD

Architectural Consultant

ADDP Architects LLP

KEY CHALLENGES

- To improve productivity with Design for Manufacturing and Assembly (DfMA) through adoption of innovative Prefabricated Prefinished Volumetric Construction (PPVC).
- Requirements to understand the concept & constraints and design of suitable PPVC system
- QA/QC, coordination of PPVC modular works and handling of large and heavy PPVC modules
- Presence of non-typical Sky Terrace platform at typical PPVC floor

SOLUTIONS

- Early engagement of builder and design team with a common mindset and necessary technical capabilities is crucial for the adopted PPVC system to be successful & cost effective. Standardisation of units is crucial & use of innovative 'Composite Shear Wall System(patented)' to maximize user-friendly room area & usage
- Modules carcass were fabricated with good dimensional controls using 3-D steel mould casting; good site installation survey controls for levelling & verticality. Builder had close coordination in ensuring the whole PPVC construction cycle is smooth & seamless.
- Builder had early planning & study on the heavy-duty crane hoisting capacity and transportation routing to comply with LTA requirements to avoid costly police escort
- Use of large-piece 'integrated precast slab-beam element' for construction of non-typical Sky Terrace extension platform over the void by eliminating use of conventional formwork system

lyf one-north Singapore

Winner of Commercial Category

BCA DESIGN AND ENGINEERING SAFETY AWARD 2023



Qualified Person

Engineer Teoh Eng Sin

C&S Consultant

Mott MacDonald Singapore Pte Ltd

Builder

Nakano Singapore (Pte) Ltd

Developer

DBS Trustee Limited (As Trustee Of
CapitaLand Ascott Real Estate
Investment Trust)

Architectural Consultant

WOHA Architects Pte Ltd

KEY CHALLENGES

- Engineering a three storey link bridge building, to connect two L-shape, seven-storey buildings, from the 5th to 7th storey.
- Tight and narrow sloping site, with a height difference of 5m, from front (Portsdown Road) to back (Nepal Hill), along with a section of the site overlaying the circle line (CCL) MRT tunnels.
- Site restrictions included a five storey unobstructed viewing and ventilation corridor (GLS requirements) to the conserved black and white bungalows, within proximity to edge of slope.

SOLUTIONS

- The elevated swimming pool is supported on a shallow foundation directly above the CCL MRT tunnels. This was needed to free up the site, outside the 1st reserve for the whole building pile foundations. Our team used 3D finite element analysis to ensure minimum impact to the CCL tunnels and verified by automatic tunnel monitoring system.
- Collaborative team design development leading to the creation of the three steel plate girders and slanted steel column support structure. This design achieved minimum obstruction to the viewing and ventilation corridor and a safer build programme. Being critical elements, the girders and slanted columns are designed with redundancy to code compliance for a safe and robust design, protected with fireproof paint and exposed as part of building features.

Kallang Polyclinic and Long Term Care

Winner of Institutional & Industrial Category

BCA DESIGN AND ENGINEERING SAFETY AWARD 2023



Qualified Person

Engineer Lim Keong Liam

C&S Consultant

Arup Singapore Pte Ltd

Builder

Tiong Seng Contractors (Pte) Ltd

Developer

Ministry of Health

Architectural Consultant

RDC Architects Pte Ltd

KEY CHALLENGES

- Design and construct a barrier-free public healthcare and long term care facility with seamless and sheltered connectivity to main public transport node within a congested and land-locked site flanked by a conservation building.
- The development has to cater specially for a prominent visual landmark at main entrance which is a shared entryway with adjacent building, while ensuring sufficient green space and outdoor seating amidst space constraints with $\frac{1}{4}$ of 4,000 sqm site situated over 1st Railway Reserve Line (RRL) zone that is partially bisected by twin bored tunnels.
- The superstructure expected to be erected within a challenging & tight 26-month construction timeline.

SOLUTIONS

- Geotechnical investigations and analyses were carried out to provide a robust notional excavation scheme that would not impact the tunnel structures. The overall building form was also extensively studied and set back from the first reserve to bypass this constraint.
- Design for manufacturing and assembly (DfMA) techniques, including precast, PPVC, and structural steel elements, were integrated into the superstructure to align with the accelerated construction programme. The team had reduced the modules to five types, optimising repetition of modules for production. Five storeys of the superstructure comprising of 131 modules were installed within just four weeks.
- Employed steel Prefabricated Prefinished Volumetric Construction (PPVC) due to its lightweight nature, reducing crane usage and streamlining module connections. Factory-made PPVC modules, featuring welded intra-module connections, were bolted together on-site. This modular strategy facilitated simultaneous construction of LTC modules and the polyclinic, accelerating construction productivity and workmanship, reducing man-hours on-site, and minimising disruptions to KWSH and surrounding HDBs through better noise and dust control.

WINNERS OF BCA DESIGN AND ENGINEERING SAFETY AWARD 2023

PROJECT NAME	PROJECT TYPE	QP / QP COMPANY
Whistler Grand	Residential	Engineer Heng Kim Huat TW-Asia Consultants Pte Ltd
lyf one-north Singapore	Commercial	Engineer Teoh Eng Sin Mott MacDonal Singapore Pte Ltd
Kallang Polyclinic and Long Term Care	Institutional & Industrial	Engineer Lim Keong Liam Arup Singapore Pte Ltd

Organiser



An Initiative Under

