MEDIA RELEASE

SKY'S THE LIMIT FOR CONSTRUCTION EXCELLENCE AWARD WINNERS THIS YEAR

- Small progressive Singapore builders, CMC Construction Pte Ltd and Unison Construction Pte Ltd, recognised for strong capabilities in digital technologies and innovative solutions
- Unison Construction Pte Ltd also a winner of the Green and Gracious Builder Award Star Champion

Singapore, 18 May 2018 – Whether big or small, builders in the built environment sector are making their mark in construction excellence in Singapore. The firms winning big under Construction Excellence Award (CEA) this year are Woh Hup (Private) Ltd and China Construction (South Pacific) Development Co. Pte Ltd. More than half of the 11 award winning residential projects are helmed by these two firms and they have achieved relatively high standards of quality (i.e. their CONQUAS scores average around 95), through their strong project management processes and adoption of advanced technologies.

2 Established by the Building and Construction Authority (BCA) in 1986, CEA is awarded to builders for their exemplary performance in project management, technical expertise, innovative solutions and high quality standards for a project. Among the winners this year are also small progressive builders, CMC Construction Pte Ltd and Unison Construction Pte Ltd, who have been accorded the merit certificate for achieving a high degree of construction excellence.

3 The eight-storey St. Andrew's Nursing Home at Queenstown was built by CMC Construction Pte Ltd in a span of 18 months. The project team placed a large emphasis on solving issues at the early planning and design stages before commencing actual construction. By adopting 6D Building Information Modelling (BIM), they were able to facilitate close collaboration between different project stakeholders and identify potential clashes of building components through an interactive visualisation of the building plan and its construction process. For example, the external façade had an alternating rectangular module design that could also hold plants. With BIM, they could demonstrate how the

modules could be easily constructed by repeating a four-step installation process of the precast components. They also made the decision to upturn all cantilever beams at the side of the building after finding out from the BIM visualisation of the original design that the beams would protrude out and affect the final look of the façade.

4 In addition, 6D BIM meant that they also had the capability to use data to track the progress of the building's construction; and when the building is completed, the BIM data handed over to the building owner could be used to identify details of the building assets such as their location and expiry date for facilities management.

5 Ms Jenny Chew Lay Keng, Project Manager at CMC Construction Pte Ltd, said "I find joy in exploring the use of technologies to improve the way we construct our buildings. My team adopted the concept of facilitating collaboration among project stakeholders through digital interactive visualisations of building plans even before it was actively promoted by the government and I'm glad that my team has since developed its BIM capabilities. We are really pleased with how the St. Andrew's Nursing Home turned out with minimal reworks required and we certainly look forward to do likewise for the other projects we embark on in the future."

6 Another small Singapore builder, Unison Construction Pte Ltd, achieved good productivity and quality score for their residential project, Thomson Three. Through value engineering, the builder re-designed the foundation system using a thick concrete foundation slab instead of 200 bored piles done on site and thus shortening the construction time by 45 days. The builder also replaced the conventional reinforced concrete beam and slab system with the flat slab system, thus eliminating the need for beams or girders, for the construction of the basement floors. This helped the team to save time and manpower needed for construction.

7 It took them just slightly over three years to complete the residential flat development comprising three 21-storey blocks and 10 three-storey strata semi-detached units, together with two levels of basement car park. On their construction excellence win this year, project manager Mr Yip Wai Hoong said "We feel proud when we construct a building complying to the architects' design and hand over the house to the unit owners to their highest satisfaction. This is Unison's core philosophy that drives us to strive for the excellence during the construction for all projects we have undertaken."

8 Besides adopting innovative and productive ways of construction, Unison Construction Pte Ltd also promotes and adopts gracious practices that minimise the impact on-site and its surroundings. This includes comprehensive guidelines and manpower management developed and implemented to ensure enhanced accessibility, public safety and better mitigation of noise and vibration. Sharing sessions for staff and subcontractors are also conducted regularly to develop innovative green and gracious practices and technologies. In addition, green and gracious performance is an important criterion during the assessment and evaluation of Unison's suppliers and/or sub-contractors. For their efforts, they won the **Green and Gracious Builder Award Star Champion** (refer to factsheet), the highest tier for the award.

9 Er. Lai Huen Poh, Chairman of the CEA Assessment Committee said "Firms in the built environment sector are continuously challenging themselves to achieve greater heights. In today's increasingly competitive market, we are also seeing smaller players stepping up their game in being progressive. While many firms face resistance to changes during this period of technology disruption, these firms went head on to embrace them. I applaud them for finding strength in adversity and not letting firm size determine their capabilities. All in all, I was really impressed by this year's shortlisted projects. Congratulations to all winners for their outstanding achievements."

10 There are a total of 19 award and 17 merit certificate winners under the CEA. For the GGBA, there are a total of 2 Star Champions, 3 Star and 19 Excellent award winners (more details can be found in the annex). Winners will receive their awards during the BCA Awards Ceremony on 22 May 2018 at the Resorts World Sentosa.

Issued by the Building and Construction Authority on 18 May 2018

About Building and Construction Authority (BCA)

The Building and Construction Authority (BCA) of Singapore champions the development of an excellent built environment for Singapore. BCA's mission is to shape a safe, high quality, sustainable and friendly built environment, as these are four key elements where BCA has a significant influence. In doing so, it aims to differentiate Singapore's built environment from those of other cities and contribute to a better quality of life for everyone in Singapore. Hence, its vision is to have "a future-ready built environment for Singapore". Together with its education arm, the BCA Academy, BCA works closely with its industry partners to develop skills and expertise that help shape a future-ready built environment for Singapore. For more information, visit www.bca.gov.sg.

MEDIA FACTSHEETS

Annex A: Construction Excellence Award 2018

Annex B: Green and Gracious Builder Scheme / Award 2018

Annex A: Construction Excellence Award 2018

The Award

The BCA Construction Excellence Award was introduced in 1986 and is now into its 32nd year. To date, BCA has conferred 297 Awards and 254 Certificates of Merit (1986~2017). Invitations for nominations for the 2018 Awards were made in August 2017 to architectural and engineering consultancy firms, government departments, statutory boards as well as construction firms. 48 projects were nominated projects and 47 were short listed for evaluation. In the end, a total of 19 Awards and 17 Certificates of Merits were conferred for 2018.

The Recipients

Builders are the principal recipients of the Award. Developers and consultants (Architects, Structural Engineers, M&E Engineers and Quantity Surveyors) who were involved in the project would also be acknowledged.

Award Categories

There are a total of 7 award categories, as follows:

a. Commercial/Mixed Development Buildings

b. Industrial Buildings

c. Institutional Buildings

d. Residential Buildings ($1,800 / m^2 and Above)

e. Residential Buildings (Below $1,800 / m^2)

f. Small Buildings - $3 million to $10 million

g. Civil Engineering Projects

Assessment Criteria

Projects were assessed by the Assessment Committee in 3 stages:-

a. Builders' presentation on the construction process;
b. Site visits; and
c. A committee meeting to deliberate the results

The assessment of the nominations are based on the following criteria:

a. Builder's overall management of the project;
b. Builder's technical capability and innovations; and
c. Quality of the completed project.

ASSESSMENT COMMITTEE

Chairman:

Mr Lai Huen Poh

BCA Board Member

Senior Managing Director

RSP ARCHITECTS PLANNERS ENGINEERS (PTE) LTD

Deputy Chairman:

Mr Ang Wee Gee

BCA Board Member

Members:

Mr Anthony Chia	YANLORD LAND GROUP LIMITED
Er Chan Ewe Jin	ECAS CONSULTANTS PTE LTD

Er Dr Johnny Wong Liang Heng	HOUSING & DEVELOPMENT BOARD
Mr Jon Skipworth-Button	SCOTT VICKER ENVIROMENTAL PTE LTD
Er Kaliannan Thanabal	BUILDING AND CONSTRUCTION AUTHORITY
Ms Leong-Kok Su-Ming	BUILDING AND CONSTRUCTION AUTHORITY
Mrs Ong-Koh Wee Nah	LAND TRANSPORT AUTHORITY
Professor Richard Liew	NATIONAL UNIVERSITY OF SINGAPORE
Mr Sin Lye Chong	URBAN REDEVELOPMENT AUTHORITY
Mr Steven Low Kong Yen	ONG&ONG PTE LTD
Er Tan Kiat Leong	TW INTERNATIONAL COUNSEL PTE LTD
Mr Tanaka Hiroyuki	KAJIMA OVERSEAS ASIA PTE LTD
Mr Tan Soon Kian	UNISON CONSTRUCTION PTE LTD

Construction Excellence Award 2018 Winners

Featured winners

Award Type	Project	Category	Builder
Merit	St Andrew Nursing Home (Queenstown)	Institutional Buildings	CMC Construction Pte Ltd
Merit	Thomson Three	Residential $1,800/m2 and above Projects	Unison Construction Pte Ltd

Award winners

Project	Category	Builder
Ascott Orchard Singapore	Commercial / Mixed Development Buildings	Woh Hup (Private) Limited
Katong Square	Commercial / Mixed Development Buildings	Master Contract Services Pte Ltd
ICPH2@KB	Industrial Building	Straits Construction Singapore Pte Ltd
Singapore Management University - School of Law Building	Institutional Buildings	Kajima Overseas Asia Pte Ltd
Yale-NUS College	Institutional Buildings	Ssangyong Engineering & Construction Co., Ltd
Three 11	Residential $1,800/m2 and above Projects	Woh Hup (Private) Limited
Cairnhill Nine	Residential $1,800/m2 and above Projects	Woh Hup (Private) Limited
Jewel @ Buangkok	Residential $1,800/m2 and above Projects	Dragages Singapore Pte Ltd

Seventy Saint Patrick's	Residential $1,800/m2 and above Projects	China Construction Realty Co Pte Ltd
Hillsta	Residential $1,800/m2 and above Projects	China Construction (South Pacific) Development Co Pte Ltd
Sengkang N2 C43A (Compassvale Cape)	Residential Buildings – Below $1,800/m2	Qingjian International (South Pacific) Group Development Co Pte Ltd
Hougang N9 C23 (Hougang Crimson)	Residential Buildings – Below $1,800/m2	China Construction (South Pacific) Development Co Pte Ltd
Hougang N4 C20 (Hougang ParkEdge)	Residential Buildings – Below $1,800/m2	China Construction (South Pacific) Development Co Pte Ltd
Choa Chu Kang N8 C4 (Keat Hong Axis)	Residential Buildings – Below $1,800/m2	China Construction (South Pacific) Development Co Pte Ltd
Clementi Ridges	Residential Buildings – Below $1,800/m2	Teambuild Engineering & Construction Pte Ltd
Choa Chu Kang N8 C1 (Keat Hong Crest)	Residential Buildings – Below $1,800/m2	LC&T Builder (1971) Pte Ltd
Contract 929A - Construction and Completion of Tunnels between Ubi and Kaki Bukit Stations and Reception Tunnels for Downtown Line Stage 3	Civil Engineering Projects	Nishimatsu Construction Co Ltd
Contract 1688 Construction of Station EW30 and Viaducts for Tuas West Extension	Civil Engineering Projects	Shanghai Tunnel Engineering Co (Singapore) Pte Ltd
C936 Construction and Completion of Bencoolen Station for Downtown Line Stage 3	Civil Engineering Projects	Sato Kogyo (S) Pte. Ltd.

Certificate of Merit winners

Project	Category	Builder
The Midtown & Midtown Residences	Commercial / Mixed Development Buildings	Lian Beng Construction (1988) Pte Ltd
JTC Aviation Two @ Seletar Aerospace Park	Industrial Building	Sembcorp Design and Construction Pte Ltd
Fairprice Hub @ Joo Koon	Industrial Building	Tiong Seng Contractors Pte Ltd
Proposed Additions & Alterations to Existing Riverside, Springdale, West Spring and Westwood Primary Schools	Institutional Buildings	Guan Ho Construction Co (Pte) Ltd
St Andrew Nursing Home (Queenstown)	Institutional Buildings	CMC Construction Pte Ltd
Riversails	Residential $1,800/m2 and above Projects	Tiong Aik Construction Pte Ltd
euHabitat	Residential $1,800/m2 and above Projects	Woh Hup (Private) Limited
Seahill	Residential $1,800/m2 and above Projects	China Construction (South Pacific) Development Co Pte Ltd
Lush Acres Executive Condominium	Residential $1,800/m2 and above Projects	Nakano Singapore (Pte) Ltd
The Hillier	Residential $1,800/m2 and above Projects	China Construction (South Pacific) Development Co Pte Ltd
Leedon Residence	Residential $1,800/m2 and above Projects	Woh Hup (Private) Limited
HAUS @ Serangoon Garden	Residential $1,800/m2 and above Projects	Tiong Seng Contractors Pte Ltd
The Tembusu	Residential $1,800/m2 and above Projects	Shimizu Corporation
Parc Centros	Residential $1,800/m2 and above Projects	Wee Hur Construction Pte Ltd

Sky Vue	Residential $1,800/m2 and above Projects	Dragages Singapore Pte Ltd
Thomson Three	Residential $1,800/m2 and above Projects	Unison Construction Pte Ltd
Gramercy Park	Residential $1,800/m2 and above Projects	Hyundai Engineering & Construction Co Ltd

Construction Excellence Award 2018 Winners - Featured winners

MERIT

St. Andrew's Nursing Home (Queenstown)

Institutional Buildings Category

Builder	**CMC Construction Pte Ltd**
Developer	**Ministry of Health**
Principal Consultant	**Architects Team 3 Pte Ltd**
Architectural Consultant	**Architects Team 3 Pte Ltd**
Structural Consultant	**ECAS Consultants Pte Ltd**

M&E Consultant	**J. Roger Preston (S) Pte Ltd**
Quantity Surveyor	**CPG Consultants Pte Ltd**
Project Management Consultant	**Davis Langdon KPK (Singapore) Pte Ltd**
Construction Period	**18 Months**
Gross Floor Area	**10,972 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction of a 8-storey Nursing Home at 11 Jalan Penjara

- **MAIN CONSTRAINTS:**
  - Shared access site boundary with Queenstown Baptist Church and construction of Rainbow Centre.
  - Existing services such as gas pipes, water main pipes and electrical cables were required to be diverted and it clashed with the construction of stipulated drainage and sewer works.

- **NOTABLE FEATURES**
  - Changed façade, external wall fin feature and roof parapet to precast components for productivity
  - Integrated planter box to the precast façade
  - Extensive usage of precast columns (80% by volume), precast plank slabs (50% by volume) and precast internal walls
  - Adopted flat slab construction for 50% of the in-situ slab
  - Adopted offsite fabrication of the necessary services in the precast columns and fins walls

- Used prefab mechanical vents and ducts for ACMV (air conditioning and mechanical ventilation system)
- Used hubless mechanical joint for sanitary and fire protection pipes
- Used BIM modelling for 4D modelling with timeliner, clash detection, visualisation (construction of the façade, headroom clearance for services, etc.), FM (facilities management) data and assets naming
- Adopted spray painting for walls and pre-paint for fire protection piping

- **NOTABLE ACHIEVEMENTS**
  - BCA Green & Gracious Builder Award 2017 – Excellent

MERIT

Thomson Three

Residential Buildings - $1,800 /$m^2$ and above Category

Builder	**Unison Construction Pte Ltd**
Developer	**United Venture Development (Thomson) Pte Ltd**
Principal Consultant	**P&T Consultants Pte Ltd**
Architectural Consultant	**P&T Consultants Pte Ltd**
Structural Consultant	**TEP Consultants Pte Ltd**
M&E Consultant	**J. Roger Preston (S) Pte Ltd**
Quantity Surveyor	**Arcadis Singapore Pte Ltd**

Landscape Consultant	**Site Concepts International Pte Ltd**
Construction Period	**38.5 Months**
Gross Floor Area	**41,386 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - A 445 units residential flat development comprising 3 blocks of 21-storey and 10 units of 3-storey strata semi-detached with 2 level of basement car park at Bright Hill Drive

- **MAIN CONSTRAINTS:**
  - Site access location coincided with the drop off area. Thus resulted in congestion during drop off area construction stage

- **NOTABLE FEATURES**
  - Changed bore pile foundation to raft foundation
  - Replaced conventional beam & slab system with flat slab with drop panels at basement
  - Redesigned 1st story surface drainage to add rainwater collection tank with pump for better discharge of runoff to external drainage to prevent flooding
  - Used BIM modelling to coordinate and address the complicated interfacing at the substation and overhung units
  - Used 100% precast columns produced by 2 precast yards on site
  - Adopted various system formworks to improve productivity for in-situ concrete:
    - Volumetric aluminium formwork system for wall and staircase
    - Jump formwork for lift and staircase wall
    - HKL- Alumalite table formwork shoring system for slab

- Extensive usage of MEWP (mobile elevated work platform) for works at height
- Provided workers dormitory on site to reduce travelling time and fatigue. Dormitory toilets were 5-Star Happy Toilet Certified. Provided full laundry service.

- **NOTABLE ACHIEVEMENTS**
  - High productivity score of 0.475 m^2 per manday
  - BCA Green & Gracious Builder Award 2016 – STAR
  - RoSPA Award 2015 and 2016 – GOLD
  - MOM WSH SHARP Award 2016

Construction Excellence Award 2018 Winners - Award winners

AWARD

Ascott Orchard Singapore

Commercial/Mixed Development Buildings Category

Builder	**Woh Hup (Private) Limited**
Developer	**CapitaLand Limited**
Principal Consultant	**RSP Architects Planners & Engineers (Pte) Ltd**
Architectural Consultant	**RSP Architects Planners & Engineers (Pte) Ltd**
Structural Consultant	**AECOM Singapore Pte. Ltd.**
M&E Consultant	**Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd**
Quantity Surveyor	**Arcadis Singapore Pte Ltd**

Landscape Consultant	**COEN Design International Pte Ltd**
Construction Period	**38.0 Months**
Gross Floor Area	**18,978 m^2**

KEY FEATURES

- **SCOPE OF WORKS**
  - A commercial/mixed development building along Cairnhill Road comprising 1 block of 20-storey hotel (220 rooms) and 6-storey podium car park with 7th storey landscape deck, incorporating alteration and addition works to existing mosque.
- **MAIN CONSTRAINTS**
  - Working in close proximity to the bustling streets and crowded shopping malls especially a challenge for the erection of the link bridge between Ascott Orchard Singapore and Paragon Shopping Mall and the erection or dismantling of tower cranes
  - Not to affect the operation of Al-Falah Mosque for the A&A and façade modification
- **NOTABLE FEATURES**
  - Used diamond cutter and robotic hydraulic crushers for demolition to ensure safety of remaining structure
  - Required only 1 night road closure for the installation of the link bridge between Ascott Orchard Singapore and Paragon Shopping Mall
  - The steel link bridge was designed as a truss system and prefabricated off site for ease of installation and minimised disruption to traffic
  - Through proper planning, no road closure was required for the dismantling of both tower cranes using a 350 tonnes mobile crane
  - Adopted various system formwork systems such as the table form, steel column, jump form and staircase shelter formwork moulds to increase productivity

- Incorporation of the green wall system into the façade system for productivity in installation and ease of maintenance
- Building Information Modelling (BIM) system was implemented on site to improve the coordination of drawings between different departments and trades

- **NOTABLE ACHIEVEMENTS**
  - High CONQUAS score of 98.2 points
  - BCA Green Mark Award 2014 – GOLD^{PLUS}
  - BCA Green & Gracious Builder Award 2017 - STAR
  - BCA BIM AWARD – 2014 (GOLD), 2015 (GOLD PLUS), 2016 (PLATINUM
  - MOM WSH SHARP 2014, 2015, 2016
  - RoSPA 2015 (GOLD), 2016 (GOLD), 2017 (GOLD)

AWARD

Katong Square

Commercial/Mixed Development Buildings Category

Builder	**Master Contract Services Pte Ltd**
Developer	**Katong Holdings Pte Ltd**
Principal Consultant	**ONG&ONG Pte Ltd**
Architectural Consultant	**ONG&ONG Pte Ltd**
Structural Consultant	**TW-Asia Consultants Pte Ltd**
M&E Consultant	**United Project Consultants Pte Ltd**
Quantity Surveyor	**Davis Langdon KPK, an AECOM Company**
Signage Consultant	**Design Objectives Pte Ltd**
Interior Designer & Landscape Consultant	**Eco-id Design Pte Ltd**

Construction Period	**20.0 months**
Gross Floor Area	**25,210 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction of the 131-guestroom Peranakan theme boutique Hotel Indigo Katong, 451-rooms Holiday Inn Express Katong and a 2-storey mall at the former Joo Chiat Police Station at 86 East Coast Road

- **MAIN CONSTRAINTS:**
  - Conservation of house built in 1920 on brick foundation
  - Presence of marine clay in the substructure works
  - Likely presence of buried war relics
  - Delays by 4 months for the demolition of the existing ESS (electrical substation)
  - Close proximity to existing residential, hotel and shopping malls and shared access by 2 other construction sites

- **NOTABLE FEATURES**
  - Used caisson shaft for access for minor sewer pipe jacking due to marine clay
  - Used of PBU (Prefabricated Bathroom Unit), Unitized curtain wall and precast component, drywall system, screedless floor for better productivity
  - Used of pre-insulated chilled water pipes
  - Replaced rooftop aluminium fin façade screen with Z purlin high tensile galvanized steel frame for faster installation
  - Used Novade Mobile App for defect management

- Used of IST App (Insight Manpower Management) for time card management
- Works completed 8 months ahead of time

- **NOTABLE ACHIEVEMENTS**
  - High CONQUAS score of 90.9 points
  - BCA Green Mark Award – PLATINUM
  - BCA PIP Award (Productivity Innovation Project)
  - High Productivity Score of 0.369 m2 per manday

AWARD

ICPH2@KB (Greyform Building)

Industrial Buildings Category

Builder	**Straits Construction Singapore Pte Ltd**
Developer	**Straits Construction Singapore Pte Ltd**
Principal Consultant	**ONG&ONG Pte Ltd**
Architectural Consultant	**ONG&ONG Pte Ltd**
Structural Consultant	**BC Koh & Partners LLP**
M&E Consultant	**Rankine & Hill (S) Pte Ltd**
Quantity Surveyor	**Straits Construction Singapore Pte Ltd**

Construction Period	**30.0 months**
Gross Floor Area	**32,081 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction of a 4-storey integrated construction and precast hub with a 12-storey workers dormitory and a 3-storey Admin building at Kakit Bukit

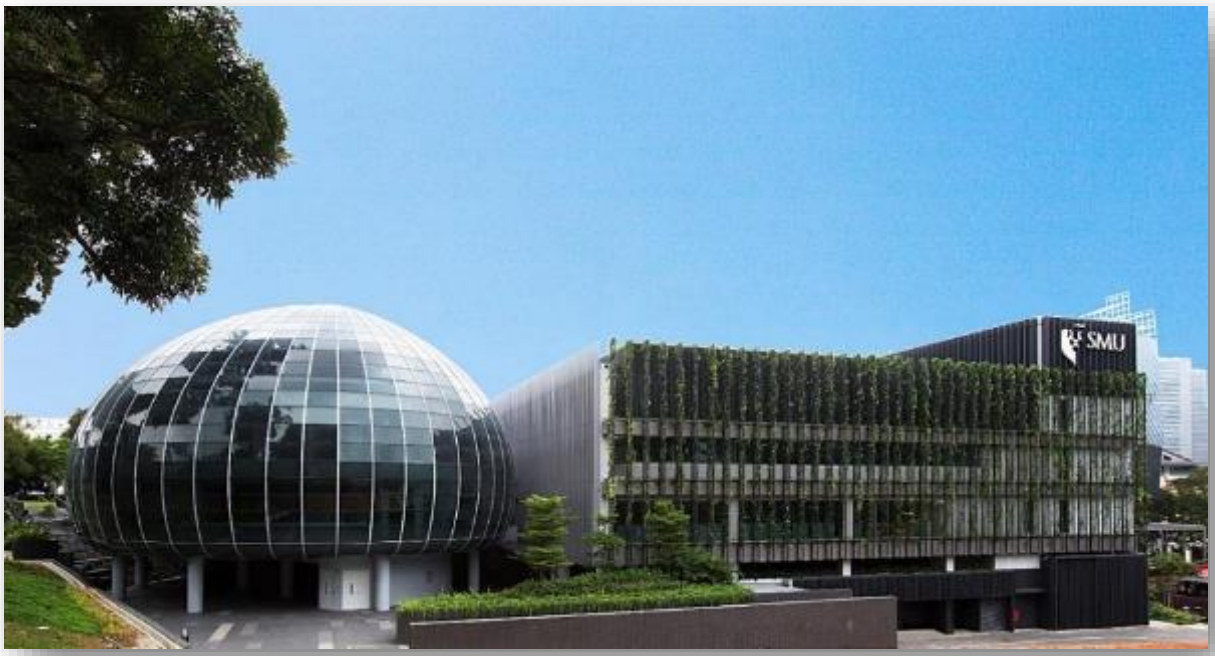
- **MAIN CONSTRAINTS:**
  - Early coordination and continuous follow up with stakeholders were required to resolve the Paya Lebar Airbase fencing encroachment which would affect the CBP (contiguous bored pile) installation works
  - Soil swelling issue that required additional disposal
  - Concurrent installation of machinery for the precast hub

- **NOTABLE FEATURES**
  - Improved ERSS (earth retaining or stabilising structure) design with the use of shotcrete to stabilize open cut slope eliminated the needs for temporary retaining structure
  - Integrated the tower crane pile cap with basement slab eliminated the needs for demolition after completion
  - Used MCWP (Mast climbing working platform) and gondola to finish façade with no external scaffold required
  - Used Ultra Flat Screed machine for floor finishing work to achieve high quality smooth surface
  - Adopted various system formworks to improve productivity:
    - Band 2 aluminium formwork system for in-situ structural works
    - Band 2 table system form for in-situ post tensioning beam works

    - Band 4 system formwork for column and core wall
  - Used self-compact concrete for casting factory 10-m high columns in 1 operation
  - Used hollow core slabs to replace slab formwork
  - Precast detention tank and factory perimeter beams (with perimeter railing incorporated) were produced on site precast yard
  - Changed in-situ retaining wall to semi-precast along east boundary to improve productivity and improved safety
  - Used BIM (build information modelling) for multi-disciplinary clashes detection to ensure early intervention

- **NOTABLE ACHIEVEMENTS**
  - BCA Green & Gracious Builder Award 2016 – STAR
  - High CONQUAS Score of 93.3

AWARD



Singapore Management University - School of Law Building
Institutional Buildings Category

Builder	**Kajima Overseas Asia (Singapore) Pte. Ltd.**
Developer	**Singapore Management University**
Principal Consultant	**MKPL Architects Pte Ltd**
Architectural Consultant	**MKPL Architects Pte Ltd**
Structural Consultant	**Meinhardt (Singapore) Pte Ltd**
M&E Consultant	**AECOM Singapore Pte. Ltd.**
Quantity Surveyor	**Rider Levett Bucknall LLP**
Project Manager	**SIPM Consultants Pte Ltd**

Façade, Acoustic & ESD Consultant	**Arup Singapore Pte Ltd**
Construction Period	**30.0 months**
Gross Floor Area	**23,327 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction of a 23,000 m^2 building comprising 21 seminar/class rooms, a Law library, 1 Moot Court, group study rooms, a Law Research Centre, Pro-Bono room and Mediation room at Armenian Street

- **MAIN CONSTRAINTS:**
  - Proximity to Fort Canning Tunnel and adjacent conservation buildings and heritage trees
  - Special design requirements:
    - Construction of the column free 41m by 37m Multi-Function Hall from B1 to L1 and 33m by 22m Atrium Void from L1 to L4
    - Large glass dome
    - Long cantilever structure
  - Major drain diversion
  - Possibility of historical artefacts within vicinity of Fort Canning Hill
  - Discovery and protection of an endangered species eagle's nest
  - Undulating terrain with Fort Canning boulder bed

- **NOTABLE FEATURES**
  - Adopted a "Zoned" Top-Down construction in view of the undulating terrain

- Redesigned shorter pile length for bored piles (in collaboration with Structural Consultants)
- Adopted CBP (contiguous bored pile) wall eliminate the needs for steel strutting for the top-down construction
- Redesigned 6 mega trusses at atrium resulted in reduction of 30 tons of steel
- Innovation in assembly of 9 mega trusses for column free by converting each mega truss into 3 segments for safer handling
- Redesigned glass dome from cassette system to semi-unitised system and dome integrated steel assembly for better installation tolerance, productivity and reduced risk of overflow
- Enhanced design of basement wall water management system to minimise risk of flooding
- Changed basement floor waterproofing system to drain cell system for managing water seepage and rising damp
- Replaced granite tiles with agglomerated stone tiles for greener product
- Used Bondek composite system for slab construction
- Used steek kickers to transfer loadings to reduce steel weight
- Used U-clips for rebar lapping to reduce rebar and faster in installation
- Used of jumbo ALC (autoclaved lightweight concrete) blocks (600 mm by 1200mm) for wall
- Completed 7 days ahead of time
- Utilized BIM (Building Information Modelling) for design, construction and clash detection.

- **NOTABLE ACHIEVEMENTS**
  - High CONQUAS score of 93.7 points
  - BCA Green & Gracious Builder Award – STAR
  - BCA Green Mark Award 2014 – PLATINUM
  - WSH SHARP 2016
  - RoSPA Silver (2016)

AWARD

Yale-NUS College

Institutional Buildings Category

Builder	**Ssangyong Engineering & Construction Co., Ltd.**
Developer	**Yale-NUS College, National University of Singapore**
Principal Consultant	**Forum Architects Pte Ltd**
Architectural Consultant	**Forum Architects Pte Ltd**
Structural Consultant	**Meinhardt (Singapore) Pte Ltd**
M&E Consultant	**Meinhardt (Singapore) Pte Ltd**
Quantity Surveyor	**Rider Levett Bucknall LLP**

Design Architects	**Forum Architects Pte Ltd / Pelli Clarke Pelli Architects**
Construction Period	**32.0 months**
Gross Floor Area	**63,276 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction of 3 Residential Colleges (total 1001 units) and supporting amenities including seminar rooms, laboratories, library, black box theatre, performance hall, art studios, etc covering 64,000 m^2

- **MAIN CONSTRAINTS:**
  - Close proximity to schools and residences posed challenge to control of traffic, mitigating noise and dust pollution
  - Obstruction by 6 heritage trees
  - Undulating terrain limited staging areas and access
  - Hugging of M&E (mechanical and electrical) services with profile of ID (interior design) ceiling

- **NOTABLE FEATURES**
  - Achieved 6-day cycle for typical floor
  - Adopted scaffold-free construction
  - Extensive usage of offsite prefabricated components e.g. rebar, prestressed hollow core slab, precast concrete walls for external, precast cement wall for internal, drywall, ID (interior design) works, etc
  - Utilized special precast hoisting frame for lifting of large precast component

- Used of aluminium system formworks for in-situ concreting
- Utilized BIM (Building Information Modelling) for design, construction, clash detection and monthly report

NOTABLE ACHIEVEMENTS

- High CONQUAS score of 91.5
- BCA Green & Gracious Builder Award – EXCELLENT
- BCA Green Mark Award 2014 – PLATINUM
- WSH SHARP 2013, 2014, 2015
- RoSPA GOLD for 2014 and 2015
- NPark Leaf Certificate
- PUB ABC Certificate for Bio Retention Swale
- Happy Toilet 5-Star rating for site office toilets and 4-Star for worker's toilets

AWARD

Three 11

Residential Buildings - $1,800 /m^2 and above Category

Builder	**Woh Hup (Private) Limited**
Developer	**Aurum Land (Private) Limited**
Principal Consultant	**Park+Associates Pte Ltd**
Architectural Consultant	**Park+Associates Pte Ltd**
Structural Consultant	**KTP Consultants Pte Ltd**
M&E Consultant	**NEAM Solutions**
Quantity Surveyor	**LCH Quantity Surveying Consultants**
Landscape Consultant	**Ecoplan Asia Pte Ltd**

Construction Period	**24.0 months**
Gross Floor Area	**5,344 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction consist of 3 5-storey residential blocks (total 65 units), 1 swimming pool, 2 pavilions with 1 basement car park at Upper Thomson Road

- **MAIN CONSTRAINTS:**
  - Proximity to MRT reserve zone
  - Small single site access
  - Only 1 tower crane for installation of steel roofs
  - Required strict control on noise and dust pollution due to close proximity to neighboring houses
  - Proper material delivery planning required to prevent congestion of bus lane outside single site access

NOTABLE FEATURES

- Used off-form concrete with timber look alike formliner for the entire boundary wall and some feature walls within the development
- Used drywall and Acotec panels for internal walls
- Used aluminum and steel formworks
- Changed slab rebar to prefabricated mesh
- Used prefabricated timber cladding for units' balconies to improve site productivity
- Used of jack-in RC (reinforced concrete) piles to minimise noise disturbance to nearby neighbours

- **NOTABLE ACHIEVEMENTS**
    - High CONQUAS score of 97.7 (STAR)
    - Completed 3 months ahead
    - BCA Green & Gracious Builder Award – STAR
    - BCA BIM Award – Platinum 2016
    - BCA Green Mark GOLD^{Plus} 2015
    - MOM WSH SHARP Award 2016
    - RoSPA Safety Award GOLD for 2014, 2015 & 2016

AWARD

Cairnhill Nine

Residential Buildings - $1,800 /m2 and above Category

Builder	**Woh Hup (Private) Limited**
Developer	**CapitaLand Limited**
Principal Consultant	**RSP Architects Planners & Engineers (Pte) Ltd**
Architectural Consultant	**RSP Architects Planners & Engineers (Pte) Ltd**
Structural Consultant	**AECOM Singapore Pte. Ltd.**
M&E Consultant	**Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd**
Quantity Surveyor	**Arcadis Singapore Pte Ltd**
Landscape Consultant	**COEN Design International Pte Ltd**

Construction Period	**38.0 months**
Gross Floor Area	**27,632 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - A design and build mixed development including construction of 1 block of 30-storey residential apartment with 268 units and ancillary facilities at 15 Cairnhill Road

MAIN CONSTRAINTS:

- Location proximity near iconic shopping malls with heavy human traffic flow
- Restricted access way posed challenges in deploying and dismantling of the tower cranes on site
- Development's foundation piles constructed above the existing piles which required de-conflict measures when clashes of the old and new piles occurred
- To ensure Al-Falah Mosque in full operation during the construction over it and the A&A works

NOTABLE FEATURES

- Implemented BIM (Building Information Modelling) system to improve the coordination of drawings between different departments and trades
- Used diamond cutter and robotic hydraulic crushers to ensure existing building remains structurally sound
- Incorporation of the green wall system into the façade system for productivity in installation and ease of maintenance

- Precast Civil Defence (CD) shelter, door frames, and refuse chutes were used to improve the site productivity
- Used various formwork systems such as the table form, jump form, round steel column, staircase shelter formwork moulds were used
- Used Novade system for managing of defects

- **NOTABLE ACHIEVEMENTS**
  - High CONQUAS score of 96.3 points (STAR)
  - High average QM score of 92.4 and Tiered rated STAR
  - BCA Green & Gracious Builder Award – STAR
  - BCA BIM Award – Platinum 2016
  - BCA Green Mark GOLD^{Plus} 2013
  - MOM WSH SHARP Award for 2014, 2015 and 2016
  - RoSPA Safety Award GOLD for 2014, 2015 and 2016

AWARD

Jewel @ Buangkok
Residential Buildings - $1,800 /m2 and above Category

Builder	**Dragages Singapore Pte Ltd**
Developer	**White Haven Properties Pte Ltd (A wholly owned property of City Developments Limited)**
Principal Consultant	**DCA Architects Pte Ltd**
Architectural Consultant	**DCA Architects Pte Ltd**
Structural Consultant	**LSW Consulting Engineers Pte Ltd**
M&E Consultant	**Squire Mech Pte Ltd**
Quantity Surveyor	**Rider Levett Bucknall LLP**
Landscape Consultant	**Tinderbox Landscape Studio Pte Ltd**

Construction Period	**33.0 months**
Gross Floor Area	**55,572 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction of 6 residential blocks (15 – 17 Storey) with 616 residential units at Buangkok Drive

- **MAIN CONSTRAINTS:**
  - Close proximity to nearby residents and schools required tight control on noise and dust pollution.
  - Huge amount of excavation works for deep cascading basements
  - Part of site is within railway protection zone and underground MRT
  - Live sewer across site

- **NOTABLE FEATURES**
  - Redistributed basement car park space between 4-level to maximize the space from boundary:
    a. Minimised temporary work
    b. Avoided stricter LTA's requirements for proximity with MRT line
    c. Reduced CFA (Construction Floor Area)
  - Used Glass Fiber Reinforced Polymer (GFRP) soil nails as temporary ERSS (Earth Retaining or Stabilizing Structure)
  - Used ES (Early Strength) concrete for on-site precast production for more efficient casting time
  - Used of LSS (Liquefied Stabilized Soil) Method for construction of foundation of club house
  - Used RECKLI precast mold wall for textured façade installation

- Usage of silent piling for minimal vibration and noise level to minimise disturbance to the surrounding environment
- Adopted pre-cast swimming pool and slab panel to improve site productivity
- Simplified design using cast-in embed for base support of steel frame of feature roofs rather than cast-in bolt

- **NOTABLE ACHIEVEMENTS**
  - CONQUAS STAR
  - BCA Green & Gracious Builder Award - STAR
  - BCA Green Mark GOLD^{Plus} 2013
  - BCA BIM Award 2014 GOLD
  - MOM WSH SHARP Award 2017
  - RoSPA Safety Award 2017 (GOLD) and 2016 (Silver)
  - Good productivity of 0.355 m^2 per manday

AWARD

Seventy Saint Patrick's

Residential Buildings - $1,800 /m^2 and above Category

Builder	**China Construction Realty Co Pte Ltd**
Developer	**UOL Development (St Patrick) Pte Ltd**
Principal Consultant	**Consortium 168 Architects Pte Ltd**
Architectural Consultant	**Consortium 168 Architects Pte Ltd**
Structural Consultant	**TEP Consultants Pte Ltd**
M&E Consultant	**J. Roger Preston (S) Pte Ltd**
Quantity Surveyor	**Davis Langdon KPK (Singapore) Pte Ltd**
Landscape Consultant	**Sitetectonix Pte Ltd**

Construction Period	**33.0 months**
Gross Floor Area	**19,943 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Proposed condominium housing development comprising 9 blocks of 5-storey residential units plus attic with swimming pool, ancillary facilities and 1 level basement car park (total of 186 units) at 70 St. Patrick's Road

- **MAIN CONSTRAINTS:**
  - Single site access for whole development especially challenging for deployment of tower crane
  - Heavy traffic due to close proximity to nearby famous school and residential
  - Proximity to old unsupported PUB open drain and conserved buildings
  - Construction of the sloped RC (reinforced concrete) roof

NOTABLE FEATURES

- Redesigned basement to reduce basement area, improved safe distance to adjacent buildings and cost saving from reduction of excavation and disposal of marine clay
- Used GMP (Grout Mix Piling) and DCM (Direct Cement Mixing) for the lift pit construction for productivity
- Improved design of foundation jet system for maintainability
- Changed waterproofing screed to slope roof to premixed flexible acrylic membrane system for constructability and better quality
- Added drop off life line system for raised planter for safety and maintainability

- Changed painted stainless steel capping at roof edge with matching colour PVC (Polyvinyl Chloride) beading for better maintainability
- Adopted spray painting for basement high ceiling including M&E (Mechanical and Electrical) services
- Adopted roof secure system for future easy maintenance
- Adopted cast in RWDP (rainwater downpipe) to external precast wall for constructability

- **NOTABLE ACHIEVEMENTS**
  - CONQUAS STAR
  - QM STAR
  - BCA Green & Gracious Builder Award – Excellent
  - Completed 3 months ahead

AWARD

Hillsta

Residential Buildings - $1,800 /m^2 and above Category

Builder	**China Construction (South Pacific) Development Co Pte Ltd**
Developer	**TrustHouse Pte Ltd (China Construction, Sekisui House & Far East Organization)**
Principal Consultant	**DP Architects Pte Ltd**
Architectural Consultant	**DP Architects Pte Ltd**
Structural Consultant	**KTP Consultants Pte Ltd**
M&E Consultant	**Rankine&Hill (Singapore) Pte Ltd**
Quantity Surveyor	**Davis Langdon KPK (Singapore) Pte Ltd**
Landscape Consultant	**Tinderbox Pte Ltd**

Interior Designer	**KKS International (S) Pte Ltd**
Construction Period	**42.0 months**
Gross Floor Area	**35,540 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Consist of 1 block of 20-storey, 1 block of 23-storey, 1 block of 21-storey, 14 3-storey strata terraces with roof terrace and 6 3-storey strata terrace with attic (total 416 units) at junction of Phoenix Road and Choa Chu Kang Road

- **MAIN CONSTRAINTS:**
  - Close proximity to Choa Chu Kang ESS (Electrical Substation) with multiple 230KV extra high voltage underground cables crossing the development
  - Close proximity to LRT's Railway Protection Zone thus needed to comply with LTA's requirement at the structure / tower crane erection and dismantling stage
  - Close proximity to MINDEF thus needed to comply with MINDEF's requirements during structure and external wall stage
  - Coordination of 183 types of unit finishes
  - Difficult terrain with 30m drop over 100m distance
  - Can only remove existing showflat 10 months before completion to complete balance works

- **NOTABLE FEATURES**
  - Changed raker strut and soldier piles to buttress wall system as ERSS (Earth Retaining or Stabilizing Structure) for the 18m deep excavation

along the shared boundary with MINDEF improved productivity (by 3 months), water tightness and reduced cost
    - Replaced pile cap design with column stump design allowed concurrent construction of the superstructure and substructure works
    - Adopted DOKA system formwork for all structural works
    - Adopted precast for wall panel partition system, staircase, HS (home shelter) door frame, retaining wall footing, refuse chute, etc
    - Changed steel C-Channel feature design below balcony to precast RC (reinforced concrete) channel design for productivity, better quality connection with the aluminium louvre, eliminating rust issue in the future and was cheaper in both cost and maintenance
    - Added aluminium access panel to the Aircon ledge beside balcony for safer access for maintenance
    - Built in groove in precast wall panel for Mechanical and Electrical (M&E) services
    - Adopted new timber door frame system with no sub frame to improve both quality and productivity.

- **NOTABLE ACHIEVEMENTS**
    - BCA Green And Gracious Builder Award – Excellent
    - WSH Innovation Awards
    - NPark LEAF Certificate of Recognition 2017

AWARD

Sengkang N2 C43A (Compassvale Cape)

Residential Buildings – Below $1,800 /m^2 Category

Builder	**Qingjian International (South Pacific) Group Development Co Pte Ltd**
Developer	**Housing & Development Board**
Principal Consultant	**Surbana Jurong Consultants Pte. Ltd.**
Architectural Consultant	**Surbana Jurong Consultants Pte. Ltd.**
Structural Consultant	**Surbana Jurong Consultants Pte. Ltd.**
M&E Consultant	**Surbana Jurong Consultants Pte. Ltd.**
Quantity Surveyor	**Surbana Jurong Consultants Pte. Ltd.**

Landscape Consultant	**Surbana Jurong Consultants Pte. Ltd.**
Construction Period	**36.0 months**
Gross Floor Area	**170,940 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction of 11 residential blocks of 15-storey HDB flats, 1 MSCP with roof garden, 1 commercial block integrated with eating house, shops and roof garden

- **MAIN CONSTRAINTS:**
  - Residential block within LTA Railway Protection Zone which required regular submission and consultation to obtain LTA's clearance for each construction stage
  - Only one site access for the project during structural stage which required careful delivery planning to prevent congestion
  - Building structure next to PUB New water pipe which required careful planning to prevent damage to the pipe

- **NOTABLE FEATURES**
  - Used bracket supporting system for the construction of cantilever roof to replace scaffold requirements to improve safety and productivity
  - Used pipe jacking method to install sewer pipes which helped to minimise excavation works
  - Replaced conventional 12 tons water tank with 6 tons precast ring water tank eliminate the needs of special 500t mobile crane for installation
  - Used BIM (Building Information Modelling) and VDC (virtual Design and Construction) to analyse the feasibility of work planning to improve productivity

- Used aluminium formwork for in-situ concreting
- Used spray plaster for plastering
- Used mechanical joint for water piping
- Used precast panel for embedding electrical fitting
- Implemented electronic Permit Mobile Application (e-Permit App) for improvement of work flow

- **NOTABLE ACHIEVEMENTS**
  - CONQUAS STAR
  - BCA Green and Gracious Builder Award – STAR
  - RoSPA Safety Award – GOLD
  - Good productivity of 0.480 m^2 per manday

AWARD

Hougang N9 C23 (Hougang Crimson)

Residential Buildings – Below $1,800 /m^2 Category

Builder	**China Construction (South Pacific) Development Co Pte Ltd**
Developer	**Housing & Development Board**
Principal Consultant	**P&T Consultants Pte Ltd**
Architectural Consultant	**P&T Consultants Pte Ltd**
Structural Consultant	**P&T Consultants Pte Ltd**
M&E Consultant	**United Project Consultants Pte Ltd**
Quantity Surveyor	**Arcadis Singapore Pte Ltd**

Landscape Consultant	**Ecoplan Asia Pte Ltd**
Construction Period	**31.1 months**
Gross Floor Area	**37,746 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction of 3 residential blocks (314 units) and 1 MSCP (multi-storey car park) at Hougang Avenue 9

- **MAIN CONSTRAINTS:**
  - Short contract period of 26.5 months
  - Required constant communication and coordination with nearby Ci Yuan CC (Community Centre) contractor to address interfacing work
  - Ground beam of high link way was close to the existing (Gas/Water and Telecom) underground services
  - Constructing of seven permanent entrance/exits to existing roads within short contract period and limited site access

NOTABLE FEATURES

- Improved link bridge design by adding roof shelter, barrier and grille for better safety, security and privacy
- Adopted pipe sleeve method for connecting to existing manhole to eliminate the needs to block traffic lane for 2 months
- Used polymer concrete pipe for minor sewer which had more structural strength and improved productivity due to smoother jacking process
- Used precast fin instead of cast-in-situ to improve productivity

- Used bolt and nut connecting method for the drop off porch instead of welding to improve site productivity
- Used BIM to simulate construction sequencing and co-ordinate construction works
- For safer working condition:
    - Used 2m height prefabricated barricade at air-con ledge
    - Used prefabricated platform for HHS (Household Shelter) cage installation
    - Used prefabricated hanging platform for external RC (reinforced concrete) works
    - Provided extra safety netting to catch falling objects at system formwork
- Used crane lifted system formwork for all external cast in-situ structural element to improve productivity
- Used pad stone at edges of toilet window opening to prevent cracks at corner

- **NOTABLE ACHIEVEMENTS**
    - BCA Green and Gracious Builder Award – Excellent
    - BCA Quality Excellence Award - PLATINUM
    - BCA BIM Award 2016 - GOLD^{plus}
    - HDB Construction Award 2017
    - High productivity of 0.565 m^2 per manday

AWARD

Hougang N4 C20 (Hougang ParkEdge)

Residential Buildings – Below $1,800 /$m^2$ Category

Builder	**China Construction (South Pacific) Development Co Pte Ltd**
Developer	**Housing & Development Board**
Principal Consultant	**Surbana Jurong Consultants Pte. Ltd.**
Architectural Consultant	**Surbana Jurong Consultants Pte. Ltd.**
Structural Consultant	**Surbana Jurong Consultants Pte. Ltd.**
M&E Consultant	**Surbana Jurong Consultants Pte. Ltd.**
Quantity Surveyor	**Surbana Jurong Consultants Pte. Ltd.**

Construction Period	**34.5 months**
Gross Floor Area	**74,770 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction consist of 4 residential blocks and 1 MSCP (Multi-Storey Car Park) between Serangoon Road and Upper Serangoon Crescent

- **MAIN CONSTRAINTS:**
  - Deployed additional tower crane to bring forward the handover of Block 473A to minimize inconvenience to residents for the need to share site entrance
  - Limited site storage space thus requiring TOL (Temporary Occupation Licence) for additional precast storage on site to prevent precast supply delay and overcome site access constraint

- **NOTABLE FEATURES**
  - Used BIM (Building Information Modelling) to do co-ordination to improve visualization of construction process
  - Used enhanced water retaining system, which allowed more clean water to be filtered and recycled, to cut-down on possible flooding due to drain outlet chokage at driveway
  - Used crane-lifted system formwork instead of external scaffold to improve site productivity
  - Steel hollow sections were welded on ground level before hoisting up
  - Integrated precast skin to precast façade joints removed the need for external formwork and enabled grouting to be done internally improved safety and casting efficiency
  - Deployed dumper at MSCP for faster landscaping works

- Used precast tablet with recess for electrical switches eliminated hacking
- Introduced “Barricade Piping System” to enhance safety for working at external ledges

- **NOTABLE ACHIEVEMENTS**
  - High CONQUAS Score – 93.6
  - BCA Green & Gracious Builder Award - Excellent
  - BCA Universal Design Mark Award 2017 - GOLD^{Plus}
  - HDB Construction Award 2017
  - PUB ABC Water Certified Project
  - High productivity of 0.528 m^2 per manday

AWARD

Choa Chu Kang N8 C4 (Keat Hong Axis)

Residential Buildings – Below $1,800 /m^2 Category

Builder	**China Construction (South Pacific) Development Co Pte Ltd**
Developer	**Housing & Development Board**
Principal Consultant	**P&T Consultants Pte Ltd**
Architectural Consultant	**P&T Consultants Pte Ltd**
Structural Consultant	**P&T Consultants Pte Ltd**
M&E Consultant	**United Project Consultants Pte Ltd**
Quantity Surveyor	**Arcadis Singapore Pte Ltd**

Landscape Consultant	**Ecoplan Asia Pte Ltd**
Construction Period	**36.0 months**
Gross Floor Area	**143,320 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction of 9 residential blocks with 1 MSCP (Multi-Storey Car Park) with a roof garden at Choa Chu Kang Avenue 1

- **MAIN CONSTRAINTS:**
  - Complex roof design which created accessibility issue for formwork and casting
  - Shared access points with 4 other ongoing projects which led to traffic congestion during peak period
  - Within MRT Railway Protection Zone

- **NOTABLE FEATURES**
  - Provided alternative proposal to add retractable roof features for gondola installation which led to safer and faster construction
  - Used Bi-directional Method instead of conventional kentledge block for ultimate load test which helped to improve testing efficiency
  - Used pipe jacking method instead of open cut for minor sewer work to minimise disruption to site access and improved productivity
  - Adopted pre-cast column than skin wall to reduce need for external scaffolding and climbing platform thus improving productivity

- Improved end wall waterproofing at joint by applying additional waterproofing externally rather than cutting a recess
- Reduced congestion and provided safer access by stacking water pipes in support frames
- Changed in-situ RC (reinforced concrete) roof feature to precast components reduced hazard for working at height

- **NOTABLE ACHIEVEMENTS**
  - High CONQUAS score – 93.6
  - BCA Built Environmental Leadership Award 2016 – Gold
  - BCA Green & Gracious Builder Award - Excellent
  - BCA Quality Excellence Award 2016 - PLATINUM
  - HDB Construction Award 2016
  - High productivity of 0.650 m^2 per manday

AWARD

Clementi Ridges

Residential Buildings – Below $1,800 /$m^2$ Category

Builder	**Teambuild Engineering & Construction Pte Ltd**
Developer	**Housing & Development Board**
Principal Consultant	**Surbana Jurong Consultants Pte. Ltd.**
Architectural Consultant	**Surbana Jurong Consultants Pte. Ltd.**
Structural Consultant	**Surbana Jurong Consultants Pte. Ltd.**
M&E Consultant	**Surbana Jurong Consultants Pte. Ltd.**
Quantity Surveyor	**Surbana Jurong Consultants Pte. Ltd.**

Landscape Consultant	**Surbana Jurong Consultants Pte. Ltd.**
Construction Period	**45.0 months**
Gross Floor Area	**83,851 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction of 3 blocks of 40-storey residential blocks, 1 precinct pavilion and a 7-storey MSCP (Multi-Storey Car Park) along Clementi Avenue 4

- **MAIN CONSTRAINTS**
  - Hard soil strata was identified and additional soil investigations were conducted as soil profile differ from tender bored log
  - Building of additional barrier free covered link ways within and around the boundary of the sites upon request without extension of time
  - Maintenance of the tree protection zone throughout the construction period provided additional challenges
  - Single access for the construction site

NOTABLE FEATURES

- Used self-developed mobile applications for managing safety, environmental and quality inspections
- Used BIM to:
  - Modelled complex roof design during shop drawings submission to resolve all issues before roof construction
  - Modelled tower crane utilization
  - Optimized construction processes

    - Improved RC (reinforced concrete) cycle from 16 days to 10 days
  - Steel shelters, steel link way structure and railing for air-con ledge were pre-assembled before erection improved safety, quality and productivity
  - Used precast concrete planks for temporary access minimised maintenance
  - Used concrete placing boom with stationed concrete pump to increase productivity for concreting
  - Adopted automatic wheel washer with automated sludge disposal to minimised maintenance at wash bay
  - Adopted a 28-day Architectural Works Cycle for better works flow and productivity

- **NOTABLE ACHIEVEMENTS**
  - Good CONQUAS score – 92.6
  - HDB Construction Award 2017
  - HDB Construction Safety Award 2017
  - MOM WSH SHARP Award 2017
  - RoSPA Safety Award 2016 – GOLD
  - HDB-BCA Quality Mark Benchmarking 2016
  - High productivity of 0.520 m^2 per manday

AWARD

Choa Chu Kang N8 C1 (Keat Hong Crest)

Residential Buildings – Below $1,800 /m^2 Category

Builder	**LC&T Builder (1971) Pte Ltd**
Developer	**Housing & Development Board**
Principal Consultant	**P&T Consultants Pte Ltd**
Architectural Consultant	**P&T Consultants Pte Ltd**
Structural Consultant	**P&T Consultants Pte Ltd**
M&E Consultant	**United Project Consultants Pte Ltd**
Quantity Surveyor	**Arcadis Singapore Pte Ltd**
Construction Period	**31.3 months**

Gross Floor Area	**92,415 m^2**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Comprising 6 13-storey residential blocks, 1 14-storey residential block (total 682 dwelling units) and 1 MSCP (Multi-Storey Car Park) comprising Education Centre, Senior Care Centre, ESS & Precinct Pavilion with green roof at Choa Chu Kang Avenue 6

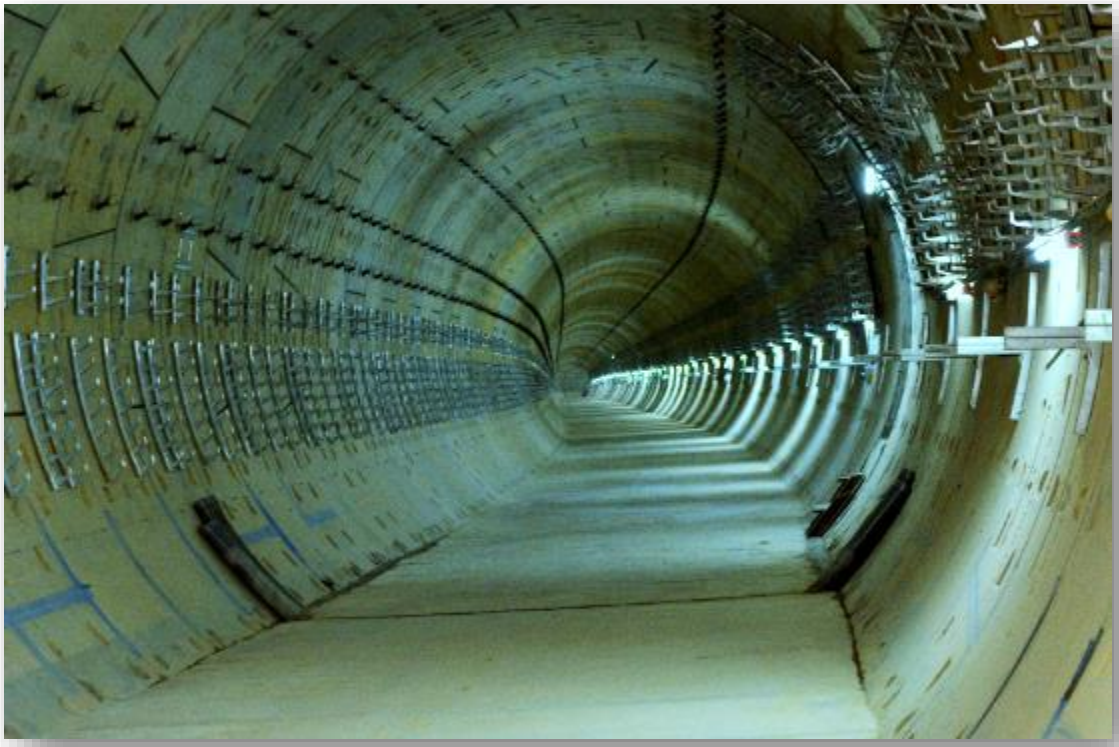
- **MAIN CONSTRAINTS:**
  - Due to close proximity to MRT track, advanced planning and close coordination with LTA and SMRT for night time access and temporary segregation hoarding were required
  - Detail collapse zone analysis, planning of tower crane placement and piling rig movement required as site is within Railway Protection Zone
  - Progress affected by additional authority pre-cautionary checks as site was inside dengue red zone during critical period

- **NOTABLE FEATURES**
  - Implemented FINALCAD app for defects management
  - Used BIM for clash detection of M&E (Mechanical and Electrical) services
  - Improved design of RC (reinforced concrete) roof feature by changing some components to precast improved productivity and safety
  - Used vacuum grinding for wall finishing preparation reduced air pollution
  - Used rotary concrete deck placer for faster concreting
  - Used ride-on power trowel for faster slab trowel finish
  - Used RC (reinforced concrete) power grinder for faster floor surface preparation

- Adopted pre-installation of railing on air-con ledge at ground level before erection improved safety and productivity
- Adopted spray painting for internal wall and ceiling
- Adopted table form system for construction of MSCP eliminated the use of external scaffold

- **NOTABLE ACHIEVEMENTS**
  - Good CONQUAS score of 92.3
  - BCA Universal Design Mark Award – GOLD^{Plus}
  - HDB Construction Award 2017
  - HDB Construction Safety Award 2017
  - MOM WSH SHARP Award 2017
  - HDB-BCA Quality Mark Benchmarking 2016
  - PUB ABC Certification for the Rain Garden

AWARD



Contract 929A - Construction and Completion of Tunnels between Ubi and Kaki Bukit Stations and Reception Tunnels for Downtown Line Stage 3
Civil Engineering Projects Category

Builder	**Nishimatsu Construction Co., Ltd.**
Developer	**Land Transport Authority**
Principal Consultant (Design)	**T.Y. LIN International Pte Ltd**
Principal Consultant (Civil)	**ECAS Consultants Pte Ltd**
Architectural Consultant	**ONG&ONG Pte Ltd**
Structural Consultant (Design)	**T.Y. LIN International Pte Ltd**
Structural Consultant (Supervision)	**ECAS Consultants Pte Ltd**
Construction Period	**71.0 months**

KEY FEATURES

- **SCOPE OF WORKS:**
  - Construction of:
    - Twin bored tunnels of about 0.91 km between UBI (Ubi) and KKB (Kaki Bukit) stations
    - Single bored tunnel of about 2.02 km between UBI station and Tai Seng Facility Building (TSFB).
    - Single bored tunnel of about 2.11km between TSFB and BDT (Bedok Town Park) station.
    - Cut and cover tunnels at East end of UBI station and East end of TSFB.
    - One Escape Shaft and four Cross Passages

- **MAIN CONSTRAINTS:**
  - All four tunnels required to undercross or tunnelling near/between many existing structures

- **NOTABLE FEATURES**
  - First in Singapore to deploy soil pump to handle and disposal of the tunnel spoil
  - Used CCTV and TBM computer system to monitor progress
  - Success in tunnelling between existing KPE tunnel and link sewer with clearance of mere 3.4m and 3.9m respectively for the tunnels between TSFB to UBI Station
  - Diversion and reinstatement on part of the canal along Ubi Road to allow for construction of the diaphragm wall right beside the canal and decking across it
  - To reduce the risk of damaging the flyover, short boom machineries were used for works under the flyover while placement of physical barriers below the soffit and side of the flyover act as protection
  - For undercrossing of the POB (Pedestrian Overhead Bridge), advance underpinning works was carried out and the H-piles of the POB which

clashes with the pre-determined tunnel alignment had to be removed from the TBM through cutterhead intervention

- Backfilling of ES3 (Escape Shaft 3) with LSS (Liquefied Soil Stabilizer) to allow the EPBM (Earth Pressure Balance Machine) to pass through ES3 without stoppage before the LSS was re-excavated to continue construction of the ES3. This method also avoided the needs to realign the tight curve tunnel.

- **NOTABLE ACHIEVEMENTS**
  - WSH SHARP Award 2017
  - LTA Annual Safety Award (ASAC) - Certificate of Participation 2016
  - PUB's Friends of Water (since 2015)
  - BCA Green & Gracious Builder Award 2014 - Excellent

AWARD

Contract 1688 Construction of Station EW30 and Viaducts for Tuas West Extension

Civil Engineering Projects Category

Builder	**Shanghai Tunnel Engineering Co (Singapore) Pte Ltd**
Developer	**Land Transport Authority**
Principal Consultant	**AECOM Singapore Pte. Ltd.**
Architectural Consultant	**Aedas Pte Ltd**
Structural Consultant	**AECOM Singapore Pte. Ltd.**
M&E Consultant	**AECOM Singapore Pte. Ltd.**
Construction Period	**60.0 months**

KEY FEATURES

- **SCOPE OF WORKS:**
    - Project C1688 comprises of the construction and completion of one elevated interchange station EW30, and approximately 2.8km of elevated MRT viaducts. The two single-track MRT viaducts begin at the existing overrun of East-West Line along Joo Koon Circle to EW30 Station at Tuas Road and end at the junction in between Tuas Road and Pioneer Road.

- **MAIN CONSTRAINTS:**
    - Construction above the busy Tuas Road
    - Proximity to existing buildings, especially the Tuas Fire Station, SPPG Powergas, etc
    - Massive live underground utilities

- **NOTABLE FEATURES**
    - Production of the precast segmental box girder used short-line match-cast technique
    - Used geometry control software to correct geometric errors during casting in the match-casting process
    - Used balanced cantilever method for segmental viaduct beam construction crossing above the PIE during midnight operation eliminated impact to the traffic flow at PIE
    - Used span by span method for segmental viaduct beam construction above the Joo Koon Circle, AYE flyover and Tuas Road with lane closure of traffic during off peak hours to minimise disruption to traffic in daytime
    - Suspended rods to hang the segment for launching were designed with high factor of safety
    - For hanging a segment, three hanging points were necessary and sufficient to maintain the segment in balanced condition. In addition, a fourth hanging rod was introduced as the second tier safety, in case of “failure” of any one hanging rod

- Capacity checks for the permanent structures at the critical beam launching construction was conducted by the bridge specialist consultant

- **NOTABLE ACHIEVEMENTS**
  - LTA Environmental Award – Merit (2013)
  - LTA Annual Safety Award
    - Certificate of Excellence (2013)
    - Certificate of Merit (2014)
    - Certificate of Excellence (2015)
    - Certificate of Recognition (2015)
  - MOM's WSH (SHARP)
    - Award 2013
    - Commendation 2014
    - Award 2015

AWARD

C936 Construction and Completion of Bencoolen Station for Downtown Line Stage 3

Civil Engineering Projects Category

Builder	**Sato Kogyo (S) Pte. Ltd.**
Developer	**Land Transport Authority**
Principal Consultant	**Arup Singapore Pte Ltd**
Architectural Consultant	**Aedas Pte Ltd**
Structural Consultant	**Arup Singapore Pte Ltd**
M&E Consultant	**Land Transport Authority**
Quantity Surveyor	**Land Transport Authority**
Qualified Person (Supervision)	**GWC Consulting Pte Ltd**
Construction Period	**80.0 months**

KEY FEATURES

- **SCOPE OF WORKS:**
    - Construction of Bencoolen Station for Downtown Line Stage 3
    - C920 formed part of the 16.6km long Downtown Line Stage 2 (DTL2) fully underground Rail Transit System that comprises 12 Stations and a Depot. Newton Station is one of the three Interchange Stations and is linked to the existing North South Line (NSL) Newton Station.

- **MAIN CONSTRAINTS:**
    - Deepest station at 43m on record
    - 70-80% of piling and excavation works encountered Fort Canning Boulder Bed (FCBB)
    - Congested site and close proximity to existing structures in CBD area

- **NOTABLE FEATURES**
    - Shorten bored pile length by 23% based on additional soil investigation studies
    - Used 18m length prefabricated sheet pile to reduce site jointing
    - Used Clamshell telescopic excavators with long reach boom to reach 30m below ground for efficiency
    - Adopted Top-Down construction
    - Used self-compacting concrete for casting top portion of wall for Top-Down construction and walls adjacent to existing buildings
    - Used space frame to create free space to continue architectural finishes through 43m deep void

- **NOTABLE ACHIEVEMENTS**
    - LTA Annual Safety Award (ASAC) 2013, 2015
    - MOM WSH (SHARP) Award 2013

Construction Excellence Award 2018 Winners - Certificate of Merit winners

MERIT

The Midtown & Midtown Residences

Commercial/Mixed Development Buildings Category

Builder	**Lian Beng Construction (1988) Pte Ltd**
Developer	**Oxley-Lian Beng Pte Ltd**
Principal Consultant	**RSP Architects Planners & Engineers (Pte) Ltd**
Architectural Consultant	**RSP Architects Planners & Engineers (Pte) Ltd**
Structural Consultant	**LBW Consultant LLP**
M&E Consultant	**Squire Mech Pte Ltd**
Quantity Surveyor	**Arcadis Singapore Pte Ltd**

Landscape Consultant	**Ecoplan Asia Pte Ltd**
Construction Period	**33.0 months**
Gross Floor Area	**16,853 m^2**

MERIT

JTC Aviation Two @ Seletar Aerospace Park

Industrial Buildings Category

Builder	**Sembcorp Design and Construction Pte Ltd**
Developer	**JTC Corporation**
Principal Consultant	**AWP Pte Ltd**
Architectural Consultant	**AWP Pte Ltd**
Structural Consultant	**Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd**
M&E Consultant	**Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd**
Quantity Surveyor	**WT Partnership (S) Pte Ltd**
Landscape Consultant	**Stephen Caffyn Landscape Design**

Green Mark Consultant	**Kaer Pte Ltd**
Construction Period	**20.5 months**
Gross Floor Area	**19,457 m^2**

MERIT

Fairprice Hub @ Joo Koon

Industrial Buildings Category

Builder	**Tiong Seng Contractors (Pte) Ltd**
Developer	**NTUC Fairprice Co-operative Pte Ltd**
Principal Consultant	**ADDP Architects LLP**
Architectural Consultant	**ADDP Architects LLP**
Structural Consultant	**SCE Consultants Pte Ltd**
M&E Consultant	**United Project Consultants Pte Ltd**
Quantity Surveyor	**ST Architects & Engineers Pte Ltd**
Construction Period	**30.0 months**

Gross Floor Area	**110,894 m^2**

MERIT

Proposed Additions & Alterations to Existing Riverside, Springdale, West Spring and Westwood Primary Schools (MOE Kindergarten Phase 2)

Institutional Buildings Category

Builder	**Guan Ho Construction Co (Pte) Ltd**
Developer	**Ministry of Education**
Principal Consultant	**Architects Project Group LLP**
Architectural Consultant	**Architects Project Group LLP**
Structural Consultant	**Lee & Lee Consultants Pte Ltd**
M&E Consultant	**Conteem Engineers Pte Ltd**
Quantity Surveyor	**LTY+LCH (JV)**

Project Manager	**WSP Consultancy Pte Ltd**
Construction Period	**16.0 months**
Gross Floor Area	**10,351 m^2**

MERIT

St. Andrew's Nursing Home (Queenstown)

Institutional Buildings Category

Builder	**CMC Construction Pte Ltd**
Developer	**Ministry of Health**
Principal Consultant	**Architects Team 3 Pte Ltd**
Architectural Consultant	**Architects Team 3 Pte Ltd**
Structural Consultant	**ECAS Consultants Pte Ltd**
M&E Consultant	**J. Roger Preston (S) Pte Ltd**
Quantity Surveyor	**CPG Consultants Pte Ltd**
Project Manager	**Davis Langdon KPK (Singapore) Pte Ltd**

Construction Period	**18.0months**
Gross Floor Area	**10,972 m^2**

MERIT

Riversails

Residential Buildings - $1,800 /m^2 and above Category

Builder	**Tiong Aik Construction Pte Ltd**
Developer	**Benefit Investments Pte Ltd (subsidiary of Allgreen Properties Limited)**
Principal Consultant	**Design Link Architects Pte Ltd**
Architectural Consultant	**Design Link Architects Pte Ltd**
Structural Consultant	**KTP Consultants Pte Ltd**
M&E Consultant	**Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd**
Quantity Surveyor	**Arcadis Singapore Pte Ltd**
Landscape Consultant	**COEN Design International Pte Ltd**

Interior Designer	**Suying Design Pte Ltd**
Construction Period	**51.6 months**
Gross Floor Area	**94,789 m^2**

MERIT

euHabitat

Residential Buildings - $1,800 /m^2 and above Category

Builder	**Woh Hup (Private) Limited**
Developer	**Far East Organization & Far East Orchard Limited**
Principal Consultant	**DP Architects Pte Ltd**
Architectural Consultant	**DP Architects Pte Ltd**
Structural Consultant	**P&T Consultants Pte Ltd**
M&E Consultant	**Alpha Consulting Engineers Pte Ltd**
Quantity Surveyor	**Davis Langdon KPK (Singapore) Pte Ltd**
Landscape Consultant	**ICN Design International Pte Ltd**

Construction Period	**42.5 months**
Gross Floor Area	**61,875 m^2**

MERIT

Seahill

Residential Buildings - $1,800 /$m^2$ and above Category

Builder	**China Construction (South Pacific) Development Co Pte Ltd**
Developer	**Far East Organization**
Principal Consultant	**RDC Architects Pte Ltd**
Architectural Consultant	**RDC Architects Pte Ltd**
Structural Consultant	**P&T Consultants Pte Ltd**
M&E Consultant	**United Project Consultants Pte Ltd**
Quantity Surveyor	**Davis Langdon KPK (Singapore) Pte Ltd**

Construction Period	**40.0 months**
Gross Floor Area	**38,884 m^2**

MERIT

Lush Acres Executive Condominium

Residential Buildings - $1,800 / m^2 and above Category

Builder	**Nakano Singapore (Pte) Ltd**
Developer	**Verspring Properties Pte Ltd**
Principal Consultant	**ADDP Architects LLP**
Architectural Consultant	**ADDP Architects LLP**
Structural Consultant	**LSW Consulting Engineers Pte Ltd**
M&E Consultant	**United Project Consultants Pte Ltd**
Quantity Surveyor	**Arcadis Singapore Pte Ltd**
Landscape Consultant	**Site Concepts International**
Interior Designer	**KKS International (S) Pte Ltd**

Construction Period	**33.0 months**
Gross Floor Area	**46,532 m^2**

MERIT

The Hillier

Residential Buildings - $1,800 /$m^2$ and above Category

Builder	**China Construction (South Pacific) Development Co Pte Ltd**
Developer	**Far East Organization**
Principal Consultant	**RSP Architects Planners & Engineers (Pte) Ltd**
Architectural Consultant	**RSP Architects Planners & Engineers (Pte) Ltd**
Structural Consultant	**Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd**
M&E Consultant	**Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd**
Quantity Surveyor	**Davis Langdon KPK (Singapore) Pte Ltd**

Landscape Consultant	**Tinderbox Landscape Studio Pte Ltd**
Construction Period	**47.0 months**
Gross Floor Area	**40,025 m^2**

MERIT

Leedon Residence

Residential Buildings - $1,800/ m^2 and above Category

Builder	**Woh Hup (Private) Limited**
Developer	**Leedon Residence Development Ltd**
Principal Consultant	**SCDA Architects Pte Ltd**
Architectural Consultant	**SCDA Architects Pte Ltd**
Structural Consultant	**TEP Consultants Pte Ltd**
M&E Consultant	**Rankine & Hill (S) Pte Ltd**
Quantity Surveyor	**Arcadis Singapore Pte Ltd**
Landscape Consultant	**SCDA Architects Pte Ltd**

Construction Period	**37.0 months**
Gross Floor Area	**85,242 m^2**

MERIT

HAUS @ Serangoon Garden

Residential Buildings - $1,800/ m^2 and above Category

Builder	**Tiong Seng Contractors (Pte) Ltd**
Developer	**City Developments Pte Ltd**
Principal Consultant	**ADDP Architects LLP**
Architectural Consultant	**ADDP Architects LLP**
Structural Consultant	**Tham & Wong LLP**
M&E Consultant	**United Project Consultants Pte Ltd**
Quantity Surveyor	**Arcadis Singapore Pte Ltd**
Construction Period	**39.0 months**

Gross Floor Area	**30,310 m^2**

MERIT

The Tembusu

Residential Buildings - $1,800/ m^2 and above Category

Builder	**Shimizu Corporation**
Developer	**Wing Tai Holdings Ltd (on behalf of Winsmart Investment Pte Ltd)**
Architectural Consultant	**Arc Studio Architecture + Urbanism Pte Ltd**
Structural Consultant	**P&T Consultants Pte Ltd**
M&E Consultant	**United Project Consultants Pte Ltd**
Quantity Surveyor	**Rider Levett Bucknall LLP**
Landscape Consultant	**Tierra Design (S) Pte Ltd**

Construction Period	**35.0 months**
Gross Floor Area	**30,374 m^2**

MERIT

Sky Vue

Residential Buildings - $1,800/ m2 and above Category

Builder	**Dragages Singapore Pte Ltd**
Developer	**CapitaLand Limited & Mitsubishi Estate Asia Pte Ltd**
Principal Consultant	**DCA Architects Pte Ltd**
Architectural Consultant	**DCA Architects Pte Ltd**
Structural Consultant	**Tham & Wong LLP**
M&E Consultant	**Belmacs Pte Ltd**
Quantity Surveyor	**Rider Levett Bucknall LLP**
Landscape Consultant	**COEN Design International Pte Ltd**

Construction Period	**33.0 Months**
Gross Floor Area	**60,517 m^2**

MERIT

Parc Centros

Residential Buildings - $1,800 /$m^2$ and above Category

Builder	**Wee Hur Construction Pte Ltd**
Developer	**Wee Hur (Punggol Central) Pte Ltd**
Principal Consultant	**P&T Consultants Pte Ltd**
Architectural Consultant	**P&T Consultants Pte Ltd**
Structural Consultant	**LSW Consulting Engineers Pte Ltd**
M&E Consultant	**Rankine&Hill (Singapore) Pte Ltd**
Quantity Surveyor	**Wee Hur Construction Pte Ltd**

Landscape Consultant	**Ecoplan Asia Pte Ltd**
Construction Period	**41.0 Months**
Gross Floor Area	**59,452 m^2**

MERIT

Thomson Three

Residential Buildings - $1,800 /$m^2$ and above Category

Builder	**Unison Construction Pte Ltd**
Developer	**United Venture Development (Thomson) Pte Ltd**
Principal Consultant	**P&T Consultants Pte Ltd**
Architectural Consultant	**P&T Consultants Pte Ltd**
Structural Consultant	**TEP Consultants Pte Ltd**
M&E Consultant	**J. Roger Preston (S) Pte Ltd**
Quantity Surveyor	**Arcadis Singapore Pte Ltd**

Landscape Consultant	**Site Concepts International Pte Ltd**
Construction Period	**38.5 Months**
Gross Floor Area	**41,386 m^2**

MERIT

Gramercy Park

Residential Buildings - $1,800 /$m^2$ and above Category

Builder	**Hyundai Engineering & Construction Co., Ltd.**
Developer	**Aston Properties Pte. Ltd.**
Principal Consultant	**AXIS Architects Planners Pte. Ltd.**
Architectural Consultant	**NBBJ**
Structural Consultant	**LSW Consulting Engineers Pte Ltd**
M&E Consultant	**Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd**

Quantity Surveyor	**Arcadis Singapore Pte Ltd**
Landscape Consultant	**ICN Design International Pte Ltd**
Construction Period	**40.0 Months**
Gross Floor Area	**36,302 m^2**

Annex B: Green and Gracious Builder Scheme / Award 2018

ABOUT THE GREEN AND GRACIOUS BUILDER SCHEME

The Green and Gracious Builder Scheme (GGBS) is a certification scheme launched by the Building and Construction Authority (BCA) in 2009. This scheme aims to promote green and gracious practices during the construction phase of building projects, in an effort to protect the environment and reduce disamenities (e.g. noise and dust) to the surrounding neighbourhoods.

Since October 2013, this certification has been **made mandatory to all builders registering as grade A1 to B2 builders** under the BCA Contractor Registry System (CRS).

There were several couple of enhancements to the scheme since then:

April 2014	• **GGBS v2** was introduced, **placing greater emphasis on gracious building practices that help to minimise the impact on site and surroundings**, such as improved accessibility, enhanced public safety and better noise and vibration control. In addition, manpower management practices have also been revised to emphasise employee engagement, staff welfare, retention and training. • **GGBS (SMC)** was launched to encourage wider adoption of environmentally friendly and gracious practices among builders. Adapted from GGBS, the GGBS (SMC) is a **voluntary scheme tailored for builders who work on smaller projects**. It places greater emphasis on operational and gracious practices that can be easily adopted by smaller builders.
October 2016	• **GGBS v2.1** included new enhancements that: i) Recognises the **adoption of productive construction methods**[1] which reduce on-site construction activities, shorten construction time on site, and thereby reducing disamenities to the public. ii) Recognises **main contractors' efforts to encourage their sub-contractors to join them** in their GGBS journey by obtaining the GGBS or GGBS (SMC) certification iii) Places greater emphasis on gracious practices [1] Including methods using the Design for Manufacturing and Assembly approach (e.g. Prefabricated Prefinished Volumetric Construction (PPVC) and Cross Laminated Timber (CLT)), and other construction

	equipment that boosts productivity on site like concrete pump and portable traffic light.

ASSESSMENT CRITERIA

From 20 October 2017, all firms will be assessed on their construction projects based on the GGBS v2.1 criteria below:

- **Green (35 points):** To encourage environmentally friendly best practices such as use of recycled materials and reduction in energy and water consumption on site.
- **Gracious (55 points):** To encourage gracious best practices which address the needs and concerns of the public, such as enhanced communications, consideration for public accessibility, mitigating noise and vibrations, minimising, if not eradicating disturbances in the vicinity and neighbourhood.
- **Innovation and Exemplary Practices (10 points):** To recognise firms which have adopted innovative and productive solutions or technologies to address environmental concerns, site challenges, and/or minimise the concerns of the public.
- In addition, **bonus points of up to 5 points** are given to recognise outstanding achievements such as relevant construction industry awards such as Construction Productivity Award.

*For more info on the current assessment criteria for GGBS v2, please refer to page 74 of the Green and Gracious Builder Guide via this link: http://www.bca.gov.sg/Awards/GGBA/others/GGB_book.pdf

The highest possible score is 105 and only those who get 50 and above will be awarded the certification. Firms will be ranked according to their score:

- Star – above 90
- Excellent – 76-90
- Merit – 61-75
- Certified – 50-60

The certificate is valid for 3 years. A renewal audit is required at the end of the 3-year period to maintain the certification.

ABOUT THE BCA GREEN AND GRACIOUS BUILDER AWARD

The **BCA Green and Gracious Builder Award (GGBA)** are conferred to firms which achieve the top tiers of GGBS (i.e. Excellent and Star).

In 2017, the **BCA Green and Gracious Builder Star Champion Award** was introduced to recognise builders which have demonstrated exemplary green and gracious performance in their projects and consistently achieved the highest tier rating (i.e. Star). The pinnacle award also aims to encourage the whole construction value chain to embrace a green and gracious culture. The following criteria have to be met to be considered for this award:

i) GGBS Star rating for five consecutive times for a period of five years (commencing from a certification, recertification or renewal audit)
ii) No adverse feedback and green and gracious related stop work order in the past three years
iii) Engaged at least five or more GGBS / GGBS (SMC) certified sub-contractors / partners in ongoing projects

BCA GREEN AND GRACIOUS BUILDER AWARD WINNERS 2018

STAR CHAMPION

1. LendLease Singapore Pte. Ltd.
2. Unison Construction Pte Ltd

STAR (Above 90 points)

1. China State Construction Engineering Corporation Limited Singapore Branch
2. Chye Joo Construction Pte Ltd
3. Kimly Construction Private Limited

EXCELLENT (More than 75 to 90 points)

1. Asiabuild Construction Pte. Ltd.
2. BHCC Construction Pte. Ltd.
3. Boustead Projects E&C Pte Ltd
4. China Railway First Group Co., Ltd. Singapore Branch
5. Chiu Teng Construction Co. Pte. Ltd.
6. Gennal Industries Pte Ltd
7. Hock Lian Seng Infrastructure Pte. Ltd.
8. HPC Builders Pte. Ltd.
9. Hua Siah Construction Pte Ltd
10. Keong Hong Construction Pte Ltd
11. Koon Construction & Transport Co. Pte. Ltd.
12. Logistics Construction Pte Ltd
13. Nishimatsu Construction Co., Ltd.
14. Progressive Builders Private Limited
15. Quek & Quek Civil Engineering Pte Ltd
16. Shanghai Chong Kee Furniture & Construction Pte Ltd
17. Tat Hin Builders Pte Ltd
18. Welltech Construction Pte Ltd
19. Woodwater Integrated Pte. Ltd.

STAR CHAMPION CATEGORY

1. **LendLease Singapore Pte. Ltd.** is a Grade A1"General Building" BCA registered contractor.

   In line with Lendlease's vision to 'Create the Best Places', they place great emphasis on ensuring that both the public and environment are least impacted by their construction activities.

   Lendlease has set companywide targets to reduce emissions, energy intensity, water and waste to landfill by 20% by year 2020. An in-house Green Site Rating Tool which stipulates minimum requirements was rolled out. A system "Footprint" records all data for energy, emissions, water, waste etc. and data are audited by external auditors annually and reported.

   As part of pre-qualification requirements to work on their projects, the supply chain are required to commit to their Supply Chain Sustainability Responsibility declaration. At a project level, they actively promote the use of prefabricated solutions to minimize labour and resource usage e.g. pre-cast components, modular pie racks. They also adopt the use of environment friendly equipment and sustainable materials e.g. paper from farmed sources, construction materials with Green Label and energy efficient air-cons, lighting, etc.

2. **Unison Construction Pte Ltd** is a Grade A2 "General Building" BCA registered contractor.

   Unison Construction Pte Ltd has played an integral role in promoting the best green and gracious practices in Singapore's built environment.

   Their management actively fosters environmental awareness by involving all employees in the use of recycled materials and reduction in energy and water consumption on site. This includes the installation of energy-efficient and water recycling appliances and equipment. Air quality management, housekeeping procedures and incentive programs are also implemented to ensure a healthy and safe workplace environment. In addition, green performance is an important criteria during the assessment and evaluation of Unison's Suppliers and Sub-contractors.

   Beyond green initiatives, Unison encourages gracious practices that minimise the impact on site and surroundings. Comprehensive guidelines and manpower management are established to ensure enhanced accessibility, public safety and better mitigation of noise and vibration. Sharing sessions for staff and subcontractors are conducted regularly to develop innovative green and gracious practices and technologies. As part of their Corporate Social Responsibility activity, they have also committed 50 trees to NParks' Plant-A-Tree (PAT) program.

STAR CATEGORY

1. **China State Construction Engineering Corporation Limited Singapore Branch** is a Grade A1 "Civil Engineering" BCA registered contractor.

   Key Features
   - Use of BIM to reduce interfacing issues, enable containment of noise during construction and thus increasing productivity.
   - Use of Bio-metric face recognizer to capture the attendance that reduce paperwork and improve productivity.
   - Provide traffic warden with LED vest for better visibility when directing traffic.
   - Motion sensor connected to lighting to reduce electricity

2. **Chye Joo Construction Pte Ltd** is a Grade A1 "Civil Engineering" BCA registered contractor.

   Key Features
   - Use of portable noise barriers which can be easily assembled and dismantled.
   - Use of rain-water for various construction activities to reduce water consumption.
   - Allow daylight through glass-like material on roof of site office to minimize need for powered lighting.
   - Use of BIM for all its projects.

3. **Kimly Construction Private Limited** is a Grade A1 "General Building" BCA registered contractor.

   Key Features
   - Maximize usage of BIM application through integrating it with other smart technologies.
   - Use of 5D simulation for project planning.
   - Adopt top down construction to mitigate noise generated in bottom-up construction.
   - Protection of trees within and around site that is beyond regulatory requirement.

EXCELLENT CATEGORY

1. **Asiabuild Construction Pte. Ltd.** is a Grade A2 "General Building" BCA registered contractor.

   Key Features
   - Use of modular mobile guard room with biometric authentication system and rotating bar barriers for attendance tracking.
   - Extensive use of green wall at main site entrance.
   - Use of VDC and BIM to aid planning.

2. **BHCC Construction Pte. Ltd.** is a Grade A1 "General Building" BCA registered contractor.

   Key Features
   - Use of rainwater coupled with a system to water plants and garden within the site.
   - Provision of 10m high noise barrier hoarding to minimise noise impact on a neighbouring school.
   - Include cleaning up of public areas as part of housekeeping regime.

3. **Boustead Projects E&C Pte Ltd** is a Grade A1 “General Building” BCA registered contractor.

   Key Features
   - Tutelage to subcontractors and encourage them to attain higher levels for GGBS and BIZsafe.
   - Arrange various yearly community service projects for their staff to participate and contribute.
   - Use of system to report and record defects and rectification thus reducing usage of paper.

4. **China Railway First Group Co., Ltd. Singapore Branch** is a Grade B1 “Civil Engineering” BCA registered contractor.

   Key Features
   - Use of biometric system for attendance on site.
   - Use of drone technology for site utilisation monitoring and housekeeping inspection.
   - Provision of AED and full emergency kit on site.

5. **Chiu Teng Construction Co. Pte. Ltd.** is a Grade A1 “General Building” BCA registered contractor.

   Key Features
   - Use of technology to recycle the heat energy from ACU to provide electricity for their offices.
   - Use of GNSS technology to increase accuracy of piles thus reduce wastages.
   - Provision of yearly study trips for staff to gain insights of overseas good practices.

6. **Gennal Industries Pte Ltd** is a Grade A1 “General Building” BCA registered contractor.

   Key Features
   - Well-designed and maintained wheelchair accessibility around the site.
   - Active and passive noise prevention control in place such as provision of extensive noise barrier for works and generators.
   - Implement 3-prong approach to save water through water rationing, reused condensate water and reused collected rainwater.

7. **Hock Lian Seng Infrastructure Pte. Ltd.** is a Grade A1 “General Building” and “Civil Engineering” BCA registered contractor.

   Key Features
   - Use of robotic aqua crusher for its work.
   - Short-term attachment to structural consultants for exposure to different job scope

8. **HPC Builders Pte. Ltd.** is a Grade A1 “General Building” BCA registered contractor.

   Key Features
   - Adoption of BIM and PPVC for its project.
   - Conservation of existing trees within site.

9. **Hua Siah Construction Pte Ltd** is a Grade A2 “General Building” BCA registered contractor.

   Key Features
   - Extensive provision of recreation for workers’ welfare, which include game room, reading corner and sports area.
   - Use of motion sensor at its site offices.
   - Use of biometric attendance system to reduce usage of paper.

10. **Keong Hong Construction Pte Ltd** is a Grade A1 “General Building” BCA registered contractor.

    Key Features
    - Install auto-timer for lighting in hoarding for efficiency and power saving
    - Use of e-Permit-to-Work system through mobile phone for better efficiency.
    - Provision of air coolers and fans to neighbouring school affected by the construction to improve comfort of the students.

11. **Koon Construction & Transport Co. Pte. Ltd.** is a Grade A1 “Civil Engineering” BCA registered contractor.

    Key Features
    - Use of thermite welding for rail joints to eliminate the need for electricity for welding works.
    - Replace concrete blocks with steel plates for pile load test to reduce material usage.
    - Use of recycle grinded wood from site clearance as wood fertilizer for site use.
    - Use of biometric face screening to monitor attendance.

12. **Logistics Construction Pte Ltd** is a Grade A1 “General Building” BCA registered contractor.

    Key Features
    - Use of see-through mesh hoarding at corners to facilitate sighting of pedestrians for public safety.
    - Self-designed roof edge barriers to aid maintenance works at old HDB roofs.

13. **Nishimatsu Construction Co., Ltd.** is a Grade A1 “Civil Engineering” BCA registered contractor.

    Key Features
    - Adopt TBM U-turn method instead re-launching to reduce construction time significantly.

    - Adopt HAT pile installation that reduce noise impact and ground settlement.
    - Considerateness towards the safety of students and residents by shifting site entrance to PIE slip road instead to reduce the number of heavy vehicles passing through the roads of the neighbourhood and a neighbouring school.

14. **Progressive Builders Private Limited** is a Grade A1 “General Building” BCA registered contractor.

    Key Features
    - Pipe jacking method used instead of open cut to avoid shoring and reduce the use of timber and steel.
    - Proposed use of precast component instead of cast in situ to reduce concrete waste.

15. **Quek & Quek Civil Engineering Pte Ltd** is a Grade A1 “Civil Engineering” BCA registered contractor.

    Key Features
    - Provision of fridges for workers to keep their food fresh.
    - Use of synthetic grass, that is visually soothing, to address soil erosion problem and dust generated at site.
    - Provision of a temporary ramp instead a temporary staircase replacement required.

16. **Shanghai Chong Kee Furniture & Construction Pte Ltd** is a Grade A2 “General Building” BCA registered contractor.

    Key Features
    - Use of drone to check for stagnant water on temporary holding areas’ platform roofs thus improve productivity and reduce the need for mobile lifts.

    - Use of remote controlled self-propelling modular transport to shift the railway platforms to minimise vibration, prevent damages to the surrounding and improve productivity.
    - Extensive reuse of left over material from past projects and own factory to build up storage on site.

17. **Tat Hin Builders Pte Ltd** is a Grade A1 “General Building” BCA registered contractor.

    Key Features
    - Extensive greenery, which include vertical greens at the site office and a mini garden.
    - Use of plastic water bottles to bring in natural lighting on temporary metal roof.
    - Provision of masks and ear plugs for residents.

18. **Welltech Construction Pte Ltd** is a Grade A1 “General Building” BCA registered contractor.

    Key Features
    - Use of biometric attendance system to reduce paper usage.
    - Use of automated wheel washer to increase productivity and reduce water usage.
    - Self-made plastic water tank attached to fork lift vehicle for dust control on site.

19. **Woodwater Integrated Pte. Ltd.** is a Grade B1 “General Building” BCA registered contractor.

    Key Features
    - Extensive Green efforts for site office, which include north-south facing, insulation metal roofing and lower ceiling height.
    - Extensive provision of noise barriers around site.
    - Relocation of public carpark to improve neighbouring school students’ safety and accessibility.