



**BCA** AWARDS  
2020

Recognising Excellence in the Built Environment

**GREEN MARK AWARD**



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# GREEN BUILT-ENVIRONMENT ADVISORY COMMITTEE



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# CONTENT PAGE

---

BCA GREEN MARK AWARD FOR BUILDINGS

BCA GREEN MARK AWARD FOR NON-BUILDINGS

BCA GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES

BCA GREEN MARK AWARD FOR BUILDINGS (OVERSEAS PROJECTS)

BCA GREEN MARK AWARD FOR NON-BUILDINGS (OVERSEAS PROJECTS)

# CONTENT PAGE

## BCA GREEN MARK AWARD FOR BUILDINGS SUPER LOW ENERGY (SLE) BUILDINGS

Administration Building	65
Block N1.1	66
Block N2	67
Block N3 (MAE)	68
Caltex Jurong Spring	69
Central Library at National University of Singapore	70
Changi Naval Base addition	71
Choa Chu Kang Columbarium	72
Hangar Complex @ Changi East	73

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **SUPER LOW ENERGY (SLE) BUILDINGS**

Institute of System Science at National University of Singapore	74
JTC Space @ Tuas Biomedical Park	75
LogisTech	76
Medicine-Science Knowledge Hub at National University of Singapore	77
Nanyang House	78
One Raffles Link	79
School of Computing Block COM3 at National University of Singapore	80
SMU A-South 3	81
Techno Edge at National University of Singapore	82

# CONTENT PAGE

## BCA GREEN MARK AWARD FOR BUILDINGS SUPER LOW ENERGY (SLE) BUILDINGS

Tiong Bahru Market	83
Ulu Pandan Bus Depot (SBST)	84
United World College of South East Asia	85
United World College of South East Asia- East	86

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

1 Changi Business Park Avenue 1	271
1 Jalan Kilang	271
13 Blocks of 2-Storey Terrace Factory @ Pioneer Road North	271
28 Teban Gardens Crescent	264
3 Tuas Ave 2	264
30 Raffles Place	88
313@somerset	102
55 Market Street	264
5B Toh Guan	264

# CONTENT PAGE

## BCA GREEN MARK AWARD FOR BUILDINGS NON-RESIDENTIAL BUILDINGS

7 north coast	89
79 Anson Road	193
Admirax	264
AMK HUB	194
Ang Mo Kio Police Division Headquarters	264
Asian Civilisations Museum	195
ASM Technology Singapore @ Tech Park Building 2	265
Ayer Rajah Community Club	196
Bedok Point	265

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Block N1 (CEE)	103
Block N2.1	104
Block N3.1	105
Block N3.2 (MAE)	106
Block N4 (SCSE)	107
Block N4.1 (MSE)	108
BNP PARIBAS Campus Asia Pacific	265
Botany Centre at Singapore Botanic Gardens	265
Bras Basah Complex	271

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Bugis+	109
Bukit Panjang Hawker Centre & Market	110
Bukit Panjang Plaza	197
Campus Clubhouse	111
Central Boulevard Towers	90
Centre for Climate Research Singapore (CCRS)	265
Chinese Heritage Centre	112
Clarke Quay	271
College of Medicine Building	113

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Compass One	265
Corporation Place	114
Cross Street Exchange	198
CSC @ Bukit Batok Clubhouse	271
CSC @ Tessensohn Clubhouse	271
Das Spektrum @ CBP	115
Duke-NUS Medical School, Singapore	271
DUO Tower and DUO Galleria, Proposed Mixed-Use Development at Ophir-Rochor, Singapore (Commercial)	116

# CONTENT PAGE

## BCA GREEN MARK AWARD FOR BUILDINGS NON-RESIDENTIAL BUILDINGS

Faculty of Engineering Block E7 at National University of Singapore	91
Family Link @ Lengkok Bahru	265
Four Seasons Hotel Singapore	271
Fraser Residence Promenade, Singapore	186
Fusionopolis One	117
Fusionopolis Two	118
Gardens by the Bay (Bay South)	119
Genting Hotel Jurong	120
Geylang Serai Market	265

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Goldbell Towers	265
Golden Mile Food Centre	199
Grab Headquarters	187
Grand Hyatt Singapore	265
Great Eastern Centre & Nankin Row Shophouses	121
Great World Serviced Apartment	122
Guoco Midtown	92
Guoco Tower	123
Hansapoint	271

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

HarbourFront Centre	124
HarbourFront Tower One and HarbourFront Tower Two	26
HDB Hub	125
Health Promotion Board Building	126
Health Sciences Authority	127
Heritage Conservation Centre	128
Holiday Inn Singapore Orchard City Centre	266
HomeTeamNS Khatib	93
Honeywell Building	271

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Hotel Royal @ Queens	266
Hougang Community Club	266
IMM Building	200
Income @ Prinsep	266
Income @ Raffles	201
Income Centre	202
Infinite Studios	203
International Building	204
International Plaza	205

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

ITE College West	129
JCube	130
Jurong Island Check Point	266
Jurong Point 1	131
Jurong Point 2	132
Jurong Town Hall	133
Kolam Ayer Community Club	264
Lee Kong Chian School of Medicine (Clinical Sciences Building)	134
Lee Kong Chian School of Medicine (Experimental Medicine Building)	135

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

LOGOS Tuas Logistics Hub	94
Lot One Shoppers' Mall	266
LTA Bedok Campus	206
Lucky Chinatown	266
LYF One-north Singapore	188
M Social Singapore	136
M1 (Annex) at 9 IBP	266
Mandarin Orchard Singapore	266
Manulife Tower	266

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Mapletree Anson	137
Mapletree Business City I	138
Mapletree Business City II	139
Marina Bay Financial Centre Tower 1, Tower 2 & Marina Bay Link Mall	140
Marina One (East and West Tower and Retail Podium)	141
Marina Square	272
Maxwell Chambers Suites	272
Ministry of Manpower	142
Mount Elizabeth Novena	143

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

MYP Centre	266
Nanyang Polytechnic	144
National Design Centre	145
National Gallery Singapore	207
National Library Building	146
National Museum of Singapore	208
National University of Singapore - Yong Siew Toh Conservatory of Music	272
NCS Hub	147
Nee Soon East Community Club	267

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

New Phoenix Park	148
Ngee Ann Polytechnic Blocks 4 to 8, 23, 25, 27 & 31	209
North Spine	149
NORTHTECH	272
Nucleos	210
Oasis @ Sakra	150
One Marina Boulevard	211
One Raffles Place (Tower Two)	151
One Raffles Quay	152

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Orchard Hotel Singapore	212
Pacific Tech Centre	272
Pan Pacific Orchard	95
Parkroyal Collection Marina Bay, Singapore	267
ParkRoyal on Kitchener Road	153
Peninsula Hotel	213
Peninsula Shopping Complex	214
Pioneer Encapsulation Plant	264
Plaza Singapura	267

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Police Cantonment Complex	154
Police Coast Guard Headquarters	155
PSA Liveable City	96
PSA Vista	272
Punggol Fire Station & Neighbourhood Police Centre	264
Radin Mas Community Club	267
Raffles Building	267
Raffles Hospital	272
Razer SEA HQ	189

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Redlion Warehouse Singapore	97
Resorts World Sentosa - Beach Villas	215
Resorts World Sentosa - Crockfords Tower	216
Resorts World Sentosa - Equarius Hotel	217
Resorts World Sentosa - ESPA	218
Resorts World Sentosa - Festive Hotel	219
Resorts World Sentosa - Hard Rock Hotel	220
Resorts World Sentosa - Hotel Michael	221
Resorts World Sentosa - Marine Life Park	222

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Resorts World Sentosa - Resorts World Convention Centre	156
Resorts World Sentosa - Universal Studios Singapore	157
Rivervale Mall	223
Robinson 112	158
Rochester Commons	98
School of Biological Science (SBS)	159
School of Chemical and Biomedical Engineering (CBE)	160
School Of Chemical and Biomedical Engineering(CBE)	161
School of Physical & Mathematical Sciences	162

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Science Centre Singapore	224
SEAMEO Regional Language Centre	225
Senja Hawker Centre	99
Senja-Cashew Community Club	226
Sheraton Towers Singapore Hotel	163
Shimano Singapore Intelligent Plant	100
Sim Lim Square	267
Singapore American School	267
Singapore Institute of Technology @ Nanyang Polytechnic	164

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Singapore Institute of Technology @ Ngee Ann Polytechnic	165
Singapore Institute of Technology @ Singapore Polytechnic	166
Singapore Institute of Technology @ Temasek Polytechnic	167
Singapore Land Tower	227
Single Storey Eating House @ Tuas Ave 1	272
SOUTHPOINT	272
ST Engineering Electronics	264
St. James Power Station	168
Stamford Court	169

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Standard Chartered @ Changi Business Park 1 (CBP1)	170
StarHub Green	267
Student Service Centre (SSC)	171
Sun Yat Sen Nanyang Memorial Hall	228
Suntec City Mall	267
Suntec Singapore Convention & Exhibition Centre	267
Taman Jurong Market and Food Centre	229
Tampines West Community Club	267
Techlink	230

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

Techpoint	231
Techview	232
Tekka Place	190
The Adelphi	172
The Aries	272
The Atrium @ Orchard	268
The Beach View Southern Transport Complex	268
The Gemini	272
The Pan Pacific Hotel Singapore	268

# CONTENT PAGE

## BCA GREEN MARK AWARD FOR BUILDINGS NON-RESIDENTIAL BUILDINGS

The Signature	268
The Star	268
The Tanglin Club	273
TimMac @ Kranji	101
Traffic Police Headquarters	173
Treetops Executive Residences	174
TÜV SÜD @ IBP	264
UIC Building	233
Valley Point	268

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR BUILDINGS** **NON-RESIDENTIAL BUILDINGS**

VivoCity	175
Woh Hup Technical Hub	191
Woodlands Bus Interchange	192
Yew Tee Community Club	234
York Hotel	268

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR BUILDINGS** **RESIDENTIAL BUILDINGS**

15 Holland Hill	235
19 Nassim	236
Cairnhill 16	237
Fourth Avenue Residences	238
Haus on Handy	239
Juniper Hill	240
Midtown Bay	176
Midwood	241
Northshore Edge	242

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR BUILDINGS** **RESIDENTIAL BUILDINGS**

NTU Hall of Residence 5	177
Proposed Condominium Development at Harbourfront Avenue (Plot 4)	243
RIVIÈRE	244
ROYALGREEN	245
SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN – HOSTELS & FACULTY APARTMENTS	178
The Essence	246
The Gazania	247
The Liliium	248
Woodleigh Glen	249

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR BUILDINGS** **LANDED HOUSES**

39 Jalan Kakatua

182

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR BUILDINGS** **TRANSIT STATIONS**

Canberra Station

184

Upper Thomson Station

185

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR BUILDINGS SCHOOLS**

Angsana Primary School	250
Blangah Rise Primary School	251
Bukit Batok Secondary School	252
Casuarina Primary School	253
Clementi Primary School	268
Compassvale Primary School	268
Compassvale Secondary School	254
Fernvale Primary School	268
First Toa Payoh Primary School	255

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR BUILDINGS SCHOOLS**

Frontier Primary School	268
Guangyang Primary School	269
Holy Innocents' High School	269
Hougang Primary School	256
Junyuan Secondary School	269
Juying Primary School	257
Juying Secondary School	269
Kent Ridge Secondary School	258
Loyang View Secondary School	269

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR BUILDINGS** **SCHOOLS**

Nanyang Primary School	259
New Town Primary School	269
Princess Elizabeth Primary School	260
Radin Mas Primary School	261
Raffles Girls' Primary School	262
Seng Kang Primary School	269
Shuqun Primary School	269
St Hilda's Primary School	269
Tampines Secondary School	263

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR BUILDINGS** **SCHOOLS**

Tanglin Secondary School	269
Teck Ghee Primary School	269
Telok Kurau Primary School	270
Temasek Primary School	270
Xinmin Primary School	270

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR BUILDINGS** **HEALTHCARE FACILITIES**

Integrated Development of Polyclinic, Nursing Home and Senior Care Centre	179
National Skin Centre	180
Woodlands Health Campus (WHC)	181

# CONTENT PAGE

---

## BCA GREEN MARK AWARD FOR NON-BUILDINGS PARKS

Yunnan Garden @ NTU

274

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR NON-BUILDINGS DISTRICTS**

Nanyang Technological University District

275

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR NON-BUILDINGS INFRASTRUCTURE**

Tuas Water Reclamation Plant

276

# CONTENT PAGE

## BCA GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES HEALTHIER WORKPLACES

Amozonia Pte Ltd	290
BHP Marketing Asia Pte Ltd	279
Central Provident Fund Board	287
CSuites	280
Cyber Security Agency	288
DBS Bank Ltd	281
DNV GL SINGAPORE PTE LTD	282
Intellectual Property Office of Singapore	283
JLL Singapore @ PLQ	284

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES** **HEALTHIER WORKPLACES**

Lidl Singapore Pte. Limited	290
Mapletree Investments Pte Ltd	285
O2Work Pte. Ltd.	289
PUB, Singapore's National Water Agency Joint Operations Centre and Office Space on Level 18 Environment Building	286

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES** **OFFICE INTERIOR**

Bank Of China (Levels 1, 3 and 5)	302
Central Provident Fund Board Bishan Service Centre	300
Centre for Climate Research Singapore	300
FM Global	300
Government Technology Agency of Singapore (GovTech)	300
Hilton International Asia Pacific Pte Ltd	300
Info-communications Media Development Authority	293
Ministry of Culture, Community & Youth	300
National Environment Agency	300

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES** **OFFICE INTERIOR**

PUB WaterHub, Singapore Water Academy and Office Block	300
Salesforce.com Singapore Pte Ltd	300
SGX office at The Metropolis Tower 2	300
Singapore Environment Institute	294
Singapore Food Agency	301
Singapore Land Authority, GeoWorks	295
Singapore Water Exchange, PUB WaterHub	296
SMRT Corporation Ltd	292

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES** **OFFICE INTERIOR**

Training Vision Institute Pte Ltd	297
Twitter Asia Pacific Pte. Ltd.	298
Visa Worldwide Pte Ltd	299

# CONTENT PAGE

---

## BCA GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES SUPERMARKETS

FairPrice Finest at Jewel Changi Airport	305
FairPrice Finest Supermarket at Triple One Somerset	304
FairPrice Xtra hypermart at Ang Mo Kio Hub	305

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES** **RETAIL**

DBS Choa Chu Kang Branch	307
DBS Clementi Central Branch	308
DBS Kovan Branch	309
DBS Treasures at Bukit Timah Plaza	310
POSB Square 2 Branch	311
POSB Waterway Point Branch	312
POSB Yishun West Branch	313

# CONTENT PAGE

## BCA GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES DATA CENTRES

AirTrunk Data Centre SGP1	315
BCA Academy Data Centre	316
China Mobile International SG1	317
Data Centre at 9 Tai Seng Drive	318
Digital Loyang 2 (SIN12)	319
Facebook Singapore Data Center	320
NUS SoC Computer Room 1	323
Sigma Data Centre	321
STT Loyang	322

# CONTENT PAGE

---

## BCA GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES RESTAURANTS

McDonald's Buangkok Square (BSQ)

325

# CONTENT PAGE

## **BCA GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES** **LABORATORIES**

Bioprocessing Technology Institute (BTI)	326
Genome Institute of Singapore (GIS)	326
Institute of Materials Research and Engineering (IMRE)	326
Institute of Medical Biology (IMB)	326
Institute of Microelectronics (IME)	326
Institute of Microelectronics (IME) at Science Park	326
Institute of Molecular & Cell Biology (IMCB)	326
Singapore Bioimaging Consortium (SBIC)	326
Singapore Institute for Clinical Sciences (SICS)	326

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES** **LABORATORIES**

Singapore Institute of Manufacturing Technology (SIMTech)

326

Skin Research Institute of Singapore (SRIS)

326

# CONTENT PAGE

---

## BCA GREEN MARK AWARD FOR BUILDINGS (OVERSEAS PROJECTS)

CapitaMall Tiangongyuan, China	331
CHUBB Square	337
Indosurya Life Center	337
Junction City - Pan Pacific Hotel	332
Junction City Office Tower	333
Junction City Shopping Centre	334
Macao Olympic Sports Centre (Main, Indoor Stadium & Aquatic Centre)	337
Oasis Business Centre	337
Palm Heights	335

# CONTENT PAGE

---

## **BCA GREEN MARK AWARD FOR BUILDINGS (OVERSEAS PROJECTS)**

Park Avenue Heights	329
Somerset Alabang Manila	337
The Pinnacle	336
UOB (Thai) - Phetkasem Building A & B	328
Waterfront Residences	330

# CONTENT PAGE

---

## BCA GREEN MARK AWARD FOR NON-BUILDINGS (OVERSEAS PROJECTS)

Eco Sanctuary	337
Nusajaya Tech Park	337

# BCA GREEN MARK CHAMPION AWARD

## ABOUT THE AWARD

Launched in 2008, the BCA Green Mark Champion Awards recognises developers who demonstrate strong commitment towards corporate social responsibility and who have achieved a substantial number of Green Mark buildings at Gold level or higher.

## AWARD CATEGORIES

- BCA Green Mark Champion
- BCA Green Mark Platinum Champion
- BCA Green Mark Platinum<sup>STAR</sup> Champion

## CRITERIA

Total Number of Buildings Rated	BCA Green Mark Champion	BCA Green Mark Platinum Champion	BCA Green Mark Platinum <sup>STAR</sup> Champion
Green Mark Gold and above	At least 10	At least 50	-
Green Mark Gold <sup>PLUS</sup> and above	At least 6	At least 30	-
Green Mark Platinum	At least 3	At least 15	At least 50

# CAPITALAND GROUP

## BCA GREEN MARK PLATINUM CHAMPION AWARD



CapitaLand is one of Asia's largest diversified real estate groups. Its global portfolio spans across diversified real estate classes which includes commercial, retail; business park, industrial and logistics; integrated development, urban development; as well as lodging and residential. It has presence across more than 220 cities in over 30 countries. As a responsible global real estate company, CapitaLand places sustainability at the core of what it does by contributing to the environmental and social well-being of its communities as it delivers long-term economic value.

In Singapore, 97% of CapitaLand's existing offices, malls, integrated developments and serviced residences (by m2) have achieved a green rating by 31 Dec 2019. Notably, LogisTech is Singapore's first logistics building to receive BCA Green Mark Platinum Super Low Energy (SLE) Award. This is one of the highest accolades for energy efficiency in the BCA Green Mark Award scheme. Five other properties have received BCA Green Mark Platinum Award including retail malls Bugis+ and JCube; a data centre 9 Tai Seng Drive; an industrial property Corporation Place; and an upcoming integrated development Rochester Commons. Rochester Commons comprises a 17-storey Grade A office tower, hotel, 12 heritage bungalows and a Shared Executive Learning Centre. To date, CapitaLand has over 130 Green Mark Awards for its properties and sites in Singapore, Australia, China, Malaysia and Vietnam (including 24 Green Mark Platinum<sup>1</sup> and 40 Green Mark GoldPLUS awards).

CapitaLand installed rooftop solar panels atop six Singapore properties, potentially avoiding over 4,300 tonnes of carbon emissions every year. The clean energy generated will enable it to power its corporate headquarters in Singapore with 100% renewable energy by 2020.

For its sustainability efforts, CapitaLand remains listed in the Global 100 Most Sustainable Corporations in the World 2020 and The Sustainability Yearbook 2020. It also retained listing on the Dow Jones Sustainability World Index for the 11th year and regained Global Sector Leader status in the Diversified sector for the Global Real Estate Sustainability Benchmark.

Reinforcing CapitaLand's commitment towards responsible growth, the Group has raised 2.82 billion through sustainable finance to date and has achieved interest saving as a result of meeting its sustainability targets. CapitaLand has also obtained S\$1.2 billion in green loans to be used towards green building certifications pegged to BCA Green Mark ratings.

<sup>1</sup>This figure excludes properties which were subsequently divested.



**Rochester Commons**



**LogisTech**

# THE NATIONAL ENVIRONMENT AGENCY (NEA)

## BCA GREEN MARK CHAMPION AWARD



The National Environment Agency (NEA) is a statutory board under the Ministry of Sustainability and the Environment (MSE). Formed on 1 July 2002, NEA is responsible for ensuring a clean and green environment, and the sustainable development of Singapore. It is responsible for the planning, design and development of new hawker centres, after-death facilities and services as well as management of the facilities maintenance, cyclical repairs and redecoration works of MSE-owned hawker centres. NEA seeks to leverage and explore new technologies and innovation solutions in our development projects to ensure sustainability.

Senja Hawker Centre adopts design strategies to ensure energy efficiency and usage of sustainable products certified under the Singapore Green Labelled Scheme. The hawker centre also uses low carbon concrete and energy-efficient LED lightings, and features a rooftop garden that reduces heat gain into the building. This year, Senja Hawker Centre is pleased to receive BCA Green Mark Platinum Award for its environmentally sustainable design that leads to at least 30% in energy savings.

Choa Chu Kang (CCK) Columbarium houses some 147,000 niches across 18 four-storey blocks. Its design allows natural light into niche rooms and utilizes prevailing wind conditions to achieve ample ventilation within the buildings. Efforts have been put in place to reduce the total building energy usage. This includes setting realistic energy reduction targets and regular energy consumption monitoring each year as well as installation of solar panels to achieve the eventual target of 100% conventional energy source replacement. This year, CCK Columbarium is pleased to receive BCA Green Mark Platinum Award for its environmentally sustainable design and efforts in reducing the total building energy usage.

NEA is honoured to be recognised with the Green Mark Champion Award. We will continue our strong commitment to shaping a green and sustainable built environment in our existing and future developments.



**Senja Hawker Centre**



**Choa Chu Kang Columbarium**

# SINGAPORE POLICE FORCE (SPF)

## BCA GREEN MARK CHAMPION AWARD

The Singapore Police Force (SPF) is a uniformed organisation under the purview of the Ministry of Home Affairs. The mission of the SPF is to prevent, deter and detect crime to ensure the safety and security of Singapore. This is done through its focus on the five broad areas of Police work – Frontline Policing, Counter and E-services, Investigation, Community Engagement and Public Security & Order.

As a socially responsible organisation, the SPF actively promotes environmental sustainability in the development of Police infrastructure through the deliberate adoption of sustainable design methods and use of environmentally-friendly products.

The Woodlands Police Division Headquarters has been designed as an energy-conserving building. The façade design and materials include the use of sustainable and recycled materials certified by the Singapore Green Building Council and Singapore Green Labelling Scheme, which allow low heat transfer through the external walls and double glazed windows. Other key green features include an energy-efficient central chiller plant, LED lightings with motion sensors, water-efficient fittings and roof top greenery.

Energy and water efficiency measures have also been implemented at the Police Cantonment Complex. The central air-conditioning system has been retrofitted with energy efficient chillers, pumps, variable speed drives, auto-tube cleaning system and an Energy Management System. These measures help to improve energy efficiency and reduce carbon footprint.

SPF is honoured to receive the Green Mark Champion Award and will continue to play our part in building a sustainable future for Singapore.



**Police Cantonment Complex**



**Woodlands DHQ**

# UOL GROUP LIMITED

## BCA GREEN MARK CHAMPION AWARD



UOL Group Limited (UOL) has a diversified portfolio of development and investment properties, hotels and serviced suites in Asia, Oceania, Europe and North America. Through hotel subsidiary Pan Pacific Hotels Group Limited, UOL owns three acclaimed brands namely “Pan Pacific”, PARKROYAL COLLECTION and PARKROYAL.

As a leading property and hospitality group, we recognise that we have a role to play in protecting and conserving the environment. We set energy and water reduction targets to manage our carbon footprint across all our commercial and hospitality properties in Singapore, and seek to improve their environmental performance through ongoing maintenance and fit-out. We also set target to attain Green Mark Gold for the development of new investment properties in Singapore. Green design has always been the hallmark of our development projects, as we recognise the well-being benefits that a green building brings to the occupiers, along with the energy and water savings. We also deploy building technologies such as Prefabricated Prefinished Volumetric Construction method to minimise the impact of construction to the environment and improve productivity.

To date, about 10 of our Singapore properties have been recognised by the BCA Green Mark scheme. More recently, our 347-key Pan Pacific Orchard, which is targeted to open in 2021, was awarded Green Mark Platinum in January 2020. The hotel will offer rooms with eco-friendly features, and its landscapes are designed to be self-sustaining with minimal reliance on energy and water resources.

Our existing property Novena Square underwent an extensive retrofitting to improve water and energy efficiencies. The mixed development was awarded Green Mark Gold Plus in 2018.

UOL is supportive of the Government’s vision to achieve a low-carbon and sustainable future Singapore. We are committed to improve the sustainability performance of the Group.



**Pan Pacific Orchard (artist's impression)**



**Novena Square**

# GUOCOLAND

## BCA GREEN MARK CHAMPION AWARD



GuocoLand is known for its high-end residential projects and integrated mixed developments. Its projects are conceived with sustainability principles as the foundation. It was also one of the first real estate developers to receive the Green Mark Platinum award from the Building and Construction Authority.

Guoco Tower, GuocoLand's flagship integrated development at Tanjong Pagar, is Singapore's tallest building at a height of 290m. As "a vertical city" within the Central Business District, Guoco Tower brings together 890,000 sq ft of premium Grade A office space with exciting dining and retail options, an urban park and community space, a 5-star business hotel and the 181-unit Wallich Residence at the apex.

Guoco Tower has received two of the highest achievable certifications in the industry – the Green Mark Platinum award by BCA and the Leadership in Energy and Environment Design (LEED) Platinum certification label by the U.S. Green Building Council. Guoco Tower has brought a new level of sustainable designs and green performance building technology to the Tanjong Pagar district. It has also uplifted the image and offerings of the district, thereby contributing to its rejuvenation.

GuocoLand is now developing Guoco Midtown, another transformative project in the CBD. It will comprise 770,000 sq ft of premium Grade A office space with different retail and public spaces on the ground level and the Midtown Bay residential tower, as well as a new residential cum commercial development at Tan Quee Lan Street. Guoco Midtown will connect the three major office micro-markets of City Hall, Marina Centre and Bugis and introduce new concepts of live, work and play.

GuocoLand will continue to strive towards developing buildings that will take on innovative concepts and contribute to the sustainable development objectives of Singapore.



**Guoco Tower**



**Guoco Midtown**

# BCA GREEN MARK FOR SUPER LOW ENERGY BUILDINGS



The **SLE programme** is the next wave of Singapore’s green building movement. SLE buildings feature best-in-class energy efficiency, the use of onsite and offsite renewable energy and other intelligent energy management strategies.

## GREEN MARK SLE CERTIFICATION

BCA is inviting industry practitioners and government agencies to strive to achieve at least one GM SLE project by 2023. The SLE Challenge applies to both new and existing non-residential buildings.

## GREEN MARK SLE CATEGORIES

Categories	Description
Super Low Energy Building (SLEB)	Best-in-class energy performing building that achieves at least 40%* energy savings based on prevailing code  *(equivalent to 60% energy savings above the 2005 building code)
Zero Energy Building (ZEB)	Best-in-class energy performing building with all energy consumption, including plug load, supplied from renewable sources
Positive Energy Building (PEB)	Best-in-class energy performing building with 115% of energy consumption, including plug load, supplied from renewable sources

# ADMINISTRATION BUILDING EXISTING NON-RESIDENTIAL BUILDING

## GREEN MARK AWARD FOR BUILDINGS | PLATINUM, ZERO ENERGY BUILDING (RE-CERT)



- Efficient Water-cooled chilled water system with efficiency of 0.59 kW/RT
- Extensive use of LED lighting
- Motion Sensors at all toilets and staircase
- Water sub-metering link to BMS for leak detection system
- PV generation within NTU offset the entire energy consumption to achieve zero energy building

<b>Client/Developer</b>	Nanyang Technological University
<b>Facility Management</b>	SMM Pte Ltd
<b>ESD/Green Consultant</b>	SMM Pte Ltd

# BLOCK N1.1

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, ZERO ENERGY BUILDING (RE-CERT)



- Efficient water cooled plant
- High Efficient LED Lighting
- Certified PUB Water Efficient Buildings
- Naturally ventilated carpark
- Motion sensors at all toilets and staircases

<b>Client/Developer</b>	Nanyang Technological University
<b>Facility Management</b>	SMM Pte Ltd
<b>ESD Consultant</b>	SMM Pte Ltd

# BLOCK N2

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING (RE-CERT)



- Efficient water cooled plant
- High Efficient LED Lighting
- Certified PUB Water Efficient Buildings
- Naturally ventilated carpark
- Motion sensors at all toilets and staircases

<b>Client/Developer</b>	Nanyang Technological University
<b>Facility Management</b>	SMM Pte Ltd
<b>ESD Consultant</b>	SMM Pte Ltd

# BLOCK N3 (MAE)

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING (RE-CERT)



- Efficient water cooled plant
- High Efficient LED Lighting
- Certified PUB Water Efficient Buildings
- Naturally ventilated carpark
- Motion sensors at all toilets and staircases

**Client/Developer** Nanyang Technological University

**Facility Management** SMM Pte Ltd

**ESD Consultant** SMM Pte Ltd

# CALTEX JURONG SPRING

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING



- 5 Ticks Unitary Air-conditioning System.
- 100% LED Lighting Fixtures.
- 41.2 kWp Solar PV System.
- 45.2% Replacement of Power Consumption with Solar Energy.
- 100% 3 Ticks WELs Rating Water Fittings.

<b>Client/Developer</b>	Chevron Singapore Pte Ltd
<b>Architect</b>	OGP Konsult Pte Ltd
<b>M&amp;E Engineer</b>	Regional Engineering Pte Ltd
<b>Structural Engineer</b>	OGP Konsult Pte Ltd
<b>Main Contractor</b>	Wing Tuck Engineering Pte Ltd

# CENTRAL LIBRARY AT NATIONAL UNIVERSITY OF SINGAPORE

## EXISTING NON-RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING



- Energy efficient chilled water plant (operating efficiency - 0.58 kW/RT)
- Energy efficient lighting system (>60% savings over baseline)
- Use of motion sensors for toilets and staircases
- Extensive greenery around main entrance foyer
- Extensive use of sustainable products
- Naturally-ventilated circulation space to adjacent buildings
- Provision of 460 kWp photovoltaic system
- 48% energy savings vs NRB 2015 reference

<b>Client/Developer</b>	National University of Singapore
<b>Project Manager</b>	National University of Singapore Office of Estate Development
<b>Architect</b>	Architects 61 Pte Ltd
<b>M&amp;E Engineer</b>	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
<b>Structural Engineer</b>	KCL Consultants Pte Ltd
<b>Quantity Surveyor</b>	CPG Consultants Pte Ltd
<b>Main Contractor</b>	Gennal Industries Pte Ltd

# CHANGI NAVAL BASE ADDITION

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD, POSITIVE ENERGY BUILDING



- 4.8 kWp Solar PV Panel at roof, annual production of electricity 58.43 MWh, more than double of the building annual power consumption
- Use of energy efficient Air-Conditioning system at 0.78 kW/RT
- Use of energy efficient LED lighting system at 4.8W/m<sup>2</sup>
- Use of water efficient water fittings
- Heat recover hot water system integrated with high efficiency VRV system
- Solar tube resting & dining area and Vertical Ventilator for toilet and laundrette Room

<b>Client/Developer</b>	Defence Science & Technology Agency
<b>Architect</b>	S A Chua Architects Pte Ltd
<b>M&amp;E Engineer</b>	CCA & Partners Pte Ltd
<b>Structural Engineer</b>	Steen Consultants Pte Ltd
<b>Main Contractor</b>	Antara Koh Pte Ltd

# CHOA CHU KANG COLUMBARIUM

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, POSITIVE ENERGY BUILDING



- Good natural ventilation with design of building layout that utilises prevailing wind conditions to achieve adequate cross ventilation
- Efficient lightings for common areas
- Awarded PUB Water Efficient building certificate
- Implementation of recycling programme, with provision of recycling bins and sustainability awareness messages within the vicinity
- Solar PV generates up to 189,216 kWh/yr
- Installation of solar panels to achieve 100% replacement

**Client/Developer**

National Environment Agency

**Facility Manager**

Fonda Global Engineering Pte Ltd

**ESD Consultant**

Building System & Diagnostics Pte Ltd

# HANGAR COMPLEX @ CHANGI EAST

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, POSITIVE ENERGY BUILDING



<b>Client/Developer</b>	Defence Science and Technology Agency
<b>Architect</b>	3HPArchitects Pte Ltd
<b>M&amp;E Engineer</b>	Bescon Consulting Engineers Pte
<b>Structural Engineer</b>	KTP Consultants Pte Ltd
<b>Main Contractor</b>	Sanchoon Builders Pte Ltd
<b>ESD Consultant</b>	GreenA Consultants Pte Ltd

- Estimated energy savings: 433,956 kWh/yr; Estimated water savings: 5,460 m<sup>3</sup>/yr, ETTV: 21.89 W/m<sup>2</sup>
- Low Heat Gain Facade with ETTV of 22W/m<sup>2</sup>.
- Use of BIM and VR for development of virtual environment.
- Natural Ventilation of Hangar Complex with average wind velocity of 0.72m/s.
- Energy Efficient LED lighting with 66.6% savings and VRF air-conditioning design system efficiency of 0.71kW/RT.
- Use of solar panels at 980kWp as source of renewable energy.
- Rainwater Harvesting system with drip irrigation for green roof.
- Sustainable products and water fittings which are SGBC Leader certified and 'Excellent' WELS rated.

# INSTITUTE OF SYSTEMS SCIENCE AT NATIONAL UNIVERSITY OF SINGAPORE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING



- Energy efficient air conditioning system (5 ticks VRF)
- Energy efficient lighting system (>40% savings over baseline)
- Use of motion sensors for toilets and staircases
- Extensive use of metering system for plug load management
- Extensive use of sustainable products
- Provision of a 108 kWp photovoltaic system
- 41.5% energy savings vs NRB 2015 Reference model

<b>Client/Developer</b>	National University of Singapore
<b>Project Manager</b>	National University of Singapore Office of Facilities Management
<b>Architect</b>	AWP Architects Pte Ltd
<b>M&amp;E Engineer</b>	CPG Consultants Pte Ltd
<b>Structural Engineer</b>	KCL Consultants Pte Ltd
<b>Quantity Surveyor</b>	Quants Associates
<b>Main Contractor</b>	Gennal Industries Pte Ltd

# JTC SPACE @ TUAS BIOMEDICAL PARK

## EXISTING NON-RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>, SUPER LOW ENERGY BUILDING (RE-CERT)



- EEI is 6.7kwh/m2/yr
- Efficient VRF system
- High Efficient LED Lighting
- Extensive use of environmentally friendly products

<b>Client/Developer</b>	JTC
<b>Facility Management</b>	CBM Pte Ltd / CBRE
<b>ESD Consultant</b>	CBM Solutions Pte Ltd

# LOGISTECH

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING



- Chilled water plant with performance guaranteed of 0.62kW/RT.
- All AHUs installed with EC fans with estimated efficiency of 0.18kW/RT.
- LED light fittings for all common area with estimated saving of 42.6%.
- Adoption of solar energy generation with estimated solar generation of 2,006,215 kWh/yr.
- All AHUs installed with energy valve with function of energy monitoring and cloud optimization.
- Smart facilities management system for chilled water plant with smart sequencing and dynamic artificial intelligence control.
- Cooling tower installed with EC fans.

#### Client/Developer

CapitaLand Group

#### Facility Management

CapitaLand Singapore (BP&C) Pte. Ltd

#### ESD / Green Consultant

Evergreen Engineering and Construction Pte Ltd

# MEDICINE-SCIENCE KNOWLEDGE HUB AT NATIONAL UNIVERSITY OF SINGAPORE

## EXISTING NON-RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING



- ETTV - 43.99 W/m<sup>2</sup>
- Energy efficient chilled water plant (operating efficiency - 0.59 kW/RT)
- Energy efficient lighting system (>60% savings over baseline)
- Use of motion sensors for toilets and staircases
- Extensive use of sustainable products
- Provision of 150 kWp photovoltaic system
- 40.5% energy savings vs NRB 2015 Reference model

**Client/Developer**

National University of Singapore

**Project Manager**

National University of Singapore Office of Estate Development

**Architect**

CPG Consultants Pte Ltd

**M&E Engineer**

WSP Consultancy Pte Ltd

**Structural Engineer**

ECAS Consultants Pte Ltd

**Quantity Surveyor**

CPG Consultants Pte Ltd

**ESD/Green Consultant**

WSP Consultancy Pte Ltd

**Main Contractor**

Debenho Pte Ltd

# NANYANG HOUSE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, ZERO ENERGY BUILDING (RE-CERT)



- Estimated energy savings: 0.555MWh/yr;
- VRF system with operating efficiency of 0.78kW/RT
- Energy efficient LED lighting
- Motion sensor control for staircases and toilets
- Water leakage detection system
- Green educational corners

<b>Building Owner</b>	Nanyang Technological University
<b>Facility Management</b>	SMM Pte Ltd
<b>Consultant Firm</b>	SMM Pte Ltd

# ONE RAFFLES LINK

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING



- Estimated energy savings: 1,000,000 kWh/yr
- Efficient overall cooling system with efficiency of 0.6 kW/RT
- Provision of Energy Efficient Lifts with Regenerative Drive
- Extensive use of LED lighting
- Achieve Super Low Energy Building

<b>Building Owner</b>	HKL (Esplanade) Pte Ltd
<b>Facility Management</b>	Hongkong Land (Singapore) Pte Ltd
<b>ESD/Green Consultant</b>	BMG Green Technology Pte Ltd Building System & Diagnostics Pte Ltd

# SCHOOL OF COMPUTING BLOCK COM3 AT NATIONAL UNIVERSITY OF SINGAPORE

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING



- Estimated Energy Savings: 1,084,813 kWh/yr, Estimated Water savings: 14,781 m<sup>3</sup> /yr, ETTV: 37.86W/m<sup>2</sup>
- Energy efficient chilled water air conditioning system  
Total system efficiency of 0.75 kW/RT  
(0.58 kW/RT + 0.17 kW/RT<sub>Air</sub>)
- Energy efficient lighting system (>40% savings over baseline)
- Use of motion sensors for toilets and staircases
- Extensive use of WELS "Excellent" water fittings
- Extensive use of sustainable green products
- Smart and Integrated Building Management System

**Client/Developer**

National University of Singapore

**Architect**

LAUD Architects Pte Ltd

**M&E Engineer**

Alpha Consulting Engineers Pte Ltd

**Structural Engineer**

Ronnie & Koh Consultants Pte Ltd

**Quantity Surveyor**

Northcroft Lim Consultants Pte Ltd

**ESD Consultant**

Building System and Diagnosis Pte Ltd

**Main Contractor**

Kim Seng Heng Engineering Construction Pte Ltd

# SMU A-SOUTH 3

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING



- Self shading building form, shading devices, insulated building envelope with low-E double glazing resulting in an ETTV of 26.9 W/m<sup>2</sup>
- Innovative Enhanced Passive Displacement Cooling (EPDC) System for majority of air-con spaces with total system efficiency of 0.61kW/RT
- Optimised lighting design with daylight utilisation, dimming control, photocell & occupancy sensor and LED lighting
- SMART building control system to ensure the occupant thermal comfort & optimised energy consumption
- Mass Engineered Timber (MET) structure reduces embodied carbon of the building

<b>Client/Developer</b>	Singapore Management University
<b>Architect</b>	MKPL Architects Pte Ltd
<b>M&amp;E Engineer</b>	Meinhardt (Singapore) Pte Ltd
<b>Structural Engineer</b>	Meinhardt (Singapore) Pte Ltd
<b>Quantity Surveyor</b>	Rider Levett Bucknall Pte Ltd
<b>Main Contractor</b>	Lian Ho Lee Construction Pte Ltd
<b>ESD Consultant</b>	Web Earth Pte Ltd

# TECHNO EDGE AT NATIONAL UNIVERSITY OF SINGAPORE

## NEW NON-RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING



<b>Client/Developer</b>	National University of Singapore
<b>Architect</b>	Forum Architects Pte Ltd
<b>M&amp;E Engineer</b>	CPG Consultants Pte Ltd
<b>Structural Engineer</b>	KCL Consultants Pte Ltd
<b>Quantity Surveyor</b>	Quants Associates
<b>Main Contractor</b>	Debenho Pte Ltd
<b>ESD Consultant</b>	GreenA Consultants Pte Ltd

- Estimated energy savings: 399,193kWh/yr, Estimated water savings: 32,414m<sup>3</sup>, ETTV: 37.82W/m<sup>2</sup>
- Energy efficient chilled water air conditioning system  
Total system efficiency of 0.72 kW/RT (0.57 kW/RT + 0.15 kW/RT<sub>Air</sub>)
- Over 80% of overall GFA are non air-conditioned space
- Energy efficient lighting system (>50% savings over baseline)
- Provision of 60kWp photovoltaic system
- 41.3% energy savings vs NRB 2015 reference model
- Extensive use of WELS “Excellent” water fittings
- Extensive use of sustainable green products

# TIONG BAHRU MARKET

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING



- Estimated to achieve 49% energy savings with energy efficient LED lightings for common area, and the upcoming installation of solar panels
- Good natural ventilation with design of building layout that utilises prevailing wind conditions to achieve adequate cross ventilation
- Installation of Smart Feedback system outside the toilet for patrons to report any faults or feedback
- Awarded PUB water Efficient Building certificate
- Implementation of recycling programme, with provision of recycling bins and sustainability awareness messages within the vicinity

<b>Client/Developer</b>	National Environment Agency
<b>Facility Manager</b>	National Environment Agency
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd

# ULU PANDAN BUS DEPOT

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING



<b>Client/Developer</b>	SBS Transit Ltd
<b>Facility Manager</b>	SBS Transit Ltd
<b>ESD/Green Consultant</b>	Measurement and Verification Pte Ltd; Building System & Diagnostics Pte Ltd

- Energy efficient unitary air-conditioning system with weighted efficiency of 0.7346 kW/RT
- Extensive use of energy efficient LED lighting system in offices, workshop and bus parking area.
- Naturally ventilated bus parking area.
- Use of water efficient fittings rated with 'Excellent' under WELS scheme and adopting water efficient flow rates.
- The first depot in Singapore to install with 700.26 kWp photovoltaic solar panel system on its rooftop to harvest renewable energy.
- Installed with NEWater system as non-portable uses for bus washing and irrigation for the rooftop garden.
- Provision of 3000 m<sup>2</sup> surface area as rooftop greenery with the use of polyculture planting
- 49% energy savings vs NRB 2015 Reference model

# UNITED WORLD COLLEGE OF SOUTH EAST ASIA

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING (RE-CERT)



#### Client/Developer

United World College of South East Asia

#### Facility Manager

United World College of South East Asia

#### Energy & Sustainability Consultant

United World College of South East Asia

- Estimated energy savings: 309,525 kWh/yr; Estimated water savings: 4811 m<sup>3</sup>
- Passive design and building layout to minimise heat gain and maximise natural ventilation. Depth of most classrooms is not more than 9.5m to allow for natural daylighting.
- Passive Chilled Beam for energy efficient office setup
- Solar Photovoltaic system of installed capacity 482.37kWp estimated to generate more than 550,000kWh of electricity a year
- Filtrated rainwater to water points for general washing and irrigation purposes.
- Motion sensor lighting at all private lift lobbies, changing rooms and common staircases. Day lighting sensors in classrooms.
- Rooftop garden, Building façades incorporate huge green walls to reduce the ambient temperature.

# UNITED WORLD COLLEGE OF SOUTH EAST ASIA - EAST

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM, SUPER LOW ENERGY BUILDING (RE-CERT)



- Estimated energy savings: 278,940 kWh/yr; Estimated water savings: 5033 m<sup>3</sup>
- High efficiency chiller plant- 0.58kW/RT
- Extensive green wall
- Rainwater collection and filtration using rain garden for irrigation
- Depth of classroom not more than 9.5m to enhance daylight harvesting
- Motion sensor for lighting control for lift lobbies, changing rooms and common staircases

**Client/Developer** United World College of South East Asia - East

**Facility Manager** United World College of South East Asia - East

**Energy & Sustainability Consultant** United World College of South East Asia - East

# BCA GREEN MARK FOR BUILDINGS

The **Green Mark certification scheme** was launched in January 2005. It is a green building rating system designed to evaluate a building's environmental impact and performance. It provides a comprehensive framework for assessing the overall environmental performance of new and existing buildings to promote sustainable design, and best practices in construction and operations in buildings.

Green projects may enjoy these benefits over the long run:

- Meaningful differentiation of buildings in the real estate market
- Positive effect on corporate image, leasing and resale value of buildings
- Reduction in energy, water and material resource usage
- Reduce potential environmental impact
- Improvement in indoor environmental quality for better health and well being
- Provide clearer direction for continual improvement

## Key criteria

- Climatic responsive design
- Building energy performance
- Resources stewardship
- Smart and healthy building
- Advance green efforts

# 30 RAFFLES PLACE

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



<b>Client/Developer</b>	Oxley Beryl Pte Ltd
<b>Architect</b>	DCA Architects Pte Ltd
<b>M&amp;E Engineer</b>	J Roger Preston (S) Pte Ltd
<b>Structural Engineer</b>	RSP Architects Planners & Engineers (Pte) Ltd
<b>Quantity Surveyor</b>	Arcadis Singapore Pte Ltd
<b>Main Contractor</b>	Sunray Woodcraft Construction Pte Ltd
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd
<b>Landscape Consultant</b>	Tinderbox Pte Ltd

- Installation of energy efficient water-cooled chilled-water plant with system design efficiency of 0.562 kW/RT
- Installation of 100% EC plug fan FCUs with air distribution efficiency of 0.19 kW/RT
- Use of 100% energy efficiency LED lightings to achieve 39.78% energy savings as compared to the baseline
- Conservation of existing structure and CUI of 0.156 m<sup>3</sup>/m<sup>2</sup> for all new works
- Use of SGBC-certified 2-ticks and 4-ticks concrete and locally certified environmentally friendly products for the building
- Use of innovative and integrative features to optimise workflow and attain persistence of high performance and energy efficiency in building
- Green lease agreement to control lighting power density for tenanted areas

# 7 NORTH COAST

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Estimated energy savings: 2,222,701kWh/yr; Estimated water savings: 220161m<sup>3</sup>, ETTV: 32.31 W/m<sup>2</sup>
- Extensive use of Green Cover
- Use of EC Plug, Thermal Diffusers, Energy Valve, Heat Pumps etc
- Provision of Energy & Water Dashboard.
- Use of Water efficient fitting

<b>Client/Developer</b>	JTC Corporation
<b>Architect</b>	Aedas Pte Ltd
<b>M&amp;E Engineer</b>	WSP Consultancy Pte Ltd
<b>Structural Engineer</b>	Arup Singapore Pte Ltd
<b>Quantity Surveyor</b>	Rider Levett Bucknall LLP
<b>Main Contractor</b>	Lum Chang Building Contractors Pte Ltd

# CENTRAL BOULEVARD TOWERS

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



**Client/Developer**

**Architect**

**M&E Engineer**

**Structural Engineer**

**Quantity Surveyor**

**Main Contractor**

**ESD Consultant**

**Landscape Consultant**

Wealthy Link Pte Ltd

Callison RTKL Asia Ltd /  
Architects 61 Pte Ltd

J Roger Preston (S) Pte Ltd

KTP Consultants Pte Ltd

Threesixty Cost Management Pte Ltd

Hexacon Construction Pte Ltd

Building System & Diagnostics Pte Ltd

Coen Design International Pte Ltd

- Extensive greenery on Level 1, 5, 7 and at the rooftop of 16-storey tower (GnPR of 5.8)
- Rainwater harvesting and drip irrigation system to irrigate 100% of the landscape area
- 100% LED lighting with an overall energy saving of 42%, with installation of motion sensors for toilets, staircases and carparks
- Implementing Green Lease for tenants to ensure the targeted energy saving is achieved
- Estimated energy savings: 8,293,036.00 kWh/yr and water savings: 55,642.16 m<sup>3</sup>/yr
- Extensive use of environmentally friendly materials
- IGU glass and air-tight systems to reduce the heat gain through fenestration

# FACULTY OF ENGINEERING BLOCK E7 AT NATIONAL UNIVERSITY OF SINGAPORE

## NEW NON-RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Estimated energy savings: 1,242,248 kWh/yr;  
Estimated water savings: 9,984 m<sup>3</sup>/yr, ETTV: 37.08 W/m<sup>2</sup>
- Energy efficient chilled water air conditioning system  
Total system efficiency of 0.76 kW/RT  
(0.57 kW/RT + 0.19 KW/RT<sub>Air</sub>)
- Energy efficient VRF system with operating efficiency of 0.66kW/RT.
- Energy efficient lighting system (>40% savings over baseline)
- Use of motion sensors for toilets and staircases
- Extensive use of WELS "Excellent" water fittings
- Extensive use of green concrete sustainable green products
- Smart and Integrated Building Management System

<b>Client/Developer</b>	National University of Singapore
<b>Architect</b>	Architect 61 Pte Ltd
<b>M&amp;E Engineer</b>	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
<b>Structural Engineer</b>	KTP Consultants Pte Ltd
<b>Quantity Surveyor</b>	Arcadis Singapore Pte Ltd
<b>Main Contractor</b>	Lian Soon Construction Pte
<b>Landscape Consultant</b>	Coen Design International Pte Ltd
<b>Acoustic Consultant</b>	Alpha Acoustics Engineering Pte Ltd
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd

# GUOCO MIDTOWN

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



<b>Client/Developer</b>	GuocoLand
<b>Architects</b>	Denton Corker Marshall DP Architects Pte Ltd
<b>M&amp;E Engineer</b>	Meinhardt (Singapore) Pte. Ltd
<b>Structural Engineer</b>	Meinhardt (Singapore) Pte. Ltd
<b>Quantity Surveyor</b>	AECOM Cost Consulting And Project Management (Singapore) Pte Ltd
<b>Main Contractor</b>	China Construction (South Pacific) Development Co Pte. Ltd.
<b>Landscape Consultant</b>	Ortus Design Pte. Ltd
<b>ESD Consultant</b>	DP Sustainable Design Pte. Ltd

- Optimal building orientations are designed to minimize heat gain and achieve ETTV of 37.72 W/m<sup>2</sup>. Sun shadings and performance glazing are provided to achieve maximum comfort.
- Extensive landscape areas with GnPR of 7.08 to enhance biodiversity and provide visual relief to staffs, residents and publics.
- Efficient Chiller Plant System of 0.575 kW/RT is designed.
- Efficient lighting design through the use of LED lightings and provision of motion sensors.
- Use of cooling tower water treatment system to increase the solubility of water and facilitate at least 7 cycles of concentration (CoC) of acceptable water quality.
- Use of "Excellent" Water Efficiency Labeling Scheme (WELS)- Certified fittings for all applicable areas.
- Recovery of condensate from AHUs for cooling tower make-up to reduce potable water usage.

# HOMETEAMNS KHATIB

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Low Heat Gain Facade
- Energy Efficient Air Conditioning Chilled Water Plant
- Use of LED Lightings
- Solar Photovoltaics System
- Rainwater Harvesting System
- Heat Recovery System for Heat Pumps
- Water Efficient Fittings
- Eco filtration system for Swimming Pool
- Use of low VOC paints
- Electric Car Charging Stations
- Engagement of Acoustic Consultant

<b>Client/Developer</b>	HomeTeamNS
<b>Project Manager</b>	SIPM Consultants Pte Ltd
<b>Architect</b>	DP Architects Pte Ltd
<b>Landscape Consultant</b>	DP Green Pte Ltd
<b>M&amp;E Engineer</b>	WSP Consultancy Pte Ltd
<b>Structural Engineer</b>	KTP Consultants Pte Ltd
<b>Green Mark Consultant</b>	WSP Consultancy Pte Ltd
<b>Quantity Surveyor</b>	AECOM Cost Consulting And Project Management (Singapore) Pte Ltd
<b>Main Contractor</b>	CMC Construction Pte Ltd

# LOGOS TUAS LOGISTICS HUB

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Features such as comprehensive wayfinding signages and security surveillance are provided to encourage bicycle usage.
- Extensive use of Green Label Products with higher recycled content and lower carbon footprint are used extensively throughout the development.
- Variable Refrigerant Flow (VRF) System with high efficiency of about 0.8kW/RT used in the development.
- Landscape is populated by lush native greenery and robust drought-tolerant plants which are convenient to maintain.
- 3-Ticks WELS water fittings are used extensively for maximum water savings in the development.
- Major water usage areas have private meters connected to building management system for leak detection
- Dashboard with trending of water and energy consumption is installed at a high traffic area to encourage reduction and conservation of water and energy usage.

<b>Client/Developer</b>	LOGOS SE ASIA PTE LTD
<b>Architect</b>	ID Architects Pte Ltd
<b>M&amp;E Engineer</b>	Bescon Consulting Engineers Pte Ltd
<b>Structural Engineer</b>	Thymn Pte Ltd
<b>Quantity Surveyor</b>	Northcroft Lim Consultants Pte Ltd
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd
<b>Main Contractor</b>	HPC Builders Pte. Ltd.

# PAN PACIFIC ORCHARD

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



<b>Client/Developer</b>	UOL Claymore Investment Pte Ltd
<b>Architect</b>	WOHA Architects Pte Ltd
<b>M&amp;E &amp; ESD Engineer</b>	Beca Carter Hollings & Ferner (S.E.Asia) Pte Ltd
<b>Structural Engineer</b>	TEP Consultant Pte Ltd
<b>Quantity Surveyor</b>	Rider Levett Bucknall LLP
<b>Main Contractor</b>	Shimizu Corporation

- Low E Double Glazed Glass with an ETTV Value of 37.7 W/m<sup>2</sup>
- Biomimicry design comprising 4 themed terraces achieving a Green Plot Ratio of (GnPR) 9.38 and incorporating usage of approximately 23% drought tolerant plants
- Energy Efficient Air Distribution System of 0.163 kW/RT with adoption of EC fans at all Fan Coil Units (FCU)
- Energy efficient LED lighting with lighting savings of approximately 38%
- Bio Digester System for food waste recycling with greywater by product reused for system self sufficiency
- Installed solar photovoltaic (PV) capacity of 175 kWp
- Effective daylighting for 38% of occupied common areas

# PSA LIVEABLE CITY

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- 28% reduction in Envelope Thermal Transfer Value. ETTV achieved - 36 W/m<sup>2</sup>
- Minimum 15% cooling load reduction
- High efficiency magnetic bearing chiller with plant efficiency of 0.56 kW/RT
- Use of high efficiency EC motor for Air-Distribution, minimum 50% energy savings.
- Use of Daily light and motion sensors for enhanced operational savings.
- Annual energy savings – 32.94% (excluding Renewables). Including renewables it is 36.76% savings
- Water sustenance via efficient fittings, condensate recovery etc.
- Live Energy and Water dashboard.

<b>Client/Developer</b>	PSA Corporation Pte Ltd
<b>Architect</b>	DCA Architects Pte Ltd
<b>M&amp;E Engineer</b>	Surbana Jurong Consultants Pte Ltd.
<b>ESD</b>	Surbana Jurong Consultants Pte Ltd.
<b>Structural Engineer</b>	RSP Architects planners and engineers Pte Ltd
<b>Quantity Surveyor</b>	PSA Corporation Pte Ltd
<b>Main Contractor</b>	PSA Corporation Pte Ltd

# REDLION WAREHOUSE SINGAPORE

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



<b>Client/Developer</b>	Schenker Singapore (Pte) Ltd
<b>Architect</b>	HA Architects Pte Ltd
<b>M&amp;E Engineer</b>	PDC Consulting Engineers
<b>Structural Engineer</b>	YH Liew Consulting Engineers
<b>Main Contractor</b>	Boustead Projects E&C Pte Ltd
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd

- Native plant species used for more than 50% of the landscape
- Chiller plant designed to meet efficiency of 0.58 kW/RT
- Energy efficient jet fans provided at carpark
- Locally certified sustainable products used extensively throughout development
- Solar photovoltaic panels with a capacity of more than 400 kWp will be installed on rooftop
- Post-tension slabs used for more than 75% of the development's constructed floor area
- Open protocol controllers will be used as the network backbone for the Building Management System of the development

# ROCHESTER COMMONS

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Chilled water chiller plant with efficiency of 0.610kW/ton.
- ~50% lighting savings through LED fittings.
- High façade performance and low window-to-wall ratio.
- Use of WELS 3 ticks water fittings.
- Provision of Courtyard garden and Rooftop garden.

<b>Client/Developer</b>	Ascendas Vista Property Pte Ltd acting as trustee of Ascendas Vista Trust
<b>Architect</b>	DCA Architects Pte Ltd
<b>M&amp;E Engineer</b>	Mott Macdonald Pte Ltd
<b>Structural Engineer</b>	Mott Macdonald Pte Ltd
<b>Quantity Surveyor</b>	Rider Levett Bucknall LLP
<b>Main Contractor</b>	Hexacon Construction Pte Ltd

# SENJA HAWKER CENTRE

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



<b>Client/Developer</b>	National Environment Agency
<b>Architect</b>	Tan + Tsakonas Architects
<b>M&amp;E Engineer</b>	Conteem Engineers Pte Ltd
<b>Structural Engineer</b>	OGP Konsult Pte Ltd
<b>Quantity Surveyor</b>	PQS Consultants Pte Ltd
<b>Main Contractor</b>	Guan Ho Construction Co (Pte) Ltd

- Designed for Natural Ventilation- Spatial layout, HVLS fans and façade design were optimised following various CFD studies.
- Provision of Pneumatic Food Waste Conveyance System
- Use of low carbon concrete in place of regular concrete for superstructure.
- Provision of rainwater harvesting system to minimize potable water use for irrigation.
- Extensive greenery at rooftop garden reduces heat gain while providing biophilic communal space for residents to enjoy.
- Extensive use of sustainable products certified by SGLS.
- Use of energy-efficient LED lightings and water fittings with excellent WELS rating.

# SHIMANO SINGAPORE INTELLIGENT PLANT

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Estimated energy savings: 2,990,000 kWh/yr; Estimated water savings: 4,180 m<sup>3</sup>/yr, ETTV: 28.64 W/m<sup>2</sup> .
- Water cooled chilled water plant with operating efficiency of 0.61kW/RT.
- High Efficient LED Lighting for the whole development
- Motion sensors installed in all toilets and staircases
- All water fittings installed are WELS 3-tick rated fittings.
- Extensive use of environmentally friendly products.
- Provision of roof garden covers 11,000 square meters and features a walking loop, grassland and trees and shrubs.
- 100% of the landscape area are served by drip irrigation system.

<b>Client/Developer</b>	Shimano (Singapore) Pte Ltd
<b>Design Architect</b>	Taro Ashihara Architects
<b>Design Development</b>	Takenaka Corporation
<b>Main Contractor</b>	Takenaka Corporation
<b>Architecture QP</b>	AWP Pte Ltd
<b>Structural QP</b>	KTP Consultants Pte Ltd
<b>M&amp;E QP</b>	Surbana Jurong Consultants Pte Ltd
<b>ESD Consultant</b>	GreenA Consultants Pte Ltd

# TIMMAC @ KRANJI

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Enhanced overall thermal performance of building envelope achieving an ETTV of 38W/m<sup>2</sup> and below.
- Extensive greenery at a Green Plot Ratio of 4.5 and above are provided for nature connectivity and appreciation.
- Provision of energy efficient water-cooled chilled water system with an efficiency of 0.58kW/RT and lower.
- Development roof is designed for solar readiness in terms of structural, electrical and spatial aspects.
- More than 50% of the landscaped areas served by water efficient automated auto irrigation with rain sensor control.
- Water and Energy dashboard showing consumption trends of development common areas is provided to create awareness of the building users and visitors.
- Provision of collaborative BIM for clash detection purposes, 4D time information linkages and schedule tracking of Project

<b>Client/Developer</b>	JTC Corporation
<b>Architect</b>	ID Architects Pte Ltd
<b>M&amp;E Engineer</b>	Mott MacDonald Singapore Pte Ltd
<b>Structural Engineer</b>	Mott MacDonald Singapore Pte Ltd
<b>Quantity Surveyor</b>	WT Partnership (S) Pte Ltd
<b>Landscape Consultant</b>	Martin Lee Designs
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd
<b>Main Contractor</b>	SH Design & Build Pte Ltd

# 313@SOMERSET

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient chiller plant performance of 0.636kW/RT
- All lifts are equipped with variable voltage variable frequency motor drive and sleep mode function
- Use of energy efficient motion sensors and photo sensor for common corridors
- Use of car park guidance systems to divert traffic and avoid congestion of vehicles
- Achieved PUB Water Efficient Building Silver certification with water savings fitting installed and other water saving measures

**Building Owner** Lendlease Global Commercial REIT

**Facility Management** Lendlease Retail Pte Ltd

**ESD/Green Consultant** Kaer Pte Ltd

# BLOCK N1 (CEE)

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient water cooled plant
- High Efficient LED Lighting
- Certified PUB Water Efficient Buildings
- Naturally ventilated carpark
- Motion sensors at all toilets and staircases

<b>Client/Developer</b>	Nanyang Technological University
<b>Facility Management</b>	SMM Pte Ltd
<b>ESD Consultant</b>	SMM Pte Ltd

# BLOCK N2.1

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient water cooled plant
- High Efficient LED Lighting
- Certified PUB Water Efficient Buildings
- Naturally ventilated carpark
- Motion sensors at all toilets and staircases

<b>Client/Developer</b>	Nanyang Technological University
<b>Facility Management</b>	SMM Pte Ltd
<b>ESD Consultant</b>	SMM Pte Ltd

# BLOCK N3.1 (MAE)

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient water cooled plant
- High Efficient LED Lighting
- Certified PUB Water Efficient Buildings
- Naturally ventilated carpark
- Motion sensors at all toilets and staircases

**Client/Developer**

Nanyang Technological University

**Facility Management**

SMM Pte Ltd

**ESD Consultant**

SMM Pte Ltd

## BLOCK N3.2 (MAE)

### EXISTING NON-RESIDENTIAL BUILDING

#### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient water cooled plant
- High Efficient LED Lighting
- Certified PUB Water Efficient Buildings
- Naturally ventilated carpark
- Motion sensors at all toilets and staircases

<b>Client/Developer</b>	Nanyang Technological University
<b>Facility Management</b>	SMM Pte Ltd
<b>ESD Consultant</b>	SMM Pte Ltd

# BLOCK N4 (SCSE)

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient water cooled plant
- High Efficient LED Lighting
- Certified PUB Water Efficient Buildings
- Naturally ventilated carpark
- Motion sensors at all toilets and staircases

**Client/Developer** Nanyang Technological University

**Facility Management** SMM Pte Ltd

**ESD Consultant** SMM Pte Ltd

# BLOCK N4.1 (MSE)

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient water cooled plant
- High Efficient LED Lighting
- Certified PUB Water Efficient Buildings
- Naturally ventilated carpark
- Motion sensors at all toilets and staircases

**Client/Developer** Nanyang Technological University

**Facility Management** SMM Pte Ltd

**ESD Consultant** SMM Pte Ltd

# BUGIS+

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Chiller system efficiency of 0.64kW/RT.
- Naturally ventilated public toilets.
- Carpark guidance system is available in the carpark to minimise carbon monoxide emitted from unnecessary movement of cars.
- Lifts and escalators are equipped with variable speed drives (VSDs).

<b>Client/Developer</b>	CapitaLand
<b>Facility Management</b>	CapitaLand
<b>ESCO</b>	LJ Energy Pte Ltd
<b>ESD /Green Consultant</b>	LJ Energy Pte Ltd

# BUKIT PANJANG HAWKER CENTRE & MARKET

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Naturally ventilated design with adjustable louvres and Energy efficient MV fans
- Energy efficient light fittings
- Daylight sensor & motion sensor control for office spaces, toilets & staircases
- CO sensor with MV jet fan for car park
- Water fittings installed are "Excellent" under PUB WELS rating scheme
- Daylight design with daylight sensors
- Vertical green wall, rainwater harvesting system
- Sustainable certified products

<b>Building Owner</b>	National Environment Agency
<b>Facility Management</b>	NTUC Foodfare Co-operative Ltd
<b>ESD/Green Consultant</b>	Building System & Diagnostics Pte Ltd

# CAMPUS CLUBHOUSE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Efficient VRF system
- Extensive use of LED Light Fittings
- Naturally ventilated carpark
- Provision stormwater collection for irrigation

<b>Building Owner</b>	Nanyang Technological University
<b>Facility Management</b>	Sodexo Kim Yew Pte Ltd
<b>ESD/Green Consultant</b>	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

# CHINESE HERITAGE CENTRE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Efficient Water-cooled chilled water system with efficiency of 0.59 kW/RT
- Passive Displacement Ventilation system is used
- Extensive use of LED lighting
- Motion sensors for artificial lighting control

<b>Building Owner</b>	Nanyang Technological University
<b>Facility Management</b>	SMM Pte Ltd
<b>ESD/Green Consultant</b>	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

# COLLEGE OF MEDICINE BUILDING

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Estimated energy savings: 177,562 kWh/yr; Estimated water savings: 438 m<sup>3</sup>/yr
- Efficient chilled water plant with overall chiller plant efficiency of 0.653 kW/Rt
- Extensive of energy efficient LED lighting in the development.
- Use of lifts with variable voltage variable frequency motor drive and sleep mode.
- Use of water efficient fittings 2 ticks / 3 ticks under (WELS) rating and obtain Water Efficient Building Certification from PUB
- Natural ventilated carparks
- Extensive use of Singapore Green Building Products certified by Singapore Green Building Council

<b>Client/Developer</b>	Ministry of Health
<b>Architect</b>	SQFT Architects Pte Ltd
<b>M&amp;E Engineer</b>	HPX Consulting Engineers Pte Ltd
<b>Conservation Consultant</b>	FranzWood Associates
<b>Quantity Surveyor</b>	OTN Building Cost Consultants Pte Ltd
<b>Main Contractor</b>	TEE International Ltd
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd

# CORPORATION PLACE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



<b>Client/Developer</b>	HSBC Institutional Trust Services (Singapore) Limited as Trustee of Ascendas Real Estate Investment Trust (the Trustee)
<b>Facility Manager</b>	Ascendas Services Pte Ltd
<b>ESD / Green Consultant</b>	C&W Services (S) Pte Ltd

- Chiller plant system is under guaranteed performance contracting services to achieve 0.614 kW/RT or better .
- LED lightings are in use at common areas, achieving 62% improvement over baselines. Motion sensors are installed to optimise lighting energy usage.
- "Earth Hour" activity was conducted with participation by tenants. Health & wellness activities are also conducted regularly as part of HPB "Healthy Workplace Ecosystem" programme.
- Recycling facilities for common recyclables and for electronic wastes are available. CapitaLand is in partnership with NEA for the campaign - "Say Yes to Waste Less" to promote the use of reusables.

# DAS SPEKTRUM @ CBP

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- North-West facing facade canted to reduce solar heat gain
- Use of sustainable material terracotta for louvers as shading devices
- Extensive greenery within development with Green Plot Ratio > 5
- Recycling of at least 50% AHU condensate as non-potable water source for landscape irrigation
- Use of chemical-free anti-termite treatment system

<b>Client/Developer</b>	Rohde & Schwarz Property Singapore Pte Ltd
<b>Facility Manager</b>	C&W Services (S) Pte Ltd
<b>ESD / Green Consultant</b>	Earth-In-Mind Private Limited

# DUO TOWER AND DUO GALLERIA, PROPOSED MIXED-USE DEVELOPMENT AT OPHIR-ROCHOR, SINGAPORE (COMMERCIAL) EXISTING NON-RESIDENTIAL BUILDING

## GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Hexagonal façade design with double glazed low-e glass
- Energy Efficient Central Chiller System at 0.59 kW/RT
- Heat pipe to recover energy from toilet to exhaust air to PAHU
- Lush green surroundings with 100% landscape replacement
- Carpark guidance system
- Rainwater harvesting system coupled with siphonic rainwater drainage piping from irrigation

**Client/Developer** Ophir-Rochor Commercial Pte Ltd

**ESD Consultant** G-Energy Global Pte Ltd

**Facility Manager** MCST PLAN NO.4662

# FUSIONPOLIS ONE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Automatic control devices are used to regulate outdoor air flow rate to maintain the concentration of Carbon Dioxide (CO<sub>2</sub>)
- 49% improvement in air distribution system efficiency
- Carbon Monoxide (CO) monitoring system for control of car park mechanical ventilation fans
- Occupancy sensors are installed in all toilets and sky bridges to reduce energy consumption usage
- Use energy-saving lightings at landlord common areas and tenanted areas

<b>Client/Developer</b>	JTC Corporation
<b>Facility Management</b>	C&W Services (S) Pte Ltd
<b>ESD Consultant</b>	C&W Services (S) Pte Ltd

# FUSIONOPOLIS TWO

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Chill water system efficiency is 0.6kW/RT
- High Efficient LED Lighting
- High performance fan filter units with low power consumption DC motors
- Rainwater harvesting system and AHU condensate water used for toilet flushing
- Centralized pneumatic waste collection system

**Client/Developer**

JTC Corporation

**Facility Management**

C&W Services (S) Pte Ltd

**ESD Consultant**

C&W Services (S) Pte Ltd

# GARDENS BY THE BAY (BAY SOUTH)

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Biomass co-generation system with absorption chiller
- Provision of Photovoltaic system at the supertree top
- Natural water filtration using lake
- Provision of light shelve and skylight for gardens staff office
- Provision of green roof and vertical greenery

<b>Client/Developer</b>	Gardens by the Bay
<b>Facility Manager</b>	ST Synthesis
<b>ESD / Green Consultant</b>	Surbana Jurong Consultants Pte Ltd

# GENTING HOTEL JURONG

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Provision of automated parking to reduce the emission of carbon footprints, reduce lightings and maximum the open space.
- Extensive use of high efficiency LED lamps with lower wattage.
- High efficiency water-cooled chilled-water system with average operating system efficiency of 0.62 kW/RT.
- High efficiency air filters (MERV 14) for AHUs to maintain good indoor air quality.
- Efficient heat pump system to produce hot water for guest rooms, F&B and kitchen usage.

<b>Building Owner</b>	Tamerton Pte Ltd
<b>Facility Manager</b>	Resorts World at Sentosa Pte Ltd
<b>ESD/Green Consultant</b>	G-Energy Global Pte Ltd

# GREAT EASTERN CENTRE & NANKIN ROW SHOPHOUSES

## EXISTING NON-RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Energy efficient air conditioning system with system efficiency of 0.6kW/RT or better
- Involved in guarantee energy saving performance (GESP) to ensure chiller plant performance
- Installed energy efficient LED lightings for the offices and common area and motion sensors to control staircases and toilets lightings.
- Installed UVC lights in AHUs for better Indoor Air Quality
- Encourages tenants participation in energy saving and promotes waste recycling
- Carbon Monoxide detection to control Carpark Mechanical Ventilation fan.
- Achieved PUB Water Efficient Building certification with water savings fitting installed throughout the building
- Lifts are equipped with variable voltage variable frequency motor drive and sleep mode function

<b>Building Owner</b>	Great Eastern Life Assurance Company
<b>Facility Management</b>	MCST 2781
<b>ESD/Green Consultant</b>	Kaer Pte Ltd

# GREAT WORLD SERVICED APARTMENT

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Use of eco-friendly cleaning chemicals for cleaning of apartments and common areas
- Using products certified by Green Label whenever feasible
- Took extra effort in recycling of Nescafe capsules as well as other wastes

<b>Building Owner</b>	GWC Serviced Apartments Pte Ltd
<b>Facility Management</b>	GWC Serviced Apartments Pte Ltd
<b>ESD/Green Consultant</b>	Johnson Controls (S) Pte Ltd

# GUOCO TOWER

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Water cooled chilled water plant with peak load efficiency of 0.639 kW/RT
- Use of T5 and LED lighting
- Integrated solar photo-voltaic panels
- Most water fittings with 3 tick WELS rating
- Extensive Greenery
- Integrated Storm Water Management System

**Client/Developer**

GuocoLand Singapore

**Facility Manager**

GuocoLand Property Maintenance  
Services Pte. Ltd.

# HARBOURFRONT CENTRE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient central chiller plant with system efficiency of 0.65 kW/RT
- Use of WELS-certified fittings and awarded as Water Efficient Building
- Use of NEWater for cooling tower make-up water consumption resulting to a reduction of potable water consumption
- Energy efficient LED lighting in use for common areas and motion sensors are installed toilets to optimize energy use

<b>Client/Developer</b>	HARBOURFRONT CENTRE PTE LTD
<b>Facility Management</b>	HARBOURFRONT CENTRE PTE LTD
<b>ESD Consultant</b>	C&W Services (S) Pte Ltd

# HDB HUB

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



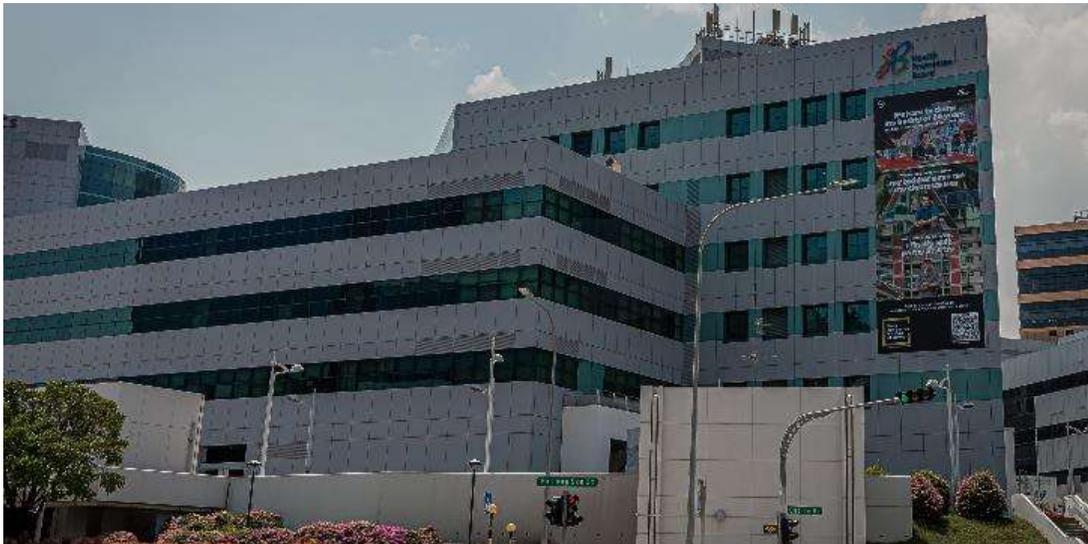
- Estimated energy savings: 34,535.25kWh/yr; Estimated water savings: 273.72m<sup>3</sup>
- Energy efficient chiller plant system (0.626 kW/RT)
- LED lightings for common areas & carpark
- Solar Photovoltaic System (0.5 MWp) at rooftop
- Extensive greenery supplemented by vertical green walls

<b>Building Owner</b>	Housing & Development Board
<b>Facility Management</b>	CPG Facilities Management Pte Ltd
<b>ESCO</b>	Johnson Controls (S) Pte Ltd
<b>ESD/Green Consultant</b>	Johnson Controls (S) Pte Ltd

# HEALTH PROMOTION BOARD

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- High performance water cooled chillers with efficiency of 0.617kW/RT and variable speed driver (VSDs) units installed to chilled water pumps, condenser pumps and cooling towers fan motor
- Refrigerant leak detection system installed in plant room and automatic tube cleaning system installed to condenser circuits of chillers
- Ultraviolet light C band (UV) emitters installed in AHUs to improve indoor air quality
- Energy-efficient LED lightings and carbon monoxide (CO) gas detection system installed at basement carpark.
- Motion sensors installed for all common toilets

<b>Client/Developer</b>	Health Promotion Board
<b>Facility Manager</b>	Indeco Engineers Pte Ltd
<b>ESD / Green Consultant</b>	CBM Solutions Pte Ltd

# HEALTH SCIENCES AUTHORITY

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Guaranteed energy savings performance contract to achieve 0.62 kW/RT with chiller replacement.
- Extensive energy-efficient LED lightings, achieving 40% improvement over baselines.
- UV light emitters installed in AHUs to reduce infectious agents and improve IAQ.
- Photocell sensors are installed for lightings at Basement corridor & carpark, and motion sensors are installed in staircases & toilets.
- Achieved PUB Water Efficient Building certification.

<b>Client/Developer</b>	Health Sciences Authority
<b>ESD / Green Consultant</b>	Indeco Engineers Pte Ltd
<b>Facility Management</b>	C&W Services (S) Pte Ltd
<b>ESCO</b>	C&W Services (S) Pte Ltd

# HERITAGE CONSERVATION CENTRE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Selection of high efficiency air distribution system that achieves 31% savings over baseline requirements
- Lighting power budget achieving 41% savings over baseline requirements
- Water efficient fittings that are already present on-site achieves excellent ratings for water conservation as well as an abundance of savings in order to target PUB Water Efficient Building Certificate
- Utilization of Cogeneration plant for cooling system.
- Comprehensive waste management programs.
- Renewable energy, Solar panels at the roof area which generating 4.53% of the total building energy.

<b>Client/Developer</b>	National Heritage Board
<b>ESD Consultant</b>	Afogreen Build Pte Ltd
<b>Facility Manager</b>	Khoo Lor Nam
<b>M&amp;E Consultant</b>	Bescon Consulting Engineers Pte

# ITE COLLEGE WEST

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



<b>Client/Developer</b>	PPP Infrastructure Management Pte Ltd
<b>Facility Manager</b>	C&W Services (S) Pte Ltd
<b>ESCO</b>	C&W Services (S) Pte Ltd
<b>ESD/Green Consultant</b>	C&W Services (S) Pte Ltd

- ETTV of 39 W/m<sup>2</sup>
- Efficient chiller plant system efficiency of 0.559 kW/RT, with CO<sub>2</sub> sensors in AHUs
- Certified PUB Water Efficient Building, with use of water-less urinals
- Extensive use of environmentally friendly products, including reinforced earth walls, eco-concrete, low-VOC waterproofing membranes and paints, recycled mineral fibre ceiling boards and partition boards
- Extensive greenery including rooftop gardens and vertical greenery, with use of compost recycled from organic matter
- Displacement ventilation at building auditorium and cross ventilation at Events Plaza
- Efficient hot water system with use of heat pumps and solar collectors

# JCUBE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Estimated energy savings: NA ; Estimated water savings: NA, ETTV: NA
- Chiller system with operating efficiency of 0.649 kW/RT
- High Efficient LED Lighting for most of the building
- Extensive use of environmentally friendly products

<b>Owner</b>	CapitaLand Mall Trust
<b>Architect</b>	RSP Architects Planners & Engineers (Pte) Ltd
<b>M&amp;E Engineer</b>	Squire Mech Pte Ltd
<b>Structural Engineer</b>	RSP Architects Planners & Engineers (Pte) Ltd
<b>Main Contractor</b>	Wee Hur Construction Pte Ltd
<b>Energy Consultant</b>	LJ Energy Pte Ltd

# JURONG POINT 1

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Implementation of Integrated Building Management System (iBMS) with adaptive control algorithm
- Energy efficient chiller plant with OSE of 0.623kW/RT
- Upgrading of existing light fittings to better performing LED lights for common areas, toilets and staircases
- Use of environmentally friendly products and practices through Green Guide for tenants
- Provision of charging point for electric vehicles
- Provision of Green Tenancy Fit-out Guide for tenants to incorporate sustainable operations and material selection

**Building Owner**

MCST 2693

**Facility Management**

Mercatus Epsilon Co-operative Ltd

**ESD/Green Consultant**

Qi Square Pte Ltd

# JURONG POINT 2

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- HVA-ECS System, a chemical free water treatment implemented for cooling tower to improve COC of up to 19
- Upgrading the existing light fittings with more energy efficient LED lights for toilets
- Car park provided with CO sensors and MV fans with VSD control
- All the lifts and escalators have been upgraded with VVVF and sleep mode
- Provision of charging point for electric vehicles
- Provision of Green Tenancy fit-out guideline for tenants to promote sustainable operations and material selection

<b>Building Owner</b>	Sub MCST 3586 (No.1)
<b>Facility Management</b>	Mercatus Epsilon Co-operative Ltd
<b>ESD/Green Consultant</b>	Qi Square Pte Ltd

# JURONG TOWN HALL

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Energy efficient water-cooled chiller system with chiller system efficiency of 0.587 kW/RT.
- Use of LED lightings in common areas such as lift lobbies, common corridors and staircases.
- Efficient air distribution system (AHU/FCU), with 56% improvement over the baseline.
- Use of lifts with provision of Variable Frequency (VVVF) drives and sleep mode.
- Provision of motion sensors to regulate the lightings in common areas, i.e. toilet, staircases.
- Provision of water sub-meters for major water usage such as cooling tower make-up water, domestic water usage.
- Extensive use of water efficient fittings with rating of 3 ticks and above under Water Efficient Labelling Scheme(WELS).
- Use of sustainable products certified by Singapore Green Council (SGBC) or Singapore Green Label Scheme (SGLS).

<b>Client/Developer</b>	JTC Corporation
<b>Facility Management</b>	CapitaLand Pte Ltd
<b>ESCO</b>	6-Sigma Automation Pte Ltd
<b>ESD / Green Consultant</b>	6-Sigma Automation Pte Ltd

# LEE KONG CHIAN SCHOOL OF MEDICINE (CLINICAL SCIENCES BUILDING)

## EXISTING NON-RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Energy efficient water-cooled chiller system with chiller system efficiency of 0.61 kW/RT
- Passive building design to reduce solar heat gain
- Minimised use of single pass AHUs in lab air distribution system
- Heat recovery using round around coil
- Under floor air distribution system in auditorium and learning studio
- Energy efficient lighting
- Use of green concrete

**Client/Developer** Nanyang Technological University, Lee Kong Chian School of Medicine

**ESD Consultant** Ecosavvy Pte Ltd

**Facility Manager** Synergy FMI Pte Ltd

# LEE KONG CHIAN SCHOOL OF MEDICINE (EXPERIMENTAL MEDICINE BUILDING)

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Energy efficient air-conditioning system
- Passive building design to reduce solar heat gain
- Heat recovery using round around coil
- Minimised use of single pass AHUs in lab air distribution system
- Under floor air distribution system in learning studio
- Energy efficient lighting
- Use of green concrete

**Client/Developer** Nanyang Technological University

**Consultant/Contractor** 6-Sigma Pte Ltd

**Facility Manager** Synergy FMI Pte Ltd

**ESCO** 6-Sigma Pte Ltd

# M SOCIAL SINGAPORE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient chiller plant with measured system efficiency of 0.573 kW/ton
- Extensively use of energy efficient LED light fittings for car parks and corridors.
- Use of Motion sensors linked to lightings for staircases.
- Extensive use of sustainable products certified by SGLS.
- Lifts equipped with energy efficient regenerative motors and sleep mode feature.

<b>Client/Developer</b>	Novel Developments Pte Ltd
<b>Facility Management</b>	Novel Developments Pte Ltd
<b>ESCO</b>	G-Energy Global Pte Ltd
<b>ESD / Green Consultant</b>	G-Energy Global Pte Ltd

# MAPLETREE ANSON

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



#### Client/Developer

DBS Trustee Ltd as Trustee of MCT

#### Facility Management

Building Systems & Diagnostics Pte Ltd

#### ESD / Green Consultant

Mapletree Commercial Property Management Pte Ltd

- High efficiency central cooling plant – VSD screw chillers, VSD for chilled water and condenser water pump, VSD for cooling tower fan.
- Incorporated Heat Pipes technologies at the pre-cooled AHU to pre-cool the outdoor fresh air through cooled toilet exhaust air.
- Extensive use of energy efficiency T5 fluorescent lights with electronic ballast for office space. Occupancy sensor are installed in all staircases.
- CO2 sensors integrated demand control ventilation for office AHU to reduce fresh air intake when human occupancy is low hence reduce cooling load demand.
- CO sensor integrated with ductless MV jet fan for carpark - to activate the MV fans when the CO level is above the unacceptable limits hence reducing the electricity consumption.
- Motion detectors integrated with lighting control for all toilets.
- Indoor air quality (IAQ) audit conducted to ensure a good indoor air quality in office premises.

# MAPLETREE BUSINESS CITY I

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient Water-cooled chilled water system with efficiency of 0.6 kW/RT
- Extensive use of LED lighting
- CO2 sensors integrated demand control ventilation for all office AHUs
- Rainwater is harvested for non-potable uses
- Provision of heat recovery system to produce hot water for F&B and amenities use

<b>Building Owner</b>	DBS Trustee Limited (as Trustee of Mapletree Commercial Trust)
<b>Facility Management</b>	Mapletree Commercial Property Management Pte Ltd
<b>ESD/Green Consultant</b>	Building System & Diagnostics Pte Ltd

# MAPLETREE BUSINESS CITY II

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient Water-cooled chilled water system with efficiency of 0.59 kW/RT
- Extensive use of LED lighting
- CO2 sensors integrated demand control ventilation for all office AHUs
- Rainwater is harvested for non-potable uses
- Provision of 40 kWp onsite Solar PV of renewable energy

<b>Building Owner</b>	Mapletree Business City Pte Ltd
<b>Facility Management</b>	Mapletree Business City Pte Ltd
<b>ESD/Green Consultant</b>	Building System & Diagnostics Pte Ltd

# MARINA BAY FINANCIAL CENTRE TOWER 1, TOWER 2 AND MARINA BAY LINK MALL

## EXISTING NON-RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient air distribution system, with CO<sub>2</sub> sensor in AHUs
- Energy-efficient lifts with regenerative drive feature and lift destination control system
- Energy-efficient T5 and LED lightings with motion sensors in both landlord and tenanted spaces
- Achieved PUB WEB Gold (Mixed Development)
- Water leak detection system linked to BMS and installed at all HX/AHU rooms and risers
- Recycling facilities in place for common recyclables (carton, paper, can, plastic and glass) and specialised waste stream (light tubes and electronic wastes)
- Active landlord involvement in encouraging tenants to adopt the BCA Green Mark for Healthier Workplaces 2018 Certification

<b>Client/Developer</b>	BFC Development LLP
<b>Facility Manager</b>	Raffles Quay Asset Management Pte Ltd
<b>ESCO</b>	C&W Services (S) Pte Ltd
<b>ESD/Green Consultant</b>	C&W Services (S) Pte Ltd

# MARINA ONE (EAST AND WEST TOWER AND RETAIL PODIUM)

## EXISTING NON-RESIDENTIAL BUILDING

## GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Heat pipes for all PAHUs
- Electronic Air Filter(EAC) at AHU units
- CO Sensor with ductless Jet Fan for Carpark Ventilation
- Energy Savings for lighting, through the usage of energy efficient fixtures such as LED at carparks, retail, toilets etc and T5 Fluorescent at Office Spaces
- NEWater for Toilet Flushing and Facade Cleaning
- Provision of Green Chute & Pneumatic Chute System

<b>Client/Developer</b>	MS Commercial Pte Ltd
<b>Facility Manager</b>	MS Property Management Pte Ltd
<b>ESD/Green Consultant</b>	G-Energy Global Pte Ltd

# MINISTRY OF MANPOWER

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Pre-cooled fresh air AHU on rooftop.
- Motion sensor control incorporated for escalators.
- Regenerative and gearless driven elevators.
- Extensive usage of LED lightings for offices, toilets, lift lobbies & corridors, and staircases.
- New Water for Cooling Tower water make up. Up to 85% replacement of potable water consumption.
- Collection of pre-cool AHU condensate.
- CO sensor for car park fans and CO2 for Air Handling Units.

**Client/Developer**

Ministry of Manpower

**Facility Manager**

Ministry of Manpower

**ESD/Green Consultant**

Johnson Controls (S) Pte Ltd

# MOUNT ELIZABETH NOVENA

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Chiller plant system with operating efficiency of 0.65kW/RT
- Pre- cool AHU to improve IAQ and RH control
- Demand control ventilation CO sensors for car park
- Provision of energy efficient LED lighting design
- Lifts and escalators are installed with VVVF motor and sensors
- Extensive greenery at various levels
- 10kWp onsite PV energy generation

**Client/Developer**

Parkway Pantai

**Facility Manager**

Parkway Hospitals Singapore Pte Ltd

**ESD/ Green Consultant**

G-Energy Global Pte Ltd

# NANYANG POLYTECHNIC

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- 45% NEWater replacement serving ponds, water features, irrigation and toilet flushing
- Promotion of environmental awareness to staff and students
- Continuous effort to innovate and implement green features to achieve energy and water savings
- Use of SGBC certified Chiller and Pumps
- PUB Water-Efficient Building Certified
- Vertical greenery and rooftop gardens to soften the hardscape

<b>Client/Developer</b>	Nanyang Polytechnic
<b>Facility Manager</b>	Nanyang Polytechnic
<b>ESD/Green Consultant</b>	G-Energy Global Pte Ltd

# NATIONAL DESIGN CENTRE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Energy Efficient Variable Refrigerant Volume (VRV) air-conditioning system
- Extensive use of energy efficient lightings achieving at least 40% energy savings compared to the baseline
- Implementation of Energy, Green Procurement and Environmental Policies and Water Efficient Improvement Plans
- Use of energy efficient lifts with Variable Voltage Variable Frequency (VVVF) Drive and sleep mode

<b>Client/Developer</b>	DesignSingapore Council Pte Ltd
<b>Facility Manager</b>	ENGIE Property Services Pte Ltd
<b>ESD/Green Consultant</b>	Building System & Diagnostics Pte Ltd

# NATIONAL LIBRARY BUILDING

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient Water-cooled chilled water system with efficiency of 0.69 kW/RT
- High Efficient LED/T5 Lighting
- Naturally ventilated Atrium Events Plaza
- Efficient day lighting design with light shelves throughout perimeter of building
- Extensive greenery

<b>Building Owner</b>	National Library Board
<b>Facility Management</b>	Fonda Global Engineering Pte Ltd
<b>ESD/Green Consultant</b>	G-Energy Global Pte Ltd

# NCS HUB

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Energy Efficient Chiller Plant System < 0.6kW/RT
- Extensive use of energy efficient lightings
- Implementation of Energy, Green Procurement and Environmental Policies and Water Efficient Improvement Plans
- CO2 sensors were installed to modulate fresh air intake for all buildings
- All lifts are also upgraded with VVVF drive
- Waste recycling program

<b>Client/Developer</b>	NCS Pte Ltd
<b>Facility Manager</b>	Koyo Engineering (S.E.Asia) Private Limited
<b>ESD/Green Consultant</b>	6-Sigma Pte Ltd

# NEW PHOENIX PARK

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Energy saving is 3,412,780kwh/m2/yr
- Chill water system efficiency is 0.633kW/RT
- High Efficient LED Lighting
- Basement Carpark Equipped with CO sensor for Carpark Mechanical Ventilation Rate Control
- Guard House Roof Equipped with Solar Panel with capacity of 70 kWp

<b>Client/Developer</b>	Ministry of Home Affairs
<b>Facility Management</b>	C&W Services (S) Pte Ltd
<b>ESD Consultant</b>	EWC Engineers Pte Ltd

# NORTH SPINE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient Water-cooled chilled water system with efficiency of 0.59 kW/RT
- Extensive use of LED lighting
- Motion Sensors at all toilets and staircase
- Water sub-metering link to BMS for leak detection system

**Building Owner** Nanyang Technological University

**Facility Management** SMM Pte Ltd

**ESD/Green Consultant** SMM Pte Ltd

# OASIS @ SAKRA

## EXISTING NON-RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Achieved 42.6W/m<sup>2</sup> with Low-E glass (1.85 U-Value and 0.3SC) and overhangs
- Efficient VRF AC system with efficiency of 0.73kW/RT
- T5 and LED luminaries give 59% improvement over baseline
- Cross-ventilation air flow in 8 levels of car park
- All water fittings are with 3-tick WELS Water Efficiency Label
- BMS tracking of water consumption and room temperature
- Management commitment in Waste Management and Post Occupancy Evaluation

<b>Building Owner</b>	JTC Corporation
<b>Facility Management</b>	Guthrie FMC Pte Ltd
<b>ESD/Green Consultant</b>	ES Management Pte Ltd

# ONE RAFFLES PLACE (TOWER 2)

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Energy efficient water-cooled chiller system with chiller system efficiency of 0.62 kW/RT
- Provision of CO2 sensor control for fresh air modulation of AHUs
- Use of LED lightings in common areas such as lift lobbies, common corridors and staircases
- Rainwater harvesting to replace potable water required for toilet flushing

<b>Client/Developer</b>	OUB Centre Limited
<b>Facility Management</b>	OUB Centre Limited
<b>ESCO</b>	6-Sigma Automation Pte Ltd

# ONE RAFFLES QUAY

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Estimated energy savings: 1,084,820 kWh/yr; Estimated water savings: 375.5m<sup>3</sup>
- Provision of regenerative lift drive
- Provision of siphonic rainwater discharge system
- Provision of carpark guidance system
- Condensate water is collected for carpark washing
- Provision of LED floodlights

**Client/Developer**

One Raffles Quay Pte Ltd

**Facility Manager**

Raffles Quay Asset Management  
Pte Ltd

**ESD/ Green Consultant**

C&W Services (S) Pte Ltd

# PARKROYAL ON KITCHENER ROAD

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Energy efficient chiller plant system
- Efficient lighting system
- Usage of heat pumps
- Regenerative lifts with VVVF and sleep mode features
- Use of fertilizers recycled from horticultural waste

**Building Owner** Parkroyal Kitchener Hotel Pte. Ltd.

**ESD Consultant** G-Energy Global Pte Ltd

# POLICE CANTONMENT COMPLEX

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- High efficiency chiller plant system retrofitted with Energy Management System for control and monitoring
- Use of energy efficiency products, e.g. chillers, pumps, VSDs and autotube cleaning system
- Mechanically ventilated carpark installed with CO sensors for better control
- Awarded PUB Water Efficient Building
- Motion sensors installed for toilets

<b>Client/Developer</b>	Singapore Police Force
<b>Consultant/Contractor</b>	Johnson Controls (S) Pte Ltd
<b>Facility Manager</b>	C&W Services
<b>ESCO</b>	Johnson Controls (S) Pte Ltd

# POLICE COAST GUARD HEADQUARTERS

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM

**Image not to be disclosed**

- Estimated energy savings: 2,356,720 kWh/yr
- High efficiency chiller plant system retrofitted with the control and monitoring of building's Energy Management System
- Natural ventilation for carpark, staircases, corridors and toilets
- Use of energy efficiency products, e.g. chillers, pumps, VSDs and autotube cleaning system
- Motion sensors installed for all toilets

<b>Client/Developer</b>	Singapore Police Force
<b>Facility Manager</b>	C&W Services (S) Pte Ltd
<b>ESD / Green Consultant</b>	Johnson Control (S) Pte Ltd
<b>ESCO</b>	Johnson Control (S) Pte Ltd

# RESORTS WORLD SENTOSA – RESORTS WORLD CONVENTION CENTRE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Extensive use of high efficiency LED lamps with lower wattage
- Provision of smart remote metering system for water monitoring and leak detection
- High efficiency air filters (MERV 14) for AHUs to maintain good indoor air quality
- Provision of VSD and dedicated Proportional Integral Derivative (PID) control for Secondary Heat Exchangers Pumping System
- On-site food waste treatment system which turn food waste into liquid and safely discharged into the sewage system

**Client/Developer** Resorts World at Sentosa Pte Ltd

**Facility Manager** Resorts World at Sentosa Pte Ltd

**ESD/ Green Consultant** G-Energy Global Pte Ltd

# RESORTS WORLD SENTOSA - UNIVERSAL STUDIOS SINGAPORE EXISTING NON-RESIDENTIAL BUILDING

## GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Extensive use of high efficiency LED lamps with lower wattage
- Provision of VSD and dedicated Proportional Integral Derivative (PID) control for secondary heat exchangers pumping system
- 500 kWp Solar Photovoltaic System which harvest solar energy to generate electricity
- High efficiency air filters (MERV 14) for AHUs to maintain good indoor air quality
- Provision of smart remote metering system for water monitoring and leak detection

**Building Owner** Resorts World at Sentosa Pte Ltd

**Facility Management** Resorts World at Sentosa Pte Ltd

**ESD/Green Consultant** G-Energy Global Pte Ltd

# ROBINSON 112

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



<b>Client/Developer</b>	Robinson Singapore Holding Pte Ltd
<b>Project Manager</b>	Grace Global Investments Pte Ltd
<b>Facilities Manager</b>	Jones Lang LaSalle Property & Asset Management, Singapore
<b>ESD/ Green Consultant</b>	Comfort Management Pte Ltd

- Estimated energy savings: 624,810kWh/yr
- Retrofitting of existing WCPU system to water-cooled energy efficient refrigeration (EER) system with certified green products such as high efficient pumps, cooling towers and VSD
- Replacement of energy efficient lightings for common facilities and tenants to achieve at least 29% improvement in lighting power budget
- Use of lifts with AC variable voltage and variable frequency (VVVF) motor drive and sleep mode features
- Use of energy efficient lights with motion sensors at staircases
- PUB certified water efficient building (WEB)
- Provision of recycling program to track, reduce, and recycle the waste
- Provision of energy performance contract and continuous energy & efficiency monitoring program

# SCHOOL OF BIOLOGICAL SCIENCE (SBS)

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Estimated energy savings: 63.983MWh/yr
- Chilled water system with operating efficiency of 0.65kW/RT
- Automatic sash closer for lab fume hoods
- Energy efficient LED lighting
- Task lighting for work desks and lab benches
- Motion sensor control for staircase and toilets
- Intelligence energy management system to manage building consumption
- Machine Learning and artificial air-conditioning optimization
- Auto tube cleaning system & refrigerant leak detection system for the chiller plant
- Variable speed drives for pumps and cooling tower
- Green educational corners

**Building Owner** Nanyang Technological University

**Facility Management** SMM Pte Ltd

**Consultant Firm** SMM Pte Ltd

# SCHOOL OF CHEMICAL AND BIOMEDICAL ENGINEERING (CBE)

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



<b>Building Owner</b>	Nanyang Technological University
<b>Facility Management</b>	SMM Pte Ltd
<b>Consultant Firm</b>	SMM Pte Ltd

- Estimated energy savings: 88.199MWh/yr
- Chilled water system with operating efficiency of 0.65kW/RT
- Automatic sash closer for lab fume hoods
- Energy efficient LED lighting
- Task lighting for work desks and lab benches
- Motion sensor control for staircase and toilets
- Intelligence energy management system to manage building consumption
- Machine Learning and artificial air-conditioning optimization
- Auto tube cleaning system & refrigerant leak detection system for the chiller plant
- Variable speed drives for pumps and cooling tower
- Green educational corners

# SCHOOL OF CHEMICAL AND BIOMEDICAL ENGINEERING(CBE) EXISTING NON-RESIDENTIAL BUILDING

## GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Estimated energy savings: 40.421MWh/yr
- Chilled water system with operating efficiency of 0.65kW/RT
- Energy efficient LED lighting for all areas
- Task lighting for work desks and lab benches
- Motion sensor control for staircase and toilets
- Automatic sash closer for Fume Hoods
- Intelligence energy management system to manage building consumption
- Machine Learning and artificial air-conditioning optimization
- Auto tube cleaning system & refrigerant leak detection system for the chiller plant
- Variable speed drives for pumps and cooling tower
- Green educational corners

**Building Owner** Nanyang Technological University

**Facility Management** SMM Pte Ltd

**Consultant Firm** SMM Pte Ltd

# SCHOOL OF PHYSICAL AND MATHEMATICAL SCIENCES

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Estimated energy savings: 6,051,818 kWh/yr and ETTV: 36.4W/m<sup>2</sup>
- Upgrade thermal energy storage to highly efficiency chiller plant of 0.65 kW/RT
- Upgrade from fix speed fume exhaust fan to variable speed
- Upgrade to Passive Displacement Cooling System
- High efficiency LED lighting with motion sensor control
- Automatic sash closer for Fume Hoods
- Naturally ventilated carpark and staircases
- Machine Learning and Artificial intelligence air-conditioning optimisation
- Certified PUB Water Efficient Building

<b>Client/Developer</b>	Nanyang Technological University
<b>Facility Manager</b>	Nanyang Technological University
<b>M&amp;E Engineer</b>	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
<b>ESD/Green Consultant</b>	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

# SHERATON TOWERS SINGAPORE HOTEL

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Estimated energy savings: 13,370 kWh/yr through chiller system optimisation
- Chiller plant system efficiency of 0.60 kW/RT
- Majority of lighting consists of LED-based luminaries
- Heat pump system providing hot water for showers
- Heat pipes for heat recovery for pre-cooled air units

<b>Client/Developer</b>	Sheraton Towers Singapore Hotel
<b>Facility Manager</b>	Sheraton Towers Singapore Hotel
<b>ESD / Green Consultant</b>	LJ Energy Pte Ltd
<b>ESCO</b>	LJ Energy Pte Ltd

# SINGAPORE INSTITUTE OF TECHNOLOGY @ NANYANG POLYTECHNIC

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient chiller plant system of less than 0.65 kW/ton
- Measurement and verification system and heat balancing to monitor chiller plant efficiency
- Variable speed drives for pumps and cooling towers
- Energy efficient T5/LED lighting for all areas
- Natural ventilation in study and common areas to minimize energy consumption
- Motion sensors for toilets and staircases
- Lifts with AC VVVF and sleep mode features

**Building Owner** Singapore Institute of Technology

**Facility Management** SMM Pte Ltd

**ESD/Green Consultant** SMM Pte Ltd

# SINGAPORE INSTITUTE OF TECHNOLOGY @ NGEE ANN POLYTECHNIC

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient chiller plant with measured system efficiency of 0.62 kW/ton
- Extensively use of energy efficient T5 and LED light fittings for all areas.
- Use of Motion sensors linked to lightings for toilets and staircases.
- Atrium, corridors, and other common areas are naturally ventilated.
- Variable speed drives for pumps and cooling towers.
- Lifts have energy efficient AC VVVF motors and sleep mode feature.

**Building Owner** Singapore Institute of Technology

**Facility Management** SMM Pte Ltd

**ESD / Green Consultant** SMM Pte Ltd

# SINGAPORE INSTITUTE OF TECHNOLOGY @ SINGAPORE POLYTECHNIC

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient chiller plant system of less than 0.65 kW/ton
- Measurement and verification system and heat balancing to monitor chiller plant efficiency
- Variable speed drives for pumps and cooling towers
- Energy efficient T5/LED lighting for all areas
- Vast non air-conditioned area (Atrium, corridors, and other common areas) to reduce air-conditioning requirement
- Motion sensors for toilets and staircases
- Lifts with AC VVVF and sleep mode features

**Building Owner** Singapore Institute of Technology

**Facility Management** SMM Pte Ltd

**ESD/Green Consultant** SMM Pte Ltd

# SINGAPORE INSTITUTE OF TECHNOLOGY @ TEMASEK POLYTECHNIC

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient chiller plant with measured system efficiency of 0.574 kW/ton
- Extensively use of energy efficient T5 and LED light fittings for all areas.
- Use of Motion sensors linked to lightings for toilets and staircases.
- Atrium, corridors, and other common areas are naturally ventilated.
- Variable speed drives for pumps and cooling towers.
- Lifts have energy efficient AC VVVF motors and sleep mode feature.

**Client/Developer** Singapore Institute of Technology

**Facility Management** SMM Pte Ltd

**ESD / Green Consultant** SMM Pte Ltd

# ST. JAMES POWER STATION

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Central chilled water plant system with target efficiency of 0.619 kW/ton.
- Extensive use of LED lighting
- Harvested rainwater for irrigation.
- Extensive greenery
- Envelope Thermal Transfer Value (ETTV) of 41.15 W/m<sup>2</sup>.

<b>Client/Developer</b>	The Harbourfront Pte Ltd
<b>Facility Manager</b>	Mapletree Investments Pte Ltd
<b>ESD/Green Consultant</b>	LJ Energy Pte Ltd
<b>Architect</b>	W Architects Pte Ltd
<b>Builder</b>	Lum Chang Interiors Pte Ltd

# STAMFORD COURT

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Estimated energy savings: 522,634 kWh/yr
- Retrofitting of existing air cool system to chilled water system to achieve plant room efficiency 0.52kW/RT with certified green products such as chiller, high efficient pumps and VSD
- Replacement of existing AHU with EC fans to achieve 0.108 kW/RT
- Installation of energy saving LED lightings
- PUB certified water efficient building
- Provision of energy performance contract and continuous energy & efficiency monitoring program

<b>Client/Developer</b>	UIC Land Pte Ltd
<b>Facility Manager</b>	UIC Land Pte Ltd
<b>ESCO</b>	Comfort Management Pte Ltd
<b>ESD/ Green Consultant</b>	Comfort Management Pte Ltd/ Building System & Diagnostics Pte Ltd

# STANDARD CHARTERED @ CHANGI BUSINESS PARK 1 (CBP1)

## EXISTING NON-RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Provision of 96 kWp solar panel to harvest renewable energy.
- Extensively use of energy efficient T5 and LED light fittings and motion sensor for all office areas.
- Use of water efficient fittings rated with 'Excellent' under WELS scheme and adopting water efficient flow rates.
- Integrated grey water, condensate water and rain water harvesting system for toilet flushing.
- Green Wall Corner provide educational Program featuring Educational Program featuring:- a) Endangered Plant Species b) Renewable energy harvested, electrical & water consumption of the Building c) Waste Management.

<b>Client/Developer</b>	Standard Chartered Bank (Singapore) Limited
<b>Facility Management</b>	CBRE GWS Holding (S) Pte Ltd
<b>ESD / Green Consultant</b>	Building System & Diagnostics Pte Ltd

# STUDENT SERVICE CENTRE (SSC)

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Efficient water cooled plant
- High Efficient LED Lighting
- Certified PUB Water Efficient Buildings
- Naturally ventilated carpark
- Motion sensors at all toilets and staircases

**Client/Developer** Nanyang Technological University

**Facility Management** SMM Pte Ltd

**ESD Consultant** SMM Pte Ltd

# THE ADELPHI

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Existing chiller plant efficiency at 0.57kW/ton
- Use of energy efficient products, i.e. Chillers, Pumps, Cooling Towers & Variable Speed Drives
- Adoption of Building Management System (BMS) to monitor the operation condition for chillers, pumps, AHUs.
- Usage of energy efficient lighting and LED PLC lights to achieve energy savings at common facilities
- Use of environmentally friendly & sustainable products, i.e. Toilet Paper, Hand Soap, Washing Detergent

<b>Client/Developer</b>	Management Corporation Strata Title No.1614
<b>Facility Manager</b>	Propmag Management Services Pte Ltd
<b>ESD / Green Consultant</b>	Comfort Management Pte Ltd
<b>ESCO</b>	Comfort Management Pte Ltd

# TRAFFIC POLICE HEADQUARTERS

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



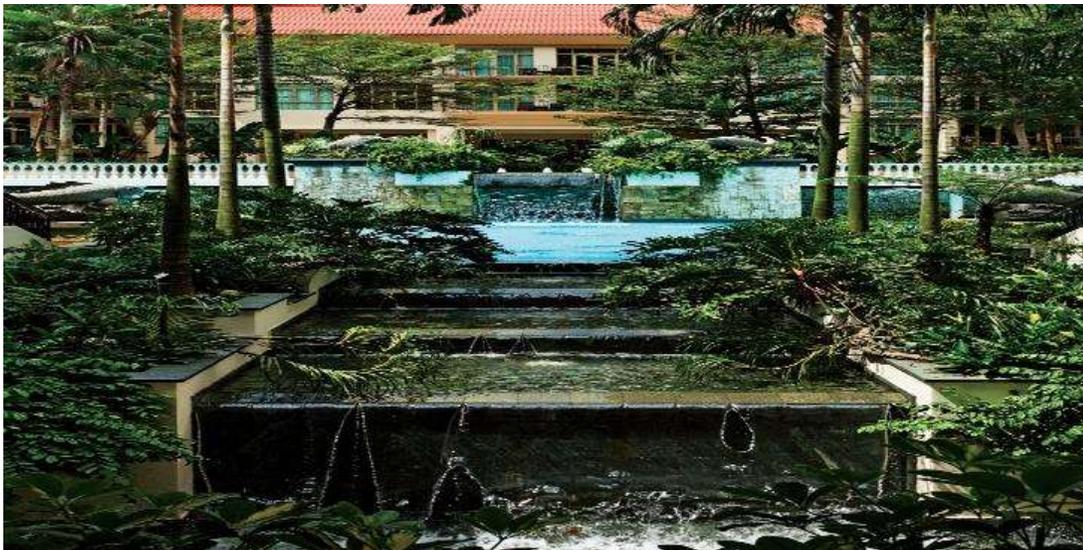
<b>Client/Developer</b>	Singapore Police Force
<b>Facility Manager</b>	CBM Pte Ltd
<b>ESD / Green Consultant</b>	C&W Services (S) Pte Ltd

- Chiller plant system is under guaranteed performance contracting services to achieve 0.643 kW/RT or better
- Air distribution system to be retrofitted to achieve 0.40 W/CMH, equipped with CO2 sensors to regulate fresh air intake, and at least MERV13 filters for good indoor air quality
- LED lightings are in use at common areas, achieving 35% improvement over baselines. Motion sensors are installed to optimise lighting energy usage
- Green corners with recycling facilities are available in various locations of the building
- Priority parking lots for hybrid vehicles are available

# TREETOPS EXECUTIVE RESIDENCES

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Use of tri-generation system that produces electricity, chilled water for air-conditioning, and domestic hot water
- Extended usage of fluorescent and LED lightings at Common Facilities and Car Parks
- Demand ventilation at car park using CO sensors & variable speed drives
- Extensive greenery within in the premises
- UV system employed for Cooling Tower to reduce reliance on chemical treatment usage

<b>Client/Developer</b>	British Malayan Trustees Pte Ltd
<b>Facility Manager</b>	Edmund Tie & Company Hospitality Management Services
<b>ESD / Green Consultant</b>	Comfort Management Pte Ltd
<b>ESCO</b>	Comfort Management Pte Ltd

# VIVOCITY

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



<b>Client/Developer</b>	DBS Trustee Limited as Trustee of Mapletree Commercial Trust
<b>ESD Consultant</b>	LJ Energy Pte Ltd
<b>Facility Manager</b>	Mapletree Commercial Property Management Pte Ltd
<b>Main Contractor</b>	Measurement & Verification Pte Ltd

- Upgraded chiller plant system with VSD for chilled/condenser water pumps, and cooling tower fans achieving an efficiency of 0.60 kW/RT.
- Common area lighting intensity is 41% better than baseline using LED luminaires, light sensors and motion detectors.
- CO2 sensors are installed in AHUs to regulate the fresh air intake and reduce cooling load demand.
- Renewable energy generation is approximately 1.3 million kWh/year.
- Automatic irrigation system is used for outdoor greenery, including rain sensors to utilize rainwater for landscape irrigation.
- Carpark guidance system is used for minimizing vehicle movement, resulting in a reduction of CO production and carbon footprint.

# MIDTOWN BAY

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



**Client/Developer**

GuocoLand

**Architect**

Denton Corker Marshall  
DP Architects Pte. Ltd.

**M&E Engineer**

Meinhardt (Singapore) Pte. Ltd.

**Structural Engineer**

Meinhardt (Singapore) Pte. Ltd.

**Quantity Surveyor**

AECOM Cost Consulting and Project  
Management (Singapore) Pte Ltd

**Main Contractor**

China Construction (South  
Pacific) Development Co Pte. Ltd.

**Landscape Contractor**

Ortus Design Pte. Ltd.

**ESD Consultant**

DP Sustainable Design Pte. Ltd.

- Achieved RETV of 17.75 W/m<sup>2</sup>
- The residential development is designed with lush green landscape exceeding 4 GnPR
- The building configuration and site orientation promotes natural ventilation and day lighting
- Use of ceiling fan for all dwellings units to aid in natural ventilation
- Use of energy efficient LED lightings with sensors for the development
- Extensive use of SGBC 3-tick concrete with RCA and WCS replacement
- Extensive integration of biophilic elements within the common facilities to provide good wellbeing and connection to the nature for residents

# NTU HALL OF RESIDENCE 5

## EXISTING RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Estimated energy savings: 50,954 kWh/yr
- Extensive use of motion sensors at toilets and amenity rooms
- Extensive use of LED
- Certified PUB Water Efficient Building
- Upgrade to energy efficient hot water heat pumps for toilets
- Natural ventilated car park, corridors and staircases
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment
- Green educational corner

<b>Client/Developer</b>	Nanyang Technological University
<b>Facility Manager</b>	Nanyang Technological University
<b>M&amp;E Engineer</b>	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
<b>ESD/Green Consultant</b>	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

# SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN – HOSTELS & FACULTY APARTMENTS

## EXISTING RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | PLATINUM (RE-CERT)



- Estimated energy savings: 2,306,762 kWh/yr; Estimated water savings: 20,412m<sup>3</sup>/yr
- Energy Efficient Air Conditioning Units (4 ticks)
- Energy Efficient Lighting Design
- Energy Efficient Water Heater

<b>Client/Developer</b>	Singapore University of Technology and Design (SUTD)
<b>ESD Consultant</b>	ENGIE South East Asia Pte Ltd
<b>Facility Management</b>	ENGIE Services Singapore

# INTEGRATED DEVELOPMENT OF POLYCLINIC, NURSING HOME AND SENIOR CARE CENTRE

## HEALTHCARE FACILITIES



### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- High façade performance and low WWR
- 30.8% energy savings with efficient chiller plant system
- 40% lighting savings through use of 100% LED
- Assisted ventilated nursing home to ensure thermal comfort
- 29.2kWp PV panels at the rooftop

<b>Client/Developer</b>	Ministry of Health Singapore
<b>Architect</b>	Surbana Jurong
<b>M&amp;E Engineer</b>	Surbana Jurong
<b>Structural Engineer</b>	Surbana Jurong
<b>Quantity Surveyor</b>	Arcadis
<b>Main Contractor</b>	Teambuild Construction Group

# NATIONAL SKIN CENTRE

## HEALTHCARE FACILITIES

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Chiller Plant System High Operating Efficiency of 0.58kW/RT
- Extensive use of alternative water sources for replacement of potable water for major water uses.
- 100% Use of WELS “Excellent” Rated Water Fittings
- Excellent Envelope Thermal Transfer Value (ETTV) of 29.87 W/m<sup>2</sup>
- Conservation of 91% of the existing structure

**Client/Developer**

Ministry of Health (MOH)  
MOH Holdings Pte Ltd (MOHH)

**Operator**

National Skin Centre

**Project Manager**

Arcadis Pte Ltd

**Architect**

CIAP Architects Pte Ltd

**M&E Engineer**

WSP Consultancy Pte Ltd

**Structural Engineer**

Arup Singapore Pte Ltd

**Quantity Surveyor**

CPG Consultants Pte Ltd

**Main Contractor**

Keong Hong Construction Pte Ltd

**ESD Consultant**

G-Energy Global Pte Ltd

# WOODLANDS HEALTH CAMPUS (WHC)

## HEALTHCARE FACILITIES

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Estimated energy savings: 33,677,720 kWh/yr; Estimated water savings: 261,652 m<sup>3</sup>, ETTV: 33.62 W/m<sup>2</sup>
- Chiller plant efficiency: 0.567kW/Ton
- High Efficient LED Lighting
- Food Waste Recycling System
- Community Farm
- Water Source Heat Pump
- Integrated healing Garden Design

**Client/Developer**

Ministry of Health

**Architect**

SAA Architects Pte Ltd

**M&E Engineer**

SSMA

Surbana Jurong Consultants Pte Ltd

Squire Mech Pte Ltd

Alpha Consulting Engineers Pte Ltd

**Structural Engineer**

T.Y.Lin International Pte Ltd

**Quantity Surveyor**

Rider Levett Bucknall LLP

**Main Contractor**

SDK Consortium

Ssangyong Engineering & Construction

Daewoo Engineering & Construction

Koh Brothers Building & Civil Engineering

# 39 JALAN KAKATUA

## LANDED HOUSES

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Good passive design implementation
- Use of efficient active system design
- Use of efficient sustainable construction method
- Extensive use of sustainable products
- Provision of solar PV system and solar hot water system

<b>Client/Developer</b>	Seletar View Pte Ltd
<b>Architect</b>	Bhatch Architects
<b>M&amp;E Engineer</b>	Tham & Wong LLP
<b>Structural Engineer</b>	TW-Asia Consultants Pte Ltd
<b>Main Contractor</b>	Prelim Construction Pte Ltd

# GREEN MARK FOR TRANSIT STATIONS

Globally, meeting the sustainability objectives will be increasingly important for transit facilities as they expand to meet the heightened demands due to urban development. It presents opportunities where transit stations can be designed, constructed and operated sustainably in contributing to the overall national efforts to mitigate climate change in tandem with rail network development

In the move towards creating a more sustainable transit facilities and greener commuter experience, the Building and Construction Authority (BCA) has introduced a new addition to its suite of Green Mark schemes specifically for rail and light rail stations – The BCA Green Mark for Transit Stations.

This new scheme co-developed in consultation with Land Transport Authority (LTA) and industry practitioners was officially launched on 1 Nov 2019, to provide a holistic approach in evaluating and rating the environmental performance of station developments. Other than setting the pace for higher energy efficiency standard, this scheme also encourages the development of a sustainable, accessible and contextual response that supports reductions in per-capita transport energy use which would in turn, help minimises environmental impacts.

# CANBERRA STATION

## NEW TRANSIT STATIONS

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



**Client/Developer**

Land Transport Authority

**Project Manager**

China State Construction Engineering Corporation Ltd (Singapore Branch)

**Architect**

RSP Architects Planners & Engineers Pte Ltd

**M&E Engineer**

Surbana Jurong Consultants Pte Ltd

**Structural Engineer**

Surbana Jurong Consultants Pte Ltd

**Landscape Consultant**

COEN Design International Pte Ltd

**Main Contractor**

China State Construction Engineering Corporation Ltd (Singapore Branch)

- Estimated energy savings: 155,160 kWh/yr; Estimated water savings: 4,464m<sup>3</sup> /yr
- Energy efficient air-conditioning system and lighting provision
- Energy efficient lift and escalator system
- Biophilic design with edge planting, green roof and vertical greenery
- Automatic irrigation system with rain sensors
- Extensive use of environmentally friendly products

# UPPER THOMSON STATION

## NEW TRANSIT STATIONS

### GREEN MARK AWARD FOR BUILDINGS | PLATINUM



- Estimated energy savings: 1,545,533 kWh/yr; Estimated water savings: 2,348 m<sup>3</sup>/yr
- Energy efficient air-conditioning system and lighting provision
- Provision of daylighting at entrance areas
- Optimisation of land uptake and accessibility
- Provision of sub-metering at system level
- Extensive use of environmentally friendly products

<b>Client/Developer</b>	Land Transport Authority
<b>Project Manager</b>	TY Lin International Pte Ltd
<b>Architect</b>	DP Architects Pte Ltd
<b>M&amp;E Engineer</b>	WSP Consultancy Pte Ltd
<b>Structural Engineer</b>	TY Lin International Pte Ltd
<b>Quantity Surveyor</b>	Land Transport Authority
<b>Main Contractor</b>	Sato Kogyo (S) Pte Ltd
<b>Landscape Consultant</b>	Element Design Studio Pte Ltd
<b>ESD Consultant</b>	DP Sustainable Design Pte Ltd

# FRASER RESIDENCE PROMENADE, SINGAPORE

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Enhanced overall thermal performance of building envelope achieving an ETTV of 38W/m<sup>2</sup> and below.
- Provision of energy efficient air-cooled Variable Refrigerant Flow (VRF) system with an efficiency of 0.68kW/RT.
- 100% of the landscaped areas served by water efficient automated irrigation with rain sensor control.
- Low Concrete Usage Index (CUI) of 0.38 for the development.
- Provision of collaborative BIM for clash detection purposes, 4D time information linkages and 5D cost and quantity tracking of Project.

<b>Client/Developer</b>	Fraser Property Singapore
<b>Project Manager</b>	Fraser Property Corporate Services Pte Ltd
<b>Design Architect</b>	P&T Consultants Pte Ltd
<b>Submission Architect</b>	J Roger Preston (S) Pte Ltd
<b>M&amp;E Engineer</b>	KTP Consultants Pte Ltd
<b>Structural Engineer</b>	SCDA Architects Pte Ltd
<b>Interior Design</b>	SCDA Architects Pte Ltd
<b>Quantity Surveyor</b>	Threesixty Cost Management Pte Ltd
<b>Landscape Consultant</b>	Sald Pte Ltd
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd
<b>Main Contractor</b>	Woh Hup (Private) Limited

# GRAB HEADQUARTERS

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



<b>Client/Developer</b>	HSBC Institutional Trust Services (Singapore) Limited As Trustee Of Ascendas Real Estate Investment Trust
<b>Architect</b>	P&T Consultants Pte Ltd
<b>M&amp;E Engineer</b>	Beca Carter Hollings & Ferner(S.E.A) Pte Ltd
<b>Structural Engineer</b>	Sterling C&S Consulting Engineer Pte Ltd
<b>Quantity Surveyor</b>	Northcroft Lim Consultants Pte Ltd
<b>Main Contractor</b>	HPC Builders Pte Ltd

- Estimated energy savings: 1,867,617 kWh/yr; Estimated water savings: 391.61m<sup>3</sup>, ETTV: 33.54W/m<sup>2</sup>
- Water cooled centrifugal chilled water system with Design system efficiency of 0.514 kW/RT
- Efficient AHU's with EC fans & Air distribution by thermal diffusers
- Energy valves to modulate the pump flow
- High Efficient LED Lighting
- Extensive use of environmentally friendly products
- Energy Sub metering & BMS monitoring

# LYF ONE-NORTH SINGAPORE NEW NON-RESIDENTIAL BUILDING

## GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Extensive use of LED lightings to all areas to improve lighting efficiency with provision of motion sensors in staircases and common toilets with contribute 33% of energy savings.
- All apartment rooms are fitted with intelligent occupancy sensors which able to reduce usage of air-conditioning system and lights, which contribute 36% energy savings.
- Provision of sub shading fins and laminated low-e DGU to reduce façade solar heat gain
- Efficient VRF air-conditioning system, which contribute 27% energy saving.
- Efficient heat pump for hot water system, which contribute 17% energy saving.

<b>Client/Developer</b>	Ascott Residence Trust
<b>Architect</b>	WOHA Architects Pte Ltd
<b>M&amp;E Engineer</b>	Squire Mech Pte Ltd
<b>Structural Engineer</b>	Mott MacDonald Singapore Pte Ltd
<b>Quantity Surveyor</b>	Arcadis Singapore Pte Ltd
<b>Main Contractor</b>	Nakano Singapore (Pte) Ltd

# RAZER SEA HQ

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Extensive use of LED lightings in all areas to improve lighting efficiency with provision of motion sensors in staircases and all toilets
- Water efficient development utilising WELS 3-tick fittings in all areas
- Low ETTV value of 37.59 W/m<sup>2</sup>
- Lush greenery with Green Plot Ratio of 4
- Use of rain sensors and harvested rainwater for irrigation purpose

<b>Client/Developer</b>	SNAKEPIT - BP LLP
<b>Architect</b>	Surbana Jurong Consultants Pte Ltd
<b>M&amp;E Engineer</b>	Squire Mech Private Limited
<b>Structural Engineer</b>	RSP Architects Planners & Engineers (Pte) Ltd
<b>Main Contractor</b>	Boustead Projects E&C Pte Ltd

# TEKKA PLACE

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



**Client/Developer**

Corwin Holding Pte Ltd

**Architect**

ONG & ONG Pte Ltd

**M&E Engineer**

KTP Consultants Ptd Ltd

**Structural Engineer**

KTP International Ptd Ltd

**Quantity Surveyor**

Davis Langdon KPK (Singapore) Pte Ltd

**Main Contractor**

Lum Chang Building Contractors Ptd Ltd

**Landscape Consultant**

COEN Design International Pte Ltd

**ESD/Green Consultant**

G-Energy Global Pte Ltd

- Estimated energy savings: 2,345,745 kWh/yr
- Efficient Chiller Plant Design System Efficiency – 0.63 kW/RT Total System Efficiency
- Extensive use of LED lighting to reduce energy consumption
- WELS rated Water Efficient Fittings used to promote water conservation.
- Extensive rooftop greenery and gardens.
- Lifts equipped with VVVF drive and Sleep mode features

# WOH HUP TECHNICAL HUB

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Good building orientation, to reduce heat gain in air conditioned areas.
- Efficient lighting system.
- Use of Solar PV system for renewable energy.
- Use of Mass Engineered Timber Structure
- Usage of sustainable products in the external wall construction.

<b>Client/Developer</b>	Tanglin Corporation Pte Ltd
<b>Architect</b>	Lander Loke Architects
<b>M&amp;E Engineer</b>	Neam Solutions
<b>Structural Engineer</b>	Ronnie & Koh Consultant Pte Ltd
<b>Main Contractor</b>	Woh Hup (Pte) Ltd

# WOODLANDS BUS INTERCHANGE

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Estimated energy savings: 788,290 kWh/yr; Estimated water savings: 10,512 m<sup>3</sup>/yr, ETTV: 37.74W/m<sup>2</sup>
- 100% use of "Excellent" WELS rating water fittings.
- Extensive use of Sustainable Products within the development.
- Highly efficient lighting system with 52.8% improvement from baseline.
- Emphasis on Good indoor air quality with implementation of UVGI and MERV 14 rating filters at air distribution systems

**Client/Developer**

Land Transport Authority

**Architect**

SD Architects & Associates Pte. Ltd

**M&E Engineer**

Elead Associates Pte. Ltd.

**Structural Engineer**

Fong Consult Pte. Ltd.

**Main Contractor**

CCECC Singapore Pte Ltd

**ESD Consultant**

G-Energy Global Pte Ltd

# 79 ANSON ROAD

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



**Client/Developer**

MCST 2465

**ESCO**

G-Energy Global Pte Ltd

**Facility Manager**

UE ServiceCorp Singapore

- Efficient chiller plant system with VSD for chilled/condenser water pumps, and cooling tower fans achieving an efficiency of 0.64 kW/RT.
- Use of energy efficiency lighting to minimize energy consumption from lighting.
- Use of lifts with provision of Variable Frequency (VVVF) drives and sleep mode.
- Provision of private-meters to monitor major water use.
- Achieved PUB Water Efficient Building Certificate.
- Promote and encourage waste minimization among occupants.

# AMK HUB

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Estimated energy savings: 2,451,201kWh/yr
- Chiller plant system with operating efficiency of 0.61kW/RT
- Permanent measurement and verification instrumentation for the monitoring of chilled water plant efficiency and heat balancing
- Use of motion sensors with highly energy efficient LED & T5 lightings

<b>Client/Developer</b>	Mercatus Alpha Co-operative Pte Ltd
<b>Architect</b>	RSP Architects Planners & Engineers (Pte) Ltd
<b>M&amp;E Engineer</b>	Squire Mech Pte Ltd

# ASIAN CIVILISATIONS MUSEUM

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Efficient Chiller Plant
- Efficient Lighting
- Water Efficient Fitting

<b>Client/Developer</b>	National Heritage Board
<b>Facility Manager</b>	National Heritage Board
<b>ESD / Green Consultant</b>	Afogreen Build Pte Ltd

# AYER RAJAH COMMUNITY CLUB

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Extensive use of LED lightings
- Air-cooled Variable Refrigerant Flow System with average operating efficiency of 0.82kW/RT
- Naturally ventilated corridors and lift lobbies
- Use of 'Excellent' WELS rating water fittings
- Water sub-meters for monitoring of water usage
- Recycling program that is closely monitored

**Client/Developer**

People's Association

**Facility Management**

C&W Services (S) Pte Ltd

# BUKIT PANJANG PLAZA

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Efficient air conditioning equipment
- More than 7 cycles of concentration for cooling tower
- Use of LED lights for the development
- Water Efficient Building Certification by PUB
- Good Indoor Air Quality achieved for the development

<b>Building Owner</b>	The MCST Plan No. 2533
<b>Facility Management</b>	Capitaland Retail Management Pte Ltd
<b>ESD Consultant</b>	W2Square Consultancy Pte Ltd

# CROSS STREET EXCHANGE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Energy efficient air-conditioning system
- Energy efficient lighting
- Use of water efficient fittings

**Client/Developer**

British and Malayan Trustees Limited  
as Trustee of Frasers Commercial Trust

**Facility Manager**

Frasers Property Commercial  
Management Pte Ltd

**ESD / Green Consultant**

DP Sustainable Design Pte Ltd

# GOLDEN MILE FOOD CENTRE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Good natural ventilation with design of building layout that utilises prevailing wind conditions to achieve adequate cross ventilation
- Efficient Lightings for common areas
- Awarded PUB Water Efficient Building certificate
- Implementation of recycling programme, with provision of recycling bins and sustainability awareness messages within the vicinity

<b>Client/Developer</b>	National Environment Agency
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd
<b>Facility Manager</b>	National Environment Agency

# IMM BUILDING

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Water-Cooled chiller plant efficiency of 0.66 kW/RT
- Use of variable speed drive (VSDs) for pumps & cooling towers.
- Natural ventilated carpark with parking guiding system.
- Occupancy sensor are installed in all staircase.
- Sleep mode feature incorporated in lift system and variable speed drive available on escalator.

**Client/Developer**

HSBC Institutional Trust Services (Singapore) Limited as Trustee of CapitaLand Mall Trust

**Facility Management**

CapitaLand Retail Management Pte Ltd

**ESCO**

LJ Energy Pte Ltd

**ESD / Green Consultant**

LJ Energy Pte Ltd

# INCOME @ RAFFLES

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Estimated energy savings: 830,000 kWh/yr
- Retrofit of 2 chiller plants achieving combined efficiency of 0.66 kw/ton
- LED lighting for most of common area in building

**Client/Developer**

Mercatus Co-operative Limited

**Facility Manager**

CBRE Pte Ltd

**ESD / Green Consultant**

LJ Energy Pte Ltd

**ESCO**

LJ Energy Pte Ltd

# INCOME CENTRE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Energy efficient VRF system achieving around 0.63 kW/RT
- Extensive use of LED lightings
- Use of motion sensors to switch on and off the air-conditioning in nearly all the meeting rooms

**Client/Developer**

NTUC Income Insurance  
Co-operative Limited

**Facility Manager**

Knight Frank Property Asset  
Management Pte Ltd

**ESD / Green Consultant**

LJ Energy Pte Ltd

# INFINITE STUDIOS

## EXISTING NON-RESIDENTIAL BUILDINGS

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- ETTV – ETTV of 29 W/m<sup>2</sup>
- Chiller Plant System Efficiency - A system efficiency of 0.647 kW/RT is achieved by the chiller plant system efficiency
- Efficient Water Fittings – All water fittings covered under WELS 3-tick
- CO sensors – Ductless fans linked to CO sensors for car park
- Automatic Condenser Tube Cleaning System – Use of automatic condenser tube cleaning system for chiller plants

<b>Building Owner</b>	Ascendas-Citramas Pte Ltd
<b>Facility Management</b>	Ascendas Services Pte Ltd
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd

# INTERNATIONAL BUILDING EXISTING NON-RESIDENTIAL BUILDING

## GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Energy efficient chiller plant system
- Use of LED lightings for common corridors, lift lobbies and toilets
- Motion sensors at corridors, lift lobbies and toilets
- Recycling bins provided at strategic locations

<b>Building Owner</b>	Yat Yuen Hong Company Limited
<b>Facility Management</b>	Yat Yuen Hong Company Limited
<b>ESD/Green Consultant</b>	Johnson Controls (S) Pte Ltd

# INTERNATIONAL PLAZA

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Two chiller plants achieving combined efficiency of 0.63 kw/ton
- EC fans and energy values for AHUs
- Water consumption monitoring system for public toilets and cooling towers

#### Client/Developer

The Management Corporation  
Strata Title Plan No. 461

#### Facility Manager

The Management Corporation  
Strata Title Plan No. 461

#### ESD / Green Consultant

C&W Services (S) Pte Ltd

# LTA BEDOK CAMPUS

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- LED lightings for most functional spaces
- New Air conditioning is the high COP type (VRV system)
- Use Daikin monitoring system to ensure all air conditioning in order and rectify immediately when fault occurs
- Water feature are switched off after working hours
- Maintain temperature settings at 23 to 24 Deg C for all office air conditioning

<b>Building Owner</b>	Singapore Land Authority
<b>Facility Management</b>	Synergy FMI Pte Ltd
<b>ESD/Green Consultant</b>	Exergy Technologies Pte Ltd

# NATIONAL GALLERY SINGAPORE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Energy Efficient Air-Con System Design
- Energy Efficient Lighting
- 53.82 kWp Solar PV System
- Use of non-potable water for irrigation
- Provision of Eco-pond
- Landscape roof top greenery and vertical greenery system

**Client/Developer** National Gallery Singapore

**ESD Consultant** G-Energy Global Pte Ltd

# NATIONAL MUSEUM OF SINGAPORE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Estimated energy savings: 1,916,703 kWh/yr
- Efficient Water-cooled chilled water system with efficiency of 0.623 kW/RT
- High Efficient LED Lighting
- Excellent WELS rating of all water fittings

<b>Building Owner</b>	National Heritage Board
<b>Facility Management</b>	National Heritage Board
<b>ESD/Green Consultant</b>	Afogreen Build Pte Ltd

# NGEE ANN POLYTECHNIC BLOCKS 4 TO 8, 23, 25, 27 & 31

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Facade replacement with Low-E DGU to achieve ETTV of 29.4W/m<sup>2</sup>
- Extensive usage of LED lighting at common areas, lift lobbies & toilets
- Replacement of sanitary fittings to water-efficient water fittings

**Client/Developer** Ngee Ann Polytechnic

**Facility Manager** Ngee Ann Polytechnic

# NUCLEOS

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Low ETTV of 35.3w/m2 through passive design of building envelope and orientation
- High Efficient LED and T5 Lightings for all common areas
- Connection to Ascendas Operations Centre (AOC) for monitoring of system efficiency and energy consumption of major systems, analytics and fault detection diagnostics
- Awarded PUB Water Efficient Building certificate

<b>Client/Developer</b>	Ascendas Venture Pte Ltd
<b>Consultant/Contractor</b>	G-Energy Global Pte Ltd
<b>Facility Manager</b>	Ascendas Services Pte Ltd
<b>ESCO</b>	G-Energy Global Pte Ltd

# ONE MARINA BOULEVARD

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Energy Portal and Dashboard, with sub-metering trending and reporting for major energy consuming equipment
- Integrated building management system (iBMS) with adaptive control algorithms
- LED-based luminaires for common areas, carpark, stairwells and toilets

**Client/Developer** Mercatus Delta Co-operative Limited  
**Facility Manager** Mercatus Delta Co-operative Limited  
**ESD / Green Consultant** Singapore District Cooling Pte Ltd

# ORCHARD HOTEL SINGAPORE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Efficient chiller plant with system efficiency of 0.585 kW/RT.
- Extensive Roof top greenery.
- Provision of CO sensors to regulate ventilation fans in basement carparks.
- Provision of recycling bins and waste management programme to collect and monitor recyclable wastes.
- Extensive use of green certified equipment by SGBC and SGLS.

<b>Building Owner</b>	DBS Trustee Limited
<b>Facility Management</b>	Orchard Hotel Singapore
<b>ESCO</b>	G-Energy Global Pte Ltd
<b>ESD / Green Consultant</b>	G-Energy Global Pte Ltd

# PENINSULA HOTEL

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Energy efficient water-cooled chiller system with chiller system efficiency of 0.59 kW/RT
- Using LED lighting for all common areas
- Retrofit all PAHUs with MERV 14 filters
- Achieved PUB Water Efficient Building Certificate

<b>Client/Developer</b>	YTC Hotels Ltd
<b>ESCO</b>	G-Energy Global Pte Ltd
<b>Facility Manager</b>	YTC Peninsula Shopping Complex Pte Ltd

# PENINSULA SHOPPING COMPLEX

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Energy efficient water-cooled chiller system with chiller system efficiency of 0.59 kW/RT
- Using LED lighting for all common areas
- Replacement Energy Efficient AHUs & FCUs in tenants areas
- Achieved PUB Water Efficient Building Certificate

#### Client/Developer

Management Corporation Strata  
Title Plan No. 399

#### ESCO

G-Energy Global Pte Ltd

#### Facility Manager

YTC Peninsula Shopping  
Complex Pte Ltd

# RESORTS WORLD SENTOSA - BEACH VILLAS

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Extensive use of high efficiency LED lamps with lower wattage
- Efficient heat pump system to produce hot water for guest bathrooms
- Provision of VSD and dedicated Proportional Integral Derivative (PID) control for secondary heat exchangers pumping system
- Provision of self-sustainable Eco-pond for the cultivation of biodiversity and Bio-swale which mitigates direct rainwater run-off and removes pollutants prior to depositing at the Eco-pond
- Extensive greenery to alleviate urban heat island effect

**Building Owner** Resorts World at Sentosa Pte Ltd

**Facility Management** Resorts World at Sentosa Pte Ltd

**ESD/Green Consultant** G-Energy Global Pte Ltd

# RESORTS WORLD SENTOSA – CROCKFORDS TOWER

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Extensive use of high efficiency LED lamps with lower wattage
- Provision of smart remote metering system for water monitoring and leak detection
- High efficiency air filters (MERV 14) for AHUs to maintain good indoor air quality
- Efficient heat recovery system to produce hot water for guest rooms, F&B and kitchen usage
- Provision of VSD and dedicated Proportional Integral Derivative (PID) control for Secondary Heat Exchangers Pumping System

**Client/Developer** Resorts World at Sentosa Pte Ltd

**Facility Manager** Resorts World at Sentosa Pte Ltd

**ESD/ Green Consultant** G-Energy Global Pte Ltd

# RESORTS WORLD SENTOSA – EQUARIUS HOTEL

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Extensive use of high efficiency LED lamps with lower wattage
- Provision of smart remote metering system for water monitoring and leak detection
- High efficiency air filters (MERV 14) for AHUs to maintain good indoor air quality
- Efficient heat recovery system to produce hot water for guest rooms, F&B and kitchen usage
- Provision of VSD and dedicated Proportional Integral Derivative (PID) control for Secondary Heat Exchangers Pumping System

**Client/Developer**

Resorts World at Sentosa Pte Ltd

**Facility Manager**

Resorts World at Sentosa Pte Ltd

**ESD/ Green Consultant**

G-Energy Global Pte Ltd

# RESORTS WORLD SENTOSA - ESPA

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Extensive use of high efficiency LED lamps with lower wattage
- Efficient heat recovery system to produce hot water for SPA usage
- Provision of VSD and dedicated Proportional Integral Derivative (PID) control for Secondary Heat Exchangers Pumping System
- Extensive greenery to soften the landscape and alleviate urban heat island effect
- Provision of bio-swale which mitigates direct rainwater run-off and removes pollutants prior to depositing at the Eco-pond

**Client/Developer** Resorts World at Sentosa Pte Ltd  
**Facility Manager** Resorts World at Sentosa Pte Ltd  
**ESD/ Green Consultant** G-Energy Global Pte Ltd

# RESORTS WORLD SENTOSA – FESTIVE HOTEL

## EXISTING NON-RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Extensive use of high efficiency LED lamps with lower wattage.
- Provision of smart remote metering system for water monitoring and leak detection.
- High efficiency air filters (MERV 14) for AHUs to maintain good indoor air quality.
- Efficient heat recovery system to produce hot water for guest rooms and kitchen usage.
- Provision of VSD and dedicated Proportional Integral Derivative (PID) control for Secondary Heat Exchangers Pumping System

**Client/Developer**      Resorts World at Sentosa Pte Ltd  
**Facility Manager**      Resorts World at Sentosa Pte Ltd  
**ESD/Green Consultant**      G-Energy Global Pte Ltd

# RESORTS WORLD SENTOSA – HARD ROCK HOTEL

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Extensive use of high efficiency LED lamps with lower wattage
- Provision of smart remote metering system for water monitoring and leak detection
- High efficiency air filters (MERV 14) for AHUs to maintain good indoor air quality
- Efficient heat recovery system to produce hot water for guest rooms, F&B and kitchen usage
- Provision of VSD and dedicated Proportional Integral Derivative (PID) control for Secondary Heat Exchangers Pumping System

**Client/Developer** Resorts World at Sentosa Pte Ltd

**Facility Manager** Resorts World at Sentosa Pte Ltd

**ESD/ Green Consultant** G-Energy Global Pte Ltd

# RESORTS WORLD SENTOSA – HOTEL MICHAEL

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Extensive use of high efficiency LED lamps with lower wattage.
- Provision of smart remote metering system for water monitoring and leak detection.
- High efficiency air filters (MERV 14) for AHUs to maintain good indoor air quality.
- Efficient heat recovery system to produce hot water for guest rooms, F&B and kitchen usage.
- Provision of VSD and dedicated Proportional Integral Derivative (PID) control for Secondary Heat Exchangers Pumping System

<b>Client/Developer</b>	Resorts World at Sentosa Pte Ltd
<b>Facility Manager</b>	Resorts World at Sentosa Pte Ltd
<b>ESD/Green Consultant</b>	G-Energy Global Pte Ltd

# RESORTS WORLD SENTOSA – MARINE LIFE PARK

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Extensive use of high efficiency LED lamps with lower wattage.
- Provision of smart remote metering system for water monitoring and leak detection.
- High efficiency air filters (MERV 14) for AHUs to maintain good indoor air quality.
- CO sensor integrated demand control ventilation for Car Park.
- Rainwater and condensate water from air-conditioners are harvested for landscape irrigation.

**Client/Developer**      Resorts World at Sentosa Pte Ltd

**Facility Manager**      Resorts World at Sentosa Pte Ltd

**ESD/Green Consultant**      G-Energy Global Pte Ltd

# RIVERVALE MALL

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Strategically located near the transport network, reducing environmental impacts from vehicle emission and pollution
- Average chiller plant room efficiency 0.7kw/ton
- Efficient T5/LEDs lightings within the building
- Widespread usage of environmentally friendly products within the premise

<b>Client/Developer</b>	RVM Holdings Pte Ltd
<b>Facility Management</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>ESCO</b>	Comfort Management Pte Ltd
<b>ESD / Green Consultant</b>	Comfort Management Pte Ltd

# SCIENCE CENTRE SINGAPORE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Estimated energy savings: 546,636 kWh/yr
- Science Centre Singapore is under GESP for Retrofitting and maintenance of chiller plant system
- Energy Efficient Products used are certified by approved local certification body (VSD, CHWP/CWP, Cooling tower, Auto tube cleaning system)

<b>Client/Developer</b>	Science Centre Board
<b>Facility Manager</b>	Science Centre Singapore
<b>ESD / Green Consultant</b>	Johnson Controls (S) Pte Ltd
<b>ESCO</b>	Johnson Controls (S) Pte Ltd

# SEAMEO REGIONAL LANGUAGE CENTRE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Centralised chilled water plant with system efficiency of 0.60kW/RT
- Energy efficient lightings installed in all areas such as common corridors, offices and guestrooms
- Motion sensors for lighting control in washrooms, common corridors and all staircases
- Provision of recycling waste facilities with monthly monitoring of recyclable waste collected.
- PUB certified Water Efficient Building

<b>Client/Developer</b>	Ministry of Education
<b>Facility Manager</b>	In-house
<b>ESCO</b>	Kaer Pte Ltd
<b>ESD/Green Consultant</b>	Kaer Pte Ltd

# SENJA-CASHEW COMMUNITY CLUB

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Naturally ventilated corridors and lift lobbies
- Extensive use of LED lighting
- Provision of green roof

**Client/Developer** People's Association

**Facility Manager** SMM Pte Ltd

# SINGAPORE LAND TOWER

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Highly efficient water-cooled chiller plant with efficiency of 0.642kW/RT
- Use of WELS 3-ticks water efficient fittings
- Use of environmentally friendly products
- Provision of facilities for the collection and storage of common recyclables such as paper, metal and plastic
- Provision of priority parking with electric vehicle charging points

<b>Client/Developer</b>	Singapore Land Limited
<b>Facility Manager</b>	SL Development Pte Ltd
<b>ESD/Green Consultant</b>	G-Energy Global Pte Ltd

# SUN YAT SEN NANYANG MEMORIAL HALL

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Air conditioning system retrofit for greater energy efficiency
- Extensive use of LED lightings
- Water efficient fittings

<b>Client/Developer</b>	Sun Yat Sen Nanyang Memorial Hall
<b>Facility Manager</b>	Sun Yat Sen Nanyang Memorial Hall
<b>ESD / Green Consultant</b>	Afogreen Build Pte Ltd

# TAMAN JURONG MARKET AND FOOD CENTRE

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Good natural ventilation with design of building layout that utilises prevailing wind conditions to achieve adequate cross ventilation
- Efficient Lightings for common areas
- Awarded PUB Water Efficient Building certificate
- Implementation of recycling programme, with provision of recycling bins and sustainability awareness messages within the vicinity

**Client/Developer** National Environment Agency  
**ESD Consultant** Building System & Diagnostics Pte Ltd  
**Facility Manager** National Environment Agency

# TECHLINK

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



**Client/Developer**

HSBC Institutional Trust Services (Singapore) Limited as Trustee of Ascendas Real Estate Investment Trust

**Facility Manager**

Ascendas Services Pte Ltd

**ESCO**

C&W (S) Services Pte Ltd

**ESD/Green Consultant**

C&W (S) Services Pte Ltd

- Chiller plant system under guaranteed performance-based maintenance contract services to achieve 0.65 kW/RT or better
- LED lightings for all common areas and motion sensors in staircases and toilets
- PUB certified Water Efficient Building with private sub-meters for remote monitoring of major end-uses
- Use of environmentally friendly products for chiller plant system and building operations
- Recycling facilities for common recyclables and electronic wastes; and partnership with NEA for “Say Yes to Waste Less” campaign to promote use of reusable items

# TECHPOINT

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Chiller plant system is under guaranteed performance contracting services to achieve 0.65 kW/RT or better
- LED lightings are in use at common areas, achieving 64% improvement over baselines. Motion sensors and photocell sensors are installed
- Landscape greenery and water feature are available, improving the occupants' physical and mental well-being. Health & wellness activities are regularly conducted as part of HPB "Healthy Workplace Ecosystem" programme
- Recycling facilities for common recyclables and for electronic wastes are available. CapitaLand is in partnership with NEA for the campaign - "Say Yes to Waste Less" to promote the use of reusables

#### Client/Developer

HSBC Institutional Trust Services (Singapore) Limited as Trustee of Ascendas Real Estate Investment Trust (the Trustee)

#### Facility Manager

Ascendas Services Pte Ltd

#### ESD/ Green Consultant

C&W Services (S) Pte Ltd

# TECHVIEW

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



**Client/Developer**

HSBC Institutional Trust Services (Singapore) Limited as Trustee of Ascendas Real Estate Investment Trust

**Facility Manager**

Ascendas Services Pte Ltd

**ESCO**

C&W (S) Services Pte Ltd

**ESD/Green Consultant**

C&W (S) Services Pte Ltd

- Chiller plant system under guaranteed performance contracting services to achieve 0.62 kW/RT or better
- LED lightings for all common areas and motion sensors in staircases and toilets
- PUB certified Water Efficient Building with private sub-meters for remote monitoring of major end-uses
- Use of environmentally friendly products for chiller plant system and building operations
- Recycling facilities for common recyclables and electronic wastes; and partnership with NEA for “Say Yes to Waste Less” campaign to promote use of reusable items

# UIC BUILDING

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup> (RE-CERT)



- Building envelope designed with double glazed low emission glass achieving ETTV of 38.51 W/m<sup>2</sup>
- Chiller plant system with operating efficiency of 0.64kW/RT
- Efficient Lighting with T5s/ LEDs and motion sensors
- All lifts are fitted with regenerative drives to conserve energy

**Client/Developer** Subsidiary Management Corporation  
No. 1 Strata Title Plan No. 4626

**Facility Manager** Knight Frank Property Asset  
Management Pte Ltd

**ESD/ Green Consultant** Comfort Management Pte Ltd

# YEW TEE COMMUNITY CLUB

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- PUB certified Water Efficient Building
- Air-cooled VRF system with average operating efficiency of 0.81kW/RT
- Energy efficient LED & T5 lighting system
- Skylight dome design over atrium
- Natural ventilation at building atrium

**Client/Developer**

People's Association

**Facility Manager**

C&W Services Pte Ltd

**Green Consultant**

CBM Solutions Pte Ltd

**ESCO**

CBM Solutions Pte Ltd

# 15 HOLLAND HILL

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



<b>Client/Developer</b>	Peak Opal Pte. Ltd
<b>Project Manager</b>	Peak Opal Pte. Ltd
<b>Architect</b>	P&T Consultants Pte Ltd
<b>M&amp;E Engineer</b>	DP Engineers Pte Ltd
<b>Structural Engineer</b>	KCL Consultant Pte Ltd
<b>Quantity Surveyor</b>	Threesixty Cost Management Pte Ltd
<b>Main Contractor</b>	Thian Sung Construction Pte Ltd
<b>Landscape Consultant</b>	Ramboll Studio Dreiseitl
<b>ESD/Green Consultant</b>	DP Sustainable Design Pte Ltd

- Estimated energy savings: 79,909.49kWh/yr; Estimated water savings: 5,560.44m<sup>3</sup>/yr, RETV: 21.08W/m<sup>2</sup>
- Extensive greenery GnPr >7
- Air-conditioning 5 ticks under the Singapore Energy Labelling Scheme
- 40% of crushed concrete waste from demolished building sent to approved recyclers
- Good acoustic design and planning

# 19 NASSIM

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Estimated energy savings: 500,500.19kWh/yr; Estimated water savings: 11,665.4m<sup>3</sup>/yr, RETV: 21.82W/m<sup>2</sup>
- Good Residential Envelope Transmittance Value achieved for dwelling units
- 5-tick energy efficient air-conditioning system used for all dwelling units
- Use of energy efficient lighting for common areas
- Water efficient fittings used to promote water conservation
- Extensive greenery with fully automated irrigation system

<b>Client/Developer</b>	Keppel Land Singapore Pte Ltd
<b>Project Manager</b>	Keppel Land Singapore Pte Ltd
<b>Architect</b>	SCDA Architects PTE LTD
<b>M&amp;E Engineer</b>	Squire Mech Pte Ltd
<b>Structural Engineer</b>	KCL Consultants Pte Ltd
<b>Quantity Surveyor</b>	Threesixty Cost Management Pte Ltd
<b>Main Contractor</b>	Unison Construction Pte Ltd
<b>Landscape Consultant</b>	SCDA Architects Pte Ltd
<b>ESD/Green Consultant</b>	G-Energy Global Pte Ltd

# CAIRNHILL 16

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



**Client/Developer**

TSky Cairnhill Pte Ltd

**Architect**

LAUD Architects Pte Ltd

**M&E Engineer**

United Project Consultants Pte Ltd

**Structural Engineer**

LSW Consulting Engineers Pte Ltd

**Quantity Surveyor**

Aecom Singapore Pte Ltd

**Landscape Consultant**

STX Landscape Architects Pte Ltd

**ESD/Green Consultant**

Afogreen Build Pte Ltd

- Estimated energy savings: 527,468kWh/yr; Estimated water savings: 2,350.3m<sup>3</sup>/yr, RETV: 21.54W/m<sup>2</sup>
- 5 tick Energy Efficiency Labelled Air Conditioning
- Water Efficient Labeling Scheme for all applicable fittings
- Roof gardens and water feature
- Good passive design with natural ventilation
- Good well-being design with natural color, fin, way finding, etc

# FOURTH AVENUE RESIDENCES

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



**Client/Developer**  
**Architect**

Allgreen Properties Limited  
RSP Architects Planners & Engineers  
(Pte) Ltd

**M&E Engineer**  
**Structural Engineer**  
**Quantity Surveyor**

J.Roger Preston (S) Pte Ltd  
KTP Consultants Pte Ltd  
Arcadis Singapore Pte Ltd

**Main Contractor**  
**Landscape Consultant**  
**ESD/Green Consultant**

Tiong Aik Construction Pte Ltd  
Coen Design International Pte Ltd  
Afogreen Build Pte Ltd

- Estimated energy savings: 3,002,141.23kWh/yr; Estimated water savings: 48,281.42m<sup>3</sup>/yr, RETV: 20.58W/m<sup>2</sup>
- Use of efficient air-con system for all FCU and CU with 5-ticks label
- Extensive greenery with GnPR 10.21
- All landscape area served by drip irrigation system
- Reduction of heat gain by achieving RETV lower than 22 W/m<sup>2</sup>
- Extensive use of LED lights to reduce energy consumption

# HAUS ON HANDY

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Use of >80% 5 ticks air-conditioners for all dwelling units
- Use of 100% LED lighting
- Use of VVVF and sleep mode lifts
- Use of auto-irrigation with rain sensor for 50% of landscape
- Use of sustainable building system- precast concrete for >50% of constructed floor area

<b>Client/Developer</b>	CDL Regulus Pte Ltd
<b>Architect</b>	Architects 61 Pte Ltd
<b>M&amp;E Engineer</b>	Rankine & Hill Pte Ltd
<b>Structural Engineer</b>	LSW Consulting Engineers Pte Ltd
<b>Quantity Surveyor</b>	Threesixty Cost Management Pte Ltd

# JUNIPER HILL

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Extensive greenery with GnPR of 6.76
- Provision of 5-ticks high energy efficiency air-conditioning systems
- Achieved RETV of 19.14 W/m<sup>2</sup>
- Extensive use of environmentally friendly products
- Provision of facilities for horticulture/ wood waste recycling

**Client/Developer**

Allgreen Properties Limited

**Architect**

P&T Consultants Pte Ltd

**M&E Engineer**

Belmacs Pte Ltd

**Structural Engineer**

Aurecon Singapore (Pte) Ltd

**Quantity Surveyor**

Rider Levett Bucknall LLP

**Landscape Consultant**

COEN Design International Pte Ltd

**Main Contractor**

Tiong Aik Construction Pte Ltd

# MIDWOOD

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Estimated energy savings: 174,110.11kWh/yr; Estimated water savings: 98.55m<sup>3</sup>/yr, RETV: 20.44W/m<sup>2</sup>
- Integrative Building Information Modeling.
- Extensive Greenery GnPr 6.
- Naturally Ventilated Car Park
- Sustainable Building System of >50% Coverage

**Client/Developer**

Hillview Rise Development Pte. Ltd.

**Project Manager**

Hillview Rise Development Pte. Ltd.

**Architect**

DP Architect Pte Ltd

**M&E Engineer**

United Project Consultants Pte Ltd

**Structural Engineer**

KCL Consultant Pte Ltd

**Quantity Surveyor**

AECOM Cost Consulting and Project Management (Singapore) Pte. Ltd.

**Main Contractor**

Kimly Construction Pte Ltd

**Landscape Consultant**

Tinderbox Pte Ltd

**ESD/Green Consultant**

DP Sustainable Design Pte Ltd

# NORTHSHORE EDGE

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Extensive Greenery
- Efficient Lighting Design Equipped with Smart Control
- Extensive Usage of Certified Green Products
- Layout Design that Optimize Cross Ventilation
- Adoption of Sustainable Building System

<b>Client/Developer</b>	Housing & Development Board
<b>Architect</b>	HDB Building & Research Institute
<b>M&amp;E Engineer</b>	HDB Building & Research Institute
<b>Structural Engineer</b>	HDB Building & Research Institute
<b>Quantity Surveyor</b>	Surbana Jurong Consultants Pte Ltd
<b>Main Contractor</b>	Teambuild Engineering & Construction Pte Ltd

# THE REEF AT KING'S DOCK

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



#### Client/Developer

HarbourFront Three Pte Ltd (JV b/w  
Mapletree Investments & Keppel Group)

#### Project Manager

Keppel Land

#### Concept Architect Architect

KCAP Architects and Planners  
DCA Architects Pte Ltd

#### M&E Engineer

Alpha Consulting Engineers Pte Ltd

#### Structural Engineer

T.Y.Lin International Pte Ltd

#### Quantity Surveyor

Arcadis Singapore Pte Ltd

#### Landscape Consultant

Grant Associates

#### ESD/Green Consultant

Arup Singapore Pte Ltd

- Estimated energy savings: 1,870,872kWh/yr;  
Estimated water savings: 6,863m<sup>3</sup>/yr, RETV:  
20.15W/m<sup>2</sup>
- Low window-to-wall ratio and integrated facade screens reduces solar heat gain
- Units with north and south facing windows allowing natural ventilation
- Extensive greenery coverage with green roofs, sky decks and communal gardens
- Use of 5-ticks energy efficient air-conditioners
- Use of highly efficient lighting fixtures

# RIVIÈRE

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



**Client/Developer**  
**Project Manager**  
**Design Architect**  
**Submission Architect**  
**M&E Engineer**  
**Structural Engineer**  
**Interior Design**  
**Quantity Surveyor**  
**Landscape Consultant**  
**ESD Consultant**  
**Main Contractor**

Frasers Property Singapore  
Frasers Property Corporate Services Pte Ltd  
SCDA Architects Pte Ltd  
P&T Consultants Pte Ltd  
J Roger Preston (S) Pte Ltd  
KTP Consultants Pte Ltd  
SCDA Architects Pte Ltd  
Threesixty Cost Management Pte Ltd  
Sald Pte Ltd  
Building System & Diagnostics Pte Ltd  
Woh Hup (Private) Limited

- Enhanced overall thermal performance of building envelope achieving a RETV of 20W/m<sup>2</sup> and below.
- Extensive greenery of a Green Plot Ratio of 4.5 and above are provided for nature connectivity and appreciation.
- Up to 97% of the energy efficient air-conditioners in the development are 5-ticks rated under the Singapore Energy Labelling Scheme.
- Up to 88% of the landscaped areas served by water efficient automated irrigation with rain sensor control.
- Provision of collaborative BIM for clash detection purposes, 4D time information linkages and 5D cost and quantity tracking of Project.

# ROYALGREEN

## NEW RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Estimated energy savings: 1,711,566.23kWh/yr; Estimated water savings: 35,944.56m<sup>3</sup>/yr, RETV: 16.87W/m<sup>2</sup>
- All residential blocks are north-south facing with low RETV achieved for reducing solar heat gain
- 5-tick energy efficient air conditioning system used for all apartment units
- Extensive use of LED lighting for common areas to reduce energy consumption
- Extensive greenery with roof garden connecting all blocks with auto irrigation used
- Certified water efficient fittings used to promote water conservation

<b>Client/Developer</b>	Allgreen Properties Limited
<b>Architect</b>	ADDP Architects LLP
<b>M&amp;E Engineer</b>	Alpha Consulting Engineers Pte Ltd
<b>Structural Engineer</b>	KTP Consultants Pte Ltd
<b>Quantity Surveyor</b>	Threesixty Cost Management Pte Ltd
<b>Main Contractor</b>	Woh Hup (Private) Limited
<b>Landscape Consultant</b>	Tinderbox Pte Ltd
<b>ESD/Green Consultant</b>	G-Energy Global Pte Ltd

# THE ESSENCE

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Estimated energy savings: 228,374kWh/yr; Estimated water savings: 23,783m<sup>3</sup>/yr, RETV: 20.39W/m<sup>2</sup>
- Use of energy efficient air-conditioning system certified with 5-ticks rating AC system
- Use of certified green and sustainable products for residential units and common areas
- Use of WELS certified water efficient sanitary fittings for residential units and common areas
- 40% improvement in the lighting power budget by using energy saving light fittings
- Provision of separate centralized recycling chutes for each block on every level

<b>Client/Developer</b>	CHONG KUO Development Pte Ltd
<b>Architect</b>	Park + Associates Pte Ltd
<b>M&amp;E Engineer</b>	United Project Consultants Pte Ltd
<b>Structural Engineer</b>	ECAS Consultants Pte Ltd
<b>Quantity Surveyor</b>	Northcroft Lim Consultants Pte Ltd
<b>Main Contractor</b>	Lian Soon Construction Pte Ltd
<b>Landscape Consultant</b>	COEN Design International Pte Ltd

# THE GAZANIA

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



<b>Client/Developer</b>	Singhaiyi Huajiang Sun Pte. Ltd
<b>Architect</b>	RSP Architects Planners & Engineers (Pte) Ltd
<b>M&amp;E Engineer</b>	Alpha Consulting Engineers Pte Ltd
<b>Structural Engineer</b>	KCL Consultants Pte Ltd
<b>Quantity Surveyor</b>	Rider Levett Bucknall LLP
<b>Main Contractor</b>	China Construction (South Pacific) Development Co Pte Ltd
<b>Landscape consultant</b>	COEN Design International Pte Ltd

- Estimated energy savings: 491,288.9 kWh/yr; Estimated water savings: 46,869.65m<sup>3</sup>, RETV: 19.46W/m<sup>2</sup>
- Use of low-E laminated glass to reduce solar heat energy gain through external façade.
- Energy efficient air-conditioning inverter system of 5-ticks are used for all apartments units.
- LED light fittings or T5 fluorescent tube and PL lamps with high frequency ballasts that are more energy efficient are used for all luminaires.
- Timers or motion sensors are used to control lightings at common area and facilities to minimize electricity consumption.
- Lifts with regenerative system are used in all towers to reduce electricity consumption.
- Water fittings of at least WELS 2-ticks are used for all apartment units.
- Ductless jet fan with CO sensor is used in basement carpark ventilation.
- Rainwater Harvesting System that supplies to landscape auto-irrigation system.

# THE LILIUM

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



<b>Client/Developer</b>	Singhaiyi Huajiang Amber Pte. Ltd.
<b>Architect</b>	RSP Architects Planners & Engineers (Pte) Ltd
<b>M&amp;E Engineer</b>	Alpha Consulting Engineers Pte Ltd
<b>Structural Engineer</b>	KCL Consultants Pte Ltd
<b>Quantity Surveyor</b>	Rider Levett Bucknall LLP
<b>Main Contractor</b>	China Construction (South Pacific) Development Co Pte Ltd

- Estimated energy savings: 263958 kWh/year; Estimated water savings: 20986 m<sup>3</sup>/year; RETV: 20.07 W/m<sup>2</sup>.
- Use of low-E laminated glass to reduce solar heat energy gain through external façade.
- Energy efficient air-conditioning inverter system of 5-ticks are used for all apartments units.
- LED light fittings or T5 fluorescent tube and PL lamps with high frequency ballasts that are more energy efficient are used for all luminaires.
- Timers or motion sensors are used to control lightings at common area and facilities to minimize electricity consumption.
- Lifts with regenerative system are used in all towers to reduce electricity consumption.
- Water fittings of at least WELS 2-ticks are used for all apartment units.
- Ductless jet fan with CO sensor is used in basement carpark ventilation.
- Rainwater Harvesting System that supplies to landscape auto-irrigation system.

# WOODLEIGH GLEN

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Solar Ready Roof for provision of Solar PV system
- Extensive use of LED light fittings for common areas
- Provision of Solar Tubes
- Provision of regenerative lifts
- Retention of existing site ecology and topography

<b>Client/Developer</b>	Housing and Development Board
<b>Architect</b>	Housing and Development Board
<b>M&amp;E Engineer</b>	Housing and Development Board
<b>Structural Engineer</b>	Housing and Development Board
<b>Quantity Surveyor</b>	Surbana Jurong Consultants Pte Ltd
<b>Landscape Consultant</b>	Housing and Development Board
<b>Project Manager</b>	BECA Carter Hollings & Ferner (S.E.Asia) Pte Ltd
<b>Main Contractor</b>	Chip Eng Seng Contractors Pte Ltd

# ANGSANA PRIMARY SCHOOL

## EXISTING SCHOOL

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Provision of recycling bins at strategic locations within the school(e.g. Canteen) and recycling poster, do's and don't's poster to educate users on recycling.
- Provision of an educational, fun and engaging green hub equipped with adequate learning materials on environmental sustainability for both student and staff.
- The school is built with minimal west and east facing facades and adequate provision of effective sun shading devices on the aforementioned facades to minimize of heat gain within the building.

**Client/Developer**

Ministry of Education

**Facility Management**

Chemicrete Enterprises Pte Ltd

**ESD /Green Consultant**

ES Management Pte Ltd

# BLANGAH RISE PRIMARY SCHOOL

## EXISTING SCHOOL

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- The school is built with minimal west and east facing facades
- Provision of energy efficient lightings and task lightings
- Provision of recycling bins at strategic locations within the school
- Provision of twin bins in classrooms to encourage recycling among students

<b>Client/Developer</b>	Ministry of Education
<b>Facility Manager</b>	C&W Services (S) Pte Ltd
<b>ESD/ Green Consultant</b>	C&W Services (S) Pte Ltd

# BUKIT BATOK SECONDARY SCHOOL

## EXISTING SCHOOL

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Attained PUB Water Efficient Building certification
- Provision of green corner with adequate learning materials on environmental sustainability for both students and staff
- Horticulture waste is recycled
- Provision of eco-pond with education facilities

**Client/Developer**

Ministry of Education

**Facility Manager**

C&W Services (S) Pte Ltd

**ESD/ Green Consultant**

C&W Services (S) Pte Ltd

# CASUARINA PRIMARY SCHOOL

## EXISTING SCHOOL

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- The east-west façade was taken into consideration when designing, thus the heat gains and solar glare was highly minimized.
- Trends of energy and water usage are monitored and documented to encourage staff and students to reduce consumption if necessary.
- Provision of a green corner equipped with adequate learning materials on environmental sustainability for both students and staff.

<b>Client/Developer</b>	Ministry of Education
<b>Facility Management</b>	SMM Pte Ltd
<b>ESD /Green Consultant</b>	Back to School Programme

# COMPASSVALE SECONDARY SCHOOL

## EXISTING SCHOOL

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Environment champions are appointed in each class to ensure that green practices are carried out in the school and to influence their peers to adopt environmentally friendly habits
- Education framework on sustainability are tailored to different levels, which include topics injected in the curriculum to teach the students on the environment factors, habitats and plants.
- Recycling efforts include the provision of recycling bins at strategic location within the school and recycling posters
- Energy and water usage are monitored, and these trends are communicated to both staff and students to encourage them to reduce consumption if necessary

**Client/Developer** Ministry of Education

**Facility Manager** Chemicrete Enterprises Pte Ltd

# FIRST TOA PAYOH PRIMARY SCHOOL

## EXISTING SCHOOL

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Use of energy efficiency air-conditioning system with average system efficiency of 0.99 kW/ton.
- The school is built with minimal west and east facing facades.
- Provision of a green corner with adequate learning materials on environmental sustainability for both students and staff.
- Provision of recycling bins at strategic locations within the school.
- Extensive greenery with a range of native plants planted in the school and labels to display the information of each plant.

<b>Client/Developer</b>	Ministry of Education
<b>Facility Management</b>	C & W Services (S) Pte Ltd
<b>ESD /Green Consultant</b>	C & W Services (S) Pte Ltd

# HOUGANG PRIMARY SCHOOL

## EXISTING SCHOOL

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- A range of native plants are planted in the school and labels are displayed for each plant to provide students with information and knowledge on these native plants.
- The school also has animal enclosures for fish, water snails, rabbits, roosters, terrapins, stick insects and birds. All these help to introduce to students the wonders of nature. They learn more about and appreciate nature.
- Environment badge programme is a school-wide programme with different activities for students from Primary 1 to Primary 6. 6 sets of environment-related activities are designed for the student to complete during their 6 years in Hougang Primary.

<b>Client/Developer</b>	Ministry of Education
<b>Facility Management</b>	Chemicrete Enterprises Pte Ltd
<b>ESD /Green Consultant</b>	ES Management Pte Ltd

# JUYING PRIMARY SCHOOL

## EXISTING SCHOOL

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



<b>Client/Developer</b>	Ministry of Education
<b>Facility Management</b>	C & W Services (S) Pte Ltd
<b>ESD /Green Consultant</b>	C & W Services (S) Pte Ltd

- The school is built with minimal west and east facing facades.
- The installation of LED lights along the corridor outside the canteen to reduce electricity consumption.
- Use of motion sensors for toilets.
- Rainwater Harvesting system which collects rainwater to water plants in the garden as an effort to conserve water.
- Monitoring food waste and composting of horticulture waste through food digester system.
- Hydroponics facility that makes use of recirculated water to grow vegetables, as an effort to save water. The facility also uses a solar panel to power the mechanism that helps it function.
- Provision of a green corner with adequate learning materials on environmental sustainability for both students and staff.
- A range of native plants are planted in the school and labels are displayed on the information of each plant.

# KENT RIDGE SECONDARY SCHOOL

## EXISTING SCHOOL



### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Use of energy efficiency air-conditioning system
- The school is built with minimal west and east facing facades
- Attained PUB Water Efficient Building certification
- Provision of vertical greenery

<b>Client/Developer</b>	Ministry of Education
<b>Facility Manager</b>	C&W Services (S) Pte Ltd
<b>ESD/ Green Consultant</b>	C&W Services (S) Pte Ltd

# NANYANG PRIMARY SCHOOL

## EXISTING SCHOOL

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



<b>Client/Developer</b>	Ministry of Education/ Nanyang Primary School
<b>Architect</b>	Ong & Ong Architects Pte Ltd and LT & T Architects Pte Ltd
<b>M&amp;E Engineer</b>	Rankine & Hill (S) Pte Ltd and William Ng Consultants Pte Ltd
<b>Structural Engineer</b>	DE Consultants (S) Pte Ltd and ECAS-EJ Consultants Pte Ltd
<b>Quantity Surveyor</b>	Davis Langdon & Seah (S) Pte Ltd and OTN Building Cost Consultants Pte Ltd
<b>Main Contractor</b>	Straits Construction Co. Pte Ltd and Guan Ho Construction Co. Pte Ltd

- Our Green Procurement Policy seeks to consider the environmental sustainability and impacts during our procurement process for goods and services.
- Provision of an eco-garden and outdoor experiential learning environment to encourage students to have an appetite for learning and cultivate responsibility for the environment
- Hydroponic gardening is another area to build the students' knowledge on biodiversity as well as allowing them to play a part in the upkeep of the garden.
- Environment Monitors are appointed and trained in each class to promote and ensure green practices are carried out.
- Monthly water and energy usage monitoring with reasons for change in consumption has been documented. The consumption trends are also shared among staff and students to raise their awareness
- A Green Corner has been incorporated as an outdoor learning for all students.
- A Green Club has also been formed to allow students to participate in green projects that include raising awareness on environmental sustainability among staff and fellow students through assembly talks, and external engagement programme to share and encourage neighbouring residents and pre-school students to support waste minimisation and recycling.

# PRINCESS ELIZABETH PRIMARY SCHOOL

## EXISTING SCHOOL



### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Attained PUB Water Efficient Building certification
- Participates yearly in the Green Schools @ South West programme which is organised by NEA and South West CDC
- Extensive greenery with GnP of 1.57
- Provision of zero waste corner to educate student on the importance of recycling

<b>Client/Developer</b>	Ministry of Education
<b>Facility Manager</b>	C&W Services (S) Pte Ltd
<b>ESD/ Green Consultant</b>	C&W Services (S) Pte Ltd

# RADIN MAS PRIMARY SCHOOL

## EXISTING SCHOOL

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- The school is built with minimal west and east facing facades.
- Energy efficient lighting for all areas and task lighting for working area.
- Attained PUB Water Efficient Building certification.
- Provision of a green corner with adequate learning materials on environmental sustainability for both students and staff.
- Provision of recycling bins at strategic locations within the school.

<b>Client/Developer</b>	Ministry of Education
<b>Facility Management</b>	C & W Services (S) Pte Ltd
<b>ESD /Green Consultant</b>	C & W Services (S) Pte Ltd

# RAFFLES GIRLS PRIMARY SCHOOL

## EXISTING SCHOOL

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



- Use of energy efficiency air-conditioning system
- Provision of energy efficient LED lightings and task lightings
- Provision of green corner with learning materials on environmental sustainability
- Provision of recycling bins at strategic locations within the school and twin bins in classrooms to encourage recycling among students

<b>Client/Developer</b>	Ministry of Education
<b>Facility Manager</b>	C&W Services (S) Pte Ltd
<b>ESD/ Green Consultant</b>	C&W Services (S) Pte Ltd

# TAMPINES SECONDARY SCHOOL

## EXISTING SCHOOL

### GREEN MARK AWARD FOR BUILDINGS | GOLD<sup>PLUS</sup>



**Client/Developer** Ministry of Education

**Facility Manager** SMM Pte Ltd

- High Efficient LED with motion sensors are installed in the school compound
- Recycling efforts include the provision of recycling bins at strategic location within the school and recycling posters
- Green Ambassadors are appointed to ensure that green practices are carried out in the school and to influence their peers to adopt environmentally friendly habits
- School's Applied Learning Programme (ALP) incorporates environmental education themes such as water and energy conservation as well as renewable energy in its curriculum. Through a problem based learning approach, the ALP aims to develop a showcase of environmentally friendly inventions.

# GREEN MARK AWARD FOR BUILDINGS | GOLD



<b>PROJECT NAME</b>	<b>CATEGORY</b>	<b>CLIENT/DEVELOPER/BUILDING OWNER</b>
3 Tuas Ave 2	New Non-Residential Buildings	AIMS AMP Capital Industrial Reit
Kolam Ayer Community Club	New Non-Residential Buildings	People's Association (PA)
Pioneer Encapsulation Plant	New Non-Residential Buildings	Givaudan Singapore Pte Ltd
Punggol Fire Station & Neighbourhood Police Centre	New Non-Residential Buildings	Ministry of Home Affairs (Singapore Police Force)
ST Engineering Electronics	New Non-Residential Buildings	ST Engineering Electronics Ltd
TÜV SÜD @ IBP	New Non-Residential Buildings	Pension Real Estate Singapore Pte. Ltd
28, Teban Gardens Crescent	Existing Non-Residential Buildings	Carrier Corporation
55 Market Street	Existing Non-Residential Buildings	AEW Asia Pte Ltd
5B Toh Guan	Existing Non-Residential Buildings	Mapletree Investments Pte Ltd
Admirax	Existing Non-Residential Buildings	ADM PRIZE SG (SINGAPORE) PTE LTD
Ang Mo Kio Police Division Headquarters	Existing Non-Residential Buildings	Ministry of Home Affairs (Singapore Police Force)

# GREEN MARK AWARD FOR BUILDINGS | GOLD



<b>PROJECT NAME</b>	<b>CATEGORY</b>	<b>CLIENT/DEVELOPER/BUILDING OWNER</b>
ASM Technology Singapore @ Tech Park Building 2	Existing Non-Residential Buildings	ASM Pacific Technology Ltd
Bedok Point	Existing Non-Residential Buildings	Frasers Property Singapore
BNP PARIBAS Campus Asia Pacific	Existing Non-Residential Buildings	Singapore Land Authority
Botany Centre at Singapore Botanic Gardens	Existing Non-Residential Buildings	National Parks Board
Centre for Climate Research Singapore (CCRS)	Existing Non-Residential Buildings	National Environment Agency
Compass One	Existing Non-Residential Buildings	MCST 2762
Family Link @ Lengkok Bahru	Existing Non-Residential Buildings	Ministry of Social and Family Development
Geylang Serai Market	Existing Non-Residential Buildings	National Environment Agency
Goldbell Towers	Existing Non-Residential Buildings	Chua Chuan Leong Contractors Pte Ltd
Grand Hyatt Singapore	Existing Non-Residential Buildings	Borneo Properties Sdn Bhd
HarbourFront Tower One and HarbourFront Tower Two	Existing Non-Residential Buildings	Mapletree Investments Pte Ltd

# GREEN MARK AWARD FOR BUILDINGS | GOLD



<b>PROJECT NAME</b>	<b>CATEGORY</b>	<b>CLIENT/DEVELOPER/BUILDING OWNER</b>
Holiday Inn Singapore	Existing Non-Residential Buildings	Harilela Hotels (S) Pte Ltd
Orchard City Centre	Existing Non-Residential Buildings	Hotel Royal Queens Singapore
Hotel Royal @ Queens	Existing Non-Residential Buildings	People's Association (PA)
Hougang Community Club	Existing Non-Residential Buildings	NTUC Income Insurance
Income @ Prinsep	Existing Non-Residential Buildings	Co-operative Ltd
Jurong Island Check Point	Existing Non-Residential Buildings	JTC Corporation
Lot One Shoppers' Mall	Existing Non-Residential Buildings	CapitaLand Group
Lucky Chinatown	Existing Non-Residential Buildings	Far East Square Pte Ltd
M1 (Annex) at 9 IBP	Existing Non-Residential Buildings	M1 Ltd
Mandarin Orchard Singapore	Existing Non-Residential Buildings	OUE Hospitality Trust
Manulife Tower	Existing Non-Residential Buildings	8 Cross Street PADREF Investments Ltd
MYP Centre	Existing Non-Residential Buildings	Salveur Pte Ltd

# GREEN MARK AWARD FOR BUILDINGS | GOLD



<b>PROJECT NAME</b>	<b>CATEGORY</b>	<b>CLIENT/DEVELOPER/BUILDING OWNER</b>
Nee Soon East Community Club	Existing Non-Residential Buildings	People's Association (PA)
Parkroyal Collection Marina Bay, Singapore	Existing Non-Residential Buildings	UOL Group Ltd
Plaza Singapura	Existing Non-Residential Buildings	CapitaLand Group
Radin Mas Community Club	Existing Non-Residential Buildings	People's Association (PA)
Raffles Building	Existing Non-Residential Buildings	National Parks Board
Sim Lim Square	Existing Non-Residential Buildings	The Management Corporation - Strata Plan Title No. 1440
Singapore American School	Existing Non-Residential Buildings	Singapore American School Limited
StarHub Green	Existing Non-Residential Buildings	Ubitech Hub Pte Ltd
Suntec City Mall	Existing Non-Residential Buildings	Management Corporation Strata Title Plan No 2197
Suntec Singapore Convention & Exhibition Centre	Existing Non-Residential Buildings	Suntec Singapore Convention & Exhibition Centre
Tampines West Community Club	Existing Non-Residential Buildings	People's Association (PA)

# GREEN MARK AWARD FOR BUILDINGS | GOLD



<b>PROJECT NAME</b>	<b>CATEGORY</b>	<b>CLIENT/DEVELOPER/BUILDING OWNER</b>
The Atrium @ Orchard	Existing Non-Residential Buildings	CapitaLand Group
The Beach View Southern Transport Complex	Existing Non-Residential Buildings	Sentosa Development Corporation
The Pan Pacific Hotel Singapore	Existing Non-Residential Buildings	Hotel Marina City Pte Ltd
The Signature	Existing Non-Residential Buildings	Mapletree Investments Pte Ltd
The Star	Existing Non-Residential Buildings	CapitaLand Group
Valley Point	Existing Non-Residential Buildings	Frasers Property Singapore
York Hotel	Existing Non-Residential Buildings	Elizabeth Khoo
Clementi Primary School	Existing Schools	Ministry of Education (MOE)
Compassvale Primary School	Existing Schools	Ministry of Education (MOE)
Fernvale Primary School	Existing Schools	Ministry of Education (MOE)
Frontier Primary School	Existing Schools	Ministry of Education (MOE)

# GREEN MARK AWARD FOR BUILDINGS | GOLD



<b>PROJECT NAME</b>	<b>CATEGORY</b>	<b>CLIENT/DEVELOPER/BUILDING OWNER</b>
Guangyang Primary School	Existing Schools	Ministry of Education (MOE)
Holy Innocents' High School	Existing Schools	Ministry of Education (MOE)
Junyuan Secondary School	Existing Schools	Ministry of Education (MOE)
Juying Secondary School	Existing Schools	Ministry of Education (MOE)
Loyang View Secondary School	Existing Schools	Ministry of Education (MOE)
New Town Primary School	Existing Schools	Ministry of Education (MOE)
Seng Kang Primary School	Existing Schools	Ministry of Education (MOE)
Shuqun Primary School	Existing Schools	Ministry of Education (MOE)
St Hilda's Primary School	Existing Schools	Ministry of Education (MOE)
Tanglin Secondary School	Existing Schools	Ministry of Education (MOE)
Teck Ghee Primary School	Existing Schools	Ministry of Education (MOE)

# GREEN MARK AWARD FOR BUILDINGS | GOLD



## PROJECT NAME

Telok Kurau Primary School

Temasek Primary School

Xinmin Primary School

## CATEGORY

Existing Schools

Existing Schools

Existing Schools

## CLIENT/DEVELOPER/BUILDING OWNER

Ministry of Education (MOE)

Ministry of Education (MOE)

Ministry of Education (MOE)

# GREEN MARK AWARD FOR BUILDINGS | CERTIFIED



<b>PROJECT NAME</b>	<b>CATEGORY</b>	<b>CLIENT/DEVELOPER/BUILDING OWNER</b>
1 Changi Business Park Avenue 1	Existing Non-Residential Buildings	Ascendas
1 Jalan Kilang	Existing Non-Residential Buildings	Ascendas
13 Blocks of 2-Storey Terrace Factory @ Pioneer Road North	Existing Non-Residential Buildings	JTC Corporation
Bras Basah Complex	Existing Non-Residential Buildings	Housing and Development Board (HDB)
Clarke Quay	Existing Non-Residential Buildings	CapitaLand Group
CSC @ Bukit Batok Clubhouse	Existing Non-Residential Buildings	Civil Service Club
CSC @ Tessensohn Clubhouse	Existing Non-Residential Buildings	Civil Service Club
Duke-NUS Medical School, Singapore	Existing Non-Residential Buildings	National University of Singapore (NUS)
Four Seasons Hotel Singapore	Existing Non-Residential Buildings	Hotel Properties Limited
Hansapoint	Existing Non-Residential Buildings	Ascendas
Honeywell Building	Existing Non-Residential Buildings	Ascendas

# GREEN MARK AWARD FOR BUILDINGS | CERTIFIED

<b>PROJECT NAME</b>	<b>CATEGORY</b>	<b>CLIENT/DEVELOPER/BUILDING OWNER</b>
Marina Square	Existing Non-Residential Buildings	Marina Centre Holdings Pte Ltd
Maxwell Chambers Suites	Existing Non-Residential Buildings	Ministry of Law
National University of Singapore - Yong Siew Toh	Existing Non-Residential Buildings	National University of Singapore (NUS)
Conservatory of Music	Existing Non-Residential Buildings	HSBC Institutional Trust Services (Singapore)
NORTHTECH	Existing Non-Residential Buildings	Limited as Trustee of AIMS APAC REIT
Pacific Tech Centre	Existing Non-Residential Buildings	Ascendas
PSA Vista	Existing Non-Residential Buildings	Vista Real Estate Investments Pte Ltd
Raffles Hospital	Existing Non-Residential Buildings	Raffles Hospital Properties Pte Ltd
Single Storey Eating House @ Tuas Ave 1	Existing Non-Residential Buildings	JTC Corporation
SOUTHPOINT	Existing Non-Residential Buildings	Handson Fu
The Aries	Existing Non-Residential Buildings	Ascendas
The Gemini	Existing Non-Residential Buildings	Ascendas

# GREEN MARK AWARD FOR BUILDINGS | CERTIFIED



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**PROJECT NAME**

The Tanglin Club

**CATEGORY**

Existing Non-Residential Buildings

**CLIENT/DEVELOPER/BUILDING OWNER**

The Tanglin Club



# YUNNAN GARDEN @ NTU

## NEW PARKS

### GREEN MARK AWARD FOR NON-BUILDINGS | PLATINUM



- ABC Waters for treatment of 100% of site's catchment
- Use of Energy Efficient LED Light Fittings
- Use of Water Efficient Water Fittings
- Use of Non-Potable water for irrigation and water features
- Extensive use of Sustainable Products and Products with Recycled Content
- On-site Tree Milling
- Use of recycled wood to make Park Benches
- Provision of Solar Panels at Street Lighting along the main road

**Client/Developer**

Nanyang Technological University  
(Office of Development & Facilities  
Management)

**Landscape Consultant  
Architectural QP**

STX Landscape Architects  
RSP Architects Planners & Engineers  
(Pte) Ltd

**C&S Consultants**

Fong Consult Pte. Ltd.;  
ECAS Consultants Pte Ltd (New Road only)

**M&E Consultants**

Aurecon Singapore (Pte) Ltd;  
BESCON Consulting Engineers Pte  
(New Road only)

**ESD Consultant**

Beca Carter Hollings & Ferner (S.E. Asia)  
Pte Ltd

**ABC Consultant**

Greenology Pte Ltd

# NANYANG TECHNOLOGICAL UNIVERSITY DISTRICT

## DISTRICT

### GREEN MARK AWARD FOR NON-BUILDINGS | PLATINUM



- Energy efficient LED street lighting for whole campus
- Provision of motion sensors for artificial lighting control
- Improvement in Green Plot Ratio
- Use of WELS rated fittings and achieved Water Efficient Building Certificate for whole campus
- Extensive use of sustainable products for whole campus
- Renewable energy from solar photovoltaic cells located at campus
- Sustainable operation with sustainable policies, green procurement policies, energy and water improvement plans

<b>Client/Developer</b>	Nanyang Technological University
<b>M&amp;E Engineer</b>	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
<b>ESD Consultant</b>	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
<b>Facility Management</b>	Nanyang Technological University

# TUAS WATER RECLAMATION PLANT

## INFRASTRUCTURE

### GREEN MARK AWARD FOR INFRASTRUCTURE | PLATINUM



**Client/Developer**

PUB, Singapore's National Water Agency

**Detailed Design Consultant**

CH2M HILL Singapore Private Limited (now Jacobs)

**EIA consultant**

DHI Water & Environment (S) Pte Ltd

**Main Contractors**

About 18 main contractors to be involved; presently on board:  
Contract 1A: McConnell Dowell South East Asia Private Limited  
Contract 2A: Koh Brothers-China Harbour Joint Venture  
Contract 4A: CES\_SDC Pte. Ltd.

- At 800,000 m<sup>3</sup>/day treatment capacity, it will be the largest membrane bioreactor facility in the world when completed
- One of the most compact used water treatment plants in the world (30% more compact than conventional plant)
- More than 85% NEWater recovery & increases overall NEWater production capacity. As a first in Singapore, Industrial Water is produced from industrial used water
- 30% more energy efficient than the international benchmark for membrane bioreactor plants and more than double the energy recovered for used water treatment.
- 100% powered by renewable, green energy (biogas, sludge, solid waste and solar)
- Maximise resource recovery through synergies with NEA's Integrated Waste Management Facility to form the Tuas Nexus
- Environmental Impact Assessment and Statements prepared early in the project implementation to identify and manage construction and operational environmental risks.

# BCA GREEN MARK OCCUPANT-CENTRIC SCHEMES

The **BCA Green Mark for Occupant-Centric Schemes** is catered for the multi-tenanted and multi-functional aspect of the diverse buildings which make up the built environment. A single building may be occupied by different tenants, who each have different operational functions. The various schemes under the BCA Green Mark Occupant-Centric schemes allow appropriate sustainability benchmarks and criteria to be tailored for the various core operations of tenants within buildings.

This year, the BCA Green Mark Award winners for Occupant-Centric schemes are grouped into the following categories:

- i. BCA-HPB Green Mark for Healthier Workplaces
- ii. BCA Green Mark Award for Office Interiors
- iii. BCA Green Mark Award for Supermarkets
- iv. BCA Green Mark Award for Retail
- v. BCA-IMDA Green Mark Award for Data Centres
- vi. BCA Green Mark Award for Laboratories
- vii. BCA Green Mark Award for Restaurants

# BCA-HPB GREEN MARK FOR HEALTHIER WORKPLACES



The health and well-being of building occupants is increasingly becoming a major value proposition for the adoption of green buildings and interior spaces. This awareness is echoed by business leaders and companies that place growing emphasis on employee health and well-being to differentiate themselves as the employer of choice. In line with global trend and increasing demand for green and healthy buildings, the BCA Green Mark has been placing greater emphasis on the quality of indoor environments as well as the health, comfort and well-being of the users and occupants.

To strengthen the business case for energy-efficient, resource efficient and healthier interior spaces, BCA collaborated with Health Promotion Board (HPB) to develop the new BCA-HPB Green Mark for Healthier Workplaces scheme (GM HW: 2018).

With international studies indicating that 90% of the business operating costs are related to human capital costs, staffs productivity would be of paramount interest and concern to any company. The new GM HW would appeal to companies that place emphasis on both health and well-being in addition to environmental sustainability in the office. GM HW aims to provide a clearer and stronger business case for office sustainability by placing occupants health, well-being and comfort at the forefront of office design and daily operations. It also seeks to create a supportive environment through the establishment of workplace health structures, policies and programmes. With the inclusion of criteria that also looks at the health and well-being, we hope that this will make the value proposition for green interior more compelling and personal from the users angle.

# BHP MARKETING ASIA PTE LTD

## HEALTHIER WORKPLACES

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



**Client/Developer**

BHP Marketing Asia Pte Ltd

**Interior Designer**

Woods Bagot Asia Limited  
(Singapore Branch)

**M&E Engineer**

AT Advanced Technologies Asia  
Pacific Pte Ltd

**Project Manager**

Cushman & Wakefield (S) Pte Ltd

**Acoustic & AV Consultant**

PTS Consulting Pte Ltd

**Green Mark Consultant**

WSP Consultancy Pte Ltd

**Quantity Surveyor**

WT Partnership (S) Pte Ltd

**Main Contractor**

ISG Asia (Singapore) Pte Ltd

- Air distribution system for meeting rooms controlled by motion sensors and thermostats
- Energy efficient LED lighting system controlled by motion sensors and daylight sensors
- Extensive use of SGBC “Very Good” rated green products during renovation
- Acoustical considerations were made to minimize unwanted noise to adjacent spaces
- Extensive greenery within office areas
- Internal staircase to encourage physical activity within occupants when moving between L17 and 18
- Submetering of energy uses to facilitate better understanding of energy usage patterns

# CSUITES

## HEALTHIER WORKPLACES

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- Ultra-low power lighting of 4.3 W/m<sup>2</sup>, more than 50% reduction vs SS530:2014
- All water fittings in the project are rated 3 ticks under PUB Water Efficiency Labelling Scheme
- Acoustical Treatment – All office suites and meeting rooms are soundproofed and feature noise-cancelling duct works to ensure maximum privacy and minimal distraction
- Base building is awarded Green Mark Platinum
- Active Workspace Elements - csuites features height-adjustable desks, high quality ergonomic furniture and fixtures, and a diverse workplace typology to meet the needs of today's dynamic workforce
- Biophilic Design – Full glass ceiling-to-floor facades provide an abundance of natural lighting, while natural elements such as wood and ample plants create a healthy, green and well-ventilated space
- Extensive use of materials certified by Singapore Green Building Council and Singapore Green Labelling Scheme

<b>Client/Developer</b>	Space Lab One Pte Ltd
<b>Architect</b>	Hassell Design (Singapore) Pte Ltd
<b>M&amp;E Engineer</b>	WSP Consultancy Pte Ltd
<b>Green Mark Consultant</b>	WSP Consultancy Pte Ltd
<b>Acoustic Consultant</b>	Alpha Acoustics Pte Ltd
<b>Main Contractor</b>	Lendlease Singapore Pte Ltd

# DBS BANK LTD

## HEALTHIER WORKPLACES

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- Extensive BMS energy monitoring and tracking system
- Integrative personalized health & fitness portal/app
- Sustainable low VOC materials used in office
- Extensive free coverage in fitness and health seminars/workshops for employees
- Layout designed to influence user towards sustainability and fitness oriented
- Incentive for sustainability and health/fitness challenge
- Ergonomic system furniture and VC meeting rooms to enhance working experience

**Client/Developer**

DBS Bank Ltd

**Facility Management**

DBS Bank Ltd

**Design Consultant**

Wolf Studio

**M&E Engineer**

Bescon Consulting Engineer Pte Ltd

**Main Contractor**

Facility Link Pte Ltd

**ESD consultant**

Building System & Diagnostics Pte Ltd

# DNV GL TECHNOLOGY CENTRE

## HEALTHIER WORKPLACES

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



<b>Client/Developer</b>	DNV GL Singapore Pte Ltd
<b>Architect</b>	Aedas Pte Ltd
<b>M&amp;E Engineer</b>	WSP Consultants
<b>Main Contractor</b>	Ngai Chin Construction Pte Ltd

- Energy efficient lighting system with lighting power budget below 9W/m<sup>2</sup>
- Photo and motion sensors to control staircase, meeting room and office perimeter lighting
- Meeting room equipped with occupancy sensor to control the chilled water motorized control valve
- Deployment of Variable Air Volume system for on-demand cooling
- Green wall installation behind level 1 reception counter
- Internal staircase from level 4 to 7 in the building
- Extensive use of environmentally friendly products

# INTELLECTUAL PROPERTY OFFICE OF SINGAPORE

## HEALTHIER WORKPLACES

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- Normalized EEI of 25.48% improvement beyond the Platinum baseline
- Use of energy efficient LEDs, dimmers and motion sensors
- Monitoring the lighting and plug load consumption separately
- Provision of green walls and planter boxes
- Provision of energy efficient IT equipment
- Substantial green and health activities
- Engagement of mental health management programme

<b>Client/Developer</b>	Intellectual Property Office Of Singapore
<b>Project Management</b>	JLL Property Consultants Pte Ltd
<b>Architecture</b>	Architects Team 3 Pte Ltd
<b>M&amp;E Engineer</b>	Hitech Engineering Management Consultants
<b>Main Contractor</b>	New Art Interior Pte Ltd
<b>ESD Consultant</b>	GreenA Consultants Pte Ltd

# JLL SINGAPORE @ PLQ

## HEALTHIER WORKPLACES



### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- Submetered utilities and indoor environment parameters can be monitored and analysed through FMS (facility management system)
- Biophilic design and >1,100 live plants that connects elements of nature with the way we work, live, and operate within the office
- Self-tuning sound masking system that provides the most balanced and privacy-protecting sound background in open office setting
- Wellness performance studio combined with regular active and meditation sessions to promote healthier life style
- 15 indoor IAQ monitors that provides continuous readings of five different indoor air quality parameters that's accessible through physical displays and staff hand phones via the JLL application
- Dimmable LED lighting design with 100% occupancy sensor control in general work areas and all meeting rooms
- Customized functional spaces and ergonomic design that allows our staffs to maximize productivity while reducing risks of work hazards
- Digital signage for all messaging

<b>Client</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>Interior Designer</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>M&amp;E Engineer</b>	WSP Consultancy Pte Ltd
<b>Facility Manager Company</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>Green Mark Consultant</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>Renovation Contractor</b>	YDL Construction Pte Ltd

# MAPLETREE INVESTMENTS PTE LTD

## HEALTHIER WORKPLACES



### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



**Tenant/ Owner**  
**Renovation Consultant/ Contractor**  
**Facility Manager**  
**Company**  
**M&E Consultant**  
**Managing Agent/ Maintenance Contractor**  
**Structural Consultant**  
**Architect**  
**ID Consultant**  
**ESD Consultant**

Mapletree Investments Pte Ltd  
D'Perception Singapore Pte Ltd

Mapletree Investments Pte Ltd

TY Lin International Pte Ltd  
Mapletree Investments Pte Ltd

P&T Consultants Pte Ltd  
P&T Consultants Pte Ltd

DB&B Pte Ltd  
Building System & Diagnostics Pte Ltd

- Increase sustainability drive such as phased out Single Use Plastic Bottled Water for all Guests and Meetings since January 2019 and sharing of green knowledge with tenants and employees through our quarterly newsletter, Mapping.
- Use efficient lighting system with zonings and controls. Install occupancy and photocell sensors to reduce wastage.
- Use LED lightings extensively.
- Use UV light and heat recovery for air-conditioning handling unit.
- Install building management system to monitor and control air-conditioning set points.
- Use energy efficient office equipment such as IT computers, multi-functional devices, shredders etc.
- Use sustainable products in office fit out work. This includes furniture made using green electrical energy.
- Have an extensive waste recycling program. This included e-waste.

# PUB, SINGAPORE'S NATIONAL WATER AGENCY JOINT OPERATIONS CENTRE AND OFFICE SPACE ON LEVEL 18 ENVIRONMENT BUILDING HEALTHIER WORKPLACES



## GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- Normalised EEI: 57.52kWh/year.
- Use of energy efficient LED lighting with lighting density 6.3W/m2.
- Use of motion sensors for the common areas corridors and pantry.
- Active workplace with consideration of office ergonomics for 24 hour Joint Operations Centre and exercise equipment available for use.
- Substantial health and green activities conducted for office occupants.
- Use of sustainable products which are SGBC Very Good and Leader certified and low VOC products for interior fittings and finishes.
- Provision of energy efficient Energy Star IT equipment.

<b>Client/Developer</b>	PUB, Singapore's National Water Agency
<b>Project Manager</b>	ENGIE Property Service Pte Ltd
<b>Main Contractor</b>	Trendbuild Contracts Pte Ltd
<b>ESD Consultant</b>	GreenA Consultants

# CENTRAL PROVIDENT FUND BOARD

## HEALTHIER WORKPLACES

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | GOLD<sup>PLUS</sup>



- Use of energy efficient lighting design with an impressive lighting Power Density of 4.9W/m<sup>2</sup>
- Holds regular staff engagement programs ( bonding events, health, safety fitness and sustainability)
- Improve wellbeing of staff with a good spread greenery within the office
- Minimised wastage by conserving more than 50% of the existing ceiling and flooring for the entire office
- Good quality of indoor environment for staff wellbeing with yearly periodic IAQ test

<b>Tenant/Owner</b>	Central Provident Fund Board
<b>Renovation Contractor</b>	D'Perception Singapore Pte Ltd
<b>Facility Manager Company</b>	Chambers Property Management Services Pte Ltd
<b>ESD Consultant</b>	Building System and Diagnostics Pte Ltd

# CYBER SECURITY AGENCY

## HEALTHIER WORKPLACES

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | GOLD<sup>PLUS</sup>



- Use of green labelled and sustainable renovation products ensuring good indoor air quality in office
- Use of energy efficient LED lights and water efficient water fittings
- Use of energy efficient Energy Star labelled for more than 80% of the office equipment
- Office is furnished with facilities that supports communal eating such as fridge and reheating facilities and non-disposable utensils and cutlery
- Staff wellbeing are well taken of with frequent fruits distribution, healthy snacks and drinks provided in pantry and Nursing Room for mothers

<b>Tenant/Owner</b>	Cyber Security Agency
<b>Renovation Contractor</b>	P&A Link Pte Ltd
<b>Facility Manager Company</b>	ENGIE Property Services Pte Ltd
<b>M&amp;E Consultant</b>	ENGIE Property Services Pte Ltd
<b>ESD Consultant</b>	Building System and Diagnostics Pte Ltd

# O2WORK PTE. LTD.

## HEALTHIER WORKPLACES

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | GOLD<sup>PLUS</sup>



- Extensive greenery to enhance indoor air quality
- Use of motion sensors to control lightings in common areas
- Relative Humidity, temperature and VOC display
- Provision of flicker-free LED lights
- Use of SGLS/SGBC certified products with low VOC content

<b>Tenant/Owner</b>	O2Work Pte. Ltd.
<b>Renovation Consultant/ Contractor</b>	ID21 Pte Ltd
<b>Facility Manager Company</b>	UOL Group Ltd
<b>Green Mark Consultant</b>	Earth-In-Mind Private Limited

# GREEN MARK AWARD FOR HEALTHIER WORKPLACES | CERTIFIED



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## PROJECT NAME

Amozonia Pte Ltd

Lidl Singapore Pte. Limited

## CATEGORY

Healthier Workplaces

Healthier Workplaces

## CLIENT/DEVELOPER/BUILDING OWNER

Amozonia Pte Ltd

Lidl Singapore Pte. Limited

# BCA-HPB GREEN MARK FOR OFFICE INTERIOR

The **BCA Green Mark for Office Interior** is BCA's initiative to promote and recognise environmentally-friendly and sustainable practices of office tenants. Office buildings make up a significant percentage of the building stock in Singapore. Such buildings may be multi-tenanted, hence the way individual tenanted spaces are operated and maintained may not always be under the control of the building owner. The BCA Green Mark for Office Interior complements the BCA Green Mark for Buildings by encouraging individual office tenants within buildings to be sustainable. The scheme is applicable to both existing and new offices that have or have not undergone renovation.

The scheme, launched in 2009, has since been gaining momentum with the industry, with its take-up rate being on the rise each year.

Offices are evaluated under the following criteria:

- i. Energy Efficiency
- ii. Water Efficiency
- iii. Sustainable Management and Operation
- iv. Indoor Environmental
- v. Other Green Features

# SMRT CORPORATION LTD

## OFFICE INTERIOR

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES| PLATINUM



- Strong commitment to improve energy, water and waste reduction through policies and monitoring consumptions
- Intelligent energy efficient lighting system with motion sensor integration
- Spacious office design that includes open offices, shared spaces and internal stairs for better collaboration and optimization
- Sustainable and environmentally friendly procurement and purchasing policies
- Use of energy efficient office equipment to save energy
- Waste reduction through recycling facilities, waste improvement plan and monitoring
- Design incorporates a greater use of greenery to create a more conducive office environment

**Client/Developer**

SMRT Corporation Ltd

**Interior Designer**

FARM

**Main Contractor**

Gennal Industries Pte Ltd

**M&E Consultant**

Aurecon Singapore (Pte) Ltd

**Managing Agent**

Lendlease Singapore Pte. Ltd.

**ESD Consultant**

Aurecon Singapore (Pte) Ltd

## OFFICE INTERIOR

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | GOLD<sup>PLUS</sup>



- Usage of energy efficient lighting fixture which contributes to a high energy saving of 46.33% for lighting
- Provision of toggle switches and motion sensors in entire office to reduce energy wastage
- 89% of the IT equipment are Energy Star certified
- Provision of internal BMS monitoring of energy and water consumption within IMDA offices
- Provision of internal staircase and green wall

**Tenant/ Owner**

Info-communications Media  
Development Authority  
D'perception Singapore Pte Ltd

**Renovation Consultant/  
Contractor**

D'perception Singapore Pte Ltd  
C&W Services (S) Pte Ltd

**M&E Consultant**

**Managing Agent/  
Maintenance Contractor**

**ESD Consultant**

Building System & Diagnostics  
Pte Ltd

# SINGAPORE ENVIRONMENT INSTITUTE

## OFFICE INTERIOR

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | GOLD<sup>PLUS</sup>



- Provision of motion sensors to reduce energy wastage.
- Usage of energy efficient lighting fixture which contributes to high energy saving of 59.0% for lighting.
- 94% of office equipment area Energy Star Certified. Use of carpet and paint certified under Singapore Green Building Council and Singapore green Labelling Scheme.
- Provision of teleconferencing facilities to reduce SEI's carbon footprint.
- Use of printing access control, digitalised processes like e-invoice and e-payment, and usage of e-notes in our courses to minimise printing.

**Client/Developer**

Singapore Environment Institute

**Renovation Contractor**

D'perception Singapore Pte Ltd

**Facility & Project  
Manager Company**

National Environment Agency

**ESD Consultant**

Building System & Diagnostics Pte Ltd

# SINGAPORE LAND AUTHORITY, GEOWORKS

## OFFICE INTERIOR

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | GOLD<sup>PLUS</sup>



- Energy efficient lighting system with zoning and motion sensor control
- Over 94% of office equipment with energy star label
- Open office layout for optimal space usage with movable workstation, movable partition and hot desks
- Provision of greenery inside office
- Provision of electrical and water sub-meter in the office to enable continuous monitoring of usage

<b>Client/Developer</b>	Singapore Land Authority
<b>Renovation</b>	D'Perception Singapore Pte Ltd
<b>Consultant/Contractor</b>	D'Perception Singapore Pte Ltd
<b>M&amp;E Engineer</b>	TÜV SÜD PSB Pte Ltd
<b>ESD Consultant</b>	D'Perception Singapore Pte Ltd
<b>Main Contractor</b>	D'Perception Singapore Pte Ltd

# SINGAPORE WATER EXCHANGE, PUB WATERHUB

## OFFICE INTERIOR



### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | GOLD<sup>PLUS</sup>



- 100% use of 'Excellent' WELS rated water fittings
- 38% savings from baseline for Artificial Lighting
- Extensive use of environmentally friendly products
- Sky garden at levels 4 and 6
- Extensive use of Sustainable Products

<b>Client/Developer</b>	PUB, Singapore's National Water Agency
<b>Architect</b>	Forum Architect Pte Ltd
<b>M&amp;E Engineer</b>	BECA Carter Hollings & Ferner (SEA) Pte Ltd
<b>Structural Engineer</b>	BECA Carter Hollings & Ferner (SEA) Pte Ltd
<b>Quantity Surveyor</b>	Rider Levett Bucknall LLP
<b>Main Contractor</b>	Wee Hur Construction Pte Ltd

# TRAINING VISION INSTITUTE PTE LTD

## OFFICE INTERIOR

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | GOLD<sup>PLUS</sup>



- Use energy efficient LED & T5 light fittings for the entire office space, with manual switches for zonal controls.
- Open office layout with minimal partitions to reduce the lighting quantity required.
- Indoor plants are incorporated to create a conducive work environment and improve the indoor air quality.
- Electrical and water sub-meters are installed to enable continuous monitoring of usage and allow intervention should there be abnormalities.
- Extensive teleconferencing facilities to reduce travel.
- Temperature of office is controlled at 24°C

**Tenant/Owner**

Training Vision Institute Pte Ltd

**Renovation Consultant  
/ Contractor**

DEPS Projects Pte Ltd

**M&E Engineer**

DEPS Projects Pte Ltd

# TWITTER ASIA PACIFIC PTE. LTD.

## OFFICE INTERIOR

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | GOLD<sup>PLUS</sup>



- Energy efficient lighting system with zoning and scheduling control
- Provision of Energy Star certified IT equipment
- Motion sensors to control lighting for office spaces
- Extensive reuse of existing furniture and finishes
- Water leak detection system equipped with SMS alerts to monitor water wastage

**Tenant/Owner**

Twitter Asia Pacific Pte. Ltd. /  
CapitaGreen

**Renovation  
Consultant/Contractor**

Jones Lang LaSalle Property  
Consultant Pte Ltd

**Facility Manager  
Company**

HSBC Institutional Trust Services  
(Singapore) Ltd

**ESD Consultant**

Earth-In-Mind Private Limited

# VISA WORLDWIDE PTE LTD

## GREEN MARK FOR OFFICE INTERIOR

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | GOLD<sup>PLUS</sup>



- Use of energy efficient lighting
- Extensive motion sensors controlled lightings
- More than 90% of office equipments are energy star certified
- Use of VAV system to varies cooling
- Implementation of sustainable policy

<b>Client/Developer</b>	Visa Worldwide Pte. Limited
<b>Facility Management</b>	CBRE
<b>M&amp;E Engineer</b>	J Roger Preston Limited
<b>Managing Agent</b>	Engine Services Singapore
<b>ESD Consultants</b>	Building System & Diagnostics Pte Ltd

# GREEN MARK AWARD FOR OFFICE INTERIOR | GOLD



<b>PROJECT NAME</b>	<b>CATEGORY</b>	<b>CLIENT/DEVELOPER/BUILDING OWNER</b>
Central Provident Fund Board Bishan Service Centre	Office Interior	Central Provident Fund (CPF)
Centre for Climate Research Singapore	Office Interior	National Environment Agency
FM Global	Office Interior	FM Global Group of companies
Government Technology Agency of Singapore (GovTech)	Office Interior	Government Technology Agency of Singapore
Hilton International Asia Pacific Pte Ltd	Office Interior	Hilton
Ministry of Culture, Community & Youth	Office Interior	Ministry of Culture, Community and Youth
National Environment Agency	Office Interior	National Environment Agency
PUB WaterHub, Singapore Water Academy and Office Block	Office Interior	Public Utilities Board (PUB)
Salesforce.com Singapore Pte Ltd	Office Interior	Salesforce.Com Singapore Pte Ltd
SGX office at The Metropolis Tower 2	Office Interior	SGX Singapore Exchange

# GREEN MARK AWARD FOR OFFICE INTERIOR | GOLD



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**PROJECT NAME**

Singapore Food Agency

**CATEGORY**

Office Interior

**CLIENT/DEVELOPER/BUILDING OWNER**

Singapore Food Agency

# GREEN MARK AWARD FOR OFFICE INTERIOR | CERTIFIED



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## PROJECT NAME

Bank Of China (Levels 1, 3 and 5)

## CATEGORY

Office Interior

## CLIENT/DEVELOPER/BUILDING OWNER

Bank Of China

# BCA GREEN MARK FOR SUPERMARKETS

The **BCA Green Mark for Supermarkets**, launched in 2012, is an initiative by BCA to promote and recognize environmentally friendly as well as sustainable practices and features in supermarket outlets. It aims to encourage supermarket operators to adopt energy efficient design, equipment and green practices at their outlets. Such measures can help supermarket operators reduce their energy consumption and utilities costs.

There are about 300 supermarkets in Singapore, and each outlet's floor area can range from 90 m<sup>2</sup> to 4,500 m<sup>2</sup>. Refrigeration, required to keep the goods and produce fresh, accounts for up to 50% of the total supermarket energy consumption. The rest of the energy is consumed by lighting, plug loads and air-conditioning. By incorporating green features, supermarkets can reduce the total energy consumed by as much as 10%. Thus, supermarket operators have a significant impact on the total building energy consumption. Green supermarkets also have the power to educate and motivate supermarket patrons to be environmentally responsible.

The scheme assesses supermarkets based on the following five criteria:

- i. Energy Efficiency
- ii. Water Efficiency
- iii. Environmental Protection
- iv. Indoor Environmental Quality
- v. Other Green Features

# FAIRPRICE FINEST SUPERMARKET AT TRIPLE ONE SOMERSET SUPERMARKET

## GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | GOLD<sup>PLUS</sup>



- Energy-efficient Refrigeration system.
- High Energy-Efficient LED Lighting & control.
- Extensive use of environmentally-friendly building material.
- Reduction in the use of paper by adopting electronic price label.
- Integrated Pharmacy service as part of Organic & Wellness concept.

**Client/Developer**

NTUC Fairprice Co-operative Ltd

**Designer**

NTUC Fairprice Co-operative Ltd

**Architect (Project)**

Brenton Fong Architects

**M&E Engineer**

CCA & Partners Pte Ltd

**Main Contractor**

Logistics Construction Pte Ltd

**Refrigeration Contractor**

D-Logic Refrigeration Pte. Ltd.

# GREEN MARK AWARD FOR SUPERMARKETS | GOLD



## PROJECT NAME

FairPrice Finest at Jewel Changi Airport

FairPrice Xtra hypermart at Ang Mo Kio Hub

## CATEGORY

Supermarkets

Supermarkets

## CLIENT/DEVELOPER/BUILDING OWNER

NTUC

NTUC Fairprice Co-operative Ltd

# BCA GREEN MARK FOR RETAIL



The **BCA Green Mark for Retail** was launched in 2012 to recognize the sustainable efforts of individual retail tenants. It provides recognition of retailers' commitment to reduce their environmental impact.

The retail sector is one of the highest consumers of energy per floor area. Data collected from retail buildings assessed under the Green Mark for Buildings showed that approximately 50% of the total building energy is consumed by the retail tenants.

The tenant loads within such buildings also lead to high air-conditioning load within the retail mall.

As the Green Mark for Buildings is catered for building owners, it may not directly address the way building tenants consume energy. Hence, the BCA Green Mark for Retail complements the Green Mark for Buildings scheme by addressing specific areas within the tenant space such as the sustainable fit-out and operation, with a strong focus on assessing efficiency of installed light fittings and plug load energy consumption –both which are within the control of the tenant. These criteria are developed to guide and encourage tenants to fit-out their shops in a sustainable manner that reduces the operating costs, energy consumption and cooling load while maintaining the required aesthetic.

The scheme assesses retail tenants under the following five criteria:

- i. Energy Efficiency
- ii. Water Efficiency
- iii. Sustainable Awareness and Operation
- iv. Indoor Environmental Quality
- v. Other Green Features

# DBS CHOA CHU KANG BRANCH

## RETAIL

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- High-efficiency lighting with 63% improvement over baseline lighting power budget
- 91% of office equipment used (by rated power) in the branch is Energy Star certified product
- Provision of water meter for water usage monitoring and leak detection to arrest leakages
- Green Branch Operations Guide and regular workshops to facilitate responsible operations and behaviors
- Use of environmentally friendly carpets with SGBC Product Certification
- Use of reusable tableware for eating and drinking in the back-of-house office
- Provide potted plants within the main welcome hall to create a more biophilic environment

<b>Client/Developer</b>	DBS Bank Ltd
<b>Renovation Consultant</b>	AI Associates Pte Ltd
<b>Facility Manager</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>M&amp;E Consultant</b>	Bescon Consulting Engineers Pte Ltd
<b>Green Mark Consultant</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>Main Contractor</b>	Yongway Contract & Construction Pte Ltd

# DBS CLEMENTI CENTRAL BRANCH

## RETAIL

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- High-efficiency lighting with 63% improvement over baseline lighting power budget
- 91% of office equipment used (by rated power) in the branch is Energy Star certified product
- Provision of water meter and leak detection system for monitoring and leaking detection
- Green Branch Operations Guide and regular workshops to facilitate responsible operations and behaviors
- Use of environmentally friendly carpets with SGBC Product Certification
- Use of environmentally friendly consumable materials such as dishwashing liquid
- Provision of plants within the main banking hall to create a more biophilic environment

<b>Client/Developer</b>	DBS Bank Ltd
<b>Renovation Consultant</b>	3istudio Consultants Pte Ltd
<b>Facility Manager</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>M&amp;E Consultant</b>	Alpha Consulting Engineers Pte Ltd
<b>Green Mark Consultant</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>Main Contractor</b>	Yongway Contract & Construction Pte Ltd

# DBS KOVAN BRANCH

## RETAIL

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



<b>Client/Developer</b>	DBS Bank Ltd
<b>Renovation Consultant</b>	I2 Pte Ltd
<b>Facility Manager</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>M&amp;E Consultant</b>	CCA & Partners Pte Ltd
<b>Green Mark Consultant</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>Main Contractor</b>	Mastron Pte Ltd

- High-efficiency lighting with 64% improvement over baseline lighting power budget
- 94% of office equipment used (by rated power) in the branch is Energy Star certified product
- Provision of water meter for water usage monitoring and leak detection to arrest leakages
- Green Branch Operations Guide and regular workshops to facilitate responsible operations and behaviors
- Use of environmentally friendly carpets with SGBC Product Certification
- Use of reusable tableware for eating and drinking in the back-of-house office
- Provide potted plants within the main welcome hall to create a more biophilic environment

# DBS TREASURES AT BUKIT TIMAH

## RETAIL

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- High-efficiency lighting with 67% improvement over baseline lighting power budget
- 89% of office equipment used (by rated power) in the branch is Energy Star certified product
- Provision of water meter for water usage monitoring and leak detection to arrest leakages
- Green Branch Operations Guide and regular workshops to facilitate responsible operations and behaviors
- Use of environmentally friendly carpets with SGBC Product Certification
- Use of reusable tableware for eating and drinking in the back-of-house office
- Provide potted plants within the main welcome hall to create a more biophilic environment

<b>Client/Developer</b>	DBS Bank Ltd
<b>Renovation Consultant</b>	Tarkus Interior Pte Ltd
<b>Facility Manager</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>M&amp;E Contractor</b>	CCA & Partners Pte Ltd
<b>Green Mark Consultant</b>	Jones Lang LaSalle Property Consultants Pte Ltd

# POSB SQUARE 2 BRANCH

## RETAIL

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- High-efficiency lighting with 68% improvement over baseline lighting power budget
- 87% of office equipment used (by rated power) in the branch is Energy Star certified product
- Provision of water meter for water usage monitoring and leak detection to arrest leakages
- Green Branch Operations Guide and regular workshops to facilitate responsible operations and behaviors
- Use of environmentally friendly carpets with SGBC Product Certification
- Use of reusable tableware for eating and drinking in the back-of-house office
- Provide potted plants within the main welcome hall to create a more biophilic environment

<b>Client/Developer</b>	DBS Bank Ltd
<b>Renovation Consultant</b>	I2 Pte Ltd
<b>Facility Manager</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>M&amp;E Consultant</b>	Alpha Consulting Engineers Pte Ltd
<b>Green Mark Consultant</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>Main Contractor</b>	Milan Decoration & Construction Pte Ltd

# POSB WATERWAY POINT BRANCH

## RETAIL

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- High-efficiency lighting with 69% improvement over baseline lighting power budget
- 95% of office equipment used (by rated power) in the branch is Energy Star certified product
- Provision of water meter for water usage monitoring and leak detection to arrest leakages
- Green Branch Operations Guide and regular workshops to facilitate responsible operations and behaviors
- Use of environmentally friendly carpets with SGBC Product Certification
- Use of reusable tableware for eating and drinking in the back-of-house office
- Provide potted plants within the main welcome hall to create a more biophilic environment

<b>Client/Developer</b>	DBS Bank Ltd
<b>Renovation Consultant</b>	I2 Pte Ltd
<b>Facility Manager</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>M&amp;E Consultant</b>	CCA & Partners Pte Ltd
<b>Green Mark Consultant</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>Main Contractor</b>	Yongway Contract & Construction Pte Ltd

# POSB YISHUN WEST BRANCH

## RETAIL

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- High-efficiency lighting with 35% improvement over baseline lighting power budget
- 79% of office equipment used (by rated power) in the branch is Energy Star certified product
- Provision of water meter for water usage monitoring and leak detection to arrest leakages
- Green Branch Operations Guide and regular workshops to facilitate responsible operations and behaviors
- Use of environmentally friendly carpets with SGBC Product Certification
- Use of reusable tableware for eating and drinking in the back-of-house office
- Provide potted plants within the main welcome hall to create a more biophilic environment

<b>Client/Developer</b>	DBS Bank Ltd
<b>Renovation Consultant</b>	I2 Pte Ltd
<b>Facility Manager</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>M&amp;E Consultant</b>	Alpha Consulting Engineers Pte Ltd
<b>Green Mark Consultant</b>	Jones Lang LaSalle Property Consultants Pte Ltd
<b>Main Contractor</b>	Milan Decoration & Construction Pte Ltd

# BCA GREEN MARK FOR DATA CENTRES



The **BCA-IDA Green Mark for Data Centres**, launched in 2012, is a joint collaboration between BCA and the Infocomm Development Authority of Singapore (IMDA) to drive data centres in Singapore to be more energy efficient.

In this technological era, the growth of cloud-based services, online media and transactions is fueling a rapid increase in global demand for data centres. This is resulting in a growing energy footprint for data centres as they are prodigious consumers of energy. According to IDA, it is estimated that in Singapore, the 10 largest data centres consume energy equivalent to that produced by 130,000 households. The local commercial data centre operational capacity is projected to increase by 50% from 2010 to 2015 with a corresponding increase in energy consumption.

The scheme covers both new and existing data centres. It is also applicable to both buildings specifically built for data centres as well as data centres within office buildings.

The scheme assesses data centres on the following criteria:

- i. Energy Efficiency
- ii. Water Efficiency
- iii. Sustainable Construction/ Operation and Management
- iv. Indoor Environmental Quality
- v. Other Green Features

# AIRTRUNK DATA CENTRE SGP1

## NEW DATA CENTRE

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- Efficient cooling system with efficiency of 0.8 kW/RT
- Indirect evaporative cooling technology is used in cooling system
- High Efficient LED Lighting
- Efficient transformer and modular UPS
- Recycling of FCU condensate water to cooling tower's make up water
- Use of CFD simulation to improve air management design

**Client/Developer**

AirTrunk Singapore Pte Ltd

**Architect**

AWP Pte Ltd

**M&E Engineer**

Red Engineering Asia Pacific Pte Ltd

**Structural Engineer**

Meinhardt (Singapore) Pte Ltd

**Quantity Surveyor**

Linesight

**Main Contractor**

Obayashi Singapore Pte Ltd

**ESD Consultant**

Afogreen Build Pte Ltd

# BCA ACADEMY DATA CENTRE

## NEW DATA CENTRE

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- Efficient water cooled chilled water system with efficiency of 0.6 kW/RT
- Full fitted with energy efficient in-row air conditioning system
- High Efficient LED Lighting
- Provision of cold aisle containment
- Use of modular UPS

<b>Client/Developer</b>	Building and Construction Authority
<b>Main Contractor</b>	Pro-Matrix Pte Ltd
<b>ESD Consultant</b>	Building System and Diagnostics Pte Ltd

# CHINA MOBILE INTERNATIONAL SG1

## NEW DATA CENTRE

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- Achieved design Power Usage Effectiveness (PUE) of 1.40
- Chiller plant system with efficiency of 0.55kW/RT
- Modular design of M&E services to minimise system losses
- Provision of high efficiency M&E systems (UPS, Transformer, Chiller system and CRAH)
- Provision of WELS-certified 'Excellent' water-savings fittings
- Provision of DCIM system to comprehensively monitor M&E systems power consumption and efficiency

<b>Client/Developer</b>	China Mobile International Infrastructure (SG1) Pte Ltd
<b>Architect</b>	Scott Brownrigg
<b>M&amp;E Engineer</b>	DSCO Group Pte Ltd
<b>Structural Engineer</b>	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
<b>ESD Consultant</b>	DSCO Group Pte Ltd
<b>Main Contractor</b>	China Construction (South Pacific) Development Co Pte Ltd

# DATA CENTRE AT 9 TAI SENG DRIVE

## NEW DATA CENTRE

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- Efficient water cooled system with efficiency of 0.44 kW/RT
- High Efficient LED Lighting
- Efficient transformer and modular UPS
- Recycling of FCU condensate water to cooling tower's make up water
- The use of Lithium Ion Batteries for UPS system

**Client/Developer**

CapitaLand Ltd

**Architect**

ID Architects Pte Ltd

**M&E Engineer**

DSCO Group Pte Ltd

**Structural Engineer**

JS Tan Consultant Pte Ltd

**Quantity Surveyor**

WT Partnership (S) Pte Ltd

**ESD Consultant**

DSCO Group Pte Ltd

# DIGITAL LOYANG 2 (SIN12)

## NEW DATA CENTRE

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- Estimated Energy savings: 86,329,800 kWh/yr
- ETTV: 27.5 W/m<sup>2</sup>
- Dedicated Dual Temperature Chilled Water Plant with dedicated hydronic and shared Cooling tower with overall chiller efficiency of 0.442 kW/Rt
- Highly efficient Single Module Static UPS with Intelligent Parallel features
- Dedicated PAHU for latent removal and pressurization of Data Hall
- Extensive Power and Water consumption Monitoring and Reporting using DCIM System

<b>Client/Developer</b>	Digital Realty
<b>Architect</b>	Greenbox Architecture
<b>M&amp;E Consultant</b>	Arup Singapore Pte Ltd

# FACEBOOK SINGAPORE DATA CENTRE

## NEW DATA CENTRE

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- Low PUE of 1.29
- Energy Efficient cooling system of 0.583 kW/RT
- Water efficient and alternative source for non-potable use
- Waste management and recycle facility
- Energy efficient lighting design and demand control
- Facebook's data center-wide power management system - Dynamo
- State Point Liquid Cooling (SPLC) system

<b>Client/Developer</b>	Facebook
<b>Architect</b>	Aedas Pte Ltd
<b>M&amp;E Engineer</b>	Cundall Singapore Pte Ltd
<b>Structural Engineer</b>	Arup Singapore Pte Ltd
<b>Quantity Surveyor</b>	Turner & Townsend Pte Ltd
<b>Main Contractor</b>	Fortis Construction Pte Ltd

# SIGMA DATA CENTRE

## NEW DATA CENTRE

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- InRow Cooling System
- Symmetra Modular UPS
- Hot Air Containment with blanking panel
- LED lighting with occupancy sensors

<b>Client/Developer</b>	JTC Corporation
<b>Facility Manager Company</b>	Ascendas Services Pte Ltd
<b>DC Infrastructure Consultant</b>	Schneider Electric Pte Ltd
<b>ESD Consultant</b>	Kaer Ptd Ltd

# STT LOYANG

## NEW DATA CENTRE

### GREEN MARK AWARD FOR OCCUPANT-CENTRIC SCHEMES | PLATINUM



- Efficient cooling system with efficiency of 0.583 kW/RT
- Full Hot Aisle Containment
- High Efficient LED Lighting
- Efficient transformer and modular UPS
- Provision of Solar PV with generation up to 373.46kWh/yr

<b>Client/Developer</b>	STT Loyang Pte Ltd
<b>Architect</b>	BK Consulting Engineers Pte Ltd
<b>M&amp;E Engineer</b>	Plan One Pte Ltd
<b>Structural Engineer</b>	BK Consulting Engineers Pte Ltd
<b>ESD Consultant</b>	Building System and Diagnostics Pte Ltd
<b>Main Contractor</b>	Acme Associates Pte Ltd

# GREEN MARK AWARD FOR DATA CENTRES | CERTIFIED



**PROJECT NAME**

NUS SoC Computer Room 1

**CATEGORY**

Existing Data Centres

**CLIENT/DEVELOPER/BUILDING OWNER**

National University of Singapore (NUS)

# BCA GREEN MARK FOR RESTAURANTS

As restaurants utilize high levels of energy and water resources on a daily basis, this provided a good opportunity to introduce the Green Mark for Restaurants in 2011, specially tailored for restaurants to promote corporate responsibility as well as to recognize environmentally friendly and sustainable practices in restaurants, taking sustainability beyond commercial and residential infrastructure.

Restaurants are evaluated under the following criteria:

- i. Energy Efficiency
- ii. Water Efficiency
- iii. Sustainable Management and Operation
- iv. Indoor Environment Quality
- v. Other Green Features

# GREEN MARK AWARD FOR RESTAURANTS | GOLD



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**PROJECT NAME**

McDonald's Buangkok Square (BSQ)

**CATEGORY**

Restaurants

**CLIENT/DEVELOPER/BUILDING OWNER**

Hanbaobao Pte Ltd

# GREEN MARK AWARD FOR LABORATORIES | GOLD



<b>PROJECT NAME</b>	<b>CATEGORY</b>	<b>CLIENT/DEVELOPER/BUILDING OWNER</b>
Bioprocessing Technology Institute (BTI)	Laboratories	Agency for Science, Technology and Research (A* Star)
Genome Institute of Singapore (GIS)	Laboratories	Agency for Science, Technology and Research (A* Star)
Institute of Materials Research and Engineering (IMRE)	Laboratories	Agency for Science, Technology and Research (A* Star)
Institute of Medical Biology (IMB)	Laboratories	Agency for Science, Technology and Research (A* Star)
Institute of Microelectronics (IME)	Laboratories	Agency for Science, Technology and Research (A* Star)
Institute of Microelectronics (IME) at Science Park	Laboratories	Agency for Science, Technology and Research (A* Star)
Institute of Molecular & Cell Biology (IMCB)	Laboratories	Agency for Science, Technology and Research (A* Star)
Singapore Bioimaging Consortium (SBIC)	Laboratories	Agency for Science, Technology and Research (A* Star)
Singapore Institute for Clinical Sciences (SICS)	Laboratories	Agency for Science, Technology and Research (A* Star)
Singapore Institute of Manufacturing Technology (SIMTech)	Laboratories	Agency for Science, Technology and Research (A* Star)
Skin Research Institute of Singapore (SRIS)	Laboratories	Agency for Science, Technology and Research (A* Star)

# BCA GREEN MARK OVERSEAS

BCA International Pte Ltd is a wholly-owned subsidiary of BCA. It provides a multitude of services to help develop excellent built environments worldwide. The Green Mark certification is among one of the most popular services offered by BCA International.

## The Success Of Green Mark Overseas

As one of more than 20 Green Building rating systems recognized by the World Green Building Council (WGBC), Green Mark has gained popularity in the region as it is developed especially for the tropical climate. Green Mark can be customized to suit various countries' climatic conditions.

More developers are using Green Mark to provide meaningful differentiation of their buildings.

Benefits of a Green Mark building include:

- Reduction in water and energy bills
- Improvement in indoor environmental quality
- Reduction in potential environment impact



# UOB (THAI) – PHETKASEM BUILDING A & B

## EXISTING NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS (OVERSEAS) | PLATINUM



- Efficient chiller plant with system efficiency of 0.56 kW/RT.
- Extensive vertical greenery on façade of multi-storey car park.
- LED lightings with motion sensors in Staircases and Toilets.
- Provision of energy portal and dashboard for monitoring of building's major energy consumption.
- Extensive usage of green products certified by local and international green certifications.
- Lift Destination Control System which increases the efficiency of the lift operation and reduces waiting times by directing and categorised passengers to the designated lift.
- Maximize use of natural lighting in the lift lobbies for Tower B to reduce reliance on artificial lightings.

**Facility Management**

UOB (Thai) Public Company Limited

**ESCO**

G-Energy Global Pte Ltd

**ESD / Green Consultant**

G-Energy Global Pte Ltd

# PARK AVENUE HEIGHTS

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS (OVERSEAS) | GOLD<sup>PLUS</sup>



- Use of Low-E double glazed glass windows for all dwelling units to reduce heat gain/loss through fenestration system.
- Use of solar energy harnessed from photovoltaic system to reduce dependency on grid power
- Use of river canal as rainwater collection tank and thereby using non-portable water collected for irrigation.
- Extensive use of construction materials such as fly ash hollow block, aerated concrete block and plasterboard, which are eco-labelled or contain substantial amount of recycled content.
- Use of energy efficient lifts.

<b>Client/Developer</b>	Keppel Heights (Wuxi) Property Development Co Ltd
<b>Project Manager</b>	Keppel Land China Ltd
<b>Architect</b>	Shanghai City Architectural Design Co Ltd
<b>M&amp;E Engineer</b>	Shanghai City Architectural Design Co Ltd
<b>Structural Engineer</b>	Shanghai City Architectural Design Co Ltd
<b>Quantity Surveyor</b>	AECOM Cost Consulting (Shenzhen) Limited Shanghai Branch
<b>Main Contractor</b>	Shanghai Construction No 1 (Group) Co Ltd
<b>Landscape Consultant</b>	Ong & Ong Pte Ltd
<b>ESD Consultant</b>	Earth-In-Mind Private Limited

# WATERFRONT RESIDENCES

## NEW RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS (OVERSEAS) | GOLD<sup>PLUS</sup>



<b>Client/Developer</b>	Keppel Lakefront (Wuxi) Property Development Co Ltd
<b>Project Manager</b>	Keppel Land China Ltd
<b>Architect</b>	Shanghai City Architectural Design Co Ltd
<b>M&amp;E Engineer</b>	Shanghai City Architectural Design Co Ltd
<b>Structural Engineer</b>	Shanghai City Architectural Design Co Ltd
<b>Quantity Surveyor</b>	AECOM Cost Consulting (Shenzhen) Limited Shanghai Branch
<b>Main Contractor</b>	Jiangsu First Construction Installation Co Ltd /Shanghai Construction No 1 (Group) Co Ltd
<b>Landscape Consultant</b>	Earth-In-Mind Private Limited
<b>ESD Consultant</b>	B+H Consulting International Inc.

- Use of Low-E double glazed glass windows for all dwelling units to reduce heat gain/loss through fenestration system.
- Use of solar energy harnessed from photovoltaic system to reduce dependency on grid power
- Use of rainwater harvested as non-potable water for irrigation
- Extensive use of construction materials such as fly ash hollow block, aerated concrete block and plasterboard, which are eco-labelled or contain substantial amount of recycled content.
- Use of energy efficient lifts.

# CAPITAMALL TIANGONGYUAN, CHINA

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS (OVERSEAS) | GOLD



- Estimated energy savings: 5,401,508 Wh/yr; Estimated water savings: 12,644 m<sup>3</sup>/yr,
- Water cooled chilled water plant with efficiency of 0.78 kW/RT
- High Efficient LED Lighting
- Provision of electric charging car parking lots

<b>Client/Developer</b>	CapitaLand Ltd
<b>Architect</b>	Laguarda Low Architects
<b>M&amp;E Engineer</b>	China IPPR International Engineering Co Ltd
<b>Structural Engineer</b>	China IPPR International Engineering Co Ltd
<b>Quantity Surveyor</b>	Sweet (Beijing) Limited
<b>Main Contractor</b>	China Construction Eighth Engineering Division Corp Ltd

# JUNCTION CITY - PAN PACIFIC HOTEL

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS (OVERSEAS) | GOLD



- Chiller plant operating efficiency of 0.613 kW/RT
- Heat recovery from heat pump to heat water for hotel's open-air swimming pool
- Regenerative drive for lifts
- Standalone soil and waste-water treatment Membrane Bio Reactor (MBR) plant with sludge dewatering system and grey-water recycling rate of 40m<sup>3</sup> per day
- Internationally certified sustainable building products used extensively throughout development
- Auto condenser tube cleaning system to allow the chiller to maintain good heat transfer with constant cleaning of the condenser tubes, hence improving efficiency of the chillers.
- Native plant species used for more than 50% of the landscape
- Non-chemical cooling tower water treatment
- Covered link bridge from development to bus stop provided with disabled-friendly facilities such as chair/handicap lift

<b>Client/Developer</b>	Shwe Taung Junction City Development Co., Ltd
<b>Architect</b>	DP Architects Pte Ltd
<b>M&amp;E Engineer</b>	J Roger Preston (S) Pte Ltd
<b>Structural Engineer</b>	DP Engineers Pte Ltd
<b>Main Contractor</b>	Shwe Padonmar Pwint Co., Ltd.
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd

# JUNCTION CITY (OFFICE) < YANGON MYANMAR

## NEW NON-RESIDENTIAL BUILDING



### GREEN MARK AWARD FOR BUILDINGS (OVERSEAS) | GOLD



<b>Client/Developer</b>	Shwe Taung Junction City Development Co., Ltd
<b>Architect</b>	DP Architects Pte Ltd
<b>M&amp;E Engineer</b>	J Roger Preston (S) Pte Ltd
<b>Structural Engineer</b>	DP Engineers Pte Ltd
<b>Main Contractor</b>	Shwe Padonmar Pwint Co., Ltd.
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd

- Chiller plant operating efficiency of 0.642 kW/RT
- Energy efficient jet fans coupled with CO sensor provided in basement carparks
- Regenerative drive for lifts
- Standalone soil and waste-water treatment Membrane Bio Reactor (MBR) plant with sludge dewatering system and grey-water recycling rate of 40m<sup>3</sup> per day
- Internationally certified sustainable building products used extensively throughout development
- Auto condenser tube cleaning system to allow the chiller to maintain good heat transfer with constant cleaning of the condenser tubes, hence improving efficiency of the chillers.
- Native plant species used for more than 50% of the landscape
- Covered link bridge from development to bus stop provided with disabled-friendly facilities such as chair/handicap lift

# JUNCTION CITY (RETAIL), YANGON, MYANMAR

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS (OVERSEAS) | GOLD



**Client/Developer**

Shwe Taung Junction City Development Co., Ltd

**Architect**

DP Architects Pte Ltd

**M&E Engineer**

J Roger Preston (S) Pte Ltd

**Structural Engineer**

DP Engineers Pte Ltd

**Main Contractor**

Shwe Padonmar Pwint Co., Ltd.

**ESD Consultant**

Building System & Diagnostics Pte Ltd

- Chiller plant operating efficiency of 0.612 kW/RT
- Energy efficient jet fans coupled with CO sensor provided in basement carparks
- Light well at atrium to harvest daylight for reduced artificial lighting load during daytime
- Internationally certified sustainable building products used extensively throughout development
- 117 kWp Polycrystalline PV panels were installed to generate around 125,000 kWh of energy yearly
- Standalone soil and waste-water treatment Membrane Bio Reactor (MBR) plant with sludge dewatering system and grey-water recycling rate of 40m<sup>3</sup> per day
- Auto condenser tube cleaning system to allow the chiller to maintain good heat transfer with constant cleaning of the condenser tubes, hence improving efficiency of the chillers.
- Covered link bridge from development to bus stop provided with disabled-friendly facilities such as chair/handicap lift

# PALM HEIGHTS

## NEW RESIDENTIAL BUILDINGS

### GREEN MARK AWARD FOR BUILDINGS (OVERSEAS) | GOLD



- Dwelling units are well ventilated
- Use of water efficient fittings that are certified under the PUB WELS rating
- Extensive greenery with high green plot ratio
- Low Concrete Usage Index

<b>Client/Developer</b>	South Rach Chiec Limited Liability Company
<b>Concept Architect</b>	A61 Singapore Pte Ltd
<b>Local Architect</b>	International Construction & Investment Consultancy Co. , Ltd
<b>M&amp;E Engineer</b>	International Construction & Investment Consultancy Co. , Ltd
<b>Structural Engineer</b>	International Construction & Investment Consultancy Co. , Ltd
<b>Quantity Surveyor</b>	Rider Levett Bucknall Co. , Ltd
<b>ESD Consultant</b>	Building System & Diagnostics Pte Ltd
<b>Main Contractor</b>	An Phong Construction Co. Ltd

# THE PINNACLE

## NEW NON-RESIDENTIAL BUILDING

### GREEN MARK AWARD FOR BUILDINGS (OVERSEAS) | GOLD



- Good ETTV 41.93 W/m<sup>2</sup>.
- Chiller plant system efficiency of 0.73 kW/ton
- Extensively use of energy efficient T5 and LED light fittings for all areas.
- Use of Motion sensors to optimize lightings consumption.
- Use of CO sensors for carpark mechanical ventilation system.
- Lifts have energy efficient AC VVVF motors and sleep mode feature.

<b>Client/Developer</b>	Sunway Pinnacle Sdn Bhd
<b>Architect</b>	Perunding Alam Bina Sdn Bhd
<b>M &amp; E Engineer</b>	KTA Tenaga Sdn Bhd
<b>Structural Engineer</b>	T Y Lin International Sdn Bhd
<b>Quantity Surveyor</b>	Arcadis (Malaysia) Sdn Bhd
<b>Main Contractor</b>	Sunway Construction Bhd
<b>ESD Consultant</b>	G-Energy (M) Sdn Bhd

# GREEN MARK AWARD FOR OVERSEAS | CERTIFIED



<b>PROJECT NAME</b>	<b>CATEGORY</b>	<b>CLIENT/DEVELOPER/BUILDING OWNER</b>
CHUBB Square	Existing Non-Residential Buildings	PT. Wisma Kartika
Eco Sanctuary	District	Eco Sanctuary Sdn Bhd
Indosurya Life Center	Existing Non-Residential Buildings	PT. Puri Adhimelati
Macao Olympic Sports Centre (Main, Indoor Stadium & Aquatic Centre)	Existing Non-Residential Buildings	Sports Bureau of Macao SAR
Nusajaya Tech Park	District	Ascendas
Oasis Business Centre	New Non-Residential Buildings	Grand Infinite Development Sdn Bhd
Somerset Alabang Manila	New Non-Residential Buildings	Star Anise Properties Corporation

Organiser



An Initiative Under

