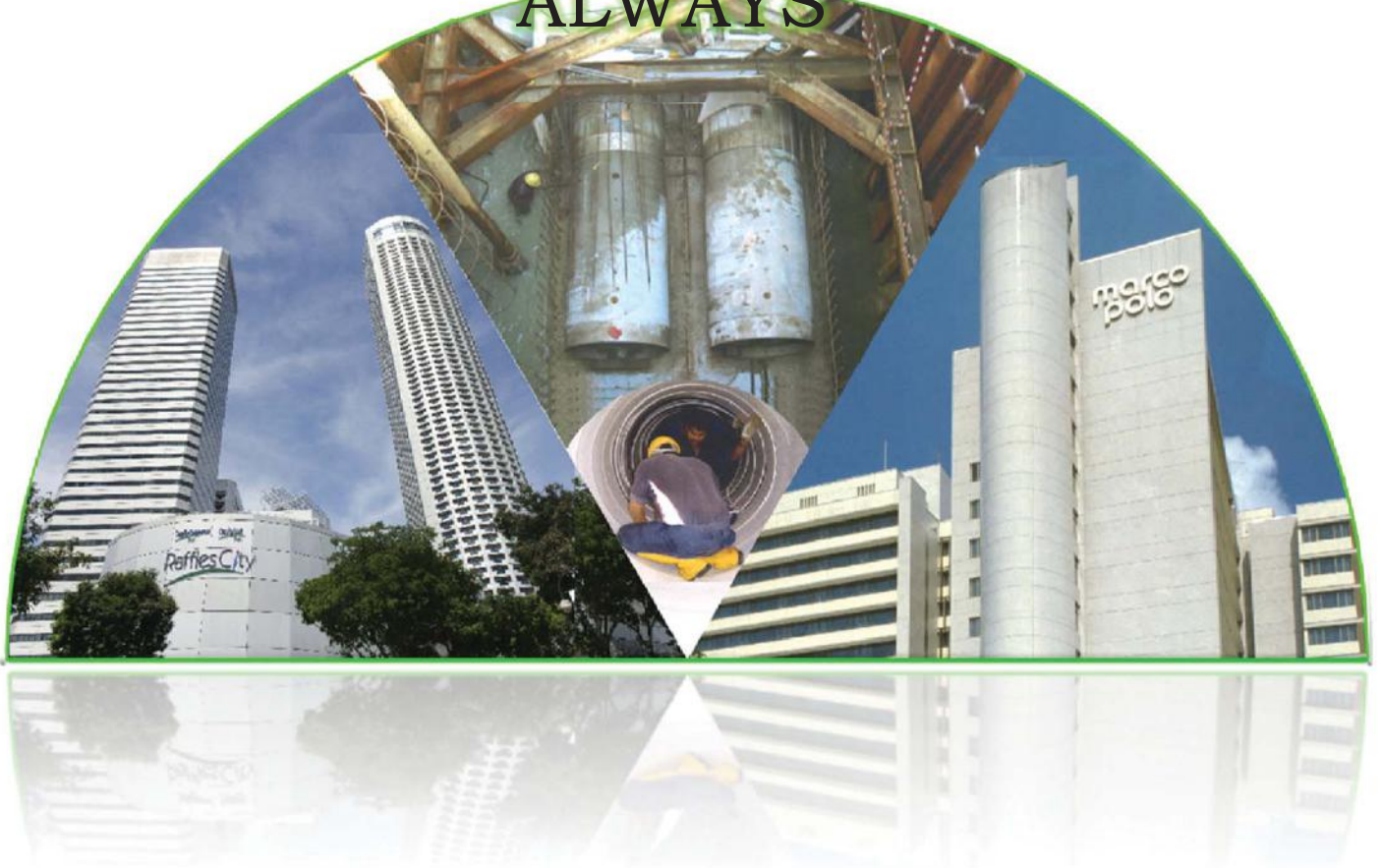


CMP

CIVIL · STRUCTURAL · MECHANICAL · ELECTRICAL



INNOVATIVE and PROFESSIONAL
ALWAYS



CMP CONSULTANTS PTE LTD

www.cmp.com.sg

WE ARE FAMILY



The management of CMP would like to thank the editorial team and contributors for their efforts and contribution to this publication.

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Special thanks to:

Chan Yew Liang, Wong Kian Keong, Alec Thng Thiam Chai, Phua Chye Meng, Hayley Wong Lai Har

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ABOUT US

CMP Consultants Pte Ltd / CMP Consulting Engineers is one of the few consulting engineering company in Singapore capable of providing multi-disciplinary consulting engineering services.

Established in 1961 as a branch firm of Crooks Michell Peacock & Stewart of Australia, the practice has grown and evolved into a mature and fully entrenched local practice.

The Company was established from the very beginning to provide consultancy services in the complete range of engineering disciplines, including Civil, Structural, Mechanical, Electrical, Industrial as well as Design for Safety (D/S), and Fire Safety Engineering – all provided “in-house”.

The Company also maintains the “in-house” capability to provide the full range of services to meet statutory authority requirements and approvals, namely:

- Planning Submission under the Planning Act
- Building Plan Submission under the Building Control Act
- Structural Inspection and Investigation of Buildings
- Accredited Checker Services
- Registered Inspector Services
- Electrical Licensing Services
- High Voltage Electrical Switching Services

CMP Consultants Pte Ltd is a Licensed Corporation under the Professional Engineers Act. The Corporation is licensed to provide both C&S and M&E professional engineering services. It is also a licensed Accredited Checker Organisation (ACO). CMP is registered under the Public Sector Panels of Consultants (PSPC) and accredited under ISO 9000:2008, ISO 14001:2004 and BizSAFE.

With the long and well established track records (since 1961) and the wealth of experience gained in having successfully completed many prestigious projects over the years the Company is eminently placed to provide the technical skills required for the design and management of construction projects. It is particularly relevant to note that these skills are tempered with an intimate knowledge of up-to-date local practices and requirements acquired through hands-on experience on projects currently being carried out.

The experience of CMP covers a wide field which includes commercial and institutional projects, civil and infrastructural projects and industrial complexes.

Some notable projects successfully completed by the Company includes:

The Raffles City Project

This is one of the world’s outstanding multi-purpose commercial complex comprising two world class hotels (a 73 Storey tower and a 28 Storey twin towers) an international convention centre, 42 Storey office tower and a luxury shopping mall (200, 000 square feet)

The building complex comprises 3 levels of basement (12m deep) a 7 Storey podium and four high rise towers with a total built-up area in excess of 4 million square feet.

Shopping Malls

- | | |
|---|--------|
| ▪ Plaza Medan Fair, Medan | \$100m |
| ▪ Plaza Singapura | \$ 39m |
| ▪ Hougang Mall | \$ 35m |
| ▪ Upgrading of Raffles City Shopping Centre | \$ 35m |
| ▪ Upgrading of Macpherson Mall / Hotel | \$ 39m |

Hotels

▪ Mandarin Hotel and Upgrading	\$ 83m
▪ Marco Polo Hotel Extension and Renovation	\$ 74m
▪ Westin Stamford and Westin Plaza (2180 rooms)	na
▪ Ming Court Hotel, Kuala Lumpur (430 rooms)	\$ 50m
▪ Hotel Boss (1500 room)	\$120m

Hospitals

▪ Seremban General Hospital 760 beds	\$ 18m
▪ Ipoh General Hospital 820 beds	\$ 40m
▪ Kelang General Hospital 820 beds	\$ 45m
▪ KB General Hospital 700 beds	\$ 32m

HighTech Factory / Warehouse Complexes

▪ Chai Chee Industrial Park	\$ 63m
▪ Techlink, Kaki Bukit Techpark	\$ 60m
▪ Research Building, Science Park II	\$ 42m
▪ SIA Supplies Centre	\$ 25m
▪ Dupont 'Delrin' Finishing Plant	\$ 50m

Industrial Plant

▪ Eastraco Pilot Plant and Lab	\$ 25m
▪ Alcom Extrusion and Anodising Plant	\$ 14m
▪ Motorola Electronics Factory	\$ 10m
▪ Bajakimia Fertilizer Plant	\$ 12m

Data Centres

▪ T-System Data Centre @ Tai Seng Drive	\$ 17m
▪ T-System Data Centre Phase II	\$ 12m
▪ KDDI Data Centre @ Chai Chee Technopark	\$ 10m
▪ I-Net Data Centre @ Chai Chee Technopark	na

Infrastructural Projects

▪ K Rompin / Batu Balek Highway, Pahang	\$120m
▪ Improvement to Alexandra Canal Phase I	\$ 40m
▪ DTSS Crawford Link Sewers	\$ 32m
▪ Circle Line Stage 3 Contract 870C	\$ 32m
▪ Reconstruction of Stamford Canal	\$ 20m
▪ Improvement to Bukit Timah First Diversion Canal	\$ 10m

Institutional Projects

▪ SCDF Division Headquarters cum Fire Station	\$ 28m
▪ Telecom Radio Transmitting Station, Kranji	\$ 15m
▪ National Archives, Canning Rise	\$ 10m
▪ 'E' Division Police Headquarters	\$ 35m
▪ Safra Club, Jurong	\$ 38m
▪ Redevelopment of Bedok Camp (D&B)	\$ 63m
▪ Sembawang Camp Phase 1A : MSVS (D&B)	\$ 27m

Educational Institution

▪ Vocational Training Institute, Bedok	\$ 15m
▪ St Joseph Institution	\$ 13m
▪ Second Japanese Primary School	\$ 44m
▪ 9 Nos Primary Schools	\$120m
▪ Upgrading of 4 Nos Secondary Schools	\$ 16m

Conservation Projects

▪ Conservation of 10 units Shophouses at Cluny Road	\$ 13m
▪ Conservation of 14 units Shophouses at Purvis Street	\$ 11m

Residential Projects

• Richmond Park Condominium	\$53m
• Housing Development, Pasir Panjang	\$6m
• Daya Bersama Housing Estate, Bt Seputek, KL	\$8m
• HDB Public Housing Projects @ Yishun, Punggol West and Serangoon Central (D&B)	\$75m

Nursing Homes

• Jamiyah Home for the Aged, Tampines (D&B)	\$8m
• 2 Nos. Home for the Aged, Bukit Batok and Marsiling (D&B)	\$16m

Restaurants, F&B Outlets

• Compass Rose, Raffles City	\$12m
• Chinese Restaurants, Raffles City	
• Japanese Restaurant, Raffles City	
• Disco, Raffles City	
• Rendezvous Restaurant at Raffles City	

AC Services

• Sogo Square, Paragon	\$40m
• Mobil CHD-3 Chemical Plant	\$120m
• Temasek Polytechnic	\$70m

Periodic Inspection of Buildings and Infrastructures

- Structural Inspection of PUB Drainage Infrastructures
- Periodic Structural Inspection of various HDB Estates
- Structural Inspection of Floating Decks and Pontoons at Bedok and Pandan Reservoirs
- Principal Inspection of Road Tunnels
- Inspection of Roads and Road Structures West Sector
- DBS Building
- NUS Building Groups 5 & 6 and Group 7 & 8
- AMK Hub

CMP STORY



-----1961 to Present

CMP, the Trusted Quality for Over 55 Years...

Mr. Chan Yew Liang (Managing Director of CMP Consultants Pte Ltd, Singapore) reviewed the first fifty-five years of our Company's history in January 2016. Back in 1954, after the World War II, Frank Michell, amalgamated with Robert Crooks but only 18 months later Frank bought out Robert's share and become the sole owner for the next five years. With the increase in work, Frank brought in Ted Peacock and J R (Ian) Stewart (the chief architect of the Malaysian Public Works Department) as partners so the name was changed to Crooks Michell Peacock and Stewart (CMPS) and went out to become one of the largest consulting engineering firms in Australia.

In the late 1961, Frank was looking ahead and saw a market opportunity in South-East Asia, he began to secure work and set up branches in Kuala Lumpur and Singapore. This led to CMPS winning the Singapore Re-development Programme against world competition. Mr. Chan Yew Liang joined R Crooks, Michell & Peacock, Kuala Lumpur in 1962 after he obtained a Bachelor in Civil Engineering from University of Malaya, Malaysia. After 11 years of consulting practice, at the age of 36, he was appointed as a Managing Director of CMP Consultants Pte Ltd of Singapore on 2 June 1973.



Inside the garden lounge of the old Raffles Hotel. From left: Chan Yew Liang (Managing Director of CMP Consultants), Jack May, Phua Chye Meng and Jesse Khor (April 1986).



Ted and Barbara Reynolds are seen here with the Managing Director of CMP Consultants Pte Ltd, Chan Yew Liang, and his wife Sally in the main foyer of the Raffles City, Singapore, after dinner in the Szechuan Restaurant (June 1986).

BOARD OF DIRECTORS



FRONT (L to R). Thng Thiam Chai, Alec Director Chan Yew Liang Managing Director Phua Chye Meng Director

BACK (L to R). Wijaya Wong Associate Director Wong Lai Har, Hayley Associate Director Goh Cheng Chai, Jason Associate Director Wong Kian Keong Director



Chan Yew Liang
Managing Director

Mr. Chan is a founder and Managing Director of CMP Consultants Pte Ltd, an associate company of Crooks Michell Peacock & Stewart (CMPS) of Australia since its incorporation on 2 June 1973. Before that, he joined R Crooks Michell & Peacock, Kuala Lumpur in 1962 and CMPS, Australia in 1967.

He has more than 54 years of extensive experience and intimate involvement in highway route selection and ground survey; planning and design of housing estate and industrial complexes; sewerage and drainage schemes; retail and commercial projects; healthcare complexes as well as institutional projects, in Singapore, Malaysia, Indonesia and Australia.

He is a registered Professional Engineer (PE), Accredited Checker (AC) and a Qualified Person (Civil) in Singapore for all projects undertaken by the Company. In the course of work, he has exposure to various culture and practices such as Australian, British, American, Japanese, South Korean, Thai, Indian and Malaysia. His wide experience in building and construction is evidenced by the successful handling of prestigious projects like Raffles City Project, Chai Chee Techno Park, SIA Supplies Centre, Second Japanese Primary School, Macro Polo Hotel and Richmond Park Condominium.

He holds a Bachelor of Engineering in Civil from the University of Malaya, Malaysia in 1962.

BOARD OF DIRECTORS



Wong Kian Keong
Director

Mr. Wong was appointed as a Director of CMP Consultants Pte Ltd. He has more than 43 years of experience in the M&E-based engineering to building and construction projects in Singapore and Indonesia.

He is a Qualified Person (Mechanical) for all the projects undertaken by the Company and a Registered Inspector (M&E RI) since 1994. He has been intimately involved in the design of the mechanical services for the Circle Line Stage 3. The highlighted completed project under his portfolio including Raffles City Project, Plaza Medan Fair in Indonesia, Ming Court Hotel in Kuala Lumpur, Hotel Boss, Telecom Radio Transmitting Station.

He received his Bachelor of Science in Mechanical Engineering from the Heriot-Watt University, Scotland in 1976.



Thng Thiam Chai, Alec
Director

Mr. Alec Thng was appointed as Director of CMP Consultants Pte Ltd. He has wide experience in the electrical engineering field in a career spanning more than 47 years.

He is a licensed Electrical Engineer authorised to operate equipment up to 22,000 volts and has been intimately involved in the design of the electrical services for the Circle Line Stage 2, the Marina Barrage and Raw Water Pumping Station.

The highlighted completed project under his portfolio including SCDF Division Headquarters cum Fire Station, KDDI Data Centre, SAFRA Club at Jurong and Hotel Development at Kallang/ Jellicoe.

He has a Bachelor of Engineering in Electrical from the University of New South Wales, Australia in 1968.



Phua Chye Meng
Director

Mr. Phua was appointed as a Director of CMP Consultants Pte Ltd. In total, he has over 47 years of experience in the field of mechanical and electrical engineering.

He has been the prime mover in the Organisation's computerisation programmes, and is currently the Computer-Aided Design and Drafting (CADD) Manager of the Design and Draughting Division of the Company.

The highlighted completed project under his portfolio including design of mechanical services for the Circle Line Stage 3, Raffles City Project, People's Park Complex, Chai Chee Industrial Parks, Replacement of Air Conditioning System for RSAF Flight Simulator Building in Perth and Undersea Cable Landing Station in Jakarta.

BOARD OF DIRECTORS



Goh Cheng Chai, Jason
Associate Director

Mr. Jason Goh was appointed as Associate Director of CMP Consultants Pte Ltd. He is a key member of the senior management team responsible for the planning, business development and managing the Company overall operation.

He is a registered Professional Engineer (PE) who had extensive years of experience in overseeing all site work; execution projects; building structural inspection in residential, retail and commercial, institution and industrial buildings; Control and liaison between the Company and its sub-contractors.

He holds a First Class Honours Bachelor of Civil Engineering degree from the University of Queensland and a Master of Civil Engineering from National University of Singapore.



Wijaya Wong
Associate Director

Wijaya has more than 20 years of working experience in various design and project delivery of infrastructure, industrial, commercial, residential as well as institutional projects in Singapore, Indonesia, Malaysia, Hong Kong and China.

The highlighted completed project under his portfolio is Marina Bay Sands Integrated Resort and Singapore Mass Rapid Transit North East Line Contract 704 (SMRT NEL C704).

He is a registered Professional Engineer (PE) and a Design for Safety Professional (D/SP) in Singapore. He is a Member of the Singapore Institute of Arbitrators (MSI Arb), Member of the Indonesian Society of Civil and Structural Engineers (Anggota HAKI) and Chartered Member of the Institution of Structural Engineers (MIStructE).



Wong Lai Har, Hayley
Associate Director

Ms. Hayley Wong has more than 36 years of work experiences in design and project delivery of multi-storey retail, commercial, residential, industrial and mixed-use development projects.

She has played major roles in engage with developers and architects for the new development projects. She is also responsible for manage and overseeing all the projects from its inception until completion.

Her wide experience in building and construction is evidenced by the successful handing of projects like 29-storey One Dusun Residences, 17-storey Neem Tree Condominium, 8-storey “M38” light industry building, Macpherson Mall, and 5-storey Tropika East Condominium.

She holds a Bachelor of Building with Honours from University of Singapore.

SCOPE OF SERVICES

CMP Consultants Pte Ltd provides a multi-faceted, multi-disciplinary consulting engineering service covering the full range of engineering disciplines (C&S, M&E and Industrial)

With our extensive experience in carrying out complex projects such as Hospitals, Hotels, Data Centres, Industrial Plants, etc CMP brings to a project the necessary skills required to deliver an “**integrated design**” as opposed to a “coordinated design” as is usual when multiple consultants are employed in a project. An “**integrated design**” has proven to be more efficient and effective and results in significant savings in time and money.

The scope of our services includes **investigation, feasibility studies, cost estimates, design, tender and contract documentations, project management and supervision of construction** in the following fields of engineering:

CIVIL AND STRUCTURAL ENGINEERING

- Building and Engineering Structures
- Foundations and Sub-structures
- Earthworks and Excavations
- Road Infrastructures
- Drainage Infrastructures
- Sewerage Infrastructures
- Water Supply Infrastructures
- Housing Estate Infrastructures

MECHANICAL ENGINEERING

- Air Conditioning and Ventilations
- Cold Rooms and Freezer Room
- Compressed Air Installation
- Steam Generation and Reticulation
- Hot and Cold Water Reticulation
- NG and LPG Reticulation
- Drainage and Sanitary Plumbing
- Automatic Sprinkler System
- Fire Protection Systems
- Medical Gas and Vacuum Systems
- Kitchen and Laundry Installation
- Lifts, Hoists and Escalators
- Hospital Equipment
- Waste Treatment and Pollution Control
- Fuel Oil Supply System
- Swimming Pools
- Solids Divertors
- Pump Sumps and Pumping Stations

SCOPE OF SERVICES

ELECTRICAL ENGINEERING

- Electricity Distribution System
- Lighting and Power Installations
- External and Street Lighting
- Emergency Power Generation and Distribution
- Communication Systems
- Security and Alarm Systems
- Audio Video Systems
- Lightning Protection Systems
- Hotel Hospitality Systems
- Instrumentation
- Central Control and Security System

INDUSTRIAL ENGINEERING

- Plant Layout and Design
- Plant Processes
- Plant Services Installation
- Mechanical Handling System
- Process Instrumentation and Control

SPECIALISED INSTALLATIONS

- Industrial Cold Stores
- High Rack Warehouses incorporating ASRS
- Food Courts and Restaurants
- Data Centres
- Operating Theatres
- Clean Rooms
- Commercial Kitchens and Laundries
- Equipment Skids
- Storage Tanks

SPECIALISED SERVICES

- Design for Safety Consultancy
- Fire Safety Engineering
- Traffic Engineering
- Green Mark Certification
- ABC Waters Certification
- QP Supervision
- Accredited Checker (AC) Services
- Registered Inspection (RI) Services
- Electrical Licensing (LEW) Services
- Periodic Inspection of Buildings
- Structural Inspect of Road and Drainage Infrastructure
- Periodic Inspection of HDB Estates
- External Façade Inspection
- Refurbishment and Upgrading of Existing facilities
- Surgical/Controlled Demolition
- Structural Strengthening of Existing Structures
- Engineering Support for D&B Projects
- Tenancy A&A Works

AWARDS AND ACCOLADES

With the long and well established track records (since 1961) and the wealth of experience gained in having successfully completed many prestigious projects over the years, CMP is eminently placed to provide the technical skills required for the design and management of construction projects.

It is particularly relevant to note that these skills are tempered with an intimate knowledge of up-to-date local practices and requirements acquired through hands-on experience on projects currently being carried out.

The Company also has had standing arrangements with various firms and individuals for specialised technical support in order to maintaining a core group of dedicated, highly experienced professionals and technical staff.

In addition to providing consistent and quality services to the building and construction sector, CMP has been prequalified and registered on the Public Sector Panels of Consultants (PSPC), accredited and certified under ISO 9000:2008, ISO 14001:2004 and bizSAFE.

The experience of the Company covers a wide field which includes industrial, residential, retail, commercial, healthcare and infrastructure projects.

With a team of dedicated professional engineers and vast experience in construction, we have delivered many projects with excellent records and received several awards.

Some notable projects successfully completed by the Company include Raffles City, Chai Chee Industrial Park, Mandarin Hotel, Hougang Mall, and Peninsula Hotel.



AWARDS AND ACHIEVEMENTS

- In Appreciation for Sogo Paragon.
- Raffles Ballroom: The Westin Stamford & Westin Plaza.
- BCA Construction Excellence Awards 2010 (Merit) for Civil Engineering Projects Category: Serangoon Interchange Station including Tunnels (Circle Line Stage 3 C852).
- In Appreciation for ITE at Chai Chee.
- In Appreciation for Yio Chu Kang Primary School.
- CIDB Best Buildable Design Awards 1997: Bukit Batok Home for the Aged & Christalite Methodist Home.
- Certificate of Appreciation for Sogo Paragon Project at 290 Orchard Road.
- CIDB Awards for Construction Excellence 1987: Raffles City.
- President's Design Award Singapore 2013 (Design of the Year): Satay by the Bay.

CIDB Awards for Construction Excellence 1987

Raffles City

★ Award



Client

Raffles City Pte Ltd

Main Contractor

Ssangyong Construction Co. Ltd

Architectural Consultant

I.M. Pei & Partners
Architects 61

C&S Consultant

Weiskopf & Pickworth
Sim Bee Teck & Associates
CMP Consultants Pte Ltd

M&E Consultant

CMP Consultants Pte Ltd
Cosentini Associates

Quantity Surveyors

Rider Hunt Levett & Bailey

Project Cost

\$780 million

Year of Completion

1986

Key Features:

Raffles City- A 'City within a City', is one of the world's largest mixed-use developments under a single ownership, comprising:

- 42-storey Raffles City Office Tower
- Four-storey luxury Raffles City Shopping Centre
- 73-storey Westin Stamford Hotel (1,257 rooms and 80 suites)
- 28-storey twin towers, Westin Plaza Hotel (796 rooms and 47 suites)
- Raffles City International Convention Centre (two ballrooms and 23 function/ meeting rooms)

RAFFLES CITY, Singapore

Raffles City - A City within a City - is one of the world's outstanding multi-purpose commercial complexes. A vast, towering development comprising two world class hotels, an international convention centre, an office tower and a luxury shopping centre.

Long planned as a key development of the new Singapore, to set standards of excellence and be a symbol of Singapore's achievements, it was given a location at the historic heart of the city state in the midst of the currently planned Civic District. It is therefore befitting that this mega-project be billed as "A City within a City".

This project was sponsored by the Development Bank of Singapore (DBS) a power house of the nation's commercial and industrial development. The DBS commissioned I M Pei one of the world's great architects, to meet the challenge of the project and supported him with an outstanding team of engineers and specialists.

CMP Consultants Pte Ltd was associated with the project from the very earliest stages right through to completion, working closely with Cosentini Associates of New York as the Mechanical and Electrical Consultants. CMP Consultants was also separately retained as Civil Engineering Consultant for the massive basement excavation, reconstruction of Stamford Canal and all the other civil works involved in the development.

Raffles City is built on a prime site bounded by four major roads covering an area of 7.6 acres (3 hectares) with a direct connection to the main interchange station of the Singapore MRT. The total built-up area is in excess of 4 million square feet (390,000 square metres). The building complex comprises 3 basement floors of almost full site area, a 7-storey podium and four high rise towers.

The complex has several major components, all carefully designed to complement each other, including :

The Westin Stamford Hotel

At 72 storeys, this opened as the tallest hotel in the world. With 1257 rooms and 80 suites it is a major building in its own right.

The Westin Plaza Hotel

Comprising two interconnected 28 storey twin-towers, it contains 796 rooms and 47 suites of even higher standard than its sister hotel.

Raffles City Convention Centre

This covers the whole of the 4th storey and extending into part of the 5th storey, providing two ballrooms and 23 function/meeting rooms. The ballrooms are provided with full convention audio visual facilities. The main ballroom has a floor area of 24,000 square feet capable of accommodating over 5000 (and up to 6,500 in theatre arrangements).

Raffles City Tower

A 42 storey office complex with 35 rentable floors having a total net rentable area of 370,000 square feet (35,000 square metres).

Raffles City Shopping Centre

A Shopping Centre occupying some 200,000 square feet (19,000 square metres) of the lower three floors of the podium provides a full range of shopping facilities, F&B outlets and other related services.

The shopping centre is arranged round a spectacular concourse comprising three atria. Installed over the main atrium are two computer operated animated light boards the first of its kind to be installed in Singapore.

Hotel Facilities

A complete range of hotel facilities are provided which includes a large size swimming pool/hyropool, 6 tennis courts, 4 squash courts, health club and fitness centre, business centre and a total of 17 F&B outlets which includes a roof top restaurant and bar (Compass Rose) on the 68th and 69th storeys of the Westin Stamford.

A large main preparation kitchen located in basement 1 provides the necessary backups to the 17 F&B outlets and the convention centre.

Laundry service is provided in house by a commercial size laundry located on the 6th storey of the podium.

Included in the development is a basement carpark for 1200 cars.



(ABOVE) Entrance to Westin Stamford Hotel.



(ABOVE) Triangular Atrium, View toward Main Atrium.

ENGINEERING FEATURES

The engineering features of the project match the overall concept in scale and sophistication. Features associated with the CMP input include:

Basement Civil Works

This required a 40 feet (12 metre) deep excavation over the whole site, right out to the boundaries of the main roads on all sides (over 370,000 cubic metres of earth was excavated). It also required the historic Stamford Canal to be reconstructed partially suspended over the excavation.

The carrying out of this massive excavation required the installation of a temporary retaining system comprising sheet piles and guniting in combination with H piles and ground anchors

Substructure

With more than 100,000 cubic metres of concrete in all, the sub structure includes many outstanding engineering features, the most notable being the immense foundation for the Westin Stamford, a single pour of 11,000 cubic metres that set a world record.

The whole of the substructure is designed to bear directly on the ground without any piles. Economies in construction of the basement structures were achieved by the provision of a sub soil drainage system and the exclusion of ground water.

A comprehensive soil instrumentation system was installed over the whole site to continuously monitor the soil condition and ground movement.

Superstructure

A construction enterprise of great complexity, it proceeded simultaneously on all fronts, employing up to 8 tower cranes at the peak of construction.

When topped out, the Westin Stamford tower was the second tallest concrete building in the world. Construction of the towers peaked at a rate better than one floor every six days.

Air-conditioning and Ventilation Installation

These installations include over 10,000 TR of cooling provided by 6 chiller-sets (each requiring 1,275 kW input power), supported by 6 chilled-water pumps, 6 condenser water pumps and 10 cooling tower cells. In addition there are 2 heat pumps rated at 11.5 million BTU/hr (3,369 kW) each and other energy saving equipment. The installed electrical load of this central plant is over 12,000 kW.

The various building areas are served by 2,450 fan coil units, 230 air handling units and 250 ventilation fans.

The entire installations are programmed, controlled and monitored by a sophisticated building automation system.

Electrical Installation

The complex has a 32 MW, 22 kV power supply for a declared demand of 30 MW. Dry-type transformers are located in the basement and in the towers. Emergency power is supplied by 6 diesel alternators at strategic locations.

Vertical Transportation

In all, Raffles City has 72 lifts and 24 escalators.

Piped Services Installation

To minimise usage of potable water, a separate piping system is provided for toilet flushing, etc. allowing use of non-portable water for these uses. Rainwater is collected for cooling tower use.

Building Automation

In addition to the comprehensive automation of airconditioning operation, the building automation provisions allow optimization of energy use and the control of maximum electrical demand.

Fire Protection Installation

The sheer size of Raffles City places special demands on the provision of fire protection. While use has been made of all of the latest techniques for providing fire protection, complete sprinkler protection of the whole complex provides the ultimate guarantee of safety.



CMP Consultants/ Cosentini Associates

Cosentini Associates of New York is one of the world's foremost consultants for M&E services in large building complexes and with its specialist expertise in this area and knowledge of state-of-the-art technology, it was a natural choice to lead the M&E design for Raffles City. CMP Consultants with its own long established record in the design and supervision of M&E systems in large hotels and shopping complexes, was ideally placed to work with Cosentini Associates in design and to be responsible for getting these designs implemented in the project.

In addition to working with Cosentini Associates on the primary M&E services, CMP was directly responsible for the design and supervision of the extension of these services into the VIP Suites, restaurants and the major tenancy areas.

CMP Consultants was separately engaged as the Consultant for the design and supervision of all the civil engineering works in the project and to assist in the design and supervision of the following specialized systems.

- Laundry Equipment
- Kitchen Equipment
- Computer Room for the Hotel Management System
- Convention Audio Visual and Television System (CATS)
- Guestroom Energy Management System (GEMS)
- Electronic Guestroom Access System (EGAS)
- Electronic Light Boards
- Window Washing Equipment

Total Project Cost

Upon its final completion at the end of 1987 the total project cost was in excess of S\$1 billion the largest amount to be spent in a single building project at the time.



CIDB Best Buildable Design Awards 1997

Bukit Batok Home for the Aged & Christalite Methodist Home

★ Award



(ABOVE). Bukit Batok Home for the Aged.
(BELOW). Christalite Methodist Home.

Client
Ministry of Community Development

C&S Consultant
CMP Consulting Engineers

Project Cost
\$16 million

Year of Completion
1996

BCA Construction Excellence Awards (Merit) 2010

Serangoon Interchange Station including Tunnels:
Circle Line Stage 3 C852

★ Award



(ABOVE). View of MRT Train Tunnel.

(BELOW). Platform of Serangoon MRT Station.

Builder

WH-STEC-AM Joint Venture

Client

Land Transport Authority

Architectural Consultant

AEP Consultants (S) Pte Ltd

Principal/ C&S Consultant

MWH Consultants (S) Pte Ltd

M&E Consultant

CMP Consulting Engineers

President's Design Award 2013

Satay by the Bay, Singapore

★ Award



Client

Planar One & Associates Pte Ltd

M&E Consultant

CMP Consultants Pte Ltd

Architectural Consultant

Linghao Architects

Year of Completion

2013

Design Collaborators

KUU (Tan Kok Meng & Satoko Saeki)

Project Cost

\$3m

C&S Consultant

Consultants United



2 Stamford Road #06-01
Raffles City Convention Centre
Singapore 178882

Telephone: (65) 33377615
Telex: RS 50987 RCHTTS
Facsimile: (65) 3373618

25 March 1999

To Whom it may concern

**PERFORMANCE ASSESSMENT OF
CMP CONSULTING ENGINEERS/CMP CONSULTANTS PTE LTD**

CMP was engaged by Raffles City Pte Ltd in 1994 to provide consulting engineering services (structural, mechanical and electrical) for the Upgrading and Refurbishment of Raffles City Shopping Centre, a project of total construction value of approximately \$35 million.

This project is both complex and difficult in execution, as it has to be carried out in several phases with the Complex in full operation with minimal disruption. The successful completion of the project in 1997 on schedule and within budget is testimony to the design and management skills of the project team.

In addition to this project CMP has also been involved in many of our upgrading projects in the Complex during the intervening years since the completion of the Raffles City Project in 1986 for which CMP has also played a significant role in its execution and successful completion.

The upgrading projects that CMP has undertaken includes:

1. Upgrading and Refurbishment of Raffles City Tower
2. Installation of a Standby Sewage Pumping System
3. Upgrading of the Incoming HV Power Supply System
4. Upgrading of the Atrium Lighting System
5. Raffles City Offices
6. Upgrading and Refurbishment works in the Raffles City Convention Centre and Westin Stamford & Westin Plaza including Raffles Ballroom, Atrium Meeting Rooms, Stamford Ballroom and Executive Conference Centre, Szechuan Court Restaurant, VIP Lounge and Long Stay Guestrooms.

CMP has been intimately involved in the design and development of the M&E Services in the Raffles City Project since its inception in 1979 and has through out the past twenty years been contributing to its evolvement and development for which we as owners of the project are fully appreciative.

Yours faithfully

ANTHONY YIP
General Manager



22 Mar 99

TO WHOM IT MAY CONCERN

1 This is to confirm that CMP Consultants Pte Ltd was the consultants for the following projects :-

Richmond Park
Bideford Road

Construction Cost : \$53m
Completion : 1996
Services provided : C&S and M&E

Chai Chee Industrial Park Biks D & E
Chai Chee Road

Construction Cost : \$63m
Completion : 1990
Services provided : C&S and M&E

2 CMP is one of the established firms in C&S and M&E services. They are committed to the projects they undertake and they endeavour to perform their work to the best of their ability. We find the performance of CMP in the above 2 projects generally satisfactory.

Yours faithfully

JOSEPH LAU
GROUP PROJECT DIRECTOR



PACICON SINGAPORE PTE LTD

Planning, Architectural & Engineering Consultants

26th March 1999

TO WHOM IT MAY CONCERN

Performance Assessment of CMP Consulting Engineers

CMP Consulting Engineer was engaged by Pacicon Singapore Pte Ltd to be the Consultants on the following projects :

1. Second Japanese Primary School Phase I & II at Upper Changi Road North

Construction Cost : S\$44 million
Completion : 1997
Services provided : C&S and M&E

2. Hitachi Warehouse at Changi South

Construction Cost : S\$11.5 million
Completion : 1996
Services provided : C&S and M&E

The successful completion of these two projects on schedule and within budget is testimony to the capability and performance of the Consultant.

We and our Client are very pleased and appreciative of the efforts put in by the Consultants for the successful completion of these two projects.

TERUHIKO TAKAHASHI
Managing Director

25 March 1999

To Whom It May Concern,

Performance Assessment of CMP Consulting Engineers

CMP Consulting Engineers was the M&E Consultants for two of our development projects:

1. Techlink – Hi Tech Industrial Building at Kaki Bukit Techpark I

Construction Cost : \$60 million
Completion : 1997
Services provided : M&E

2. The Gemini – A multi-tenanted Research Building at Science Park II

Construction Cost : \$43 million
Completion : 1998
Services provided : M&E

Both projects were “Design & Build” and the Consultant Team which includes CMP Consulting Engineers as the M&E Consultants was pre-selected by us and subsequently novated to the successful contractor for the design and construction of the projects.

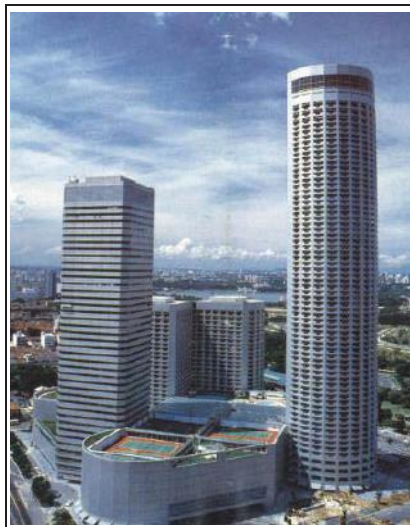
The Consultants were professional in the execution of their responsibilities and we as Owners of the developments are pleased and appreciative of the efforts put in by CMP Consultants for the successful completion of these two projects.

Yours faithfully



Thomas Teo
General Manager
Arcasia Land Pte Ltd

TRACK RECORDS



Raffles City

Client : Raffles City Pte Ltd
 Main Contractor : Ssangyong Construction Co. Ltd
 Architect : I.M. Pei & Partners
 : Architects 61
 C&S : Weiskopf & Pickworth
 : Sim Bee Teck & Associates
 M&E : CMP Consultants Pte Ltd
 : Cosentini Associates
 Project cost : \$780m
 Year of Completion : 1986



Upgrading Works to Peninsula Plaza

Client : MCST 1031
 Architect : Alfred Wong Partnership
 C&S : DE Consultants Pte
 M&E : CMP Consultants Pte Ltd
 Project cost : \$26m
 Year of Completion : 2017



2-Storey Commercial Podium and 29-Storey One Dusun Residences, Jalan Dusun

Client : LVND Homes Pte Ltd
 Architect : JGP Architecture (S) Pte Ltd
 C&S : CMP Consultants Pte Ltd
 M&E : PCA Consulting Engineer
 Project cost : \$29m
 Year of Completion : 2016

TRACK RECORDS



Grandview Suites, 1 Lorong 22 Geylang

Client : Grandview Pte Ltd
 Architect : Shing Design Atelier
 C&S : CMP Consultants Pte Ltd
 M&E : PTA Consultants Pte Ltd
 Project cost : \$15m
 Year of Completion : 2016



Upgrading Works to Macpherson Mall and 9-Storey Hotel, 401 Macpherson Road

Client : LVND Investments Pte Ltd
 Architect : ADLAB Pte Ltd
 C&S : CMP Consultants Pte Ltd
 M&E : PCA Consulting Engineer
 Project cost : \$39m
 Year of Completion : 2016



People's Park Complex, Eu Tong Sen Street

Client : People's Park Development Pte Ltd
 Main Contractor : Low Keng Huat Construction
 Architect : DP Architects Pte Ltd
 C&S : Y S Lau Consulting Engineer
 M&E : CMP Consultants Pte Ltd
 Year of Completion : 1968

TRACK RECORDS



Ming Court Hotel

Client : Ming Court Hotel Sdn Bhd
 Architect : Alfred Wong Partnership
 C&S : CMP Consultants Pte Ltd
 M&E : CMP Consultants Pte Ltd
 Project cost : \$50m
 Year of Completion : 1984



Hotel Boss with 1500 rooms, Victoria Street/ Jalan Sultan

Client : Forward Land Pte Ltd
 Architect : Archiwave Architects
 C&S : KH Consultants
 M&E : CMP Consulting Engineers
 Project cost : \$120m
 Year of Completion : 2016



V-Hotel Bencoolen with 272 rooms, Bencoolen Street

Client : Citywide Pte Ltd
 Architect : Archiwave Architects
 C&S : KH Consultants
 M&E : CMP Consulting Engineers
 Project cost : \$22m
 Year of Completion : 2014

TRACK RECORDS



Vocational Training Institute, Bedok

Client : VITB
 Architect : Alfred Wong Partnership
 C&S : CMP Consultants Pte Ltd
 M&E : CMP Consultants Pte Ltd
 Project cost : \$15m
 Year of Completion : 1986



V-Hotel with 888 rooms, Kallang/ Jellicoe

Client : Citywide Pte Ltd
 Architect : Archiwave Architects
 M&E : CMP Consulting Engineers
 Project cost : \$60m
 Year of Completion : 2010



SAFRA Club, Jurong

Client : SAFRA National Service Association
 Architect : Consortium 168
 C&S : Engineering 2000
 M&E : CMP Consulting Engineers
 Project cost : \$38m
 Year of Completion : 2009

TRACK RECORDS



Eurasian Association Community House

Client : The Eurasian Association Singapore
Architect : Consortium 168
M&E : CMP Consulting Engineers

Project cost : \$5.1m
Year of Completion : 2002



Marco Polo Hotel Extension/ Renovation, Tanglin Road

Client : Marco Polo Hotel Ltd
Architect : Alfred Wong Partnership
C&S : CMP Consultants Pte Ltd
M&E : CMP Consultants Pte Ltd

Project cost : \$74m
Year of Completion : 1995

TRACK RECORDS



17-Storey Neem Tree Condominium, 30 Jalan Kemaman

Client : Ding Zhou Consultants Pte Ltd
 Architect : Ronny Chin Architects Pte Ltd
 C&S : CMP Consultants Pte Ltd
 M&E : Elead Associates Pte
 Project cost : \$20m
 Year of Completion : 2018



One Surin Terrace Houses, 1 Surin Avenue

Client : Urban Lofts Pte Ltd
 Architect : A_Collective Architects
 C&S : CMP Consultants Pte Ltd
 M&E : PCA Consulting Engineer
 Project cost : \$18.1m
 Year of Completion : 2017



Charlton 27, Charlton Road/ Surin Ave

Client : Surindipity Pte Ltd
 Architect : ADLAB Pte Ltd
 C&S : CMP Consultants Pte Ltd
 M&E : PCA Consulting Engineer
 Project cost : \$23m
 Year of Completion : 2017

TRACK RECORDS



5-Storey Adana @ Thomson, 549 Upper Thomson Road

Client : Fortune Properties Pte Ltd
 Architect : JGP Architecture (S) Pte Ltd
 C&S : CMP Consultants Pte Ltd
 M&E : Elead Associates Pte
 Project cost : \$19.9m
 Year of Completion : 2017



2-Storey Semi-D, 9 Dyson Road

Client : Success Century Pte Ltd
 Architect : Parks & Associates Pte Ltd
 C&S : CMP Consultants Pte Ltd
 M&E : Elead Associates Pte
 Project cost : \$6m
 Year of Completion : 2017



5-Storey Jade Residences, Lew Lian Vale

Client : Roxy Residential Pte Ltd
 Architect : JGP Architecture (S) Pte Ltd
 C&S : CMP Consultants Pte Ltd
 M&E : Elead Associates Pte
 Project cost : \$43m
 Year of Completion : 2017

TRACK RECORDS



5-Storey Cambio Suites, 28 Lim Tua Tow Road

Client : Urban Lofts Pte Ltd
 Architect : A_Collective Architects
 C&S : CMP Consultants Pte Ltd
 M&E : PCA Consulting Engineer
 Project cost : \$14.5m
 Year of Completion : 2016



5-Storey Tropika East Condominium, 3 Foo Kim Lin Road

Client : Feature (East) Development Pte Ltd
 Architect : JGP Architecture (S) Pte Ltd
 C&S : CMP Consultants Pte Ltd
 M&E : Elead Associates Pte
 Project cost : \$26.95m
 Year of Completion : 2016



28-Storey Richmond Park Condominium, Bideford Road

Client : Tarorone Investments Pte Ltd
 Architect : RSP Architects
 C&S : CMP Consultants Pte Ltd
 M&E : CMP Consultants Pte Ltd
 Project cost : \$53m
 Year of Completion : 1996

TRACK RECORDS



Hitachi Warehouse, Changi Road South

Client : Pacicon (S) Pte Ltd
 Architect : Architects Vista
 C&S : CMP Consultants Pte Ltd
 M&E : CMP Consultants Pte Ltd
 Project cost : \$11.5m
 Year of Completion : 1996



SIA Supplies Centre, Loyang Way

Client : SIA Properties Pte Ltd
 Architect : Architects Vista
 C&S : CMP Consultants Pte Ltd
 M&E : CMP Consultants Pte Ltd
 Project cost : \$25m
 Year of Completion : 1994



Chai Chee Techno Park

Client : Wan Tien Realty Pte Ltd
 Architect : Architects Vista
 C&S : CMP Consultants Engineers
 M&E : CMP Consultants Engineers
 Project cost : \$63m
 Year of Completion : 1990

TRACK RECORDS



8-Storey M38 Light Industry, 38 Jalan Pemimpin

Client : Mavern Pte Ltd
 Architect : Ronny Chin Architects Pte Ltd
 C&S : CMP Consultants Pte Ltd
 M&E : Elead Associates Pte
 Project cost : \$29.8m
 Year of Completion : 2016



Techlink, Kaki Bukit Techpark

Client : Arcasia Lands Pte Ltd
 Architect : Architects Team 3
 M&E : CMP Consulting Engineers
 Project cost : \$60m
 Year of Completion : 1997



DuPont Delrin Finishing Plant, Tuas

Client : DuPont Singapore Pte Ltd
 C&S : CMP Consultants Pte Ltd
 M&E : CMP Consultants Pte Ltd
 Project cost : \$50m
 Year of Completion : 1990

TRACK RECORDS



M1 Data Centre, 9 International Business Park

Client : M1 Limited
C&S : SD Architects LLP
M&E : CMP Consultants Pte Ltd
Project cost : \$33.5m
Year of Completion : 2016



M1 Data Centre Room Integrity Test



M1 Data Centre Main Switch Board Testing

TRACK RECORDS



Upgrading to Existing Raffles Girls Primary School, Hillcrest Road

Client : School Development Office,
Ministry of Education
Architect : SD Architects LLP
C&S : E2000
M&E : CMP Consultants Pte Ltd
Project cost : \$15m
Year of Completion : 2016



Hong Wen Primary School

Client : School Development Office,
Ministry of Education
Architect : Architects Vista Pte Ltd
C&S : Lim Kim Cheong Consultants
M&E : CMP Consulting Engineers
Project cost : \$16m
Year of Completion : 2008



CHIJ Our Lady of Good Counsel Primary School, 2C Burchley Drive

Client : School Development Office,
Ministry of Education
Architect : Consortium 168
C&S : TEP Consultants Pte Ltd
M&E : CMP Consulting Engineers
Project cost : \$15m
Year of Completion : 2006

TRACK RECORDS



Second Japanese Primary School, Upper Changi Road North

Client : Pacicon (S) Pte Ltd
Architect : PCI/ Architect Vista
C&S : CMP Consultants Pte Ltd
M&E : CMP Consultants Pte Ltd
Project cost : \$44m
Year of Completion : 1998



Chua Chu Kang Primary School, Choa Chu Kang Site 15

Client : Public Works Department
Architect : Architects Vista
C&S : CMP Consultants Pte Ltd
M&E : CMP Consultants Pte Ltd
Project cost : \$8m
Year of Completion : 1994

TRACK RECORDS



Improvement to Alexandra Canal Phase 1: Between Zion Road and Kim Seng Road

Client : PUB Drainage Department
C&S : CMP Consulting Engineers
Project cost : \$31m
Year of Completion : 2009



DTSS: Crawford Link Sewers (Package D2)

Client : PUB Sewerage Department
C&S : CMP Consulting Engineers
Project cost : \$32m
Year of Completion : 2007

TRACK RECORDS



'E' Division Police Headquarters, Kampong Java Road

Client : Ministry of Home Affairs
Architect : Architects Vista
C&S : CMP Consultants Pte Ltd
M&E : CMP Consultants Pte Ltd
Project cost : \$35m
Year of Completion : 2001



Redevelopment of Bedok Camp, Upper East Coast Road

Client : Lands & Estate Organisation
Architect : Architects Vista
M&E : CMP Consultants Pte Ltd
Project cost : \$67.3m
Year of Completion : 1999

OUR CLIENTS



CMP value long-term partnerships with a diverse and growing customer base. Our client covers a wide range of public and private stakeholders including housing developers, logistic and plant operators, banks, government agencies, hospitality and educational institutions.

Clients include:

1-Net Singapore Pte Ltd

Arcasia Lands Pte Ltd
Ascendas Lands Pte Ltd

Bottle Tree Pte Ltd
British & Malayan Trustees

Central Provident Fund (CPF) Board
Chyau Fwu Development (S) Pte Ltd
Citywide Pte Ltd

Data-Sphere (S) Pte Ltd
DBS Bank
DBS Property Services Pte Ltd
Ding Zhou Consultants Pte Ltd
DuPont Singapore Pte Ltd

Feature (East) Development Pte Ltd
Fortune Properties Pte Ltd
Forward Land Pte Ltd

Grandview Pte Ltd

Hoo Huat Engineering Pte Ltd
Housing & Development Board

Jacobs Services (SEA) Pte Ltd
Jian Man Construction Pte Ltd

Land Transport Authority
Lands & Estate Organisation
Ley Choon Development Pte Ltd
LVND Investments Pte Ltd
LVND Homes Pte Ltd

M1 Limited
Majlis Ugama Islam Singapore (MUIS)
Marco Polo Hotel Ltd
Marymount Convent School
Mavern Pte Ltd
Ministry of Community Development
Ministry of Defence
Ministry of Education, Singapore
Ministry of the Environment, Singapore
Ministry of Home Affairs, Singapore
Mobil Oil Singapore Pte Ltd

National Heritage Board
National Parks Board
National University of Singapore
Nanyang Technological University
NTUC Fairprice Co-Operative Ltd

OCBC Properties Pte Ltd
OCWS Logistics Pte Ltd
OneQ Pte Ltd

Pacicon (S) Pte Ltd
PT Anugrah Prima, Indonesia
Public Utilities Board, Singapore
Public Works Department, Singapore

Raffles City Pte Ltd
Roxy Residential Pte Ltd

SAFRA National Service Association
Sentosa Development Corporation
SIA Properties Pte Ltd
Singapore Armed Forces Yacht Club
Singapore Civil Defence Force (SCDF)
Singapore Meritus Hotels International
Singapore Telecom
ST Synthesis Pte Ltd
Stock Exchange of Singapore Ltd
Success Century Pte Ltd
Summerview Development Pte Ltd
Surindipity Pte Ltd
Swensen's of Singapore Pte Ltd

Taisei Corporation
Tarorone Investments Pte Ltd
Texas Chicken Singapore
The Eurasian Association Singapore
T-System Singapore Pte Ltd

United Micro Electronics Corporation
Urban Lofts Pte Ltd

Wan Tien Realty (Pte) Ltd
Warees Investment Pte Ltd
Wing Tai Holdings Limited

YTC Pte Ltd
And many others not listed here.

We are proud to have them satisfied



Consultants

Project Management

Engineering



CMP CONSULTANTS PTE LTD

CIVIL · STRUCTURAL · MECHANICAL · ELECTRICAL

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