RLB Rider Levett Bucknall

RIDERS DIGEST 2024

SINGAPORE EDITION

RIDERS DIGEST
17TH EDITION

2024

A yearly publication from RLB's Research & Development department. Rider's Digest is a compendium of cost information and related data specifically prepared for the Singapore construction industry.

Cost information in this publication is indicative and for general guidance only. All prices and rates are as at First Quarter 2024 and expressed in Singapore Dollars unless otherwise stated. References to legislative provisions and regulations are as at Second Quarter 2024. Changes after this period will not be reflected.

All figures are rounded and exclude GST.

Singapore Office

Rider Levett Bucknall
911 Bukit Timah Road Level 3
Singapore 589622
T: +65 6339 1500
F: +65 6339 1521
E: rlb@sg.rlb.com

MCI (P) 027/04/2024


CREDITS: KKAA and NHB

Founders' Memorial, Singapore

INTRODUCTION

CONFIDENCE TODAY INSPIRES TOMORROW

With a network that covers the globe and a heritage spanning over two centuries, Rider Levett Bucknall is a leading independent organisation in quantity surveying and advisory services.

Our achievements are renowned: from the early days of pioneering quantity surveying, to landmark projects such as the Sydney Opera House, the HSBC Headquarters Building in Hong Kong, the 2012 London Olympic Games and locally, the Marina Bay Sands Integrated Resort.

This success is based on our innovative thinking, global reach and flawless execution to push the boundaries, taking ambitious projects from an idea to reality. We are committed to continuing this legacy through our dedication to understanding client needs and providing true value-add.

CREATING A BETTER TOMORROW

The Rider Levett Bucknall vision is to be the global leader in the market, through service excellence, a fresh perspective and independent advice.

Our focus is to create value for our customers, through the skills and passion of our people and to nurture strong long-term partnerships.

We trust that the research data provided herein will assist and empower all our valued partners to bring your projects and imagination to life. We look forward to working together with you to shape the future of the built environment and to create a better tomorrow.

Silas Loh and Colin Kin
Managing Directors, Singapore Office
Rider Levett Bucknall

CONTENTS

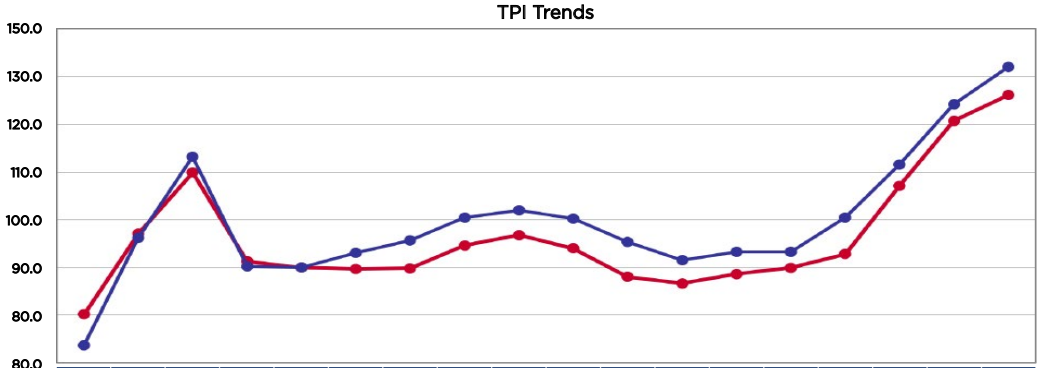
NTP+ at New Tech Park, Singapore

SINGAPORE CONSTRUCTION COST TRENDS

Click on the footer to return to this section's contents page.

SINGAPORE CONSTRUCTION TRENDS

TENDER PRICE INDICES (TPI) (YEAR 2010 = 100)



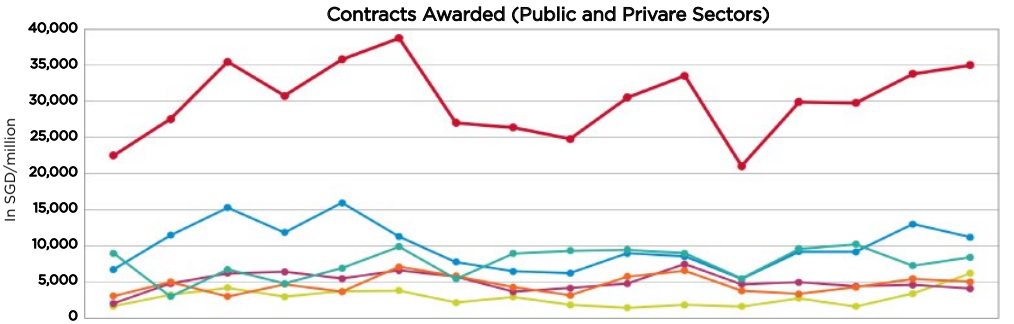
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
BCA	90.2	107.1	119.9	101.3	100	99.7	99.8	104.6	106.8	104.0	98.0	96.7	98.6	99.9	102.8	117.1	130.7	136.1
RLB	83.7	106.2	123.2	100.2	100	103.1	105.7	110.5	112.0	110.2	105.3	101.5	103.3	103.3	110.5	121.6	134.2	142.0

Variances between the RLB and the BCA TPI arise from differences in the index derivation methodology, the basket of items and weightages used for each index and the variety of building projects utilised. The index basket here excludes piling works and Mechanical & Electrical services.
With effect from the 1st Quarter of 2015, BCA has implemented the new TPI series with Base Year 2010 = 100. The TPI chart shown above has been amended accordingly to reflect the Base Year as Year 2010.

Source: BCA, RLB

SINGAPORE CONSTRUCTION TRENDS

PUBLIC & PRIVATE SECTOR CONTRACTS AWARDED FOR TOTAL WORKS



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024f
RESIDENTIAL	6,734	11,487	15,298	11,846	15,963	11,290	7,770	6,479	6,250	9,019	8,570	5,439	9,226	9,189	13,019	11,200
COMMERCIAL	1,650	3,237	4,210	2,990	3,728	3,823	2,183	2,962	1,859	1,458	1,845	1,624	2,759	1,645	3,421	6,200
INDUSTRIAL	2,040	4,790	6,221	6,418	5,490	6,628	5,778	3,676	4,177	4,808	7,506	4,705	4,988	4,438	4,621	4,100
INSTITUTIONAL & OTHERS	3,075	5,028	3,018	4,697	3,682	7,113	5,828	4,312	3,166	5,787	6,586	3,784	3,351	4,295	5,450	5,050
CIVIL ENGINEERING WORK	9,019	3,023	6,741	4,810	6,941	9,903	5,474	8,974	9,346	9,464	9,017	5,494	9,610	10,220	7,285	8,450
TOTAL	22,518	27,565	35,488	30,761	35,804	38,757	27,034	26,404	24,799	30,535	33,524	21,045	29,934	29,786	33,797	35,000

f: Average forecast construction demand for 2024 is S$32 - S$38 billion.
Note: BCA's published information as at 2 February 2024.

Source: BCA

SINGAPORE CONSTRUCTION TRENDS

AVERAGE PRICES OF BASIC CONSTRUCTION MATERIALS

YEAR	ORDINARY PORTLAND CEMENT (S$ PER TONNE)	STEEL BARS[1] (S$ PER TONNE)	GRANITE[2] (20MM AGGREGATE) (S$ PER TONNE)	READY-MIXED CONCRETE (GRADE 30) (S$ PER M³)	READY-MIXED CONCRETE[3] (GRADE 35/40) (S$ PER M³)	CONCRETING SAND[2] (S$ PER TONNE)
2000	71.28	458.50	12.50	71.32		
2001	70.04	432.81	12.67	61.40	-	-
2002	66.88	442.88	12.65	55.40	-	-
2003	71.13	583.93	12.25	56.75	-	-
2004	76.76	863.40	12.57	62.50	-	-
2005	85.20	738.44	16.29	72.09	-	-
2006	88.02	731.13	16.58	73.99	-	14.63
2007	100.85	873.19	31.74	138.13	138.93	45.77
2008	122.21	1,400.64	24.71	-	125.85	36.97
2009	103.23	765.80	19.68	-	104.73	29.95
2010	89.14	833.41	19.63	-	95.44	28.19
2011	93.78	931.26	21.58	-	108.99	25.96
2012	100.87	887.13	21.26	-	110.23	24.10
2013	100.23	766.90	20.61	-	106.85	22.99
2014	97.93	653.90	22.45	-	111.15	23.25
2015	92.97	501.40	19.71	-	99.47	22.68
2016	82.95	500.52	15.43	-	85.01	18.30
2017	75.91	688.83	16.07	-	81.42	17.12
2018	78.08	786.43	17.21	-	85.15	18.59
2019	82.68	741.87	18.49	-	93.88	26.66
2020	85.85	725.45	18.44	-	94.78	24.94
2021	91.75	1,046.57	19.58	-	99.91	23.59
2022	115.14	1,135.05	20.33	-	115.62	23.83
2023	115.58	879.62	18.98	-	116.76	28.98

[1] - Market prices of Steel bars (without cut & bend):
Jan 09-Dec 14: Based on fixed price supply contracts with contract period 6 months or less.
Jan 15-Current: Based on fixed price supply contracts with contract period 1 year or less.

Note: Prices of rebar other than 16-32mm dimensions may be subject to surcharge.

[2] - Market prices exclude local delivery charges to concrete batching plants.

[3] - Market prices of Ready Mixed Concrete:
Jan 99-Dec 06: Based on Grade 30.
Jan 07-Dec 09: Based on contracts with non-fixed price, fixed price and market retail price for Grade 35 pump.
Jan 10-Current: Based on contracts with non-fixed price, fixed price and market retail price for Grade 40 pump.

Source: BCA

CREDITS: DARREN SOH FOR 8M

265 - 271 South Bridge Road, Singapore

SINGAPORE CONSTRUCTION COST DATA

Central Business District (CBD)
The Central Business District is Singapore's business and financial district and home to leading international businesses and financial institutions. It spans from Raffles Place along Shenton Way / Robinson Road / Cecil Street to Tanjong Pagar and Anson subzones, and also extends to Marina Bay, including Central and Bayfront subzones as defined by the Urban Redevelopment Authority (URA).

Construction Floor Area (CFA)
CFA is the area of all building enclosed covered spaces measured to the outside face of the external walls including covered basement and above ground car park areas.

Gross Floor Area (GFA)
GFA is the area of building enclosed covered spaces excluding carpark and driveway areas calculated for purposes of planning submissions (refer to Page 59: Gross Floor Area for more information).

Net Lettable Area (NLA)
NLA is the total tenancy area designated for rentable purposes, i.e. areas used by tenants where rents are charged.

Building Works
Building Works include substructure (piling, foundation, and basement), super-structure, architectural works, finishes and fittings, external works, site works, preliminaries, attendance and other builder's work in connection with services.

Building Services
Building Services include Mechanical services - air-conditioning and mechanical ventilation, fire protection system, sanitary and plumbing; Electrical services – electrical installations, vertical transportation, building management systems; and preliminaries. Exclusions: Special equipment – chutes, incinerators, compactors, pneumatic refuse disposal system, facade maintenance equipment, engineered smoke control system, private telephone system; audio video, IT systems, etc.

Office
Offices within CBD refers to good quality office buildings for the upper range rental market and leading owner occupiers such as headquarter offices for financial institutions and major companies. Office outside CBD refers to medium quality office buildings built for middle range rental market.

Hotel (including FF&E)
Hotels listed are based on 'five-star', 'four-star' and 'three-star' international hotel ratings. Costs include furniture, fitment and equipment (FF&E) but exclude hotel equipment and operating supplies.

Retail
Shopping malls with typical amenities and finishes at common spaces. Tenancy fit-outs are excluded in construction costs.

Condominium
The quality of finishes required will affect the cost range. Range given is significantly affected by the height, configuration of the building and existing ground conditions. Costs exclude show flats, loose furniture, special light fittings, household electrical appliances, kitchen equipment and building owners' special requirements.

Landed Residential
Landed housings are private low-rise / low density residential developments. The quality of finishes selected will affect the cost range. Costs exclude furniture, household electrical appliances, kitchen equipment and building owners' special requirements.

Institutional
Institutions include tertiary educational schools such as universities, polytechnics and other colleges that require a full range of educational facilities and amenities.

Industrial
Industrial developments reflect a simplified type of construction suitable for light industrial activities, logistics hubs and high-end manufacturing industries. Costs exclude fitting out of special operating equipment, automated storage and retrieval systems, cold rooms and associated equipment, processing plant and proprietary systems.

Healthcare
Healthcare developments are institutional buildings with health and medical services, such as hospitals, nursing homes, medical centres and polyclinics and clinics. Costs exclude specialist medical equipment.

Car Park
Above Grade car parks are multi-storey car park with minimal external walling and exclude mechanical ventilation. Basement carparks are underground car park with diaphragm wall or contiguous bored piles walls with standard mechanical ventilation provisions.

SINGAPORE CONSTRUCTION COST DATA

BUILDING CONSTRUCTION PRICES

All construction prices for Singapore stated here are indicative only as at First Quarter 2024. Items generally excluded from the order of costs are land costs, legal and professional fees, development charges, authority fees, finance costs, loose furniture, fittings, equipment and works of art (unless otherwise stated), tenancy works such as but not limited to sub-divisional partitions in office buildings and shop fit-out in retail spaces, site infrastructure work, diversion of existing services, resident site staff cost, models and prototypes, future cost escalation, show flats / sales office, Green Mark Cost Premiums and Goods & Services Tax. All prices stated below include a general allowance for foundation, car park and external works.

Development Type	Building Works	Building Services	Total
Range Of Cost Per Construction Floor Area (CFA)	**S$/m²**	**S$/m²**	**S$/m²**
OFFICE			
Standard (outside CBD)	2,060 - 3,500	920 - 1,210	2,980 - 4,710
Standard (within CBD)	2,100 - 3,530	990 - 1,400	3,090 - 4,930
Prestige (within CBD)	3,100 - 4,140	1,120 - 1,760	4,220 - 5,900
HOTEL (including FF&E)			
Serviced Apartment	3,070 - 4,060	1,260 - 1,630	4,330 - 5,690
Three Star	3,270 - 3,800	1,160 - 1,550	4,430 - 5,350
Four Star	4,010 - 4,800	1,280 - 1,700	5,290 - 6,500
Five Star	4,730 - 5,620	1,580 - 2,100	6,310 - 7,720
RETAIL			
Medium Quality	2,240 - 3,090	1,120 - 1,440	3,360 - 4,530
Good Quality	3,040 - 3,410	1,390 - 1,760	4,430 - 5,170
CONDOMINIUM			
Medium Quality	2,650 - 2,910	500 - 660	3,150 - 3,570
Good Quality	3,050 - 3,740	540 - 780	3,590 - 4,520
Luxury Quality	3,940 - 5,300	600 - 910	4,540 - 6,210
LANDED RESIDENTIAL			
Cluster Housing	2,990 - 3,660	440 - 590	3,430 - 4,250
Terrace House	2,700 - 3,140	590 - 720	3,290 - 3,860
Semi-detached House	2,810 - 3,830	630 - 850	3,440 - 4,680
Detached House	4,010 - 6,800	880 - 1,210	4,890 - 8,010
INSTITUTIONAL			
Institution of Higher Learning	3,070 - 3,790	1,020 - 1,450	4,090 - 5,240
Medical Institution	4,390 - 5,870	1,270 - 2,010	5,660 - 7,880
INDUSTRIAL			
Light Industrial Building	1,270 - 1,630	500 - 970	1,770 - 2,600
Logistics Warehouse	1,340 - 1,710	570 - 1,040	1,910 - 2,750
High Specifications Industrial Building	1,720 - 2,190	1,850 - 2,680	3,570 - 4,870
HEALTHCARE			
Nursing Home	2,470 - 3,360	720 - 1,050	3,190 - 4,410
Medical Centre	3,020 - 3,270	1,130 - 1,570	4.150 - 4,840
Hospital	3,840 - 4,120	1,330 - 2,040	5,170 - 6,160
CAR PARKING			
Above Grade Car Park	870 - 1,550	120 - 200	990 - 1,750
Basement Car Park	1,770 - 2,640	310 - 410	2,080 - 3,050

SINGAPORE CONSTRUCTION COST DATA

CONSTRUCTION ELEMENTS

The following rates are indicative only as at First Quarter 2024, unless otherwise stated and include an allowance for profit and overheads but exclude preliminaries.

The rates are for budgetary purposes and are not valid for tendering or pricing of variations.

Item	S$	Unit
SUB-STRUCTURE		
Reinforced concrete pad footing (Grade 35)	590 - 660	m^3
300mm Reinforced concrete slab on ground (Grade 35)	130 - 160	m^2
COLUMNS / WALLS		
Reinforced concrete (600 x 600mm Grade 35)	430 - 540	m
Reinforced concrete (900 x 900mm Grade 35)	850 - 1,070	m
250mm Reinforced concrete wall (Grade 35)	270 - 290	m^2
UPPER FLOORS (Excluding Beams)		
150mm Reinforced concrete suspended floor slab (Grade 35)	140 - 150	m^2
120mm Concrete slab on Bondek with structural steel supports and 2-hour fire spray (excluding structural steel beam)	220 - 260	m^2
STAIRCASES		
1050mm Wide reinforced concrete stairs with painted steel tube balustrade (average rise 3.70m)	7,400 - 11,000	flight
2000mm Wide grand public stairs with glass and brass balustrade (4.00m rise)	85,100 - 123,500	flight
ROOF		
120mm RC Slab (Grade 35) graded to fall and built-up roofing membrane	200 - 240	m^2
Structural steel, purlins and insulated metal deck roof	480 - 570	m^2
EXTERNAL WALLS		
Single glazed window unit (casement type)	470 - 680	m^2
Double glazed window unit (casement type)	670 - 900	m^2
Unitised double glazed curtain wall system	940 - 1,240	m^2
EXTERNAL DOORS (Excluding Ironmongery)		
Single leaf solid core timber door	800 - 1,370	no.
Double leaf glazed glass door	2,100 - 3,670	no.
Double leaf auto operating glass door	5,380 - 8,060	no.

Item	S$	Unit
INTERNAL WALLS		
Stud plasterboard partition	80 - 150	m^2
100mm Precast non load bearing wall	90 - 120	m^2
150mm Precast load bearing wall	320 - 360	m^2
12mm Laminated glass screen	380 - 470	m^2
INTERNAL DOORS (Excluding Ironmongery)		
Single leaf solid core flush timber door	750 - 1,150	no.
Single leaf half hour fire timber door	900 - 1,680	no.
Single leaf one hour fire timber door	1,280 - 1,920	no.
INTERIOR SCREENS		
Laminated toilet partition	710 - 1,290	no.
WALL FINISHES		
Cement and sand plaster and emulsion paint	30 - 50	m^2
Cement render and vinyl fabric	70 - 90	m^2
Cement render and ceramic tile	120 - 150	m^2
Marble wall finish on rendered backing	280 - 380	m^2
Marble wall cladding	380 - 490	m^2
CEILING FINISHES		
Fibrous flush plasterboard ceiling painted	40 - 50	m^2
One way exposed grid with mineral fibre board acoustic ceiling	30 - 40	m^2
Aluminium louvre ceiling system	100 - 170	m^2
FLOOR FINISHES		
Carpet tile	70 - 90	m^2
Ceramic / homogeneous tile	100 - 120	m^2
Granite tile	170 - 350	m^2
Access floors	100 - 220	m^2
SPECIALIST SERVICES		
SANITARY AND PLUMBING		
Average cost per plumbing point including fixture, soil waste and vent	1,520 - 1,980	no.
VERTICAL TRANSPORTATION		
Glass sided escala tor (4m rise)	157,500 – 262,500	no.
17 Passenger lift serving 17 floors	231,000 – 315,000	no.
Machine-room-less lift serving 2 floors	82,400 – 105,000	no.

CONSTRUCTION ELEMENTS (Continued from page 14)

EXTERNAL WORKS

External Works	S$	per
LANDSCAPING		
Dense landscaping around buildings including shrubs, plants, topsoil etc.	100 – 180	m^2
Turfing only to large areas including topsoil, sowing and treating	30 – 40	m^2
Vertical Greening: Vine screen comprising stainless steel cables with plant climbers	330 – 580	m^2
CAR PARKS – ON GROUND		
Based on 35m^2 overall area per car lot with premix paving including road lines, channels, drainage and kerbs	4,800 - 5,900	lot
ROADS (Premix finish including kerbs, channels and drainage)		
Residential estate, 6.80m wide excluding foot-paths and nature strips	1,210 - 1,700	m
Industrial estate 10.40m wide including minimal to extensive formation	1,900 - 2,640	m

SPORTS FACILITIES

Facility	S$	per
FOOTBALL FIELD		
Size: 100m x 65m	550,000 – 960,000	field
SWIMMING POOL		
Half-Olympic Size	550,000 – 750,000	pool
Olympic Size	1,200,000 – 1,500,000	pool
TENNIS COURT		
Size: 37m x 18m	110,000 – 140,000	court
BASKETBALL COURT		
Size: 30m x 19m	70,000 – 120,000	court
GOLF COURSE		
18 holes over 60 hectares	1,000,000 - 1,250,000	hole

DEFINITIONS FOR BUILDING SERVICES

Air-Conditioning and Mechanical Ventilation (ACMV)

ACMV works include chiller plant, cooling towers, chilled water and condenser water pumps and pipework, air-handling unit systems, fan coil systems, AC ductwork, diffusers, split type air-conditioning units and ductwork, MV fan system, MV ductwork, diffusers and accessories, AC electrical and automatic control works where appropriate.

Sanitary & Plumbing

Sanitary & Plumbing works include water tanks and pumps, hot/cold water distribution piping, installation of water piping to sanitary wares and fittings, installation of waste piping to sanitary wares, aboveground and underground drainage piping system where appropriate.

Fire Protection System

Fire Protection System includes sprinklers, external fire hydrants, hose reels, wet and dry risers, automatic fire alarms and fire extinguishers where appropriate.

Electrical Installations

Electrical Installations include power transformers, sub-station, HV & LV switchgear, distribution/sub-main cables, final sub-circuits, cable support systems and containments, lightning protection system, earthing system, luminaires and lighting control system, standby generators, telecommunication system, public address system, intercom system, MATV/CATV system where appropriate.

Vertical Transportation

Vertical Transportation includes lifts, escalators, travellators, dumbwaiters, etc., where appropriate.

Building Management Systems (BMS)

BMS include Control and Monitoring Systems where appropriate.

Exclusions

Security Systems, IT systems, private telephone system, audio video system, car parking system, compactors, chutes; special equipment such as proprietary systems, medical gases, incinerators, pneumatic refuse disposal system, facade maintenance equipment, engineered smoke control systems, hardened structure requirements, supply of kitchen equipment, sanitary wares and fittings, Green Mark certification, WELL building standard® and other sustainability related certification requirements, etc.

Note:
The order of costs for Building Services provided herein is indicative and based solely on Construction Floor Area (CFA) assumptions.
Detailed requirements and specifications for Building Services need to be considered and provided in conceptual designs to derive cost estimates for specific project budgetary purposes.

SINGAPORE CONSTRUCTION COST DATA

BUILDING SERVICES

Development Type	ACMV	Sanitary & Plumbing	Fire Protection	Electrical	Vertical Transport	BMS
Range of Cost per Construction Floor Area (CFA)	**S$/m²**	**S$/m²**	**S$/m²**	**S$/m²**	**S$/m²**	**S$/m²**
OFFICE						
Standard (outside CBD)	300 - 390	70 - 110	70 - 110	360 - 440	100 - 130	20 - 30
Standard (within CBD)	330 - 460	70 - 130	80 - 140	360 - 470	120 - 170	30 - 30
Prestige (within CBD)	390 - 530	80 - 160	100 - 150	390 - 610	130 - 260	30 - 50
HOTEL (including FF&E)						
Serviced Apartment	380 - 460	260 - 310	90 - 140	410 - 550	100 - 140	20 - 30
Three Star	330 - 450	240 - 290	90 - 140	390 - 500	90 - 140	20 - 30
Four Star	370 - 470	280 - 350	90 - 150	400 - 520	120 - 170	20 - 40
Five Star	440 - 560	300 - 370	140 - 190	540 - 720	130 - 220	30 - 40
RETAIL						
Medium Quality	350 - 450	130 - 160	100 - 130	370 - 470	150 - 200	20 - 30
Good Quality	450 - 560	160 - 180	120 - 140	470 - 600	170 - 230	20 - 50
CONDOMINUM						
Medium Quality	160 - 200	90 - 120	20 - 40	180 - 230	50 - 70	0 - 0
Good Quality	170 - 230	100 - 140	20 - 70	200 - 250	50 - 90	0 - 0
Luxury Quality	170 - 240	120 - 150	30 - 80	220 - 280	60 - 140	0 - 20
LANDED RESIDENTIAL						
Cluster Housing	110 - 150	150 - 200	10 - 20	170 - 220	0 - 0	0 - 0
Terrace House	210 - 240	150 - 200	0 - 0	230 - 280	0 - 0	0 - 0
Semi-detached House	220 - 290	150 - 210	0 - 0	260 - 350	0 - 0	0 - 0
Detached House	290 - 410	200 - 280	0 - 0	390 - 520	0 - 0	0 - 0
INSTITUTIONAL						
Institution of Higher Learning	320 - 450	130 - 200	120 - 150	350 - 500	80 - 100	20 - 50
Medical Institution	380 - 590	250 - 410	90 - 150	430 - 660	90 - 140	30 - 60
INDUSTRIAL						
Light Industrial Building	150 - 300	60 - 140	50 - 90	160 - 270	80 - 140	0 - 30
Logistics Warehouse	150 - 300	60 - 140	50 - 100	160 - 270	150 - 200	0 - 30
High Specifications Industrial Building	600 - 850	250 - 410	140 - 250	630 - 870	150 - 200	80 - 100
HEALTHCARE						
Nursing Home	250 - 340	170 - 230	20 - 80	280 - 360	0 - 40	0 - 0
Medical Centre	360 - 490	160 - 240	110 - 140	380 - 510	110 - 150	10 - 40
Hospital	420 - 590	260 - 410	100 - 160	440 - 670	80 - 150	30 - 60
CAR PARKING						
Above Grade Car Park	30 - 40	10 - 20	20 - 30	60 - 80	0 - 30	0 - 0
Basement Car Park	110 - 130	40 - 40	70 - 90	90 - 120	0 - 30	0 - 0

OFFICE FIT-OUT

The following costs that include workstations are an indication of those currently achievable for good quality office accommodation.

Type Of Tenancy	Open Planned S$/m²	Partitioned S$/m²
General Offices	580 – 1,210	1,090 – 1,610
Major Company Headquarters	1,040 – 1,730	1,270 – 2,420
Financial Institution	1,270 – 2,300	2,070 – 3,220

WORKSTATIONS

3,500mm average length including screens generally 1,220mm high (managerial 1,620mm high), desks, storage cupboards, shelving etc. Supply of chairs is excluded.

Type of Workstation	S$/Station
Secretarial	1,200 – 1,800
Technical Staff	1,400 – 2,200
Managerial	2,900 – 4,300

OFFICE REFURBISHMENT

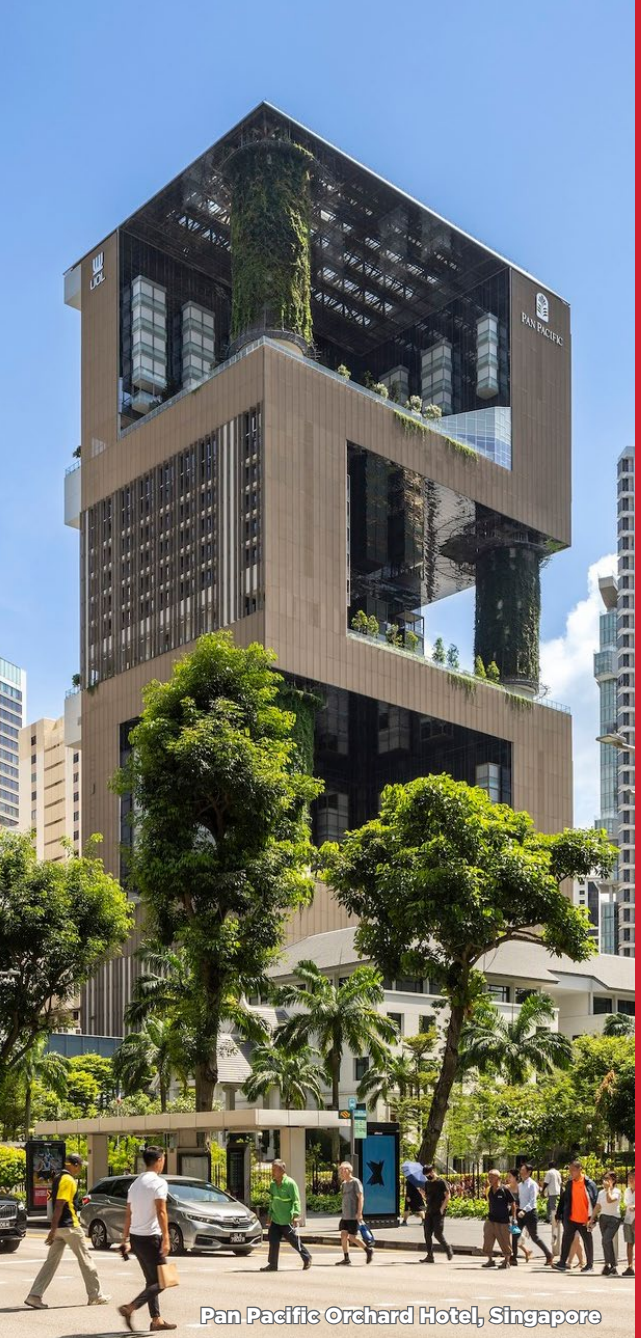
The following refurbishment costs include demolition and removal of partitions and internal finishes, provide new floor, ceiling and wall finishes but exclude fitting-out. The lower end of the range indicates reuse and modification.

Type of Refurbishment	S$/m²
CBD offices typical floor	920 – 1,960
CBD offices core upgrade (excluding lift modernisation)	700 – 1,730

HOTEL GUESTROOM FIT-OUT AND FF&E

The costs of furniture, fitments and equipment (FF&E) for a typical hotel guest room varies within its wide range and is largely dependent on the quality of FF&E specified for different hotel ratings. Fit-out costs include preliminaries, wall, floor and ceiling finishes. FF&E costs include fitments, sanitary wares and bathroom accessories, mirrors, curtains, blinds, decorative lighting and loose furniture. Hotel equipment and operating supplies are excluded.

Type of Hotel	S$/Guest Room
Three-Star	21,000 – 38,000
Four-Star	40,000 – 54,000
Five-Star	58,000 – 85,000



Pan Pacific Orchard Hotel, Singapore

ESTIMATING DATA

REINFORCEMENT RATIOS

The following ratios give an indication of the average weight of high tensile rod reinforcement per cubic metre of concrete (Grade 40) for the listed elements. Differing structural systems, ground conditions, height of buildings, load calculations and sizes of individual elements and grid sizes will result in considerable variation to the stated ratios. For project specific ratios, a Civil & Structural Engineer should be consulted.

Element	Average kg/m³
Pile caps	115 – 180
Bored Piles (compression)	25 – 35
Bored Piles (tension)	100 – 150
Raft Foundation	150 – 220
RC pad footings	70 – 100
Ground beams	200 – 300
BASEMENT	
Retaining Wall	150 – 250
RC Wall	140 – 180
Slab	100 – 150
Edge Beams	220 – 300
ABOVE GROUND	
Columns	250 – 380
Beams	220 – 350
Slab	110 – 150
Core Walls / Lift Walls	160 – 280
Household Shelter	250 – 350
Stairs	130 – 160

AVERAGE CONSTRUCTION PAYMENT DRAWDOWN

The tabulation below is derived from the statistical average of a series of case histories, which will give an indication of the anticipated rate of expenditure when used for a specific project for preliminary budgetary purposes. Construction periods incorporate various extensions of time, including wet weather, industrial disputes, etc.

All data is related to the date of submission of Contractors' claims to the Client and not actual payment, which is generally one month later.

No adjustment has been made for the retention monies for private sector projects.

The payment of outstanding monies due to the contractor and sub-contractors after the date of practical completion usually takes place at irregular intervals with payments spread out over defects liability period until settlement of final account and issuance of maintenance certificate or equivalent.

Contract Period %	Contract Expenditure %
5	0.75
10	2.70
15	5.71
20	9.65
25	14.40
30	19.80
35	25.73
40	32.06
45	38.65
50	45.40
55	52.85
60	60.15
65	67.15
70	73.68
75	79.60
80	84.79
85	89.07
90	92.29
95	94.32
100	97.50

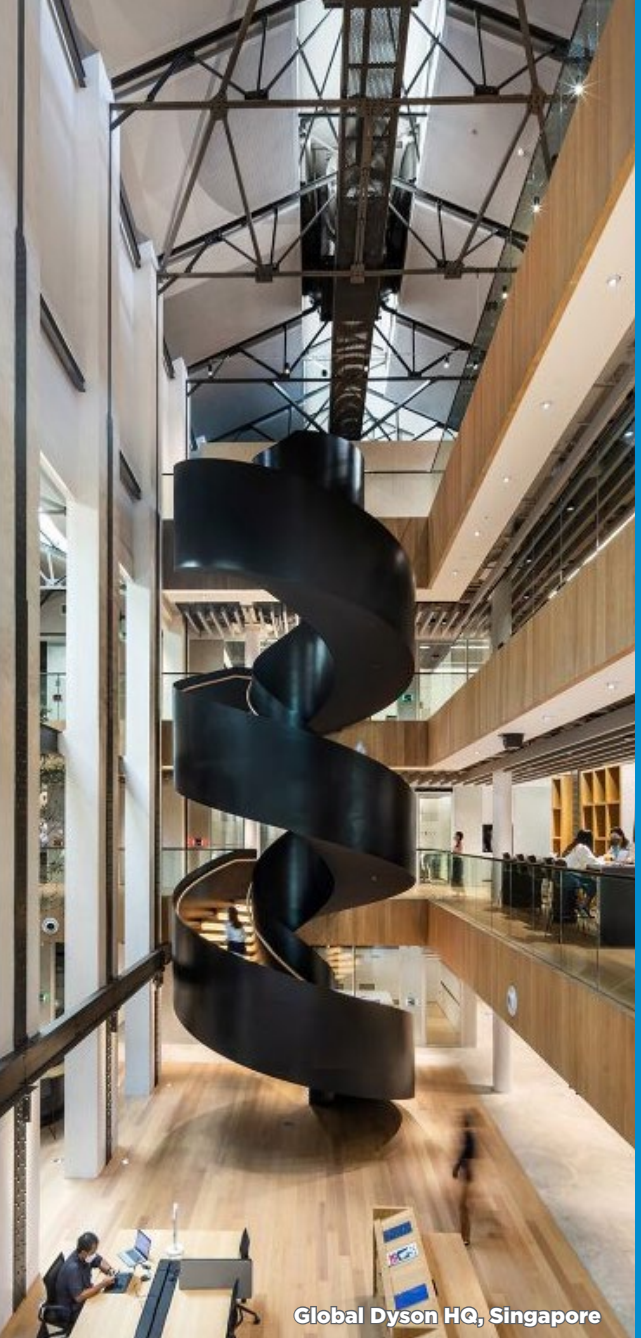
ESTIMATING DATA

VERTICAL TRANSPORT SERVICES

Application	Lift Type
Office & Residential	Gearless 9 to 13 pax
	Gearless 9 to 13 pax
	Gearless up to 17 pax
	Gearless up to 23 pax
	Gearless up to 23 pax
	Gearless up to 23 pax
	Gearless up to 23 pax
	Gearless up to 23 pax
	Gearless up to 23 pax
	Gearless up to 23 pax
Hospital	Gearless 23 pax bed lift
	Geared up to 40 pax
Large Goods Lift	Geared up to 2,000kg
	Geared up to 5,000kg
Service Lift (Dumb-Waiter)	Bench Height Unit
	Large Unit
Escalator	Rise 2.5 to 5.0m
Travelator	Distance 1.3 to 5.0m
Disabled Platform Lift	To 4.0m
	Above 4.0m

Speed (m/sec)	Base Cost (S$)	No. of Floors Served	S$/Floor Additional Floors Served	S$/Floor By-passed
1.00	89,000 - 137,000	2	8,300	6,100
1.65 - 1.75	105,000 - 168,000	8	8,300	6,100
1.65 -1.75	137,000 - 210,000	8	8,300	6,100
2.00 - 2.50	189,000 - 315,000	15	8,800	7,200
3.00 - 3.50	410,000	20	10,000	7,800
4.00	490,000	20	11,000	8,200
5.00	600,000	20	11,000	8,200
6.00	710,000	30	11,000	8,200
7.00	819,000	30	11,000	8,200
8.00	928,000	40	11,000	8,200
1.75	215,000	8	8,800	6,600
2.50	536,000	10	15,400	9,500
1.00	315,000	2	16,100	10,000
0.50	473,000	2	19,800	12,200
0.50	44,000	2	5,600	3,200
0.20	68,000	2	6,600	3,800
0.50	143,000 - 270,000	2	N.A.	N.A.
0.50	81,000 - 326,000	N.A.	N.A.	N.A.
0.15	79,000	2	N.A.	N.A.
0.15	95,000	3	N.A.	N.A.

Note:
Costs provided above are indicative and vary depending on the brand name and technical specifications.



Global Dyson HQ, Singapore

INTERNATIONAL CONSTRUCTION

INTERNATIONAL CONSTRUCTION

BUILDING COSTS

All costs are stated in local currency as shown below.
Refer to www.rlbintelligence.com for updates.

The following data represents estimates of current building costs in the respective markets as at Fourth Quarter 2023 unless otherwise stated.
Costs may vary due to factors such as site conditions, climatic conditions, standards of specification, market conditions, etc.
Rates are in national currency per square metre of Gross Floor Area (GFA), unless otherwise stated. Areas referenced differ due to local market metrics. GFA shall be as defined in each city's local context.
Singapore, Kuala Lumpur, Jakarta and Ho Chi Minh City: Rates are per square metre of Construction Floor Area (CFA), measured to external face of external walls and inclusive of covered basement and above ground parking areas.
Chinese cities, Hong Kong and Macau: Rates are per square metre of Construction Floor Area (CFA), measured to outer face of external walls.
Singapore, Kuala Lumpur, Chinese cities, Hong Kong and Macau: All hotel rates are inclusive of Furniture, Fittings and Equipment (FF&E).

Location /City	Local Currency	Cost Range Per m²									
		Office Building				Retail				Residential Multi Storey	
		Premium		Grade A		Mall		Strip Shopping			
		Low	High	Low	High	Low	High	Low	High	Low	High
ASIA											
Beijing	RMB	9,100	14,750	4,900	8,200	8,900	14,000	7,800	12,500	6,100	12,750
Guangzhou	RMB	8,900	14,250	4,700	8,000	9,200	14,250	7,900	13,250	5,900	11,750
Ho Chi Minh City	VND ('000)	27,575	36,475	24,225	28,700	22,475	29,950	N/P	N/P	16,750	27,275
Hong Kong	HKD	34,250	41,750	23,500	32,250	27,500	32,750	23,500	28,750	34,000	57,000
Jakarta	RP ('000)	16,200	20,400	10,900	15,200	9,900	12,400	N/P	N/P	9,400	18,500
Kuala Lumpur	MYR	2,700	4,700	1,500	3,400	2,500	3,800	N/P	N/P	2,000	4,800
Seoul	KRW ('000)	3,600	4,300	2,500	3,075	2,250	3,275	1,900	2,875	2,150	3,600
Shanghai	RMB	9,100	14,250	5,100	8,200	9,100	14,250	8,000	13,000	6,200	12,250
Singapore	SGD	3,650	6,300	2,800	4,950	2,800	4,050	N/P	N/P	3,000	4,300
OCEANIA											
Adelaide	AUD	3,150	4,200	2,850	3,800	2,100	3,500	1,440	2,050	2,800	3,900
Auckland	NZD	5,500	6,700	5,000	6,600	3,500	4,000	2,500	2,800	5,800	6,800
Brisbane	AUD	4,000	5,600	3,600	5,000	3,350	5,000	2,300	2,850	3,750	5,600
Canberra	AUD	3,950	6,300	3,250	4,900	2,750	4,650	1,440	2,950	3,400	6,000
Christchurch	NZD	5,500	6,900	4,700	5,900	3,600	4,000	2,100	2,700	4,700	5,600
Darwin	AUD	3,500	4,400	2,550	4,000	1,900	2,850	1,440	2,350	2,200	2,800
Gold Coast	AUD	3,600	5,200	3,100	4,400	3,250	4,200	2,050	2,550	3,500	5,300
Melbourne	AUD	4,150	5,500	3,200	4,350	2,850	4,100	1,600	2,150	3,200	5,500
Perth	AUD	4,100	6,600	3,350	5,200	2,550	4,000	1,360	3,550	2,550	5,400
Sydney	AUD	4,800	7,400	3,700	5,500	2,750	5,900	2,050	2,850	3,650	8,000
Wellington	NZD	5,500	6,500	4,000	5,500	3,800	4,100	N/P	N/P	5,500	6,300
AMERICAS											
Boston	USD	4,090	6,460	2,635	3,820	2,370	3,500	1,775	2,800	2,155	3,715
Chicago	USD	3,285	5,435	1,990	3,285	1,990	4,360	1,615	2,690	1,990	4,575
Denver	USD	3,765	4,790	2,150	3,230	1,720	3,230	1,560	2,475	1,990	3,500
Honolulu	USD	3,715	6245	2,315	3,605	2,850	6,030	2,635	4,520	2,905	4,900
Las Vegas	USD	2,690	4,680	1,885	2,530	1,615	6,405	1,455	3,500	1,990	4,735
Los Angeles	USD	2,690	4,035	2,045	3,015	1,830	3,930	1,560	2,205	2,635	4,145
New York	USD	3,985	9,205	2,315	5,760	3,445	6,890	3,660	7,210	2,420	4,680
Phoenix	USD	2,585	4,360	1,615	2,315	2,045	3,445	1,185	1,990	1,830	2,850
Toronto	CAD	3,015	4,900	2,475	3,500	2,260	4,735	1,830	2,370	2,530	3,285
EUROPE											
Amsterdam	EUR	2,100	3,150	1,740	2,400	2,200	3,400	1,380	1,920	1,860	2,600
Birmingham	GBP	2,550	3,600	2,050	3,450	3,700	5,300	1,160	2,250	2,250	3,100
Bristol	GBP	2,600	3,550	2,050	3,550	3,600	4,850	1,120	2,050	1,720	2,750
Edinburgh	GBP	1,920	2,700	1,680	2,700	2,950	4,150	940	1,760	1,760	2,500
London	GBP	3,600	4,750	3,150	4,500	4,300	6,200	1,400	2,650	3,000	5,500
North West	GBP	2,750	3,450	2,300	3,450	3,700	5,200	1,200	2,300	2,250	3,200
Thames Valley	GBP	3,250	3,750	2,750	3,500	3,650	5,400	1,360	2,600	2,600	3,700
Yorkshire & Humber	GBP	2,450	4,100	1,720	3,050	3,200	4,500	1,020	1,900	1,900	2,800
MIDDLE EAST											
Abu Dhabi	AED	6,000	7,200	4,900	6,800	4,300	9,500	N/P	N/P	4,700	8,500
Dubai	AED	6,400	7,600	5,100	7,200	4,500	9,500	N/P	N/P	4,900	9,000
Riyadh	SAR	1,300	8,800	5,700	7,900	3,500	6,500	3,800	5,500	3,400	14,750

N/P: Not Published

N/P: Not Published

INTERNATIONAL CONSTRUCTION

BUILDING COSTS (Continued from page 30)

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Costs may vary due to factors such as site conditions, climatic conditions, standards of specification, market conditions, etc.
Rates are in national currency per square metre of Gross Floor Area (GFA), unless otherwise stated. Areas referenced differ due to local market metrics. GFA shall be as defined in each city's local context.
Singapore, Kuala Lumpur, Jakarta and Ho Chi Minh City: Rates are per square metre of Construction Floor Area (CFA), measured to external face of external walls and inclusive of covered basement and above ground parking areas.
Chinese cities, Hong Kong and Macau: Rates are per square metre of Construction Floor Area (CFA), measured to outer face of external walls.
Singapore, Kuala Lumpur, Chinese cities, Hong Kong and Macau: All hotel rates are inclusive of Furniture, Fittings and Equipment (FF&E).

Location /City	Local Currency	Cost Range Per m²									
		Hotels				Car Parking				Industrial Warehouse	
		3 Star		5 Star		Multi Storey		Basement			
		Low	High	Low	High	Low	High	Low	High	Low	High
ASIA											
Beijing	RMB	11,500	14,750	15,500	20,250	3,650	5,400	4,650	7,800	5,200	6,600
Guangzhou	RMB	11,500	14,500	16,000	20,500	3,450	5,200	4,600	7,800	4,900	6,100
Ho Chi Minh City	VND ('000)	28,225	36,475	40,150	48,175	16,550	24,100	N/P	N/P	N/P	N/P
Hong Kong	HKD	32,000	39,000	40,250	49,250	12,750	15,500	25,750	32,750	17,000	21,500
Jakarta	RP ('000)	17,200	20,700	24,800	28,400	5,800	6,000	8,900	9,200	6,100	6,700
Kuala Lumpur	MYR	2,700	3,900	5,500	9,500	800	1,300	1,700	4,000	1,200	2,000
Seoul	KRW ('000)	2,450	3,425	4,500	6,625	920	1,200	1,225	1,550	1,725	2,100
Shanghai	RMB	11,000	15,000	15,750	20,750	3,750	5,600	4,650	7,800	4,600	6,100
Singapore	SGD	4,200	5,100	6,000	7,400	970	1,700	2,100	3,000	1,580	2,250
OCEANIA											
Adelaide	AUD	3,800	4,500	5,700	6,400	1,200	1,700	1,800	2,650	900	1,400
Auckland	NZD	6,000	7,000	7,300	8,000	1,760	2,400	4,000	4,500	1,200	1,500
Brisbane	AUD	3,800	5,500	5,250	7,200	1,550	2,750	2,150	3,600	1,125	1,750
Canberra	AUD	3,550	6,100	4,850	7,300	900	1,500	1,220	2,100	840	1,580
Christchurch	NZD	5,800	6,300	7,000	8,400	1,600	2,100	2,800	3,200	1,300	1,700
Darwin	AUD	3,000	3,750	3,800	4,750	840	1,440	1,380	1,760	900	1,640
Gold Coast	AUD	3,700	5,200	5,200	6,700	1,360	2,000	1,960	2,600	1,160	2,000
Melbourne	AUD	3,750	4,800	5,300	7,200	1,300	1,800	1,900	2,500	840	1,580
Perth	AUD	3,450	4,950	4,600	6,500	880	1,400	2,450	4,200	760	1,400
Sydney	AUD	4,300	5,700	6,100	8,300	1,040	1,640	1,520	2,600	1,000	1,660
Wellington	NZD	6,300	7,400	7,200	8,400	2,350	2,750	3,800	4,100	1,360	1,800
AMERICAS											
Boston	USD	3,230	4,575	4,680	6,835	1,025	1,670	1,185	1,885	1,290	2,205
Chicago	USD	3,550	4,900	4,900	7,640	915	1,400	1,505	2,690	1,345	2,205
Denver	USD	3,070	4,465	4,575	6,730	1,560	2,155	2,155	2,690	1,345	2,100
Honolulu	USD	4,090	6,460	7,105	8,610	1,615	2,155	1,830	2,960	1,290	2,745
Las Vegas	USD	2,475	4,200	4,145	7,750	805	1,075	1,025	1,885	805	1,560
Los Angeles	USD	3,230	4,090	4,250	6,295	1,185	1,400	1,560	2,205	1,400	2,155
New York	USD	3,660	4,950	4,950	7,425	1,130	1,990	1,560	2,420	1,345	2,315
Phoenix	USD	2,155	3,230	4,090	6,405	590	1,075	915	1,560	860	1,455
Toronto	CAD	2,585	3,120	4,360	8,020	1,290	1,615	1,560	2,260	1,400	1,885
EUROPE											
Amsterdam	EUR	1,700	2,400	2,100	3,500	630	830	930	1,660	680	870
Birmingham	GBP	1,680	2,700	2,850	4,050	460	900	1,060	1,820	920	1,240
Bristol	GBP	1,700	2,250	2,950	3,850	530	1,000	1,220	1,880	530	800
Edinburgh	GBP	1,420	2,100	2,250	3,100	370	710	890	1,520	400	710
London	GBP	2,350	2,950	3,450	4,650	550	1,120	1,460	2,500	950	1,220
North West	GBP	1,900	2,400	2,900	3,850	700	890	1,340	1,900	630	890
Thames Valley	GBP	2,250	2,800	3,250	4,200	540	1,080	1,360	2,400	580	1,080
Yorkshire & Humber	GBP	1,500	1,980	2,450	3,800	400	1,180	740	1,220	460	810
MIDDLE EAST											
Abu Dhabi	AED	6,300	8,800	9,300	12,500	2,100	3,900	3,200	4,900	1,600	2,800
Dubai	AED	6,600	9,800	9,800	15,500	2,800	4,100	3,600	5,100	2,000	3,200
Riyadh	SAR	6,800	8,700	18,250	21,750	2,600	3,300	3,500	4,150	3,800	4,650

N/P: Not Published

N/P: Not Published

SPECIFIC DEFINITIONS FOR INTERNATIONAL CONSTRUCTION COSTS

Office Buildings

Prestige/Premium Offices are based on landmark office buildings located in major CBD Office Markets, which are built for the premium range of the rental market. These office buildings tend to be pace-setters in establishing rentals and accommodates leading owner-occupiers including headquarters for banks, insurance, multi-national corporations and other major companies.

Grade-A/Investment Offices are buildings designed for the mid-range of their respective rental markets.

Hotels

Range of costs generally excludes furniture, fitment and equipment (FF&E), except for Chinese cities, Hong Kong, Kuala Lumpur, Macau and Singapore, where the cost ranges stated include cost allowances for FF&E.

Industrial Buildings

Quality reflects a simplified type of construction suitable for light industry.

Exclusions: Hardstanding, roadworks and special equipment.

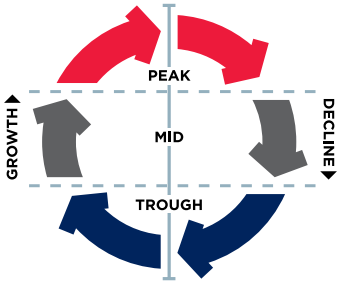
Residential Buildings

Multi-Storey reflects medium to luxury quality and air-conditioned accommodation.

Note: The comparative ratio of kitchen, laundry and bathroom areas to living areas considerably affects the cost range. Range given is significantly affected by the height and configuration of the building.

Exclusions: Loose furniture, special fittings, washing machines, dryers, refrigerators and tenants' special requirements.

CONSTRUCTION MARKET ACTIVITY CYCLE



The RLB Construction Sector Activity Cycle represents the construction development activity cycle. Each RLB office highlights the current construction sector activity position within the market activity cycle of those key construction sectors within their region.

Activity within the construction industry traditionally is subject to volatile cyclical fluctuations. The model illustrates the different growth and decline zones in a theoretical construction industry business cycle. Each RLB office highlights the current construction sector activity position within the market activity cycle of those key construction sectors in their region.

Each sector is categorised by three positions within the cycle; Peak, Mid and Trough. Within each position, activity is further defined by either declining or growing inside that sector. The "up" and "down" arrows highlight the current status within the three positions of the cycle by means of the three colours identified in the cycle diagram above.

The tabulation on the following page provides an overview of the relative growth/decline of each development sector in selected Asian cities. Each city has its own industry business cycle in the context of its own economy, and as such the performance of each development sector is not strictly comparable between the cities.

INTERNATIONAL CONSTRUCTION

CONSTRUCTION MARKET ACTIVITY FOR MAJOR ASIAN CITIES

Location	Aged Care	Apart-ments	Data Centres	Health	Hotel	Houses	Indus-trial	Infra-structure	Offices	Retail
Beijing	▲	▼	▼	▲	▲	▼	▼	▲	▼	▲
Chengdu	▲	▼	▲	▲	▲	▲	▼	▲	▼	▼
Guangzhou	▲	▼	▲	▲	▼	▼	▲	▲	▼	▼
Ho Chi Minh City	▼	▼	▲	▲	▼	▼	▼	▲	▼	▼
Hong Kong	▲	▼	▲	▲	▼	▼	▲	▲	▼	▼
Jakarta	▲	▲	▲	▲	▲	▲	▼	▲	▼	▲
Kuala Lumpur	▲	▲	▲	▲	▲	▲	▼	▲	▼	▲
Macau	▼	▲	▼	▲	▼	▲	▼	▲	▲	▲
Seoul	▼	▼	▲	▼	▼	▼	▼	▼	▼	▼
Shanghai	▼	▼	▲	▲	▼	▼	▲	▲	▼	▼
Shenzhen	▲	▲	▲	▲	▼	▼	▲	▲	▼	▼
Singapore	▲	▲	▼	▲	▲	▲	▲	▲	▲	▲

Information as at Fourth Quarter 2023.

Changi Airport Terminal 2 Expansion, Singapore

SINGAPORE CONSTRUCTION REGULATIONS & INFORMATION

The main objective of building control is to ensure building works comply with standards for safety, accessibility, environmental sustainability and buildability as prescribed in the Building Control Act and Building Control Regulations.

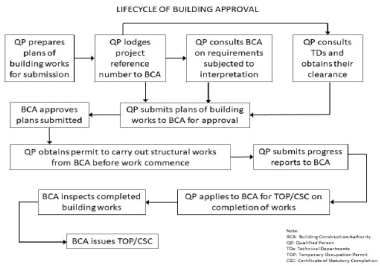
All building works, except those that are minor and exempted under the First Schedule of the Building Control Regulations, will require building plan approval from the Commissioner of Building Control (CBC), Building and Construction Authority (BCA).

Building works refer to:
a. Erection, extension or demolition of a building;
b. Alteration, addition or repair of a building;
c. Provision, extension or alteration of any air-conditioning service or ventilating system in or in connection with a building

and it includes site formation works connected with or carried out for the purpose of (a), (b) or (c).

As stipulated by the Building Control Act 1989, building plans are to be submitted by a Qualified Person (QP). A QP is a person who is registered as an Architect with the Board of Architects or a Professional Engineer (PE) with the Professional Engineers Board. The appropriate QPs for the different types of building works are listed in Third Schedule of the Building Control Regulations. For example, building plans for a warehouse or factory may be submitted by an Architect or a PE, but plans for a retaining wall has to be submitted by a PE.

The typical process of getting building plan approval is illustrated in the following flow chart. (This is a typical process. Variations do exist.)



The design and construction of a building must comply to performance requirements prescribed in the Building Control Regulations.

Source: BCA as at May 2024

The Licensing of Builders Scheme is part of BCA's long term plan to upgrade the safety and quality standards of the construction sector while raising professionalism by requiring minimum standards of management, safety record and financial solvency.

All builders carrying out building works where plans are required to be approved by the Commissioner of Building Control and builders who work in specialist areas which have a high impact on public safety will require a Builder's Licence. The requirement applies to both public and private projects.

Type of Licence

License Type	Sub-Type	Allowable Projects
General Builder License	Class 1	Projects of any value
	Class 2	Projects of S$6 million or less
Specialist Builder License	N.A.	Any of the following specialist building works: • Piling works • Ground support and stabilisation works • Instrumentation and Monitoring work • Structural steelwork • Pre-cast concrete work • In-situ post-tensioning work Note: Builders may register in more than one category if qualified.

(Continued from page 40)

Licensing Requirements

The following requirements must be fulfilled to receive a Builder's License.

Requirement	Details
Appoint an Approved Person (AP)	The AP appointed will take charge and direct the management of the business in building works. The AP must be: • The sole proprietor in a sole proprietorship • One of the partners in a partnership • A director or member of the board of management in a corporation The AP must also possess the right qualifications and experience.
Appoint a Technical Controller (TC)	The TC appointed will oversee the execution and performance of any building works undertaken by the builder. For specialist builders, the TC appointed must possess a civil or structural engineering degree from a recognised institution and have the right qualifications and experience. Resident Engineers must meet acceptable qualifications set by BCA.
Meet minimum paid-up capital (for corporations only)	• Class 1 General Builder: not less than S$300,000 • Class 2 General Builder or Specialist Builder: not less than S$25,000
Pay licensing fees Note: Validity of license is up to 3 years.	• Class 1 General Builder: S$1,800 • Class 2 General Builder: S$1,200 • Specialist Builder: S$1,500

Source: BCA as at Jul 2024

Construction Registration of Tradesmen Scheme (CoreTrade)

CoreTrade requirements on deployment of registered tradesmen and foremen began in 2009. All Class 1 General Builders undertaking a project of value which is S$20 million or more will need to deploy a prescribed minimum number of construction personnel who are registered under the CoreTrade. This applies to new building works, addition and alteration works and civil engineering works. The objective of CoreTrade is to build up a core group of local and experienced foreign workers in key construction trades to anchor and lead the workforce.

In view of the disruptions to the industry due to COVID-19, various support measures were introduced to help businesses to preserve their capacity and capability. As part of the review to support the industry post-COVID, the requirements for licensed Class 1 General Builders undertaking a relevant project to lodge and comply with the manpower programme have been adjusted as follows:

a. Projects for which the permit under section 6 of the Building Control Act to carry out structural works was granted until 31 December 2022, licensed Class 1 General Builders undertaking such projects need not lodge a manpower programme with the CBC; and,

b. Projects for which the manpower programme has been lodged with CBC till 31 December 2022 and yet to obtain Temporary Occupation Permit (TOP), compliance with the lodged manpower programme is not necessary throughout entire project period.

The adjustments will continue to apply beyond 30 June 2024 until further written notice from CBC.

Details on registration of CoreTrade personnel, deployment requirements and penalties can be found on BCA website.

Source: BCA as at Jun 2024

The legislation on buildability has been in effect since 1 January 2001. The Building Control (Buildability and Productivity) Regulations 2011 is an enhanced Buildability framework that came into effect on 15 July 2011. This enhanced legislation tightened the original requirements under the Buildable Design Score (B-Score) and included another component called the Constructability Score (C-Score). The C-Score requires the builders' contributions to buildability through the adoption of more labour-efficient construction methods/ technologies.

While the B-Score focuses on the use of buildable designs by designers during the upstream design process, the C-Score impacts on the construction methods used during the downstream construction phase. Designers and builders should familiarise themselves with the Buildable Design Appraisal System (BDAS) and Constructability Appraisal System (CAS) respectively, to enable them to consider a range of construction systems, methods, technologies, materials and products to meet the scoring requirements.

The types of development which are not subjected to the minimum B-Score and C-Score requirements are:

- Any culvert, bridge, underpass, tunnel, earth retaining or stabilising structure, slipway, dock, wharf or jetty;
- Any theme park;
- Any place of worship;
- Any power station; or
- Any waste processing or treatment plant

Enhancements to Code of Practice (CoP) on Buildability to Accelerate Adoption of Design for Manufacturing and Assembly (DfMA) Technologies

The BCA periodically reviews the Buildability framework. In 2019, BCA raised the minimum B-Score to encourage the adoption of DfMA technologies in large residential non-landed (RNL) developments (GFA ≥ 25,000m^2).

In 2020, the COVID-19 pandemic disrupted the built environment sector and accentuated the urgency for industry transformation through the adoption of technology such as DfMA to reduce our vulnerability to manpower disruptions. DfMA would become the mainstream way to design and construct buildings. It promotes efficient off-site fabrication of building components and eases assembly on-site. This results in a leaner workforce, time savings with works carried out on-site and off-site concurrently, better workmanship quality and reduced disamenities to the public.

In December 2020, the Buildability framework was enhanced to:

a. Revamp the BDAS to integrate DfMA adoption for the Structural, Architectural and Mechanical, Electrical and Plumbing (MEP) disciplines;
b. Recalibrate new minimum B-Scores for all development types due to revamped BDAS; and
c. Extend outcome-based option to all large development types, in lieu of meeting the minimum B-Score.

To accelerate the adoption of DfMA for large developments, BCA enhanced the CoP on Buildability and made amendments to the Buildability Regulations as detailed below. The changes apply to projects submitted to URA for Planning Permission on or after 30 April 2022.

Key Changes	Details
(A) Higher minimum B-Scores for large commercial, industrial and institutional projects with GFA ≥ 25,000m^2	To accelerate DfMA adoption for large projects which have greater scope for DfMA application and economies of scale, the minimum B-Scores for superstructure works of large commercial, industrial and institutional projects will be raised. The details are provided in page 47.

BUILDING CONTROL (BUILDABILITY AND PRODUCTIVITY) REGULATIONS 2011 (Continued from page 44)

Key Changes	Details
(B) Enhanced outcome-based options for all large development types, in lieu of meeting the minimum B-Score	Designers have the flexibility to decide on the DfMA designs and technologies that best meet their project needs. Large building projects can opt to comply with Buildability requirements, either by meeting the raised minimum B-Scores or fulfilling one of the outcome-based options. Outcome-based options include deemed-acceptable solutions which are currently applicable to large RNL projects only, while 'open' option is extended to all large projects. In the new COP on Buildability, BCA will make the following enhancements: (i) Revise deemed-acceptable solutions for large RNL projects; (ii) Introduce new deemed-acceptable solutions for large commercial, industrial and institutional projects; and (iii) For the 'open' option, raise the minimum productivity improvement requirement from 20% to 25% (from 2010's level).
(C) Mandatory adoption of specific productive technologies for RNL projects	As modularisation is a key approach to achieve higher productivity and optimise benefits of DfMA, there is scope to steer the sector towards wider adoption of modularised components, especially with standardised dimensions at industry level. This would pave the way for more cost-effective prefabrication of standard components due to greater economies of scale. BCA will require the following industry standard components for RNL projects: (i) Precast Household Shelters: 65% precast (of which 60% are of standard sizes) (ii) Prefabricated Bathroom Units: 65% prefabricated (of which 60% are of standard sizes)

Key Changes	Details
(D) Requirement for PE for Mechanical and Electrical Works to jointly declare B-Score submissions with QP for Architectural and Structural Works	Presently, both the QPs for Architectural and Structural Works are required to declare and submit B-Scores for their projects, together with the building plans for approval. As MEP works also contribute towards raising construction productivity and with the revamped BDAS placing more emphasis on these works, PEs for M&E works now play a bigger role to influence the design of MEP systems. To foster greater collaboration across disciplines during upstream design, BCA would require PEs for M&E works to jointly declare B-Score submissions.

Minimum Buildable Design Score (B-Score)

The minimum B-Score requirements for superstructure and basement works (where applicable) apply to new building works with GFA of 5,000m^2 or more. The minimum B-Score requirements also apply to building works consisting of repairs, alterations and/or additions (A&A work) to an existing building if the building works involve the construction of new floor and/or reconstruction of existing floor for which their total GFA is 5,000m^2 or more. A building design with basement works is required to comply with both the B-Score for superstructure works and the minimum B-Score for basement works.

The minimum B-Score for a mixed development will be prorated according to the GFA of each type of development. Computation of the minimum B-Score for a mixed development can be found in the latest edition of the CoP on Buildability.

BUILDING CONTROL (BUILDABILITY AND PRODUCTIVITY) REGULATIONS 2011 (Continued from page 46)

Minimum Buildable Design Score for Superstructure and A&A Works from 30 April 2022

Category of Building Work / Development	All New Building Works and MRT Stations	
	Superstructure Works	
	5,000m² ≤ GFA < 25,000m²	GFA ≥ 25,000m²
Public Residential (non-landed)	68	80
Private Residential (non-landed)	68	80
Commercial	60	70
Industrial	65	70
Institutional, School and Others	60	66
MRT Station	60	

* Based on date of planning application made to URA.

Basement of All New Building Works, MRT Stations and

All New Building Works and MRT Stations	A&A Works
Basement Works	
GFA ≥ 5,000m²	GFA ≥ 5,000m²
42	42

Submission of Buildable Design Score (B-Score)

The B-Score is one of the requirements for Building Plan (BP) approval. The BP will not be approved if the submitted B-Score for both the superstructure and basement works (where applicable) are lower than the stipulated minimum. The B-Scores are to be submitted by QPs at the following stages:

- BP stage
- ST (Structural plan) basement and superstructure stage
- Temporary Occupation Permit (TOP) / Certificate of Statutory Completion (CSC) stage

Buildable Design Score (B-Score) Requirements

The B-Score of the superstructure and basement works (where applicable) of a building design shall be determined using the CoP on Buildability and BDAS.

The B-Score of a project is made up of 4 parts:

Part 1 – Structural System. Points are awarded for the use of various types of structural system, DfMA technologies in the structural discipline and structural buildable design features.

Part 2 – Architectural System. Points are awarded for the use of various types of wall system, architectural finishes, DfMA technologies in the architectural discipline and architectural buildable design features.

Part 3 – Mechanical, Electrical and Plumbing (MEP) System. Points are awarded for the use of various types of MEP system, DfMA technologies in the MEP discipline and MEP buildable design features.

Part 4 - Innovation and Others. Points are awarded for the use of new innovation systems and technologies that can achieve manpower savings of at least 20%.

In addition to the above, points are awarded for simple designs that help to ease construction, design modularisation that ease manufacturing, and standardisation and repetition of components under Part 1, 2 and 3.

The maximum B-Score achievable for a project is capped at 120 points. The maximum point weightage for Part 1, 2 and 3 differs depending on the category of a building, as set out in the CoP on Buildability.

BUILDING CONTROL (BUILDABILITY AND PRODUCTIVITY) REGULATIONS 2011 (Continued from page 48)

Minimum Constructability Score (C-Score)

The minimum C-Score requirement apply to new building works with GFA of 5,000m^2 or more. The minimum C-Score requirements also apply to building works consisting of repairs and A&A works to an existing building if the building works involve the construction of new floor and/or reconstruction of existing floor for which their total GFA is 5,000m^2 or more.

Minimum C-Score for All Building Works comprising Buildings more than 6 Storeys and MRT Stations

Category of Building Work / Development	Minimum C-Score	
	5,000m² ≤ GFA < 25,000m²	GFA ≥ 25,000m²
	w.e.f. 30 April 2022	
Public Residential (non-landed)	50 (min. 35 points from Structural System)	60 (min. 45 points from Structural System)
Private Residential (non-landed)		
Commercial		
Industrial		
Institutional, School and others		
MRT Station		

*The minimum scores above are based on date of planning submissions made to URA including for building works built on land sold under the GLS Programme.

Minimum C-Score for All Building Works comprising Buildings of 6 Storeys and below

Category of Building Work / Development	Minimum C-Score	
	5,000m² ≤ GFA < 25,000m²	GFA ≥ 25,000m²
	w.e.f. 30 April 2022	
Public Residential (non-landed)	50 (min. 32 points from Structural System)	60 (min. 42 points from Structural System)
Private Residential (non-landed)		
Commercial		
Industrial		
Institutional, School and others		

*The minimum scores above are based on date of planning submissions made to URA including for building works built on land sold under the GLS Programme.

Submission of C-Score

Builders are required to submit the C-Scores which shall not be lower than the stipulated minimum at either one of the following stages:

- At the time of application for permit to carry out structural works (Permit), or
- Within 3 months (for non-Design and Build projects) or 6 months (for Design and Build projects) after the permit has been issued in the event that the builder requires more time to plan for the type of construction methods and technologies to be adopted in the project.

C-Score Requirements

The C-Score of the building works shall be determined using the CoP on Buildability and the Constructability Appraisal System (CAS).

The C-Score of a project is made up of 3 parts:

Part A – Structural System (maximum 60 points). Points are awarded for various methods and technologies adopted during the construction of structural works.

Part B – Architectural, Mechanical, Electrical & Plumbing (AMEP) System (maximum 45 points). Points are awarded for various methods and technologies adopted during the construction of AMEP works.

Part C – Good Industry Practices (maximum 15 points). Points are awarded for good industry practices adopted on site to improve productivity.

In addition to the above, points are obtainable in Part A and Part B if a project adopts innovative systems that help to achieve productivity improvement. Innovation points are awarded subjected to BCA's assessment on a case-by-case basis of the impact on labour efficiency of the particular system used.

The total point allocated under the Constructability Assessment Scheme (CAS) is 120 points.

More information on the B-Score and C-Score requirements can be found on BCA website.

Source: BCA as at Aug 2022

With an ageing population and as the number of people in Singapore with mobility difficulties rise over the years, accessibility in the Built Environment is increasingly gaining importance. The Government introduced the Code on Barrier-Free Accessibility (BFA) to support the upgrading of existing buildings. A S$40-million Accessibility Fund was set aside to encourage private sector participation, to upgrade buildings built before 1990 which are not BFA compliant and upgrade all key areas and essential facilities in Singapore to provide at least basic accessibility by 2016. The Government aims to have 70% of commercial and institutional buildings in Singapore barrier-free by 2030.

BCA also introduced new mandatory requirements in existing buildings from 2017. Owners of commercial and institutional buildings that are visited frequently by the public must include barrier-free accessibility upgrades when they undergo additions and alterations (A&A) works.

The Code on Accessibility in the Built Environment 2019 refines existing requirements to allow more equitable access for elders and persons with disabilities. In the latest revision to the Code, requirements are also enhanced to accommodate the new mobility climate resulting from advancement in technology. Apart from addressing the needs of an ageing population, the revised Code introduces more accessibility and universal design features to improve the built environment for all.

New projects and existing buildings undergoing large-scale A&A have to follow the new Code when they are submitted to BCA for regulatory approval from 6 January 2020.

In March 2020, the Building Control Act was amended, whereby owners of existing non-barrier-free buildings may be required to provide at least basic accessibility features for Persons with Disabilities ("basic accessibility requirement"), if owners carry out A&A works requiring plan approval in any part of the non-barrier-free buildings. The basic accessibility requirement came into force on 1 June 2023.

The basic accessibility requirement applies to existing non-barrier-free buildings:

- Except those which are used solely for residential purposes or as factories;
- That have GFA of more than 500m^2; and
- That are accessible by the public.

More details on the Code on Accessibility for the Built Environment can be found on BCA website.

Source: BCA as at Dec 2022

UD in the broadest term is "design for all people". It seeks to create an environment addressing the needs of all age groups and people of different abilities including temporary disability. The move towards universal design has developed due to the expanding population of people with varying degree of abilities and advancing years, their demands for recognition and desire for independent living.

The Universal Design index self-assessment framework (UDi) is a tool introduced in June 2022 as an initiative to raise the bar on UD adoption in developments. The UDi is integrated with Building Plan (BP) and Temporary Occupation Permit (TOP) / Certificate of Statutory Completion (CSC) approval processes and consist of a self-help UDi checklist to

- Enable Qualified Persons (QPs) and developers to learn about and consider user-friendly features that could be provided in their projects; and
- Obtain an indicative measure and rating of the level of user-friendliness for their projects.

All applicable projects which are first applying for BP, TOP or CSC on or after 1 September 2022 are required to complete and submit the UDi checklist as part of their application. A UDi guide was also released providing explanatory notes and photograph examples to enhance awareness and understanding of the user-friendly features listed in the checklist.

Universal Design Rating

The UD Mark was a voluntary certification scheme launched in October 2012 to promote UD and encouraged the building industry to incorporate the principles in their developments and projects. In July 2015, BCA launched a set of enhanced UD Mark criteria called the UD Mark Version 2.0 (2015), setting higher certification benchmarks and providing an expanded design scope for buildings.

With the introduction of the UDi framework which allows for self-assessment, the BCA UD Mark certification scheme was phased out. Projects which had made reference to the BCA UD Mark certification scheme as a benchmark for the level of user-friendliness can now adopt the UDi framework with its corresponding ratings.

A building/development which had provided user-friendly features beyond the minimum requirements specified in the Code on Accessibility in the Built Environment would be able to obtain a Universal Design Rating ranging from A to D.

More details on UD can be found on BCA website.

Source: BCA as at Jun 2022

The BCA Green Mark Scheme was launched in January 2005 as an initiative to drive Singapore's construction industry towards more environment-friendly buildings. It is intended to promote sustainability in the built environment and raise environmental awareness among developers, designers and builders when they start project conceptualisation and design, as well as during construction.

BCA enhanced the Building Control Act and put in place the Building Control (Environmental Sustainability) Regulations 2008 ("ES Regulations 2008") as part of the key initiatives under the earlier Green Building Masterplans.

Under the latest Singapore Green Building Masterplan, more ambitious targets to implement sustainable building development in the Built Environment sector have been set to mitigate the effects of climate change. The Environmental Sustainability requirements in the Code for Environmental Sustainability of Buildings (Edition 4.0) and the Code on Environmental Sustainability Measures for Existing Buildings (Edition 3.0) will focus on building energy efficiency and carbon reduction measures.

The ES Regulations 2008 together with the Building Control (Environmental Sustainability) (Amendment) Regulations 2021 and Building Control (Environmental Sustainability) (Amendment) Regulations 2022 applies to building works where planning permission is first submitted to the URA on or after 1 December 2021:

- Building works which involve a GFA of 5,000m^2 or more
- Building works which involve increasing GFA of an existing building by 5,000m^2 or more;
- Building works relating to an existing building which involve a GFA of 5,000m^2 or more, and which involve the provision, extension or substantial alteration of the building envelope and building services in or in connection with an existing building.

Singapore Green Building Masterplan (SGBMP)

The SGBMP is an action plan that sets out Singapore's environmental sustainability efforts for the Built Environment and is part of the Singapore Green Plan 2030. In the fourth edition, the SGBMP aims to deliver three key targets of "80-80-80 in 2030":

a. Stepping up the pace to green 80% of buildings (by gross floor area, GFA) by 2030
b. 80% of new developments by GFA to be Super Low Energy (SLE) buildings from 2030
c. Achieving 80% improvement in energy efficiency over 2005 levels for best-in-class green buildings by 2030

As part of the newest edition, all building criteria, i.e. GM NRB:2015, GM RB:2016 and GM ENRB:2017 are streamlined into a new all-in-one Green Mark 2021 Framework. The BCA GM:2021 came into effect on 1 November 2021. A refreshed GM:2021 certification standards and technical guides are uploaded as the 2nd edition. Starting from 1 June 2024, all projects will be assessed using the 2nd edition, including ongoing projects with application submitted before 1 June 2024.

Mandatory higher Green Mark Standard for Government Land Sales (GLS) Sites

Since 2010, building developments on land sold under the GLS Programme in selected strategic areas are subject to higher Green Mark standards under the ES Regulations 2008. This helps maximise the potential for cost-effective energy saving solutions in the build environment.

With the increasing need to scale up climate action, more ambitious targets to implement sustainable building development in the BE sector have been set to mitigate the effects of climate change under the latest SGBMP. Building developments on land sold under the GLS Programme on or after 30 June 2022 in all areas are required to obtain the BCA Green Mark Platinum (SLE) Rating with Maintainability Badge.

(Continued from page 54)

GreenGov.SG

The public sector is committed to take the lead in environmental sustainability and adopt a long-term view in resource efficiency. Previously known as Public Sector Taking the Lead in Environmental Sustainability (PSTLES), GreenGov.SG strive to attain ambitious sustainability targets in carbon abatement and resource efficiency and be a positive influence and enabler of green efforts.

In line with the Singapore Green Plan 2030, the GreenGov.SG has set targets and measures to steer the public sector to peak its carbon emissions around 2025, ahead of Singapore's national target.

Regulatory Requirements for Existing Buildings

To achieve an all-round sustainable built environment, it is important to ensure that existing buildings continue to operate efficiently throughout their life cycle.

PartIIIB – Environmental Sustainability Measures for Existing Buildings in the Building Control Act requires owners of existing buildings to:

- Comply with the minimum environmental sustainability standard (Green Mark Standard)
- Submit periodic energy efficiency audits of the building's cooling systems
- Submit information in respect of energy consumption and other related information as required by the Commissioner of Building Control

Minimum Environmental Sustainability Standard for Existing Buildings

On and after 2 January 2017, the Building Control (Environmental Sustainability Measures for Existing Building) Regulations 2016 will apply to all buildings with GFA greater than 5,000m^2, when installing or replacing the building cooling system.

Only the following types of buildings will be excluded from the above requirement:

- Industrial buildings;
- Railway premises, port services and facilities or airport services and facilities;
- Religious buildings;
- Data centres;
- Utility buildings; or
- Residential buildings, excluding serviced apartments.

The minimum environmental sustainability standard of the building shall have a level of environmental performance that meets all relevant Base Requirements and incorporates the number of appropriate sustainability indicators provided under the Carbon Reduction Measures in order to meet the minimum Green Mark score.

Mandatory Submission of Periodic Energy Audits

With effect from 1 January 2014, upon notice from the Commissioner of Building Control, building owners are required to engage a Mechanical Engineer (PE(Mech)) or an Energy Auditor registered with BCA to carry out an energy audit on the building cooling system before making the necessary documentary submission to the Commissioner of Building Control.

The Periodic Energy audit will be applicable to the following group of buildings:

a. For new buildings whose application for planning permission is submitted on or after 1 December 2010, building owners may be issued a notice:
   - At any time after the temporary occupation permit (TOP) or certificate of statutory completion (CSC) is issued; and
   - At intervals of not less than three years after the date of the last notice served.

b. For existing buildings which have undergone a major energy-use change on and after 2 January 2014 and are required to meet the prescribed Green Mark Standard for existing building, building owners may be issued a notice:
   - Three years after the date of the approved as-built score; and
   - At intervals of not less than three years after the date of the last notice served.

To be introduced by end-2024, the new Mandatory Energy Improvement (MEI) regime will require owners of energy-intensive buildings to carry out energy audits and implement measures to improve their building energy use intensity (EUI).

(Continued from page 56)

BCA Green Mark Assessment Criteria

BCA Green Mark is a green building rating system to evaluate a building for its environmental impact and performance. It provides a comprehensive framework for assessing the overall environmental performance of new and existing buildings to promote sustainable design, construction and operations practices in buildings.

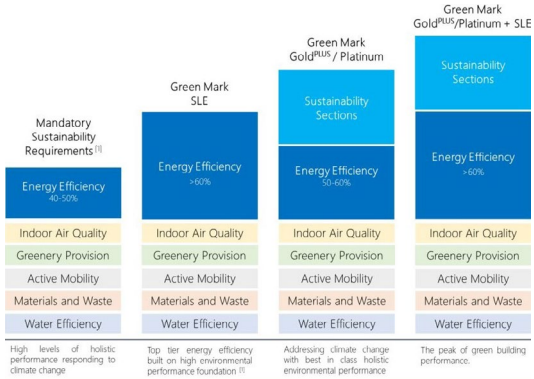
Under the assessment framework for new buildings, developers and design teams are encouraged to design and construct green, sustainable buildings which are more climatic responsive, energy effective, resource efficient, smarter and have healthier indoor environments. As for existing buildings, the building owners and operators are encouraged to meet their sustainable operations goals and to reduce adverse impacts of their buildings on the environment and occupant health over the entire building life cycle. Beside buildings, the assessment criteria evaluate energy efficiency, water efficiency, environment protection, indoor environmental quality and other green/ innovative features of districts, parks, infrastructure and building interiors.

Green Mark 2021

The BCA GM:2001 is an internationally recognised green building certification scheme tailored for the tropical climate. It applies to new and existing buildings, including commercial buildings, industrial buildings, institutional buildings and residential buildings.

BCA Green Mark Award Rating Scores

GM:2021 is positioned to recognise performance that is above mandatory, regulated standards, that include robust levels of energy efficiency, indoor air quality, greenery provision, active mobility considerations, materials and waste management and water efficiency.



[1] Mandatory requirements are based on development control and building plan provisions for new buildings, for existing buildings under retrofit, the requirements would vary depending on the type and extent of the works being undertaken.

Project teams can choose either to follow the Green Mark Gold^{PLUS} or Platinum certification which are comprehensive certification that covers various aspects of sustainability, and/or Green Mark SLE certification which is focused solely on energy efficiency.

GM Series	GM SLE Series
-	SLE, ZE, PE
Gold^{PLUS}	Gold^{PLUS} SLE/ZE/PE
Platinum	Platinum SLE/ZE/PE

More details on Environmental Sustainability can be found on BCA website.

Source: BCA as at Jun 2024

Prior to 1989, the intensity of residential development was measured in terms of population density i.e. persons per hectare. For non-residential developments such as industrial and warehouse buildings, institutional buildings, commercial buildings etc., the intensity was measured in terms of plot ratio.

Following the introduction of the new development charge system in 1989, the GFA concept was adopted by URA to determine the development intensity of a building, thereby standardising the previous methods of calculating development intensity for different types of developments.

Definition of Gross Floor Area

All covered floor areas of a building, except otherwise exempted and uncovered areas for commercial uses are deemed the GFA of the building for purposes of plot ratio control and development charge. The GFA is the total area of the covered floor space measured between the centre line of party walls, including the thickness of external walls but excluding voids. Accessibility and usability are not criteria for exclusion from GFA. URA reserves the right to decide on GFA matters based on the specific design of a development proposal on a case-by-case basis.

Various items and areas that are counted, partially counted or not counted as GFA in a building development are indicated in the following tabulation.

Items at a glance on GFA

Items	Excluded From GFA*	Partially excluded as GFA*	Included as GFA	GFA over and above Master Plan Control*
Automated Teller Machine and Vending Machine Kiosk			✓	
Balconies			✓	✓
Basement Diaphragm Wall	✓			
Bay Windows			✓	
Bicycle Parking Space	✓			
Cable Chamber	✓			
Car Parking Lot	✓			
Catwalk	✓			
Communal Roof Terrace	✓			
Covered Communal Ground Gardens		✓		
Covered Enclosed Space			✓	
Covered Greenhouses / Farms			✓	

Harmonisation of Floor Area Definitions

Prior to 1 June 2023, agencies adopted different floor area measurements for various purposes. In addition, various floor areas were defined differently. To pave the way for coordinated submissions and improved productivity, floor area definitions have been harmonised. The key changes are summarised as follows:

a. All agencies' floor areas will be measured to the middle of the wall.
b. All strata areas will be included as GFA.
c. All voids will be excluded from strata area.
d. BCA and SCDF will adopt an aligned definition for Statistical Gross Floor Area (SGFA) computation.

The revised floor area definitions will apply to all development applications submitted to URA on or after 1 June 2023. The revised definitions will also apply to all Government Land Sale (GLS) and industrial Government Land Sale (iGLS) sites launched for sale on or after 1 September 2022.

GROSS FLOOR AREA (GFA)
(Continued from page 60)

Items at a glance on GFA

Items	Excluded From GFA*	Partially excluded as GFA*	Included as GFA	GFA over and above Master Plan Control*
Covered Swimming Pool			✓	
Covered Water Feature	✓			
Covered Walkway	✓			
Curtain Wall			✓	
Driveways	✓			
End of Trip Facilities	✓			
Entrance Canopy	✓			
Floors – Under a Pitch Roof			✓	
Floors – Under a Platform			✓	
Floors – Intermediate			✓	
Floors – Perforated			✓	
Guardhouse and Sentry Post			✓	
Household Shelter			✓	
Indoor Recreation Space			✓	✓
Ledge – Air-Conditioner (common property)	✓			
Ledge – Air-Conditioner (private)			✓	
Ledge – Firemen's	✓			
Ledge – Sun Shading Purpose	✓			
Letter Boxes	✓			
Lift Lobbies with Car Park Floor		✓		
Lift Motor Room			✓	
Lift Shaft (lowest floor)			✓	
Linkages	✓			
Loading and Unloading Bay	✓			
Loading and Unloading Platforms			✓	
Metal Ceiling Grid	✓			
Meter Compartment	✓			
M&E Space – With Limited Headroom	✓			
M&E Space – Within Basement Car Park Floor	✓			
M&E Space – Enclosed by Chain Link Fence on Car Park Floor	✓			
Motorcycle Parking Lot	✓			
Open Courtyards and Air Wells (Pre-1960)			✓	
Outdoor Refreshment Area			✓	✓
Outdoor Refreshment Kiosk			✓	✓
Pavilions	✓			
Pick-up/ Drop-off Point	✓			
Planter Boxes – Communal	✓			

GROSS FLOOR AREA (GFA)

(Continued from page 62)

Items at a glance on GFA

Items	Excluded From GFA*	Partially excluded as GFA*	Included as GFA	GFA over and above Master Plan Control*
Planter Boxes – Private			✓	
Private Enclosed Space			✓	✓
Private Roof Terrace			✓	✓
Privately Owned Public Space	✓			
Racking System for Storage Purpose	✓			
Recessed Window			✓	
Refuse Chamber	✓			
Refuse Chute	✓			
Reinforced Concrete Slabs within Voids			✓	
Roof Cover	✓			
Roof Eaves and Building Projections – Below 6th Storey		✓		
Roof Eaves and Building Projections – At and Above 6th Storey	✓			
Shadow Area – Elevated Linkway	✓			
Shadow Area - Solar Panel	✓			
Service Duct			✓	
Sky Terrace		✓		
Staircase			✓	
Staircase – Intermediate	✓			
Staircase – Scissors			✓	
Staircase – Connecting Virtual Floors			✓	
Staircase – Uncovered External Perforated Staircase			✓	
Staircase – Uncovered Staircase to ESS	✓			
Unenclosed Facade Articulation			✓	✓
Void Deck			✓	
Walls and Columns			✓	
Water Tanks	✓			

*Subject to compliance with requirements and conditions. See details and updates in GFA Handbook available on URA website.

Source: URA as at Jul 2023

URA grants bonus GFA incentives to encourage the provision of specific building features or uses. The GFA of the incentivised features are allowed above the Master Plan Gross Plot Ratio (GPR) control. These bonus GFA incentives are given to help realise various planning objectives for the city.

However, as such bonus GFA are allowed over and above the Master Plan GPR control for a site, they add to the development bulk and intensity beyond what was planned for. As there is a limit to the amount of additional bulk and intensity that can be accommodated for a site and collectively within an area without adversely affecting the effectiveness of GPR and GFA as planning tools, all bonus GFA incentives are consolidated in a menu of bonus GFA schemes and the usage of the bonus GFA items from the menu will have to observe an overall budget of 10% for additional GFA allowed beyond the Master Plan under bonus GFA schemes for each development site.

Under this framework, for a site that qualifies for multiple bonus GFA incentive schemes, the developers and QPs are free to determine which bonus GFA scheme(s) to adopt and the quantum of bonus GFA to use under each scheme (subject to compliance with the guidelines of the individual schemes), as long as the cumulative bonus GFA is within the overall budget of 10% above the Master Plan GPR. All additional GFA granted under the bonus GFA incentive schemes will not form the future development potential of the sites upon redevelopment.

Developments are eligible for the following bonus GFA incentive schemes if they comply with the relevant guidelines:

Bonus GFA Incentive Schemes	
Residential Developments (Flats and Condominiums)	Balcony Incentive Scheme
	Conserved Bungalow Scheme
	Indoor Recreation Spaces Scheme
Non-Residential Development (Commercial)	Community and Sports Facilities Scheme
	Rooftop Outdoor Refreshment Areas on Landscaped Roofs
Non-Residential Development (Hotel)	Balcony Incentive Scheme
	Rooftop Outdoor Refreshment Areas on Landscaped Roofs

Source: URA as at Jul 2023

Rejuvenation Incentives for Strategic Areas

URA will be rescinding the Bonus Plot Ratio (BPR) scheme introduced in 1989 in tandem with the gazette of Master Plan 2019 with the introduction of the following rejuvenation incentives:

1. Strategic Development Incentive (SDI) Scheme
2. CBD Incentive Scheme

The new package of incentive schemes aims to encourage the rejuvenation of the CBD and other strategic areas to encourage a better mix of uses and enhance urban vibrancy. Updated conditions have been announced effective from 4 April 2022 to 26 November 2024.

Source: URA as at Apr 2022

Built Environment Transformation GFA Incentive Scheme

To accelerate the adoption of Industry Transformation Map (ITM) Outcome Requirements, BCA and URA jointly launched the BE Transformation GFA Incentive Scheme. Under the scheme, developers / building owners can enjoy up to 3% additional GFA, subject to overall cap of 10% above the Master Plan GPR, for delivering the stipulated ITM Outcome Requirements on private sites of at least 5,000m^2 GFA.

The scheme is applicable to development proposals from 24 November 2021 to 23 November 2026, for a period of five years.

More details on the scheme can be found on BCA website.

Source: BCA as at Mar 2023

The Contractors Registry is administered by BCA to register contractors who provide construction-related goods and services to the public sector. Registration status shall be accorded only to firms which BCA considers as having sufficient resources, experience and technical expertise to undertake contracts of a nature and size as defined by the Registration Head and the grade allocated.

Except for Regulatory Workheads (RW), CRS functions as an administrative body only for the public sector procurement. As such, business entities which are not registered with BCA are not restricted from conducting business as contractors or suppliers outside the public sector. The requirements stated, as set forth shall be taken as defining only the minimum requirements expected of an applicant.

From 1 Jun 2025, the CRS is set to expand its scope to a nation-wide registry of construction firms. All firms hiring foreign construction workers are required to register under the CRS. BCA will also raise the CRS registration requirements to keep pace with the current market conditions to ensure that firms hiring foreign construction workers have the minimum financial capabilities and experience to sustain their operations and deliver projects.

Scope of Registration

CRS is divided into five major categories, namely Construction Workheads (CW) that covers general building (CW01) and civil engineering works (CW02), Construction Related Workheads (CR), Mechanical & Electrical Workheads (ME), Trade Heads (TR) and Regulatory Workheads (RW).

From 1 January 2024, Facilities Management Workhead (FM) and Supply Heads (SY) have migrated from the CRS to two new registries - the Facilities Management Registry and Suppliers Registry respectively. There is no change to firms' current financial grade and registration expiry date after the migration.

Tendering Limits

The Tender Price Index (TPI) published by BCA every quarter reflects the recent trend in construction costs due to changes in material prices, manpower, plant and machinery, overheads and profits. The Tendering Limit is determined using the TPI to reflect the impact of tender price movements on project value.

The tendering limit for each respective grade may be adjusted every year depending on the economy driving the construction industry in Singapore.

Firms registered under the CRS are eligible to participate in public sector construction tenders with project values corresponding to the tendering limit based on their grade below.

More details on the system can be found on BCA website.

Construction Workheads (CW01 & CW02)	**A1**	**A2**
Tendering Limit (S$m) 1 Jul 2023 to 30 Jun 2024	Unlimited	105.0
Tendering Limit (S$m) 1 Jul 2024 to 30 Jun 2025	Unlimited	105.0
Specialist Workheads (CR, ME, FM02-04 & SY)	**Single Grade**	**L6**
Tendering Limit (S$m) 1 Jul 2023 to 30 Jun 2024	Unlimited	Unlimited
Tendering Limit (S$m) 1 Jul 2024 to 30 Jun 2025	Unlimited	Unlimited
Specialist Workheads (FM01)	**M1**	**M2**
Tendering limit (S$m) From 1 Apr 2020	Unlimited	30.0

B1	**B2**	**C1**	**C2**	**C3**
50.0	16.0	5.0	1.6	0.8
50.0	16.0	5.0	1.6	0.8
L5	**L4**	**L3**	**L2**	**L1**
16.0	8.0	5.0	1.6	0.8
16.0	8.0	5.0	1.6	0.8
M3	**M4**			
10.0	1.0			

Source: BCA as at Jun 2024

The PQM is a tendering framework based on both the price and quality attributes for the evaluation of construction tenders. PQM adopts a range of weightages for evaluation of attributes and formalises the assessment of non-price attributes into quantitative scores. PQM optimises value by awarding the tender to the tenderer with the highest combined PQM score (i.e. best offer) for the project.

The PQM applies to all public sector construction tenders under the BCA Construction Workheads (CW01 & CW02) with Estimated Construction Cost (without contingency sum) of S$3 million and above.

Key Principles of PQM

Both Price and Quality attributes will be given weightages and scored based on the guideline provided to determine the best value-for-money among all submitted proposals. The Productivity component has been removed from 1 June 2022. The Constructability Score (CS) Index component has been removed from 1 February 2023.

The PQM procedures will be as open and transparent as possible. The weightages among the components and attributes, the number of points assigned to each attribute and the method of scoring will be made known upfront in the tender.

All tenderers can request in writing to seek feedback from the respective Government Procuring Entities (GPEs) on their individual tender performance after the tender award.

Main Features of PQM

1. Weightages for PQM
The following range of weightages can be considered, depending on project requirements such as the complexity of the project, and the extent of design input required from the tenderers.

Component	Weightages for Building tenders[1]	Weightages for Civil Engineering tenders[2]
Price	40% - 60%	50% - 70%
Quality	60% - 40%, correspondingly	50% - 30%, correspondingly

1 These refer to building projects classified under Contractors Registration System (CRS) Workhead CW01.
2 These refer to civil engineering projects classified under CRS Workhead CW02

2. Tender Submissions
The GPEs can adopt the one-envelope or the two-envelope system. A one-envelope system can be adopted for projects whereby the scoring of the specified quality attributes is based on quantified templates with no subjective judgment. An example of an objective scoring for quality attributes would be safety performance based on MOM's List of Contractors with Demerit Points. Otherwise, a two-envelope system shall be adopted.

2.1 One-envelope System
Tenderers submit the Price and Quality together in one envelope. The Price and Quality scores will be computed at the same time.

2.2 Two-envelope System
Tenderers submit the Quality envelope separately from the Price envelope. GPEs would open and compute the Quality score first, before opening the Price envelope and computing the combined scores. The tenderer with the best combined score will be awarded the contract.

Scoring Methodology

1. "Price" Component
The lowest tender price will be given the maximum Price-score (P-score). GPEs reserve the right not to consider any tender bid that is abnormally low. The Price scores of the other tenderers will be inversely proportional to the lowest tender price. The "Price" Score Computation below shall be used to compute the P-score.

$$\text{Price Score (P- score)} = \frac{\text{Lowest tender price}}{\text{Tenderer's price}} \times \text{Price weightage}$$

If price loading is applicable under Bonus Scheme of Construction Quality (BSCQ), the new price (loaded according to the Total Price Loading Factor) shall be used for computing the P-score.

When computing the P-score, the tenderer's price should not include provisional sums and value of nominated subcontracts.

Any alternative bid, by any of the firm, will be treated as a separate bid and be assessed accordingly, provided alternatives are allowed. Alternative bids are offers which functionally meet the specified technical specifications and/or terms and conditions differing from those set out in the Invitation to Tender.

PRICE QUALITY METHOD (PQM)

(Continued from page 70)

2. "Quality" Component
The Quality score will be derived from the summation of past performance, safety-related attributes and GPEs' own quality attributes:

$$\text{Quality score (Q-score)} = \text{Past Performance} + \text{Safety-related Attributes} + \text{GPES' Own Quality Attributes}$$

Attributes under the Quality component could include:
a. Mandatory attribute: past performance[3];
b. Mandatory attribute: safety-related attributes; and/or
c. GPEs' own Quality attributes.

The following range of weightages of quality attributes shall apply.

% of Overall PQM Score				
		Building		
	Civil Engineering (CE)			
Price Weightage	70%	60%	50%	40%
Quality Weightage	30%	40%	50%	60%
Safety-related Attribute	Min. 5.0%	Min. 6.0%	Min. 7.5%	Min. 9.0%
Past Performance	Min. 3.0%	Min. 4.5%	Min. 6.0%	Min. 7.5%
GPEs' Own Quality Attribute	Max. 22%	Max. 29.5%	Min. 36.5%	Max. 43.5%

Note: The minimum weightage of 5% for safety-related criteria will also be applicable to public sector construction and construction related tenders, for projects >S$1mil to <S$3mil. These tenders need not comply to the other requirements of the PQM framework.

GPEs will decide which attributes are relevant for a particular project and assign the maximum points for each quality attribute.

GPEs will set out the scoring method for the specific Quality attribute selected. The scoring method can adopt any of the following approaches:
a. Benchmark performance method;
b. Ranking method;
c. Banding method; or
d. Raw score method.

Further explanations on the above four approaches are available on BCA website.

The tenderer with the highest total raw quality points will be given maximum Quality score. The Quality score of the other tenderers will be calculated proportionally to the highest total Quality points. The formula below shall be used to compute the Quality score (Q-score).

$$\text{Quality score (Q-score)} = \frac{\text{Tenderer's total Quality Points}}{\text{Highest total Quality Points}} \times \text{Quality Weightage}$$

GPEs may choose to adopt any of the following optional requirements:

a. Set a specific Quality attribute as a minimum qualifying criterion, which must be stipulated upfront in the tender documents so that potential tenderers which do not meet this criterion need not tender. This is to minimise the wastages in the firms' tendering efforts. If any agency intends to specify track record as a minimum qualifying criterion, it should not be overly onerous such that it limits the number of eligible tenderers unnecessarily; or

b. Set a minimum total Quality point for firms to meet. Firms which do not meet the minimum total Quality points will be 'disqualified' and their Price scores will not be computed. If the two-envelope system is used, the Price envelopes from the non-conforming tenders should not be opened.

Information Required in Tender Documents

The following items must be clearly made known at tender stage:
a. Price-Quality weightage.
b. Quality attributes applicable and their assigned maximum points.
c. Scoring method for each attribute, e.g. benchmark performance method or ranking method, etc. Benchmarks used in the benchmark performance method must be made known, together with how tenderers which perform better or worse than the benchmark will be scored.
d. (if applicable) Any minimum qualifying criterion for a specific quality attribute, which, if not met, would disqualify the tenderer.
e. (if applicable) Any minimum total quality points below which tenderers will not be further considered.

3 Contractors can view their individual performance score under the electronic Builders and Contractors Registration System (eBACS).

PRICE QUALITY METHOD (PQM)
(Continued from page 72)

Introduction of the Safety Disqualification (SDQ) Framework for Construction Tenders

The Workplace Safety & Health 2028 Tripartite Strategy Committee (WSH2028 TSC) was set up by the MOM in 2018 to chart out the WSH strategy up to 2028, so that Singapore can be renowned for best practices in WSH. One of the recommendations by the WSH2028 TSC was to enable a business environment that demands good WSH performance. The SDQ Framework will be applicable to public sector construction and construction related tenders:

a. For projects more than S$90,000 to less than or equal to S$1,000,000. This is applicable to Main Contractor only; and
b. For projects more than S$1,000,000. This is applicable to Main Contractor and all levels of subcontractors.

The SDQ Framework temporarily disqualifies contractors with poor WSH performance from participating in these tenders as a main contractor or first-level subcontractor[4]. Contractors meeting any of the following criteria will be disqualified from the tender:

a. Entry into MOM's Business Under Surveillance programme (BUS).
b. Barred by MOM from employing foreign employees due to the accumulation of 25 or more Demerit Points under MOM's Demerit Point System.

Revision in the Scoring Method for Joint Ventures (JVs) under the PQM Framework

The scoring for applicable scoring criteria will be by computing the scores according to the equity share of the JV partners to better reflect the contribution of the JV partners in a project.

4 Refers to firms appointed directly by the Main Contractor awarded the construction contract.

More details on PQM can be found on BCA website.

Source: BCA as at Apr 2024

BUILDING AND CONSTRUCTION INDUSTRY SECURITY OF PAYMENT ACT 2004

The Security of Payment Act (SOP Act) came into operation on 1 April 2005 after the Building and Construction Industry Security of Payment Bill was implemented in November 2004. The SOP Act seeks to improve cash flow in the construction industry by giving parties the right to seek progress payment for work done, and provide fast and low-cost adjudication to resolve payment disputes.

The SOP Act was enacted to facilitate payments for construction work done or for related goods or services supplied in the building and construction industry, and for matters connected therewith. The SOP Act entitles payments to any person who has carried out any construction work; or has supplied any goods or services under a contract, is entitled to a progress payment. Henceforth, the SOP Act covers a wide spectrum of goods and services in the construction industry relating to construction work, including professional consultancy services.

The SOP Act shall apply to any contract that is made in writing on or after 1 April 2005, whether or not the contract is expressed to be governed by the law of Singapore.

However, the SOP Act is not applicable to any contract for the carrying out of construction work, or the supply of goods or services in relation to any residential property defined under the Residential Property Act 1976, which do not require the approval of the Commissioner of Building Control under the Building Control Act 1989; or employment contracts; or contracts that deal with construction work carried out outside Singapore, or goods or services supplied to construction work carried out outside Singapore.

The Building and Construction Industry Security of Payment (Amendment) Bill was passed in Parliament in October 2018 and the Building and Construction Industry Security of Payment (Amendment) Regulations was gazetted on 26 November 2019 and came into operation from 15 December 2019. The key amendments to the Act and/or Regulations include:

a. Expanding and clarifying the scope of the application of the Act;
b. Enhancing requirements on handling of payment claims and responses;
c. Improving the adjudication processes; and
d. Other revisions to improve the operation of the Act and Regulations.

The SOP Act:

1. Facilitates progress payments in the entire construction value chain, thereby improving cash flow;
2. Provides the statutory right to progress payments for work done and materials supplied by contractors, even if there is no such provision in their contract;
3. Renders unenforceable 'pay when paid' provision of a contract;
4. Provides a procedure of a quick and less expensive adjudication system to resolve disputes and facilitate cash flow;
5. Provides right of contractor/ service provider to suspend work or supply for non-payment after adjudication; and
6. Allows other recourses to the claimant such as the right to exercise lien on goods and enforcement of an adjudication determination as a judgment debt.

Period to Respond to Claims and Make Payment

Construction contracts:

a. The respondent must respond to a payment claim by a claimant within a maximum of 21 days.
b. After serving the payment response, the respondent must make payment within a maximum of 35 days.
c. If the contract does not stipulate the payment periods, the default period of 14 days for serving payment response will apply.

Supply of goods contracts:

a. The respondent must make payment within a maximum of 60 days for payment due.
b. If the contract does not stipulate the payment period, the default period for making payment is 30 days.
c. The respondent must provide reasons for non-payment in writing to the claimant before the due date under the amendment Bill.

More details on the SOP Act can be found on BCA website.

Source: BCA as at May 2024

In 2015, BCA unveiled the 2nd Construction Productivity Roadmap as a framework to boost the construction industry's productivity by an average of 2-3% per annum to achieve a highly integrated and technologically advanced construction sector by year 2020.

Vision to Develop Collaborative Platforms and Common Standards

INTEGRATED DIGITAL DELIVERY (IDD)
(Continued from page 76)

Building Information Modelling

Within the Roadmap, Building Information Modelling (BIM) has been identified as a key technology to achieve such aims. BIM can be defined as the object-based digital representation of the physical and functional characteristics of a facility. It goes beyond the creation of 3D models for design and design coordination by creating a common platform for all parties to obtain and input information about a facility and with that provides a reliable basis for decisions during its entire lifecycle.

The Singapore BIM Guide Version 1.0 was launched in May 2012 and an updated Version 2.0 in August 2013. BCA launched a Code of Practice to set out the minimum modelling standards and regulatory information required to be provided in the BIM model. Since 2015, submissions for all new developments plans with GFA larger than 5,000m^2 are required in BIM file formats.

BCA will accept voluntary BIM e-submissions in Native BIM format with effect from 19 October 2016 (for architectural plans) and 1 October 2017 (for C&S/ MEP Engineering plans). Such submissions should be prepared in accordance with the prevailing Code of Practice.

Virtual Design and Construction

In 2017, the Virtual Design and Construction (VDC) guide was published as a reference document that provides a set of guidelines for the implementation of VDC in the Singapore context. VDC is the management of BIM models as well as people and processes in order to achieve explicit project or organisational goals and to improve performance.

This framework requires all stakeholders to commit to work collaboratively towards achieving a common set of goals, through systematically modelling what is to be built, rehearsing what is to be built, and building what was modelled and rehearsed, and through constantly measuring and narrowing deviations between what was built (real) and what was modelled and rehearsed (virtual).

Integrated Digital Delivery

In 2018, BCA launched an IDD plan to encourage more built environment sector firms to go digital. IDD involves firms and professional using ICT technologies, solutions and platforms across the entire building process and builds on BIM and VDC. The three focus areas under BCA's Implementation Plan are:

- Raising awareness on the benefits of IDD through demonstration projects.
- Developing the IDD ecosystem, with enabling solutions, platforms and standards.
- Strengthening the industry's competency in IDD.

The Common Data Environment (CDE) Data Standard was published in January 2021 for projects to ensure consistency in information requirements to support the project delivery and life-cycle management of assets. CDE comprises two components:

- Data Standard – defines what are the information required and how the information is structured for sharing and collaboration within a common data environment to deliver a project.
- Data Platform – refers to the computer system or technology platform that the data and information is stored, shared and collaborated on in a CDE.

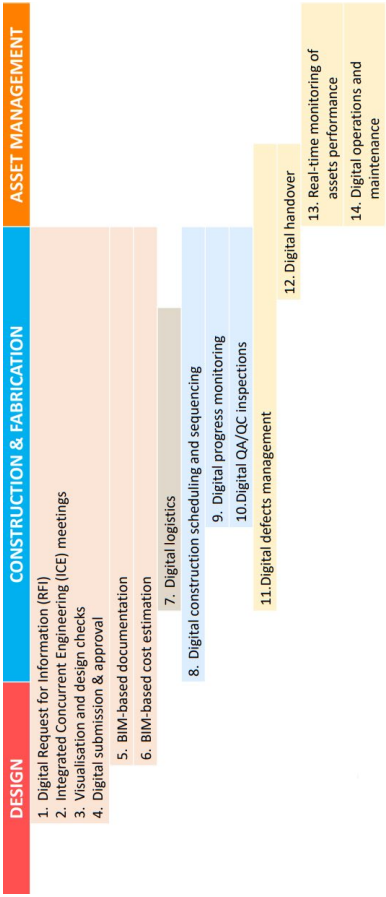
The CDE aims to:

- Ensure consistent and better managed project information and process for projects.
- Allow project team members timely access to up-to-date, relevant and reliable project information in a common and structured environment for the delivery of a project.
- Facilitate close collaboration among project team members through sharing, exchanging, communicating and managing the project information in a common space.
- Enable project teams to derive useful performance insights for trending purpose.

INTEGRATED DIGITAL DELIVERY (IDD)

(Continued from page 78)

14 commonly adopted IDD use cases across the design, construction, fabrication and asset management stages of the building lifecycle are identified below. Projects new to IDD can select from the set of essential use cases to kickstart their IDD adoption.



More details on IDD can be found on BCA website.

Source: BCA as at Jun 2024

MANDATORY ADOPTION OF SPECIFIC PRODUCTIVE TECHNOLOGIES

Mandatory Adoption Of Specific Productive Technologies For New Developments Sold Under The Government Land Sales (GLS) Programme

Developers play a key role in driving productivity improvement; downstream construction will benefit when building designs include high impact productive technologies. The adoption of new technologies is gaining traction among industry players, especially with the tightening of foreign manpower hiring policies.

Design for Manufacturing and Assembly (DfMA) is a key pillar of Singapore's Construction Industry Transformation Map (ITM) and is a game-changing method of construction which involves construction being designed for manufacturing off-site in a controlled environment, before being assembled on-site.

As of November 2014, the adoption of Prefabricated Prefinished Volumetric Construction (PPVC) is required as a land sales condition for selected non-landed residential and hotel GLS sites. The minimum level of use of PPVC shall be 65% of the total super-structural floor of the building or the component of the building that is to be used for residential or private dwelling purposes.

The adoption of structural steel is also required as a land sales condition for selected commercial sites since February 2017. The minimum level of use of structural steel construction for selected land parcels sold under the GLS Programme shall be 80% of the total office floor area of a building.

More details on Productive Technologies can be found on BCA website.

Source: BCA as at Feb 2020

CONQUAS was first introduced in Singapore in 1989 to measure the quality of building projects. CONQUAS 2022 is the eleventh edition of the assessment scheme after more than 30 years of implementation. The key changes include:

- Expansion of scope to cover 3 key areas of recurring feedback relating to workmanship and poor quality of materials – water seepage, ponding at common areas and glass shattering; and
- Revision of score weightages arising from expansion of assessment scope

The assessment of CONQUAS consists of 4 components. Each component is further divided into different items for assessment.

Components to be Assessed	Category of Development		
	Private Residential	Public Residential	Non-Residential
1. Internal Finishes	60%	55%	50%
2. Installation Methods Verification and Functional Tests	20%	25%	30%
3. External Finishes	20%	20%	20%
Sub Total CONQUAS Score	**100%**	**100%**	**100%**
4. Bonus Points – discontinued for projects with construction tenders called from 1 July 2023	8%	7%	7%
Total CONQUAS Score	**108%**	**107%**	**107%**

Note:
(i) For private mixed development with residential component, the project will follow the weightage under the private residential category.

In addition, the 3-tier CONQUAS scheme was introduced to help developer/contractors further raise the quality of their new private residential developments[1]. The 3-tier CONQUAS scheme will apply to all CONQUAS applications for new private residential developments[1].

1 Includes private mixed developments with residential component.

The building is assessed primarily on workmanship standards achieved through factory and site inspection. For projects using DfMA technologies, assessments will be done throughout the construction process with the Installation Methods Verification and some of the Functional Tests carried out in the factory. To ensure robustness of the CONQUAS scheme, major defects detected during the internal finish assessment will be taken into consideration. Adverse feedback from end-users on major defects that surface during the defects liability period of a project will also be considered when finalising the CONQUAS score.

CONQUAS Banding

Firms are banded from the highest Band 1 to the lowest Band 6 based on the firm's average CONQUAS scores over past 6 years. The quality of private residential CONQUAS projects will be reflected by bands too. Home buyers will be able to access the CONQUAS banding on the Quality Housing Portal when the banding system is launched.

For developers, the banding can serve as branding for those who are committed to delivering quality developments. Developers can similarly use the CONQUAS banding on the portal to appoint good performing builders for their projects. Correspondingly, builders should strive to deliver consistently good quality work, which would be reflected via the accorded CONQUAS bands.

The revised CONQUAS 2022 requirements will apply to projects with construction tenders called from 1 July 2023.

More details on CONQUAS 2022 can be found on BCA website.

Source: BCA as at Sep 2023

BCA QM for good workmanship scheme was launched on 1 July 2002 to help developers meet the rising expectation of Singaporeans for better quality homes.

Under the Scheme, BCA will assess every unit of newly completed private residential projects. The QM certificate will be issued to individual apartment unit that achieve a score of at least 85[1] out of 100 points (a minimum CONQUAS score for internal finishes), without any major defects and water seepage in the toilets/ bathrooms and windows. The QM certificate certifies the condition of the unit at the time of inspection.

QM is required for residential sites or the residential component of mixed developments on site sold on or after 30 June 2022 under the GLS programme. QM is also applicable as one of the ITM outcome requirement for projects that have applied for the Built Environment Transformation GFA Incentive Scheme. QM adoption is voluntary beyond this.

The scope of assessment will be the construction workmanship standards of the internal finishes of the 6 architectural elements including floor, internal wall, ceiling, door, window, and components (e.g. fixtures such as wardrobe, kitchen cabinet, vanity top, etc.).

The assessment for the 6 architectural elements will cover all locations within the units (i.e. bedrooms, bathrooms, kitchen, living & dining rooms, utility yard, balcony, private enclosed space, where applicable). In addition, the assessment will include water ponding test for bathrooms. Water-tightness tests on windows are optional. The assessment does not cover quality of material or issues of design or aesthetic preferences.

The Tiered Rating System ("Star", "Excellent" and "Merit") provides recognition to developers and builders that achieve quality excellence beyond the minimum requirements.

1 Applies to QM projects with construction tender called from 1 June 2020.

More details on QM can be found on BCA website.

Source: BCA as at Mar 2024

Singapore adopts a national, strategic and long-term approach to achieve sustainable, continuous improvement in WSH performance. The WSH 2015 and WSH 2018 National Strategies have brought about significant WSH improvements over the years.

Building on the foundation of WSH 2015 and WSH 2018, the WSH 2028 Tripartite Strategies Committee presented 3 strategies for the next 10 years:

1. Strengthen WSH ownership
2. Enhance focus on workplace health
3. Promote technology-enabled WSH

Workplace Safety and Health Act (WSHA)

The WSHA, which came into effect on 1 March 2006, emphasise the importance of cultivating good safety habits in all individuals so as to engender a strong safety culture in the workplace. It requires stakeholders to take reasonably practicable measures to ensure the safety and health of persons at the workplace.

The WSHA has four key features:

1. It places the responsibility on stakeholders that have it within their control to ensure safety at the workplace.
2. It focuses on workplace safety and health systems and outcomes, rather than merely on compliance.
3. It facilitates effective enforcement through the issuance of remedial orders.
4. It imposes higher penalties for non compliance and risky behaviour.

Launch of CheckSafe

MOM launched CheckSafe on 21 January 2021, which can be used to check and compare construction companies' safety track records. Information available includes injury data (e.g. number of fatal injuries) and enforcement data (e.g. stop work orders, demerit points issued, placement on Business Under Surveillance (BUS) Programme, conviction records).

Top Executive Workplace Safety and Health Programme (TEWP)

From 1 March 2024, at least one top executive from each company is required to complete the TEWP. It aims to focus corporate leaders' attention on how to meet their WSH responsibilities and ways to develop their company's WSH capabilities.

(Continued from page 84)

Liabilities and Penalties

The WSHA states a general maximum penalty for offences. The penalties are shown in the tables below.

Offence	Maximum Fine	Maximum Imprisonment	Conditions
Not complying with Remedial Order	S$50,000 And additional fine of S$5,000 for each day of continued offence	12 months	Either or both
Not complying with Stop Work Order	S$500,000 And additional fine of S$20,000 for each day of continued offence	12 months	Either or both

Table 1: Not Complying with a Remedial Order or Stop Work Order

Type of Offender	Maximum Fine		Maximum Imprisonment	Conditions
	1st conviction	Repeat Offenders		
Individual person	S$200,000	S$400,000	2 years	Either or Both
Corporate Body	S$500,000	S$1,000,000	N.A.	N.A.

Table 2: General Penalties (for offences where no penalty is expressly provided in the WSHA)

Note: If the previous offence caused the death of a person, any subsequent offence that causes the death of another person will have a maximum fine that is doubled.

Workplace Safety and Health (Design for Safety) Regulations (DfS)

In 2008, MOM and WSH published the Guidelines on DfS of Buildings and Structures which were adopted on a voluntary basis. To tap on the benefits of DfS to achieve significant and widespread WSH improvement in the building industry, the WSH (Design for Safety) Regulations came into operation on 1 August 2016. The key provisions of the DfS are:

a. To place duties on the various stakeholders involved in a construction project.
b. To require implementation of a DfS review process throughout every phase of the construction project.
c. To require a DfS register for all construction projects.
d. To allow developers to appoint a DfS professional.
e. To mandate it for projects with contract value of S$10 million and above.

More details on ESH can be found on MOM website.

Source: MOM as at Jul 2024

The WICA provides injured employees with a low-cost and expeditious alternative to common law to settle compensation claims. To claim under WICA, the employee only needs to prove that he was injured in a work accident or suffered a disease due to work. Engaging a lawyer is not required to file a WICA claim. Under WICA, the employer (or employer's insurer) is liable to pay the compensation regardless of who caused the accident/disease, and even after the employment has ceased or the Work Pass (of a foreign worker) has been cancelled. The amount of compensation is computed based on a fixed formula and is subject to caps. Dependents of deceased employees are also eligible to claim Work Injury Compensation. An injured employee can claim from either WICA or common law, but not from both, and has up to 1 year from the accident to decide which to claim from.

Coverage

Covered	1. All employees engaged under a "contract of service" or "contract of apprenticeship" with an employer, regardless of salary level, age or nationality.
Not Covered	1. Independent contractors and the self-employed 2. Domestic workers 3. Uniformed personnel - members of the Singapore Armed Forces, Singapore Police Force, Singapore Civil Defence Force, Central Narcotics Bureau and Singapore Prison Service

Compensation

Compensation is payable when an employee:

1. Suffered an injury by accident arising out of and in the course of employment[1];
2. Suffered an injury while on an overseas assignment;
3. Contracted an occupational disease; or
4. Contracted a disease due to work-related exposure to biological or chemical agents.

1: Refers to an accident that: (i) happened during working hours/ overtime or while on official duties ("in the course of employment") and (ii) happened due to work ("out of employment")

WORK INJURY COMPENSATION ACT (WICA)

(Continued from page 86)

Three compensation benefits can be claimed:

1. Medical Leave Wages

	Outpatient medical leave (MC)	Hospitalisation leave
Full pay	Up to 14 days	Up to 60 days
2/3 pay	15th day onwards, up to 1 year from accident	61st day onwards, up to 1 year from accident

2. Medical Expenses

The employer is required to pay for medical expenses related to a work accident up to the maximum limit, which is S$45,000 or 1 year from the date of the accident, whichever comes first.

3. Lump Sum compensation for Permanent Incapacity or Death

	Permanent Incapacity[2] Compensation		Death Compensation	
	Before 1 Jan 2020	From 1 Jan 2020	Before 1 Jan 2020	From 1 Jan 2020
Minimum	S$88,000 x (% PI)	S$97,000 x (% PI)	S$69,000	S$76,000
Maximum[3]	S$262,000 x (% PI)	S$289,000 x (% PI)	S$204,000	S$225,000

2: Percentage Permanent Incapacity (% PI) is based on doctor's assessment after the employee's medical condition stabilises. Doctor makes the assessment based on a set of guidelines in the "Guide to the Assessment of Traumatic Injuries and Occupational Diseases for Work Injury Compensation".

3: An additional 25% of the compensation amount is awarded if an injured employee suffered total permanent incapacity (i.e. 100% PI).

The maximum compensation limits will increase from 1 November 2025 as follows:

a. Death will increase to S$269,000
b. Permanent incapacity will increase to S$346,000
c. Medical expenses will increase to S$53,000

From 1 September 2020, employees on light duties due to work injuries will be compensated for their lost earnings based on their Average Monthly Earnings (AME). Employers must also report all work-related medical leave or light duties to MOM.

More details on WICA can be found on MOM website.

Source: MOM as at Apr 2024

MAN-YEAR ENTITLEMENT (MYE)

The MYE Allocation System is a Work Permit allocation system implemented by MOM to provide entitlements to main contractors (through a prior approval application) to employ foreign workers from the People's Republic of China (PRC) and Non-Traditional Source (NTS) countries including India, Sri Lanka, Thailand, Bangladesh, Myanmar and Philippines.

MYE reflects the total quota of foreign construction workers allocated to a main contractor for a specific construction project.

Companies with project contracts that were awarded or had the tender called on or before 18 February 2022 may use the awarded MYE quotas to hire NTS or PRC workers until 31 December 2024 or the project completion date, whichever is earlier.

From 1 January 2024, main contractors no longer need to apply for MYE or prior approvals (PA) to hire NRS or PRC workers based on the value of their projects or contracts awarded. Companies can hire NTS or PRC workers as long as it is within their Dependency Ratio Ceiling (DRC).

More details on MYE can be found on MOM website.

Source: MOM as at Mar 2024

The construction sector has been impacted by the COVID-19 pandemic and the significant and repeated disruptions to manpower inflow for the sector over the two years of the pandemic reaffirmed the need for the sector to press on with productivity improvements to become more manpower-lean.

From 1 January 2024, the maximum ratio of foreign workers to the total workers to the total workforce that a company in the construction sector can employ is 5:6 or 1 local employee to 5 Work Permit Holders (WPHs) or S Pass Holders.

A Singaporean or Permanent Resident employee employed under a contract of service, including the company's director, is counted as:

a. 1 local employee if they earn the Local Qualifying Salary (LQS) of at least S$1,600 per month.
b. 0.5 local employee if they earn half the LQS of at least S$800 to below S$1,600 per month.

More details on DRC can be found on MOM website.

Source: MOM as at Jun 2024

Employers are required to pay a monthly FWL when they employ a foreign worker in Singapore. FWL is a pricing mechanism to regulate the number of foreign workers. The levy liability starts from the day the Temporary Work Permit or Work Permit is issued, whichever is earlier. It ceases upon expiry or cancellation of the Work Permit.

Source Countries

Employers can employ foreign workers from Malaysia, the People's Republic of China (PRC), Non-traditional source (NTS) countries including India, Sri Lanka, Thailand, Bangladesh, Myanmar and Philippines, and North Asian source (NAS) countries including Hong Kong (HKSAR passport), Macau, South Korea and Taiwan.

Maximum period of employment

Nationality	Type of worker	Maximum period of employment
NTS, PRC	Basic-Skilled[1] (R2)	14 years
NTS, PRC	Higher-Skilled[2] (R1)	26 years
NAS, Malaysia	All sectors	No maximum period of employment

[1] Basic-Skilled workers are workers holding the Skills Evaluation Certificate (SEC) or Skills Evaluation Certificate (Knowledge) (SEC(K)).

[2] Higher-Skilled workers are workers who have been upgraded through various means including CoreTrade, Multi-Skilling Scheme, Direct R1 Pathway or the Market-Based Skills Recognition Framework (MBF).

Levy Rate

From 1 January 2024, the number of Work Permit Holders (WPHs) is limited by the Dependency Ratio Ceiling (or quota) and subject to a levy. Under the construction sector quota, employers can employ 5 WPHs for every local employee who earns the Local Qualifying Salary.

Skills Level	NTS	Malaysia, NAS, PRC	Off-site Construction
Higher-skilled (R1)	S$500	S$300	S$250
Basic-skilled (R2)	S$900	S$700	S$370

Minimum Percentage of Higher-Skilled (R1) Workers

From 1 January 2019, firms that do not meet the 10% R1 minimum will not be able to hire or renew R2 construction workers and will also have the Work Permits of any excess R2 construction workers revoked.

More details on FWL can be found on MOM website.

Source: MOM as at Jun 2024

The Ministry of National Development (MND) announced on 6 March 2019 that existing funding schemes in the areas of DfMA, IDD and Green Buildings will be consolidated under the BTF. The various schemes under the BTF amount to about S$770 million.

BTF facilities transformation plans for built environment firms under the BE ITM areas, as well as enables individuals to tackle the key transformation areas through upskilling and training.

The schemes consolidated under the BTF are tabulated below.

Workforce Development	
iBuildSG Scholarship and Sponsorship	The iBuildSG Scholarship and Sponsorship (in collaboration with industry firms) supports students of high calibre and in-service personnel pursuing full-time and part-time BE-related courses at local universities, polytechnics, ITE or BCA Academy.
Transformation	
Built Environment Transformation Gross Floor Area Incentive Scheme	Additional GFA for developers / building owners adopting enhanced Construction Industry Transformation Map (ITM) standards in areas of digitalisation, productivity and sustainability ("ITM Outcome Requirements") in private sector developments.
Growth and Transformation Scheme (GTS)	The GTS is designed to support a collective effort, by multiple partnering companies, to strengthen technical capabilities as well as corporate, digital and innovation practices, to achieve mutually beneficial outcomes over a sustained period.
DfMA and IDD	
Productivity Innovation Project (PIP)	PIP supports Singapore-registered firms to build up their capability in DfMA technologies and IDD and improve site processes in order to achieve higher site productivity.
Off-site Levy Scheme (OLS) (previously Offsite Construction Special Scheme (OCSS))	The OLS is a voluntary manpower incentive that encourages the adoption of more productive technologies such as DfMA and more off-site work. This scheme allows eligible DfMA production facilities to employ work WPH at lower levy rates.
Public Sector Construction Productivity Fund (PSCPF)	PSCPF supports government agencies to use DfMA technologies for their construction projects.
Investment Allowance Scheme (IAS)	IAS supports the mechanisation efforts of Singapore-registered firms through providing tax incentives for capital investments on productive construction equipment.
Productivity Solutions Grant (PSG)	PSG supports local SMEs in transforming digitally by subsidising the cost of adopting pre-approved digital solutions which enhances productivity under the Construction and Facilities Management Industry Digital Plan (IDP).

BUILDSG TRANSFORMATION FUND (BTF)

(Continued from page 92)

Green Buildings/ Facilities Management	
Building Retrofit Energy Efficiency Financing (BREEF) Scheme	The BREEF scheme supports building owners in obtaining financing from participating financial institutions to offset upfront costs for energy efficient retrofits of existing buildings and repay the loans through energy savings reaped. The BREEF scheme ceased on 31 March 2023.
GMIS for Existing Buildings 2.0 (GMIS-EB 2.0)	Cash incentive to lower upfront costs of energy efficiency retrofits for building owners who achieve higher energy performance standards (i.e. Platinum, Super Low Energy, and Zero Energy) for their buildings.
Grant for Low-GWP Refrigerant Chillers (LoGR)	To encourage owners and operators of existing buildings to adopt water-cooled chillers using refrigerants with low GWP early, before the ban on sales of water-cooled chillers using high-GWP hydrofluorocarbons (HFC) refrigerants takes effect in 2022. The grant will support part of the cost incurred for building owners and operators to switch to climate-friendly low-GWP refrigerant water-cooled chillers.
Integrated Facilities Management and Aggregated Facilities Management (IFM/AFM) Grant	Support service buyers and FM firms to build capabilities in adopting IFM/AFM, including the adoption of progressive procurement, processes and technologies.
Research & Innovation	
Cities of Tomorrow (CoT) R&D Programme	The CoT R&D programme is a multi-agency effort, led by the MND, to identify challenges that cities face and develop R&D solutions to address the challenges. The key research thrusts that are supported include Advanced Construction, Resilient Infrastructure and Greater Sustainability.
Green Buildings Innovation Cluster (GBIC)	GBIC is a one-stop integrated Research & Innovation hub that seeks to accelerate the adoption of promising building energy efficient technologies and solutions through programmes such as the GBIC Building Energy Efficient Demonstrations Scheme and the Super Low Energy Building Smart Hub.
Built Environment Accelerate to Market Programme (BEAMP)	BEAMP supports the fast-tracked development and commercialisation of innovative solutions supported by Gov-PACT initiative, which connects innovators with firms in the BE sector seeking to solve identified challenges through the use of their solutions.
Built Environment Technology Alliance (BETA) Programme Catalyst Funding	BETA supports industry-led R&I efforts to develop new, competitive capabilities for BE alliances with strong commercialisation potential that are aligned with firms' strategic business priorities.

Source: BCA as at Mar 2024

The Construction ITM, launched in 2017, envisioned an advanced and integrated sector with widespread adoption of leading technologies, led by progressive and collaborative firms and supported by a skilled and competent workforce.

Recognising key global trends which impact the sector such as digital revolution, rapid urbanisation and climate change, the ITM identified the following key transformation areas to address the challenges faced by the sector:
1. Integrated Digital Delivery (IDD)
2. Design for Manufacturing and Assembly (DfMA)
3. Green buildings

By 2025, the ITM targets to have 80,000 personnel trained in DfMA, IDD and green building capabilities.

Building on the foundation of the Construction and Real Estate ITMs, the BE ITM crystallises the collective vision and strategies to transform the built environment sector. Announced in September 2022, the refreshed BE ITM will help stakeholders within the sector collaborate more effectively across the value chain. The key transformation areas are:
1. Integrated Planning and Design (IPD)
2. Advanced Manufacturing and Assembly (AMA)
3. Sustainable Urban Systems (SUS)

Integrated Planning and Design (IPD)

The IPD will build on existing efforts for IDD, which refers to the use of digital technologies to integrate work processes and connect stakeholders working on the same project throughout the construction and building life-cycle. Design consideration for the building's entire life cycle, including Facilities Management are factored in at the design stage, enabled by digitalisation, Common Data Environment (CDE) standards and progressive procurement.

Refer to Page 76: Integrated Digital Delivery (IDD) for more information.

Advanced Manufacturing and Assembly (AMA)

Through AMA to enhance the efficiency of the supply chain and construction process by mainstreaming DfMA, it has helped firms reduce their reliance on foreign manpower and raise productivity. DfMA comprises a continuum of various technologies and methodologies that promote offsite fabrication, from prefabricated components to fully integrated assemblies across the structural, architectural and MEP disciplines.

The list below outlines some examples of DfMA elements:

a. Advanced Precast Concrete System (APCS) - APCS is a construction method that adopt precast slabs and applies four features (each with at least 65% coverage) under the '3S' principles of Standardisation, Simplicity and Single integrated elements.

b. Mass Engineered Timber (MET) - MET is a building material comprising engineered wood products with improved structural integrity. Cross Laminated Timber (CLT) is one form of MET which is fabricated by binding layers of timber at 90 degrees with structural adhesives to produce a solid timber panel.

c. Prefabricated Prefinished Volumetric Construction (PPVC) - PPVC is a construction method whereby free-standing volumetric modules (complete with finishes for walls, floors and ceilings) are (a) constructed and assembled or (b) manufactured and assembled, in an accredited fabrication facility, in accordance with any accredited fabrication method.

d. Prefabricated MEP - Prefabricated MEP systems are MEP components and equipment that are integrated into a sub-assembly off-site and then installed on site.

e. Structural Steel Construction - Steel has high strength-to-weight ratio and can be prefabricated with highly accurate automation machineries or facilities, minimising the need for rework due to errors.

BCA is also developing Integrated Construction Parks (ICPs) across Singapore to strengthen the construction supply ecosystem.

Also refer to Page 43: Building Control (Buildability and Productivity) Regulations 2011 for more information on the integration of DfMA into the buildability framework.

Sustainable Urban Systems (SUS)

SUS will facilitate the ramping up of decarbonisation efforts in the industry to achieve a low-carbon BE sector. Refer to Page 53: Environmental Sustainability for more information.

Source: BCA as at Aug 2023

The Singapore Government releases land regularly through land sales programme for private sector development. Each programme is planned for and announced every 6 months. The GLS sites are released through two main systems - the Reserve List and the Confirmed List.

Under the Reserve List, the Government will release a site for sale if:

- An interested party submits an application for the site to be put up for tender with an offer of a minimum purchase price that is acceptable to the Government; or
- There is sufficient market interest in the form of more than one unrelated party applications that are close to the Government's Reserve Price for the site within a reasonable period.

Available land sites under the Second Half 2024 GLS Programme

A. Confirmed List

S/N	Location	Site Area (ha)	Gross Plot Ratio	Sales Agent	Estimated Launch Date
	Residential Sites				
1	Tampines Street 95 (EC)	2.25	2.5	HDB	Aug-2024
2	Faber Walk	2.58	1.4	URA	Sep-2024
3	Lentor Gardens	2.06	2.1	URA	Oct-2024
4	River Valley Green (Parcel B)	1.17	3.5	URA	Oct-2024
5	Bayshore Road	1.05	4.2	URA	Nov-2024
6	Media Circle (Parcel A)	0.81	3.7	URA	Nov-2024
7	Media Circle (Parcel B)	0.97	4.3	URA	Nov-2024
8	Chuan Grove	1.58	3.0	URA	Dec-2024
9	Holland Link	1.72	1.4	URA	Dec-2024
	Commercial & Residential Sites				
10	Chencharu Close	2.94	3.2	HDB	Sep-2024

B. Reserved list

S/N	Location	Site Area (ha)	Gross Plot Ratio	Sales Agent	Estimated Launch Date
	Residential Sites				
1	Senja Close (EC)	1.01	3.0	HDB	Available
2	Marina Gardens Lane	0.61	5.6	URA	Oct-2024
3	Woodlands Drive 17 (EC)	2.58	1.7	HDB	Oct-2024
4	Holland Plain	1.58	1.8	URA	Dec-2024
5	River Valley Green (Parcel C)	1.15	3.5	URA	Dec-2024
	Commercial Sites				
6	Punggol Walk	1.00	1.4	URA	Available
	White Sites				
7	Marina Gardens Crescent	1.73	4.2	URA	Available
8	Woodlands Avenue 2	2.75	4.2	URA	Available
	Hotel Sites				
9	River Valley Road	1.02	2.8	URA	Available

More details on the available land sites under the GLS Programme are found on URA website.

Qualifying Certificate (QC)

Under the Residential Property Act (RPA), any housing developer that is not considered a Singapore company has to apply for a QC when it purchases residential land for development, other than from the Government.

With effect from 6 February 2020, the Ministry of Law will allow publicly listed housing developers with a substantial connection to Singapore to be treated as a Singapore company within the meaning of the RPA when they acquire residential land for development.

Refinements were announced on 29 June 2021, with immediate effect, on how the shareholding interest criterion is assessed.

More details on GLS and QC can be found on URA and SLA websites.

Sources: URA, SLA as at Jul 2024

COVID-19 (Temporary Measures) Act 2020 (COTMA)

CORENET X, which will replace CORENET 2.0, will require the industry to collaborate and coordinate their designs upfront before submission. It seeks to improve the current practice of Qualified Persons (QPs) dealing separately with multiple Agencies and having to reconcile the requirements thereafter.

Key Changes to Regulatory Approval Process under CORENET X

CORENET X will bring about two critical changes to the submission process:

a. New Regulatory Approval process for all Building Works (RABW)

All building works, except smaller scale projects, will need to go through a new process involving three key sequential submission gateways to all Agencies for one collective and coordinated approval at each gateway. All new submissions will also have to comply with the CORENET X Code of Practice (COP). An overview of the gateway objectives is outline below:

Submission Stage	Objectives
Design Gateway (for design parameters)	To resolve multi-agency key parameters which have impact on design parameters and client's brief, before proceeding to detailed design.
Piling Gateway (optional)	To resolve requirements pertaining to piling and foundation works (e.g. pile caps, raft foundation, earth retaining and stabilising structures), excluding super structural works.
Construction Gateway (for building details)	To resolve multi-agency requirements concerning design details that need to be coordinated before commencement of main structural works and launch of sales.
Independent Submissions (if applicable)	To clear agency-specific requirements with no cross-agency dependencies e.g. structural submission of ancillary structures such as barriers/claddings to BCA.
Completion Gateway (application for TOP/CSC)	To document "As-Builts" plans and obtain Occupancy Permit / Statutory Completion.

All new projects are required to be submitted through CORENET X. A coordinated BIM model by the project team would be produced and jointly submitted by the appointed QPs to all Agencies for collective review for each gateway. The gateway is cleared only after all Agencies' approvals are obtained, without which a submission cannot be made for the next gateway.

b. BIM Submissions in openBIM Format

Submissions that are made in BIM will need to use the openBIM standard, Industry Foundation Classes (IFC). Agencies will issue written directions and approvals based on the submitted BIM model in openBIM standard. The BIM submissions for new projects that are submitted via CORENET X will be required to be submitted in the IFC-SG format and prepared in accordance with the CORENET X COP. IFC-SG is an extension of the openBIM standard developed to cater to local regulatory requirements.

Implementation Plan

Key Dates	Onboarding Plan
18 Dec 2023 – 31 May 2024	Soft Launch Project teams were invited to submit their projects via CORENET X.
1 Jun 2024 – 31 Mar 2025	Voluntary Submission Project teams are highly encouraged to voluntarily submit their projects via CORENET X to familiarise themselves with the submission portal and process. Industry professionals are also encouraged to engage the agencies on the respective regulatory requirements based on the new submission process ahead of their formal submissions.
1 Apr 2025	Mandatory Submission for New Projects Submission via CORENET X will be made mandatory for new projects and the requirements under RABW and BIM submissions will apply.
First Half 2026	Mandatory Onboarding for all Ongoing Projects Projects that are seeking equivalent clearance(s) for Design Gateway under RABW will be onboarded onto CORENET X.

More details on CORENET X can be found on BCA website.

Source: BCA as at Apr 2024

CONSULTANCY PAYMENT SCHEDULE UNDER CORENET X

The new Annex C (Payment Schedule – CORENET X) is added to the Standard Consultancy Agreement for public sector construction projects using CORENET X.

The introduction of CORENET X will bring about fundamental changes to the regulatory approval process for building works. The new Payment Schedule (CORENET X) aims to map the payment milestones to the new process and review the distribution of payments across the revised milestones. Only milestones at the 'Design Stage' will be adjusted as they are affected by the new regulatory gateways.

As the scope of construction projects to be submitted under CORENET X varies, project parties can take the new Payment Schedule (CORENET X) as reference and make necessary adjustments. For projects which do not require CORENET X submissions, Government Procuring Entities can still take reference from the current Payment Schedule.

The new Payment Schedule (CORENET X) for use in CORENET X projects can be found on BCA's website under Procurement > Post-tender Stage > Standard Consultancy Agreement.

More details on the schedules can be found on BCA website.

Source: BCA as at Jan 2024

ACCREDITATION FRAMEWORK FOR BUILT ENVIRONMENT PROFESSIONALS

The Skills Framework for the Built Environment (BE Skills Framework) aims to drive the upskilling and recognition of BE professionals through the following stakeholders: students, employers and service procurers.

To support the BE Skills Framework, the accreditation schemes for BE professionals will adopt a standardised approach to validate and recognise the skillsets and competencies. The accreditation schemes are governed by a robust system to ensure they meet the service procurers' needs, and the standards are aligned across the different professional disciplines.

With the accreditation schemes progressively launched, public sector construction and FM procurement will also move towards competency-based procurement in phases.

Phase 1 - Government agencies could recognise accreditation as an alternative to academic qualification and years of experience in the following areas:

1. Tender specification requirements which specify the minimum required experience of key project team members.
2. Tender evaluation criteria which evaluate the strength and competencies of the project team proposed by the tenderer.

Phase 2 - Depending on the BE sector's readiness, BCA will review with Government agencies to fully implement the recognition of accredited personnel as a default requirement in tender specification, tender evaluation and firm registration requirements under the Public Sector Panels of Consultants and Contractors Registration System.

The following Accrediting Bodies are leading the accreditation schemes as shown below:

Career Pathway	Accrediting Bodies	Accreditation Scheme
Construction Management	Singapore Contractors Association Ltd (SCAL)	Construction Professional Accreditation Scheme (CPAS)
Digital Delivery Management	buildingSMART Singapore (bSS)	Digital Delivery Management Accreditation
Facilities Management	Singapore International Facility Management Association	Certified Facilities Management Expert (CFME)
Project Management	Society of Project Managers (SPM)	Accreditation of Project Managers (APM)
Quantity Surveying	Singapore Institute of Surveyors and Valuers (SISV)	Accredited Professional Quantity Surveyor (APQS)

More details on the framework can be found on BCA website.

Source: BCA as at Mar 2022

Collaborative contracting seeks to overcome the issues in traditional contracting. It encourages a mindset shift towards working collaboratively and helps parties to proactively identify potential issues, resolve them early and better manage disruption and cost fluctuation, especially if the market is volatile. The key principles of collaborative contracting are as follows:

a. Acting in a spirit of mutual trust and cooperation.
b. Giving early notifications on potential issues affecting the project and joint problem solving.
c. Adopting proactive project management approaches with clear timeline for (i) contractors to notify any event that will impact cost and timeline and (ii) contract administrator to respond and evaluate claims and submissions.
d. Structured dispute avoidance and resolution mechanism with the involvement of independent third party or Senior Management representatives.
e. Establishing a fair and sustainable allocation of risk and alignment of project participants' interests based on project needs.

Collaborative Contracting in Singapore

As part of the Built Environment Industry Transformation Map, a key work area is to encourage the entire value chain to collaborate and enable better planning and execution of a project as contracting parties work towards shared project goals from the start of the project.

BCA has worked with industry partners to drive the adoption of collaborative contracting in Singapore. Efforts include identifying pilot projects to use the Public Sector Standard Conditions of Contract (PSSCOC) Collaborative Contracting Option Module and the NEC4 contract.

About NEC4 Contract

NEC4 contract originated from the United Kingdom. It provides the option for a target cost approach rather than stipulating lump sum payments. With the pain share and gain share mechanism, project parties are further incentivised to innovate for better project performance and to jointly resolve issues expediently.

The NEC4 contract offers the following benefits to the client and main contractor:

a. Time and cost control – the contract includes provisions for effective time and cost management, helping clients to better control project schedules and budgets.
b. Better risk management – the early warning process stipulated in the contract allows issues to be identified early so that project parties can avoid or mitigate the risks.
c. Efficient project management – the contract emphasises efficient project management through effective communication, clear response timelines and encourages project parties to settle claims quickly. This can lead to streamlined processes and reduced delays for all project parties, resulting in earlier project delivery.

NEC4 Y(SG) Clauses

A set of additional contract clauses (NEC4 Y(SG) clauses) has been developed to align the NEC4 contract with Singapore's laws[1]. The Y clauses is publicly available on NEC website starting 1 May 2024.

Private and public sector developers are encouraged to embark on the collaborative contracting journey early. Various organisations have introduced courses and seminars to raise awareness and competencies in collaborative contracting.

1: The Building and Construction Industry Security of Payment Act 2004, the Contracts (Rights of Third Parties) Act 2001, the Insolvency, Restructuring and Dissolution Act 2018, the Prevention of Corruption Act 1960 and the Penal Code 1871.

More details on collaborative contracting can be found on BCA website.

Sources: BCA as at Jun 2024

New Science Centre, Singapore

RLB PROFESSIONAL SERVICES

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For more details, visit the RLB website at RLB.com, call us at +65 6339 1500 or email us at **rlb@sg.rlb.com**.

Woodlands Health Campus, Singapore

OFFICES AROUND THE WORLD

OFFICES AROUND THE WORLD

ASIA

SOUTHEAST ASIA

SINGAPORE
911 Bukit Timah Road, Level 3
Singapore 589622
T: +65 6339 1500
F: +65 6339 1521
E: rlb@sg.rlb.com
Contact: Silas Loh / Colin Kin

CAMBODIA

PHNOM PENH
The Fortune Tower (C7), Unit #2211
Oknha Tephorn St (182) and St 161
Phum 7, Sangkat Veal vong
Khan 7 Makara, 120307 Phnom
Penh Cambodia
T: + 65 6339 1500
F: +65 6339 1521
E: rlb@sg.rlb.com
Contact: Teoh Wooi Sin

INDONESIA

JAKARTA
Jl. Jend. Surdirman Kav. 45-46
Sampoerna Strategic Square
South Tower, Level 19
Jakarta 12930 Indonesia
T: + 62 21 5795 2308
E: rlb@id.rlb.com
Contact: Fadli Aulia

MALAYSIA

KUALA LUMPUR
B2-6-3 Solaris Dutamas
No. 1 Jalan Dutamas 1
50480 Kuala Lumpur Malaysia
T: +60 3 6207 9991
F: +60 3 6207 9992
E: rlb@my.rlb.com
Contact: Dato Lai Kar Fook

MYANMAR

YANGON
c/o 911 Bukit Timah Road, Level 3
Singapore 589622
T: +65 6339 1500
F: +65 6339 1521
E: rlb@sg.rlb.com
Contact: Silas Loh / Colin Kin

VIETNAM

HO CHI MINH CITY
Centec Tower, 19th Floor,
Unit 1604B 72-74 Nguyen Thi
Minh Khai Street, Vo Thi Sau
Ward, District 3, Ho Chi Minh City,
Vietnam
T: +84 83 823 8070
F: +84 83 823 7803
E: rlb@vn.rlb.com
Contact: Serene Wong

PHILIPPINES

METRO MANILA (MAIN OFFICE)
Corazon Clemena Compound
Bldg. 3 No. 54 Danny Floro Street
Bagong Ilog, Pasig City 1600
Philippines
T: +63 2 8234 0141 |
+63 917 548 1313
E: coraballard@ph.rlb.com |
rlb@ph.rlb.com
Contact: Corazon Ballard

BACOLOD CITY
3rd Floor, St. Therese Building
along corner Rizal - Locsin
Street Negros Occidental, 6100
Philippines
T: +63 34 432 1344
E: armando.baria@ph.rlb.com
Contact: Armando Baria

CAGAYAN DE ORO
B1 L20 Camama-an Road, Tunhai
Subdivision, Sitio Talisay, Bgy.
Indahag, Cagayan De Oro City
T: +632 8365 1060 |
+632 8365 7252
E: noel.clemena@ph.rlb.com
Contact: Noel Clemena

CEBU
9th Floor Unit 2-901, OITC2
Oakridge Business Park, 880 A.S.
Fortuna Street, Bgy. Banilad,
Mandaue City, Cebu 6014
T: +63 38 502 8660
E: joy.marasigan@ph.rlb.com
Contact: Jolly Joy Cantero

CLARK
Unit 211, Baronesa Place, Mc.
Arthur
Hi-way, City of Mabalacat,
Pampanga
T: +632 8365 1060 |
+632 8365 7252
E: rlb@ph.rlb.com
Contact: Jenifer Rondina

DAVAO
Units 404 – 405, 4th Floor,
Cocolife Building, Claro M. Recto,
Corner Palma Gil Streets, Davao
City
T: +632 8365 1060 |
+632 8365 7252
E: noel.clemena@ph.rlb.com
Contact: Noel Clemena

ILOILO
Unit 2F-17, The Galleria, Jlandoni
Street, Jaro, Iloilo City
T:+63 32 2680072
E: joy.marasigan@ph.rlb.com
Contact: Jolly Joy Cantero

PANGLAO, BOHOL
Sitio Cascajo,
Looc, Panglao Bohol,
6340 Philippines
T: +632 8365 1060 |
+632 8365 7252
E: coraballard@ph.rlb.com
Contact: Corazon Ballard

STA. ROSA CITY, LAGUNA
Unit 303, Brain Train Center, Lot 11
Blk 3, Sta. Rosa Business Park,
Greenfield, Bgy. Don Jose, Sta.
Rosa, Laguna, 4026 Philippines
T: +632 8365 1060 |
+632 8365 7252
E: gloria.casas@ph.rlb.com
Contact: Gloria Casas

NORTH ASIA

CHINA

BEIJING
Room 1803-1809, 18th Floor
East Ocean Centre
24A Jian Guo Men Wai Avenue
Chaoyang District
Beijing 100004, China
T: +86 10 6515 5818
E: sm.tuen@cn.rlb.com
Contact: Simon Tuen

CHENGDU
Room 2901-2904,
29/F, Square One,
18 Dongyu Street Jinjiang District
Chengdu 610016, China
T: +86 28 8670 3382
E: eric.lau@cn.rlb.com
Contact: Eric Lau

CHONGQING
Room 1-3 & 17-18,
39/F, IFS Tower T1,
No. 1 Qingyun Road,
Jiangbei District,
Chongqing 400024, China
T: +86 28 8670 3382
E: eric.lau@cn.rlb.com
Contact: Eric Lau

GUANGZHOU
Room 1302-1308, Central Tower,
No. 5, Xiancun Road,
Guangzhou 510623,
Guangdong Province, China
T: +852 2823 3910
E: danny.chow@hk.rlb.com
Contact: Danny Chow

GUIYANG
Room E, 12th Floor,
Fuzhong International Plaza,
126 Xin Hua Road,
Guiyang 550002,
Guizhou Province, China
T: +852 2823 3910
E: danny.chow@hk.rlb.com
Contact: Danny Chow

HAIKOU
Room 1705, 17th Floor
Fortune Centre
38 Da Tong Road
Haikou 570102
Hainan Province, China
T: +852 2823 1898
E: tim.ngai@hk.rlb.com
Contact: Tim Ngai

HANGZHOU
Room 1603, 16th Floor,
North Tower, Modern City Center,
No. 161 Shao Xing Road,
Xia Cheng District,
Hangzhou 310004,
Zhejiang Province, China
T: +86 21 6330 1999
E: iris.lee@cn.rlb.com
Contact: Iris Lee

HONG KONG
15th Floor,
Goldin Financial Global Centre,
17 Kai Cheung Road,
Kowloon Bay, Kowloon,
Hong Kong
T: +852 2823 1866
E: eric.fong@hk.rlb.com
Contact: Eric Fong

MACAU
Alameda Dr. Carlos D' Assumpcao
No.398 Edificio CNAC 9 Andar I-J,
Macau
T: +853 8796 9588
E: daniel.chiu@hk.rlb.com
Contact: Daniel Chiu

NANJING
Room 1201, South Tower,
Jinmao Plaza,
201 Zhong Yang Road,
Nanjing 210009,
Jiang Su Province, China
T: +852 2823 1866
E: eric.fong@cn.rlb.com
Contact: Eric Fong

NANNING
Room 2203, Block B
Resources Building No. 136
Minzu Road
Nanning 530000 Guangxi
China
T: +852 2823 3910
E: danny.chow@hk.rlb.com
Contact: Danny Chow

SHANGHAI
22nd Floor, Greentech Tower,
No.436, Hengfeng Road,
Jingan District,
Shanghai 200070, China
T: +86 21 6330 1999
E: iris.lee@cn.rlb.com
Contact: Iris Lee

OFFICES AROUND THE WORLD

SHENYANG
25th Floor, Tower A,
President Building,
No. 69 Heping North Avenue,
Heping District, Shenyang 110003
Liaoning Province, China
T: +86 10 6515 5818
E: sm.tuen@cn.rlb.com
Contact: Simon Tuen

SHENZHEN
Room 4510-4513, 45th Floor,
Shun Hing Square Diwang,
Commercial Centre,
5002 Shennan Road East,
Shenzhen 518001,
Guangdong Province,
China
T: +852 2823 3910
E: danny.chow@hk.rlb.com
Contact: Danny Chow

WUHAN
Room 3302, 33rd Floor
Heartland 66 Office Tower
No. 688 Jinghan Ave
Qiaokou District
Wuhan 430030
Hubei Province, China
T: +86 10 6515 5818
E: sm.tuen@cn.rlb.com
Contact: Simon Tuen

WUXI
Room 1410-1412, 14th Floor,
Juna Plaza, 6 Yonghe Road,
Nanchang District,
Wuxi 214000,
Jiangsu Province, China
T: +852 2823 1866
E: eric.fong@hk.rlb.com
Contact: Eric Fong

XIAN
Room 1506, 15th Floor
Chang'an Metropolis Center
No.88 Nanguan Zheng Street
Beilin District, Xian 710068,
Shaanxi Province, China
T +86 28 8670 3382
E: eric.lau@cn.rlb.com
Contact: Eric Lau

ZHUHAI
Room 803-804, 8th Floor,
Taifook International Finance
Building, No. 1199 Jiu Zhuo Road
East, Jida, Zhuhai 519015,
Guangdong Province, China
T: +852 2823 3910
E: danny.chow@hk.rlb.com
Contact: Danny Chow

SOUTH KOREA

SEOUL
Yeoksam-Dong, Daon Building,
8th Floor, 8, Teheran-ro 27-gil,
Gangnam-Gu, Seoul,
06141 Korea
T: +852 2823 1758
E: ling.lam@hk.rlb.com
Contact: Ling Lam

SOUTH ASIA

INDIA

BANGALORE
491, Viswakarma, East End Main
9th Block Jayanagar, 560069
T: +44 796 648 7811
E: mark.weaver@uk.rlb.com
Contact: Mark Weaver

OCEANIA

AUSTRALIA

ADELAIDE
Level 1, 8 Leigh Street
Adelaide, SA 4999
T: +61 8 8100 1200
E: john.drillis@au.rlb.com
Contact: John Drillis

BRISBANE
Level 13, 10 Eagle Street
Brisbane QLD 4000
T: +61 7 3009 6933
E: matt.long@au.rlb.com
Contact: Matt Long

CAIRNS
Suite 7, 1st Floor,
Cairns Professional Centre
92-96, PO Box 5224
Cairns QLD 4870
T: +61 7 4032 1533
E: brad.bell@au.rlb.com
Contact: Brad Bell

CANBERRA
16 Bentham Street
PO Box 7035,
Yarralumla, ACT 2600
T: +61 2 6281 5446
E: fiona.doherty@au.rlb.com
Contact: Fiona Doherty

COFFS HARBOUR
Level 1, 9 Park Avenue,
Coffs Harbour, NSW 2450
T: +61 2 4940 0000
E: mark.hocking@au.rlb.com
Contact: Mark Hocking

DARWIN
Level 1, 66 Smith Street,
Darwin, NT 0800
T: +61 8 8941 2262
E: peter.hyde@au.rlb.com
Contact: Peter Hyde

GOLD COAST
45 Nerang Street,
Southport, QLD 4215
T: +61 7 5595 6900
E: jim.krebs@au.rlb.com
Contact: Jim Krebs

MELBOURNE
Level 13, 380 St. Kilda Road
Melbourne VIC 3004
T: +61 3 9690 6111
E: tony.moleta@au.rlb.com
Contact: Tony Moleta

NEWCASTLE
Suite 4 Level 1,
101 Hannell Street,
Wickham, NSW 2293
T: +61 2 4940 0000
E: mark.hocking@au.rlb.com
Contact: Mark Hocking

PERTH
Level 9, 160 St Georges Terrace
Perth WA 6000
T: +61 8 9421 1230
E: mark.bendotti@au.rlb.com
Contact: Mark Bendotti

SUNSHINE COAST
Suite 307, La Balsa,
45 Brisbane Road,
Mooloolaba, QLD 4557
T: +61 7 5443 3622
E: nicholas.duncan@au.rlb.com
Contact: Nick Duncan

SYDNEY
Level 19, 141 Walker Street,
North Sydney, NSW 2060
T: +61 2 9922 2277
E: stephen.mee@au.rlb.com
Contact: Stephen Mee

TOWNSVILLE
PO Box 20, Belgian Gardens,
QLD 4810
T: +61 7 4771 5718
E: chris.marais@au.rlb.com
Contact: Chris Marais

NEW ZEALAND

AUCKLAND
Level 16, Vero Centre.
48 Shortland Street,
Auckland 1141
T: +64 9 309 1074
E: stephen.gracey@nz.rlb.com
Contact: Stephen Gracey

CHRISTCHURCH
Level 1, 254 Montreal Street,
Christchurch 8013
T: +64 3 354 6873
E: neil.odonnell@nz.rlb.com
Contact: Neil O'Donnell

DUNEDIN
First Floor, 402 George St,
Dunedin 9016
T: +64 3 409 0325
E: terry.fahey@nz.rlb.com
Contact: Terry Fahey

HAMILTON
Ground Floor, Parkhaven 220
Tristram Street, Hamilton 3204
T: +64 9 309 1074
E: richard.anderson@nz.rlb.com
Contact: Richard Anderson

PALMERSTON NORTH
Suite 1, Level 1, 219 Broadway
Avenue, PO Box 1117,
Palmerston North, 4440
T: +64 6 357 0326
E: michael.craine@nz.rlb.com
Contact: Michael Craine

QUEENSTOWN
36 Shotover Street,
PO Box 691, Queenstown 9348
T: +64 9 309 1074
E: robert.meyer@nz.rlb.com
Contact: Rob Meyer

TAURANGA
Office 3, 602 Cameron Road,
Tauranga
T: +64 9 309 1074
E: richard.anderson@nz.rlb.com
Contact: Richard Anderson

WELLINGTON
279 Willis Street, PO Box 27-013,
Wellington, 6011
T: +64 4 384 9198
E: tony.sutherland@nz.rlb.com
Contact: Tony Sutherland

OFFICES AROUND THE WORLD

AMERICAS

UNITED STATES OF AMERICA

PHOENIX (CORPORATE OFFICE)
4343 East Camelback Road
Suite 350 Phoenix, Arizona 85018
T: +1 602 443 4848
E: scott.macpherson@us.rlb.com
Contact: Scott Macpherson

BOSTON
24 School Street Suite 802,
Boston, Massachusetts 02108
T: +1 617 737 9339
E: michael.oreilly@us.rlb.com
Contact: Michael O'Reilly

CHICAGO
141 West Jackson Blvd Suite 3810
Chicago, IL 60604
T: +1 312 978 1292
E: warren.todd@us.rlb.com
Contact: Warren Todd

DENVER
999, 18th St, Suite 1125N
Denver, CO 80202
T: +1 720 904 1480
E: peter.knowles@us.rlb.com
Contact: Peter Knowles

HILO
820 Piilani Street, Suite 202
Hilo, Hawaii 96720
T: +1 808 883 3379
E: guia.lasquete@us.rlb.com
Contact: Guia Lasquete

HONOLULU
American Savings Bank Tower
1001 Bishop Street, Suite 2690
Honolulu, Hawaii 96813
T: +1 808 521 2641
E: erin.kirihara@us.rlb.com
Contact: Erin Kirihara

LAS VEGAS
1050 East Flamingo Road Suite
S-110, Las Vegas,
Nevada 89119
T: +1 808 383 7944
E: kevin.mitchell@us.rlb.com
Contact: Kevin Mitchell

LOS ANGELES
The Bloc 700 South Flower Street
Suite 630, Los Angeles,
California 90017
T: +1 602 443 4848
E: scott.macpherson@us.rlb.com
Contact: Scott Macpherson

MAUI
300 Ohukai Road, Building B
Kihei Hawaii 96753
T: +1 808 875 1945
E: paul.belshoff@us.rlb.com
Contact: Paul Belshoff

MIAMI
78 SW 7th Street, 06-113,
Miami, Florida 33130
T: +1 305 924 6531
E: charles.oloughlin@us.rlb.com
Contact: Charles O'Loughlin

NEW YORK
535 Fifth Avenue Suite 601,
New York, New York 10017
T: +1 347 246 4823
E: paraic.morrissey@us.rlb.com
Contact: Paraic Morrissey

PORTLAND
1120 NW Couch Street, Suite 730,
Portland, Oregon 97209
T: +1 503 226 2730
E: daniel.junge@us.rlb.com
Contact: Daniel Junge

SAN FRANCISCO
930 Montgomery Street,
Suite 500 San Francisco,
CA 94133
T: +1 415 362 2613
E: brian.schroth@us.rlb.com
Contact: Brian Schroth

SAN JOSE
2570 N First Street Suite 213
San Jose, California 95131
T: +1 408 404 4904
E: joel.brown@us.rlb.com
Contact: Joel Brown

SEATTLE
2538 Vardon Circle SW Port
Orchard, Seattle,
Washington 98367
T: +1 808 383 7944
E: kevin.mitchell@us.rlb.com
Contact: Kevin Mitchell

TUCSON
33 West Congress Street
Suite 215, Tucson, Arizona 85701
T: +1 520 777 7581
E: josh.marks@us.rlb.com
Contact: Josh Marks

WAIKOLOA
Queens' MarketPlace, 69-201
Waikoloa Beach Drive,
Suite SF12, Waikoloa,
Hawaii 96738
T: +1 808 883 3379
E: guia.lasquete@us.rlb.com
Contact: Guia Lasquete

WASHINGTON D.C.
9881 Broken Land Parkway,
Suite 406 Columbia,
Maryland 21046
T: +1 410 740 1671
E: kirk.miller@us.rlb.com
Contact: Kirk Miller

CANADA

CALGARY
304–609 14th Street NW
Calgary, Alberta, T2N 2A1, Canada
T: +1 905 827 8218
E: peter.vavaroutsos@ca.rlb.com
Contact: Peter Vavaroutsos

TORONTO
435 North Service Road West
Suite 203 Oakville Ontario
L6M 4X8
T: +1 905 827 8218
E: peter.vavaroutsos@ca.rlb.com
Contact: Peter Vavaroutsos

MEXICO

MEXICO CITY
Siera Gorda 42, piso 3
Lomas de Chapultepec
11000 Mexico City, Mexico
T: +1 720 904 1480
E: peter.knowles@us.rlb.com
Contact: Peter Knowles

ST LUCIA

CASTRIES
Mercury Court, Choc Estate
P.O. Box CP 5475 Castries,
St. Lucia
T: +1 758 452 2125
E: david.piper@lc.rlb.com
Contact: David Piper

EUROPE

UNITED KINGDOM

LONDON (HEAD OFFICE)
Level 11 The Shard, 32 London
Bridge Street SE1 9SG, London
T: +44 20 7398 8300
E: nick.eliot@uk.rlb.com
Contact: Nick Eliot

BELFAST
1st Floor, Eagle Star House
5-7 Upper Queen St
Belfast, BT1 6FB
T: +44 289 521 5001
E: carolyn.brady@uk.rlb.com
Contact: Carolyn Brady

BIRMINGHAM
15 Colmore Row
Birmingham, B3 2BH
T: +44 121 503 1500
E: brook.smith@uk.rlb.com
Contact: Brook Smith

BRISTOL
Broad Quay House, Broad Quay,
Bristol, BS1 4DJ
T: +44 117 974 1122
E: jackie.pinder@uk.rlb.com
Contact: Jackie Pinder

CAMBRIDGE
Wellington House, East Road,
Cambridge CB1 1BH
T: +44 207 398 8300
E: simon.barnard@uk.rlb.com
Contact: Simon Barnard

CARDIFF
Level 3 Wharton Place,
13 Wharton Street,
Cardiff, CF10 1GS
T: +44 292 240 5030
E: jackie.pinder@uk.rlb.com
Contact: Jackie Pinder

LEEDS
11A Platform, New Station Street,
Leeds LS1 4JB
T: +44 114 273 3300
E: matt.summerhill@uk.rlb.com
Contact: Matt Summerhill

LIVERPOOL
8 Princes Parade,
Liverpool, L3 1DL
T: +44 161 868 7700
E: stephen.gillingham@uk.rlb.com
Contact: Steve Gillingham

MANCHESTER
1 King St, Manchester,
M2 6AW
T: +44 161 868 7700
E: stephen.gillingham@uk.rlb.com
Contact: Steve Gillingham

NEWCASTLE UPON TYNE
Wizu Workspace Block D Portland
House, New Bridge Street West,
Newcastle upon Tyne, NE1 8AL
T: +44 114 273 3300
E: matt.summerhill@uk.rlb.com
Contact: Matt Summerhill

EDINBURGH
93 George Street,
Edinburgh, EH2 3ES
T: +44 1925 851787
E: jason.brownlee@uk.rlb.com
Contact: Jason Brownlee

SHEFFIELD
Fountain Precinct, 6th Floor,
Orchard Lane Wing, Balm Green
Sheffield, S1 2JA
T: +44 114 273 3300
E: matt.summerhill@uk.rlb.com
Contact: Matt Summerhill

THAMES VALLEY
1000 Eskdale Road, Winnersh
Triangle Wokingham
Berkshire, RG41 5TS
T: +44 118 974 3600
E: michael.righton@uk.rlb.com
Contact: Michael Righton

OFFICES AROUND THE WORLD

WARRINGTON
Ground South Wing, 401 Faraday Street, Birchwood Park, Warrington, Cheshire WA3 6GA
T: +44 1925 851787
E: mark.clive@uk.rlb.com
Contact: Mark Clive

EURO ALLIANCE

BELGIUM
Bopro, Oude Houtlei 140, 9000 Ghent
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

BULGARIA
12A Tsvetan Radoslavov str., Sofia, Bulgaria
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

CROATIA
Bogisiceva Str 9, 10000 Zagreb, Croatia
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

CZECH REPUBLIC
H1K Consulting
Rytirska 410/6
110 00, Prague, Czech Republic
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

DENMARK
emcon, Gammel Lundtoftevej 1C, DK-2800 Kgs. Lyngby, Denmark
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

FRANCE
7 Bis Rue de Monceau, 75008 Paris, France
T: +33 1 53 40 94 80
E: matthieu.lamy@fr.rlb.com
Contact: Matthieu Lamy

GERMANY
Kurfurstendamm 63, 10707, Berlin
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

HUNGARY
Tomlin Kft, H-1037 Budapest, Montevideo utca 16/B, 3rd floor, Hungary
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

IRELAND
KSN, Beech House, Beech Hill Office Campus, Beech Hill Road, Dublin 4, D04 V5N2
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

ITALY
BEAR Project Management
Via Gionvanni Prati 9, 20145, Milan, Italy
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

LUXEMBOURG
Sterling Quest Associates
62, Avenue Guillaume, L1650 Luxembourg
T: +33 1 53 40 94 80
E: matthieu.lamy@fr.rlb.com
Contact: Matthieu Lamy

MONTENEGRO
Bulevar Svetog Petra Cetinjskog 62 81 000, Podgorica
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

NETHERLANDS
Herengracht 562, 1017 CH, Amsterdam, Netherlands
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

NORWAY
AS Bygganalyse, Drammensveien 133, 0277, Oslo, Norway
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

POLAND
APP-Projekt S.A., ul. Kłobucka 23C / 112, 02-699, Warsaw, Poland
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

PORTUGAL
Ficope, Rua Armando Cortez nº1 4º Andar –2770-233 Paco D 'Arcos, Portugal
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

ROMANIA
Intrarea Difuzorului Nr. 3, Sector 1, Bucharest, Romania
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

SERBIA
38 Takovska street, Belgrade, 11000, Serbia
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

SPAIN
WeWork, Paseo de la Castellana 77, 28046 Madrid, Spain
T: +44 74 2541 7898
E: daniel.gomez@eu.rlb.com
Contact: Daniel Gomez

SWEDEN
AFRY, Rosenlundsgatan 52, Stockholm, Sweden
T: +31 6 1176 9557
E: william.carr-miles@eu.rlb.com
Contact: William Carr-Miles

AFRICA

BOTSWANA

GABARONE
5 Matante Mews, 3rd Floor
Plot 54373, Central Business District
Gaborone, Botswana
T: +27 72 622 9852
E: fred.selolwane@bw.rlb.com
Contact: Fred Selolwane

KENYA

NAIROBI
Norfolk Towers, Kijabe Street
Nairobi, Kenya
T:+27 79 524 1009
E: christiaan.rademan@za.rlb.com
Contact: Christiaan Rademan

MALDIVES

HULHUMALE
Palm House Building
Nirolhu Magu 18 Goalhi
Hulhumale, Maldives
T:+960 954 4004
E: george.trippier@mv.rlb.com
Contact: George Trippier

MAURITIUS

QUATRE BORNES
90 St Jean Road, Quatre Bornes, 72218 Mauritius
T:+230 5251 5507
E: navin.hooloomann@mu.rlb.com
Contact: Navin Hooloomann

MOZAMBIQUE

MAPUTO
Avenida Francisco Orlando Magumbwe n° 32, Maputo, Mozambique
T: +27 83 226 0303
E: nicolas.sheard@za.rlb.com
Contact: Nicolas Sheard

SEYCHELLES

VICTORIA
3rd Floor, Espace Building
ile du Port, Mahe, Seychelles
T: +248 434 4890
E: vanessa.laurence@sc.rlb.com
Contact: Vanessa Laurence

SOUTH AFRICA

CAPE TOWN
9th Floor, 22 Bree Street, Cape Town
T: +27 83 267 6771
E: martin.meinesz@za.rlb.com
Contact: Martin Meinesz

DURBAN
Suite 201, Ridgeside Office Park, 77 Richefond Circle, Umhlanga Ridge, Durban, S. Africa
T: +27 72 630 5317
E: evan.sim@za.rlb.com
Contact: Evan Sim

JOHANNESBURG (ECM)
Suite 113, 1st Floor, Building 4
19 on 9th Street, Houghton Estate, Johannesburg 2091
T: +27 10 072 0400
E: jandre.visser@za.rlb.com
Contact: Jandre Visser

PRETORIA
1st Floor, Banking Court, Menlyn Maine Central Square, Corner of Aramist and Corobay Avenue, Waterkloof Glen, Pretoria, South Africa
T: +27 83 226 0303
E: nicolas.sheard@za.rlb.com
Contact: Nicolas Sheard

STELLENBOSCH
La Gratitude Herehuis, 95 Dorp Street, Stellenbosch, South Africa
T: +27 82 312 0285
E: lichelle.neethling@za.rlb.com
Contact: Lichelle Neethling

OFFICES AROUND THE WORLD

AFRICA ALLIANCE

ANGOLA

LUANDA
Laguna Residencial Torre 2
302 Via 515, Talatona
Luanda, Angola
T:+244 960 954 4004
E: ft.consult.ao@gmail.com
Contact: Fernando Tavares

NAMIBIA

WINDHOEK
Unit 20 Elysium Fields
40 Berg Street, Klein Windhoek
Windhoek, Namibia
T: +264 81 446 2472
E: derek@rqs.com.na
Contact: Derek Rover

NIGERIA

LAGOS
55 Moleye Street
Alagomeji-Yaba, Lagos, Nigeria
T: +234 803 301 9606
E: hakeem.smith@hosconsult.com
Contact: Hakeem Smith

MIDDLE EAST

QATAR

DOHA
Al Mirqab Complex,
Office 32 - Second Floor,
Al Mirqab Al Jadeed Street,
Al Naser Area,
PO Box 26550, Doha, Qatar
T: +974 4016 2777
E: dean.mann@ae.rlb.com
Contact: Dean Mann

SAUDI ARABIA

RIYADH
Building 07, Second floor,
Laysen Valley, King Khalid Road
intersection with Al Urubah Road,
PO Box 8546, Riyadh 12329,
Kingdom of Saudi Arabia
T: +966 11 278 5553
E: william.barber@sa.rlb.com
Contact: William Barber

UNITED ARAB EMIRATES

ABU DHABI
Mezzanine Level,
Al Mazrouei Building,
Muroor Road, PO Box 105766,
Abu Dhabi, United Arab Emirates
T: +971 4 339 7444
E: natalie.stockman@ae.rlb.com
Contact: Natalie Stockman

DUBAI
Office 2302 Marina Plaza,
Dubai Marina, PO Box 115882,
Dubai, United Arab Emirates
T: +971 4 339 7444
E: natalie.stockman@ae.rlb.com
Contact: Natalie Stockman

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