CapitaLand Green Fit-Out Guide Requirement – Office Buildings

CapitaLand recognises that the fundamental purpose of office buildings is to provide a productive and effective place for people to work. While we do not directly determine the design of our tenants' office space, we have developed this Guide to encourage our tenants to implement environmentally friendly features and sustainable usage patterns when operating the office space.

A comfortable, productive and healthy environment is one of the most important things that you can provide for your employees. This Guide focuses on five fundamental areas which help to improve employee well-being and achieve savings from utilities consumption

- Energy Conservation
- Water Conservation
- Waste Management
- Indoor Environment Quality (IEQ)
- Good Maintenance Practices

The intended outcome for this Guide is to help our tenants to enhance the performance of the office premises and reduce its environmental impacts.

By designing and managing your workplace sustainably, it can help to achieve the following benefits:

Cost Avoidance for Utilities Bills

Reduce carbon emissions

Energy, water and material conservation

Improve health, well-being and productivity

Boost companies image on sustainability effort

ANNEX A

Lighting System

a. Use energy-saving light bulbs for lighting and the overall lighting power density of the Premises must not exceed the Allowable Lighting Power Budget (LPB) stated in Appendix A.

The lighting technical specifications, lighting schedules (showing the quantity, types of lightings and location), lighting layout plans, and the LPB complying with Appendix A, shall be submitted for Landlord's approval before installation.

b. The measured indoor lighting levels shall comply with the recommended illuminance (average lux level) stated in SS531:2019 (Code of Practice for Lighting of workplaces) or latest version of this standard.

c. Halogen or other inefficient light fittings shall not be used.

d. Area not used frequently such as toilet, storeroom, etc shall be provided with occupancy sensor and/or dedicated light switches to switch off the light when there is no occupant in the area.

e. Proper zoning together with switch/ dimming control with timer control to switch on and off the zone or dimming of lighting shall be provided in area of different use and area with daylighting. All decorative, accent and display lighting shall be switched off after operation hours.

f. All electric lightings (as applicable except decorative fixtures, emergency lights and other special purpose lighting) shall meet the minimum colour rendering index (CRI) in accordance with Clause 5 of SS531 – 1: 2016 – Code of Practice for Lighting of Workplaces and responsive light control (light dimming features). The lighting should have lifespan rating in accordance with IES TM-21 method, based on LM 80 test report (eg lifespan ≥ 50,000 life hours) and lighting designed with minimal flicker and stroboscopic effects (LED drivers with ≤ 30% flicker).

Table 1 - Lighting Power Budget Requirements

(Based on Green Mark 2021 EE Section, Table 2A)

Lighting Power Budget Requirements (W/m^2)			
Location	Goldplus	Platinum	SLE
Office, Work and Study			
Offices	*6*	*5.5*	*5*
Meeting Room	*6*	*5.5*	*5*
Copy/Print Rooms	*6*	*5.5*	*5*
Classrooms	*6*	*5.5*	*5*
Lecture Theatre	*6*	*5.5*	*5*
Computer Rooms	*6*	*5.5*	*5*
Reading Areas	*6*	*5.5*	*5*
Laboratories	*8*	*7*	*6*
Atria, Halls and Retail			
Entrance Hall	*6*	*5*	*4*
Atriums	*6*	*5*	*4*
Retail Atriums	*6*	*5*	*4*
Retail Corridors (Interior)	*4*	*3.5*	*3*
Concourse	*5*	*4.5*	*3.5*
Lobby	*5*	*4.5*	*3.5*
Auditorium	*5*	*4.5*	*3.5*
Concert Hall	*6*	*5*	*4*
Multi Purpose Hall	*8*	*7*	*6*
Conference Hall	*8*	*7*	*6*
Retail (General Lighting)	*10*	*7*	*6*
Retail - Jewellery (Total)	*23*	*19*	*14*
Retail - Furniture, clothing & accessories, cosmetics, art (Total)	*18*	*14*	*10*
Retail - Supermarket, vehicle, sporting goods, stationary, hardware,	*15*	*11*	*8*

others (Total)			
Food & Beverage Areas			
Food Courts & Hawker Centres	*6*	*5*	*4*
Canteens	*6*	*5*	*4*
Restaurants	*7*	*6*	*5*
Lounges	*7*	*6*	*5*
Bars	*7*	*6*	*5*
Transport and Goods			
Corridors	*4*	*3.5*	*3*
Stairs, Escalators, Travellators	*6*	*4.2*	*3.5*
Lift Lobbies	*4*	*3.5*	*3*
Warehouses	*6*	*5*	*4*
Storage Areas	*6*	*5*	*4*
Carpark	*2.5*	*2.25*	*2*
Rest, Clean, Exercise and Play			
Hotel Guest Rooms5	*9*	*7*	*5*
Toilets	*6*	*5*	*4*
Changing Rooms	*6*	*5*	*4*
Laundries	*6*	*5*	*4*
Washing Areas	*6*	*5*	*4*
Gymnasium & Physical Exercise Areas	*7*	*6*	*4.5*
Manufacturing & Maintenance			
Mechanical & Electrical Rooms	*6*	*5*	*4*
Manufacturing (general)	*8*	*6.5*	*5.5*
Manufacturing (electronic, fine detail or assembly)	*8*	*7*	*6*

ANNEX B

Air-Conditioning & Mechanical Ventilation System

a. If additional Air-Conditioning System for the Premises is required for cooling beyond the normal operating hours of the central plant or additional cooling, approval shall be sought from the Landlord.

b. For chilled water air handling units ('AHU') and/or fan coil units ('FCU'), the average operating efficiency shall comply with the efficiency requirements as stated in Table 1 or based on the building air-side average efficiency whichever is the more stringent, and the following requirements:

Table 1: Air-side Efficiency Requirements for each building type

Building Type	Goldplus	Platinum	SLE
Office	AHU - 0.18 kW/RT FCU – 0.12 kW/RT	AHU - 0.15 kW/RT FCU – 0.12 kW/RT	AHU - 0.13 kW/RT FCU – 0.12 kW/RT
Retail			
High Tech / High Intensity Industrial			
Light Industrial / Logistics			

i. Provide power meter and all control status and setpoints shall be connected to Landlord's Building Management System (BMS) to measure the power consumption of the AHU/FCU and monitor the overall building air-side efficiency for the purpose of green mark compliance.

ii. Where demand control of fresh air supply is required as per the existing building design, carbon dioxide sensors shall be provided at the return air duct of the AHU to modulate the fresh air flow. The carbon dioxide sensors must be connected to Landlord's BMS.

iii. Indoor CO2 levels shall be maintained at not exceeding 700ppm above the outdoor CO2 levels in accordance with SS554:2016 or prevailing standard.

c. For Variable Refrigerant Flow (VRF) System, the average operating efficiency shall comply with the efficiency requirements or better, as stated Table 2.

Table 2: ACMV Total System Efficiency Requirements for each building type

Building Type / Green Mark award	Goldplus	Platinum	SLE
Office	0.80 kW/RT	0.74 kW/RT	0.68 kW/RT
Retail	0.80 kW/RT	0.74 kW/RT	0.68 kW/RT
High Tech / High Intensity Industrial	0.80 kW/RT	0.78 kW/RT	0.75 kW/RT
Light Industrial / Logistics	0.80 kW/RT	0.75 kW/RT	0.70kW/RT

VRF systems shall be installed with the following provisions:

i. For new VRF systems or replacement, as well as new distribution system serving combined floor area of 2000m^2 or more, permanent measurement and verification system should be installed to examine the efficiency of total system. Connecting to Landlord's BMS should be provided where technically viable, and such performance data shall be made available to Landlord as and when necessary.
ii. Temperature sensors and occupancy sensors to control energy usage. Enclosed areas not served by the central cooling system shall be provided with dedicated thermostat controls (e.g. meeting rooms, closed offices, conference facilities) with auto shut off or ramp down when not in use.

d. For Unitary air-conditioning system, the minimum energy label shown in Table 3 shall be met.

Table 3: Unitary AC Requirements for each building type

Building Type / Green Mark award	Goldplus	Platinum	SLE
Office	3 phase AC – 3 ticks 1 phase AC – 4 ticks	3 phase AC – 4 ticks 1 phase AC – 5 ticks	
Retail			
High Tech / High Intensity Industrial			
Light Industrial / Logistics			

e. For Chilled Water Air-Conditioning System, the average operating efficiency shall comply with the efficiency requirements as stated in Table 2 above, or better. The total system efficiency shall comprise of both the water-side efficiency + air-side efficiency and the Measurement & Verification system shall be provided to monitor and ensure that the average operating efficiency meet the required efficiency or better. The system shall have the capability to download the data for Green Mark submission purposes.

f. For mechanical ventilation (MV) system, Tenant must use energy efficient units only and the average computed efficiency for these units must not exceed the efficiency requirements as stated below in table 4 accordingly to the building's prevailing Green Mark rating.

References are made to GM2021 Energy Efficiency (EE) Section

Fan System	Goldplus	Platinum	SLE
Nameplate motor power ≥ 4kW	0.32 W/CMH	0.28 W/CMH	0.25 W/CMH

Table 4: Mechanical Ventilation Fan Efficiency Requirements for each building type

All MV system including kitchen exhaust system shall be designed with sufficient air change rate in accordance with SS553:2016 or prevailing standards and sufficient make up air for the exhaust system.

g. All ACMV and control systems shall be regularly checked, serviced, and maintained to ensure operational efficiency and the required ventilation provision into occupied spaces are according to SS553:2016 or prevailing standards.

h. Should the Building not have any prevailing Green Mark certification, Tenant shall minimally meet efficiency targets of Goldplus rating as per tables 1, 2,3 & 4.

i. Ensure that all air-conditioning systems installed are designed to allow for cooling load variations due to fluctuations in ambient temperature to ensure consistent indoor conditions for thermal comfort. As required by the relevant prevailing codes of practices, the indoor temperature shall be between 23°C to 25°C with relative humidity less than 65 percent.

j. If the Premises designed for laboratory use which requires 100 percent fresh air for the equipment, Tenant must install heat recovery system to bring down the demand of cooling load requirement; and the efficiency of the heat recovery system must be better than 60 percent.

k. In the installation of the air conditioning and mechanical ventilation system or any equipment that may generate noise, Tenant must ensure that the ambient sound level must not exceed the recommended levels stated in SS553:2016.

ANNEX C

1) Provision of Utilities Consumption Data

a. By signing the Agreement with the green lease requirements, Tenant agrees to provide all the utilities and waste/ recycling data to Landlord, and where required, allow Landlord to obtain utilities data from the utilities providers or energy retailer.

2) Fitout & Renovation

a. Ensure that all work done within the Premises by Tenant or Tenant's representatives shall be undertaken in accordance herewith and Fitout Guide (FOG).

b. Only use interior paints, varnishes, sealants, and adhesives of low volatile organic compound ("VOC") using natural and water-based products, where possible, certified by recognized Green Certification bodies such as Singapore Green Building Product Scheme ("SGBP") with at least SGBP 2 ticks or equivalent by local certification bodies. The relevant Green Certification bodies certification, layout plans showing the area of coverage and catalogues, or technical specifications of the products shall be submitted for Landlord's approval before installation.

3) Green Purchase

a. Where possible, use appropriate environmentally friendly products that are certified by recognized Green Certification bodies such as SGBP with at least SGBP 2 ticks or equivalent local certification bodies in Tenant's fit-out works (e.g. furnishings, furniture and carpets) which contained recycled materials and be low VOC. The relevant Green Certification bodies certification and layout plans showing the area of coverage and catalogue/ technical specifications of the products shall be submitted for Landlord's approval before installation.

b. Refer to the TDG in procuring furniture, fixtures, materials, supplies, and equipment to be brought into the Premises.

c. Tenant's cleaning contractor shall use cleaning products certified in accordance with at least SGBP 2 ticks or equivalent by local certification bodies.

4) Recycling Management

a. Minimize the amount of waste ending in landfill via reducing, recycling, and reusing where possible any waste created in the demolition of existing leasehold improvements or alterations within the Premises.

b. Provide sufficient recycling receptacles in Tenant's premises for segregation of waste and recyclables (eg. Paper/cardboard, plastic, glass, metals, e-waste, food waste, etc). All recyclables shall be deposited at the collection points provided by the Landlord.

c. Avoid or minimize the use of disposables where it is feasible.

ANNEX D

GOOD PRACTICES

The Tenant is also encouraged:

a. To provide separate sub-meters for server rooms and data centres (as applicable) to monitor Tenant's energy consumption, as energy consumption data must be provided to Landlord annually for Green Mark verification and auditing. These sub-meters shall have the provision to be linked to Landlord's building automation system (subject to final confirmation) for recording of Tenant's energy consumption and for Green Mark verification purposes.

b. Where possible to offset operational energy through the procurement of renewable energy certificates (RECs) in compliance with SS 673: 2021 (or latest version), or certified carbon offsets.

c. To display water conservation posters at water usage areas within the Premises.

d. To have provision of private water meters, where applicable, and at least monthly monitoring of Premises' water usage.

e. To have a policy to ensure that energy efficient settings are enabled on all equipment.

f. To adopt energy star or NEA energy efficiency labelling rating as a minimum requirement for all applicable equipment.

g. To use mandatory energy labelling scheme (MELS) regulated appliances with highest tick-rating (i.e. 5 ticks for television, 4 ticks for refrigerator, 3 ticks for lamp).

h. Use of NEA-registered pesticides and vector control products which are suitable for indoor use.

i. Tenant's cleaning contractor must comply with elements of the Environmental Management Plan applicable to it. Particularly, and Tenant shall ensure that any cleaning contracts in respect of specialised green facilities, such as waterless urinals will require the cleaning contractor to properly understand and to be trained on the maintenance of such specialised green facilities.

j. To work with suppliers to deliver goods without or with less disposable packaging.

k. To purchase products with recycled content/less packaging material.

l. To purchase reusables instead of single-use items wherever possible.

m. To provide reusables instead of single-use items for staff use (e.g. reusable crockery and cutlery at pantries, reusable bags, water dispensers/water jugs and reusable cups in meeting rooms)

n. To track and reduce printing and photocopying volumes of each employee/department.

o. To go digital (e.g. online portal, sharing platforms, online repository).

p. To donate unwanted items that are still in working condition (e.g. check on this as part of the disposal process, organise donation drives).

q. To repair/refurbish furniture /devices to prolong their lifespan.

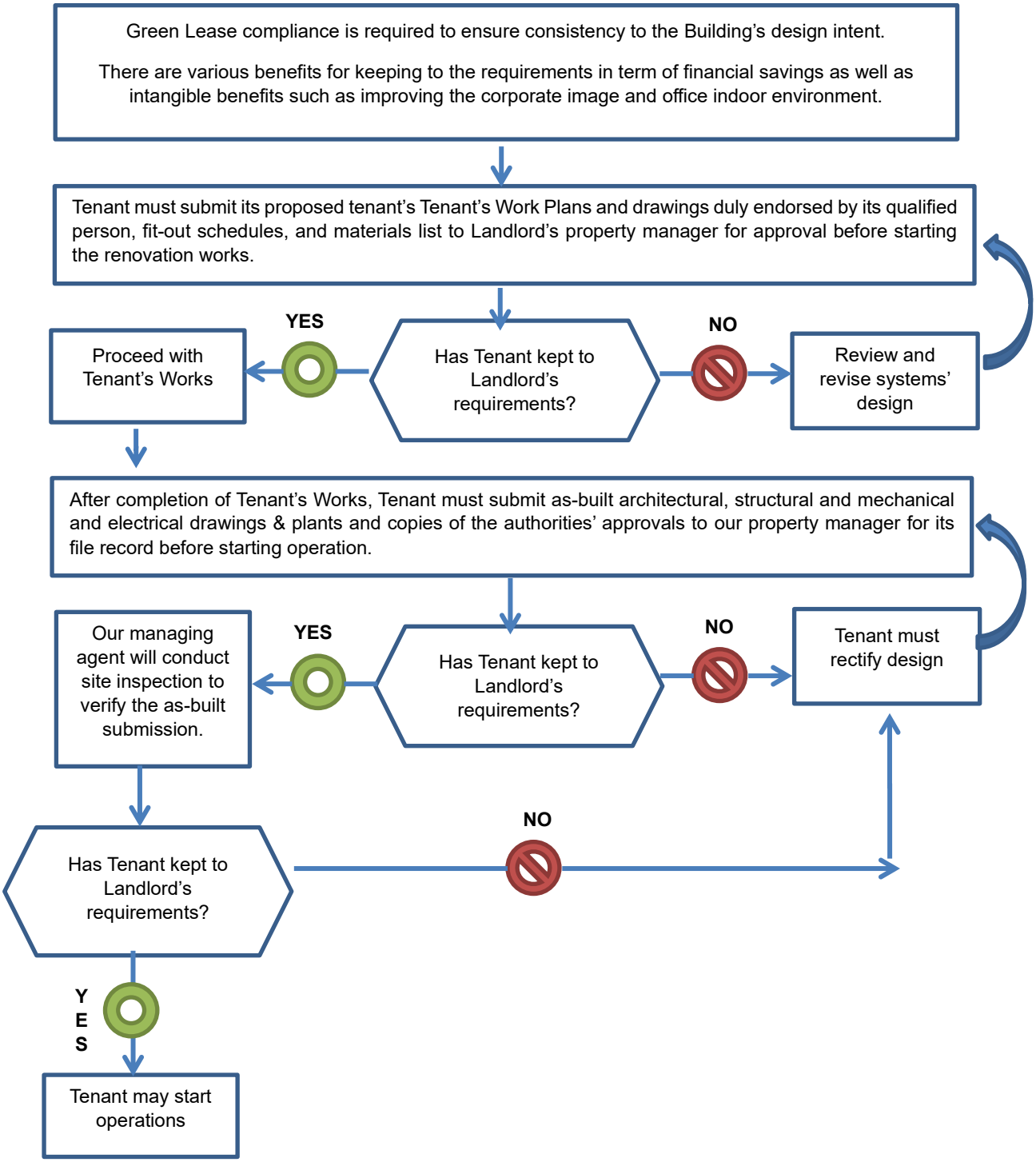
r. To conduct pre-occupancy flush out after the completion of construction and all fitting-out of interior finishes (including fixed furniture and furnishings) for all occupied spaces to remove the contaminants.

s. To conduct yearly post occupancy evaluation to assess occupant's satisfaction with the indoor environment and take corrective actions for dissatisfaction. Aggregated results should also be communicated with occupants.

t. To implement monitoring systems to ensure optimal thermal and indoor air quality standards as set out in SS 554:2016 or prevailing standards.

ANNEX E

GREEN LEASE COMPLIANCE PROCESS FLOW CHART



ANNEX F

Property Name:

TENANT'S FIT-OUT INFORMATION FORM

Tenant to design and carry out the fit-out work in accordance with Green Mark (GoldPlus / Platinum / Super Low Energy). Tenant to fill in the forms below accordingly for approval.

Lighting System

Type of Fitting	Type of Ballast	Location and Coverage Area (m^2)	Quantity	Unit Power with Ballast (W)	Total Installed Power (W)	Lighting Density (W/m^2)

Chilled Water Air-Conditioning System (Water)

Model and Brand of Chiller	Year of Installation	Design Chilled Water Temperatures (°C)	Total Full Load Input Power (kW)	Full Load Cooling Capacity (RT)	Performance (Exclude air-side) (KW/RT)

Air Handling Units / Fan Coil Units (Air)

Model and Brand of AHU / FCU	Year of Installation	Design Chilled Water Temperatures (°C)	Design Air Flow (CMH)	Design External Static Pressure ESP (Pa)	Total Full Load Input Power (kW)	Full Load Cooling Capacity (kW or RT)	Performance (Exclude water-side) (KW/RT)

Mechanical Ventilation Fans (Air)

Model and Brand of MV fan	Year of Installation	Design Air Flow (CMH)	Design External Static Pressure ESP (Pa)	Total Full Load Input Power (kW)	Fan Efficiency (W/CMH)	Sensors (Y/N)	Variable Speed Drive (VSD) (Y/N)

Unitary air-conditioning system

Year of Installation: _____

Model and Brand of System	Number of Phase (Electrical Input)	Number of Ticks in Energy Label	Weighted Cooling Capacity of CU (kW)	IEER for Condensing Unit	Weighted Cooling Capacity of FCU (kW)	Input Power of Fan Coil (kW)	Total System Efficiency (kW/RT)

Variable Refrigerant Flow System

Year of Installation: _____

Model and Brand of System	Number of Phase (Electrical Input)	Number of Ticks in Energy Label	Weighted Cooling Capacity of CU (kW)	IEER for Condensing Unit	Weighted Cooling Capacity of FCU (kW)	Input Power of Fan Coil (kW)	Total System Efficiency (kW/RT)	Measurement & Verification provision (Yes/ No)

Water Fittings

Water Fitting Type	Quantity				Total No. of Fitting
	Excellent	Very Good	Good	No Tick	

Please attached PUB WELS certificate for the fitting used.

Indoor Air Quality Management

Brand of Low VOC Paint or Low Formaldehyde Adhesive	Area of Application	Certification by

Recycling Management

Adoption of Recycling (Yes/No)	Type of Recycling (Paper/Plastic/Can)	No. of Recycling Bin

_____ _____

Submitted By Date