DETAIL GBI RATING SYSTEM: NRNC & RNC

greenbuildingindex

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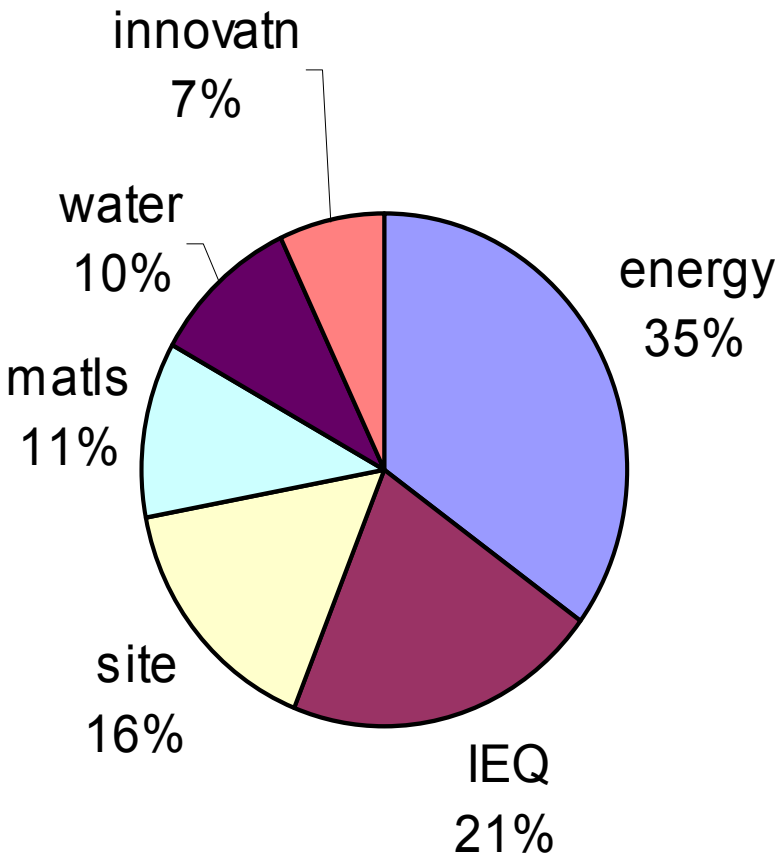
GBI Rating Tools and Concepts

GBI VERSION 1.0

- No Pre-requisite / Mandatory criteria
- Maximum score = 100 points
- No bonus points

Green Building Index (NRNC)

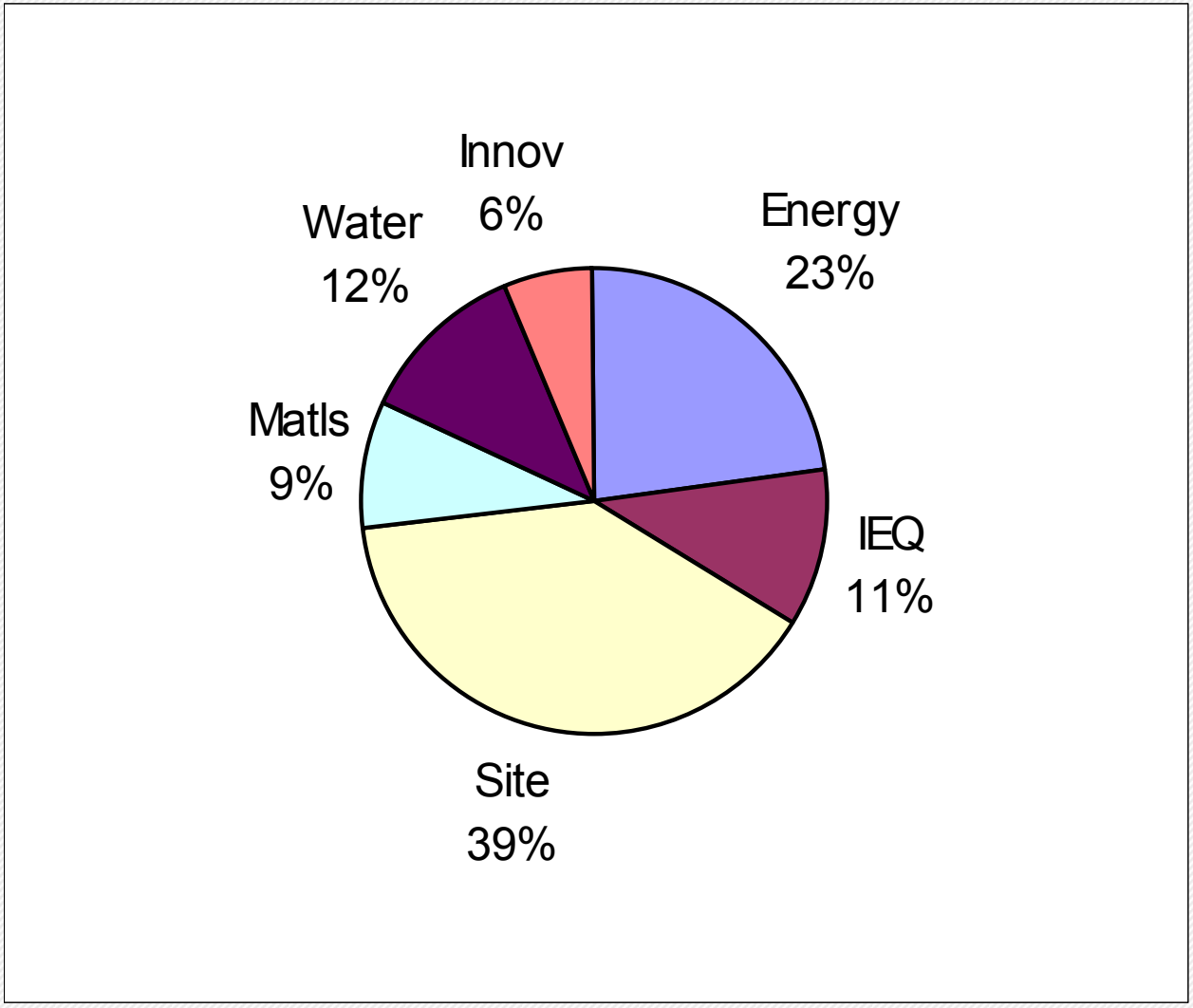


NON-RESIDENTIAL BUILDINGS

Rating Tools	Energy Effy	IEQ	Sustainable Site	Materials & Resources	Water Effy	Innovation
BREEAM 2008	19%	*13%	*37%	*17%	5%	*9%
LEED v2.2	25%	22%	20%	19%	7%	7%
Green Mark v3	62%	5%	*20%		9%	4%
Green Star v3	20%	19%	*33%	16%	8%	4%
GBI V1.0	35%	21%	16%	11%	10%	7%
LEED v3	35%	15%	26%	14%	10%	*10%

* Denotes adjusted or amalgamated figures

Green Building Index (RNC)

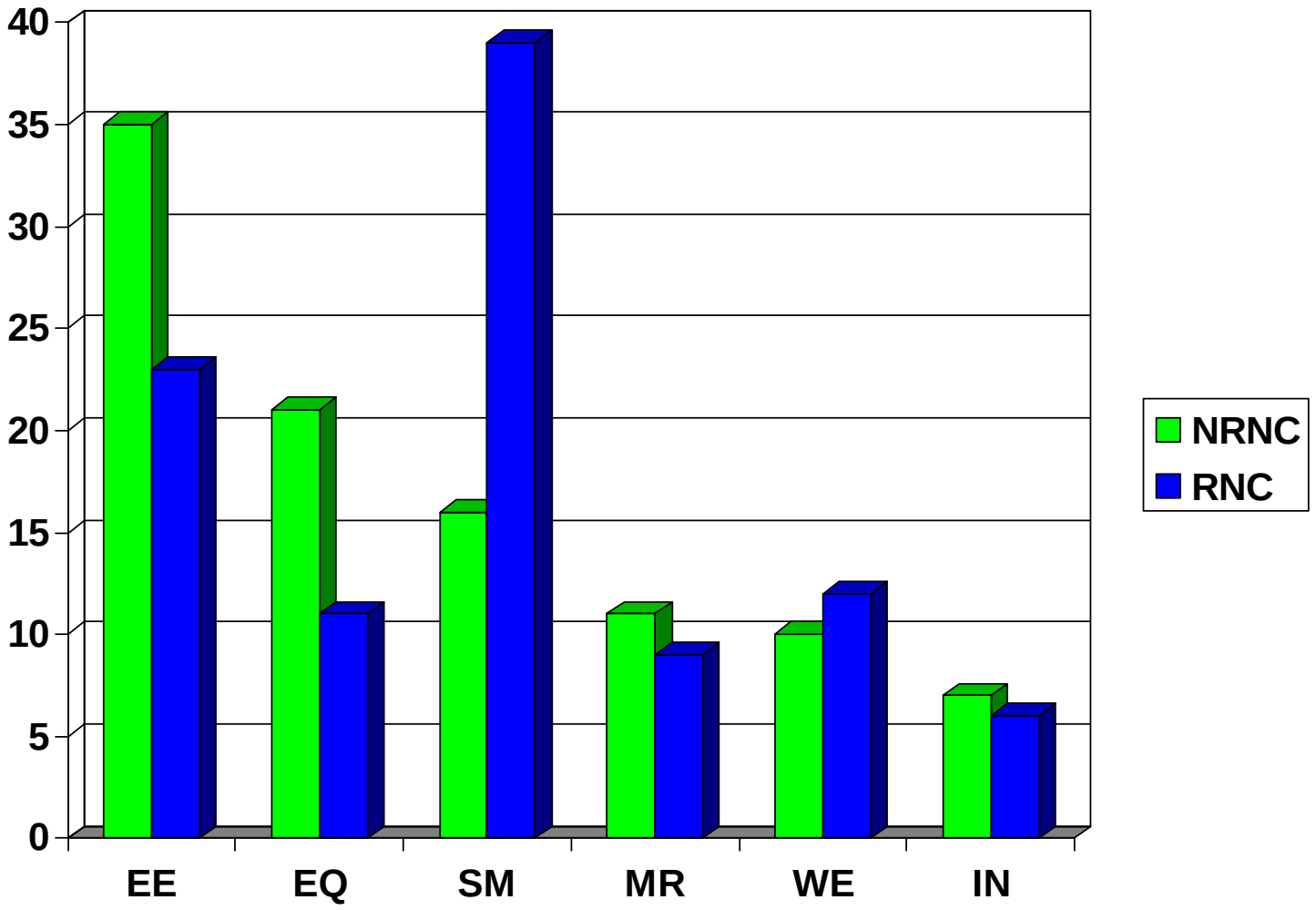


RESIDENTIAL BUILDINGS

Rating Tools	Energy Effy	IEQ	Sustainable Site	Materials & Resources	Water Effy	Innovation
Green Mark V3	61%	4%	*21%		9%	5%
GBI V1.0	23%	11%	39%	9%	12%	6%

* Denotes adjusted or amalgamated figures

GBI: NRNC vs RNC



POINTS	GBI RATING
50 to 65	GBI CERTIFIED
66 to 75	GBI SILVER
76 to 85	GBI GOLD
86 +	GBI PLATINUM

GBI NRNC
Details

1) Energy Efficiency 35 points

Design		
EE1	**Minimum EE Performance**	**1**
EE2	**Lighting Zoning**	**3**
EE3	**Electrical Sub-Metering**	**1**
EE4	**Renewable Energy**	**5**
EE5	**Advanced Energy Performance - BEI**	**15**
Commissioning		
EE6	**Enhanced Commissioning**	**3**
EE7	**Post Occupancy Commissioning**	**2**
Verification		
EE8	**EE Verification**	**2**
EE9	**Sustainable Maintenance**	**3**

1) Energy Efficiency 35 points

Design		
EE1	Minimum EE Performance	1
EE2	Lighting Zoning	3
EE3	Electrical Sub-Metering	1
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Commissioning		
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EE7	Post Occupancy Commissioning	2
Verification		
EE8	EE Verification	2
EE9	Sustainable Maintenance	3

EE1 Minimum EE Performance	1

Create EE awareness and promote the use of MS 1525

Establish minimum energy efficiency (EE) performance to reduce energy consumption in buildings, thus reducing CO2 emission to the atmosphere. Meet the following minimum EE requirements as stipulated in MS 1525:2007:	1
1. **OTTV ≤ 50, RTTV ≤ 25**. Submit calculations using the BEIT software or other GBI approved software/s, AND 2. Provision of **Energy Management System** where Air-Conditioned area **≥ 4000 m2**	

EE4 Renewable Energy	5

Encourage use of renewable energy:-

Where 0.5 % or 5 kWp whichever is the greater, of the total electricity consumption is generated by renewable energy, OR	2
Where 1.0 % or 10 kWp whichever is the greater, of the total electricity consumption is generated by renewable energy, OR	3
Where 1.5 % or 20 kWp whichever is the greater, of the total electricity consumption is generated by renewable energy, OR	4
Where 2.0 % or 40 kWp whichever is the greater, of the total electricity consumption is generated by renewable energy	5

EE5 Advanced Energy Performance - BEI	15

Encourage developments to strive for world class EE standards.

Exceed EE performance better than the baseline minimum to reduce energy consumption in the building. Achieve Building Energy Intensity (BEI) ≤ 150 kWh/m2.yr as defined under GBI reference (using BEIT Software or other GBI approved software/s), OR	2
BEI ≤ 140, OR	3
BEI ≤ 130, OR	5
BEI ≤ 120, OR	8
BEI ≤ 110, OR	10
BEI ≤ 100, OR	12
BEI ≤ 90	15

Building Energy Intensity

$$BEI = \frac{(TBEC - CPEC - DCEC)*(52/WOH)}{(GFA_{excl.cp} - DCA - GLA*FVR)}$$

where: “excl.cp” denotes excluding car park

BEIT Software or Other GBI Approved Software

1. For GBI Certified or Silver rating, submission of BEI calculation may use BEIT Software or other GBI Approved Software, which use static energy calculation method.
2. For GBI Gold or Platinum rating, BEI calculation may need to use dynamic energy simulation, employing GBI Approved Software such as ASHRAE Std 140 softwares, etc – which you need to confirm with the assigned GBI Certifier.

1) Energy Efficiency 35 points

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EE3	Electrical Sub-Metering	1
EE4	Renewable Energy	5
EE5	Advanced Energy Performance - BEI	15
Commissioning		
EE6	Enhanced Commissioning	3
EE7	Post Occupancy Commissioning	2
Verification		
EE8	EE Verification	2
EE9	Sustainable Maintenance	3

EE6 Enhanced Commissioning	3

Ensure expensive installations are properly commissioned to realise their full potential.

Ensure building's energy related systems are designed and installed to achieve proper commissioning so as to realise their full potential and intent. Appoint an independent GBI recognised Commissioning Specialist (CxS) at the onset of the design process to verify that comprehensive pre-commissioning and commissioning is performed for all the building's energy related systems in accordance with ASHRAE Commissioning Guideline or other GBI approved equivalent standard/s by:-	

1.	Conducting at least one commissioning design review during the detail design stage and back-check the review comments during the tender documentation stage.	3
2.	Developing and incorporating commissioning requirements into the tender documents.	
3.	Developing and implementing a commissioning plan.	
4.	Verifying the installation and performance of the systems to be commissioned.	
5.	Reviewing contractor submittals applicable to systems being commissioned for compliance.	
6.	Developing a systems manual that provides future operating staff the information needed to understand and optimally operate the commissioned systems.	
7.	Verifying that the requirements for training operating personnel and building occupants are completed.	

EE7 Post Occupancy Commissioning	2

Educate owners to realise the importance and EE benefits of post commissioning.

Carry out post occupancy commissioning for all tenancy areas after fit-out changes are completed	
1. Design engineer shall review all tenancy fit-out plans to ensure original design intent is not compromised and upon completion of the fit-out works, verify and fine-tune the installations to suit.	1
2. Within 12 months of practical completion (or earlier if there is at least 50% occupancy), the CxS shall carry out a full post/re-commissioning of the building's energy related systems to verify that their performance is sustained in conjunction with the completed tenancy fit-outs.	1

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EE9	Sustainable Maintenance	3

EE8 EE Verification	2

To make full use of installed EMS and ensure EE design intents are implemented.

Verify predicted energy use of key building services:-	
1. Use Energy Management System to monitor and analyse energy consumption including reading of sub-meters, AND	2
2. Fully commission EMS including Maximum Demand Limiting programme within 12 months of practical completion (or earlier if there is at least 50% occupancy).	

EE9 Sustainable Maintenance	3

Address the 1st Class installation 3rd Class maintenance mentality.

Ensure the building's energy related systems will continue to perform as intended beyond the 12 months Defects & Liability Period:-	
1. At least 50% of permanent building maintenance team to be on-board one (1) to three (3) months before practical completion and to fully participate (to be specified in contract conditions) in the Testing & Commissioning of all building energy services.	1
2. Provide for a designated building maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage.	2
3. Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).	

2) Indoor Environmental Quality 21 pts

Air Quality		
EQ1	Minimum IAQ Performance	1
EQ2	Environmental Tobacco Control	1
EQ3	Carbon Dioxide Monitoring & Control	1
EQ4	Indoor Air Pollutants	2
EQ5	Mould Prevention	1
Thermal Comfort		
EQ6	Thermal Comfort Control	2
EQ7	Air Change Effectiveness	1

Lighting, Visual & Acoustic Comfort	
EQ8 Daylighting	2
EQ9 Daylight Glare Control	1
EQ10 Electric Lighting Levels	1
EQ11 High Frequency Ballasts	1
EQ12 External Views	2
EQ13 Internal Noise Levels	1
Verification	
EQ14 IAQ Before & During Occupancy	2
EQ15 Post Occupancy Comfort Survey	2

2) Indoor Environmental Quality 21 pts

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EQ1	Minimum IAQ Performance	1
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EQ3	Carbon Dioxide Monitoring & Control	1
EQ4	Indoor Air Pollutants	2
EQ5	Mould Prevention	1
Thermal Comfort		
EQ6	Thermal Comfort Control	2
EQ7	Air Change Effectiveness	1

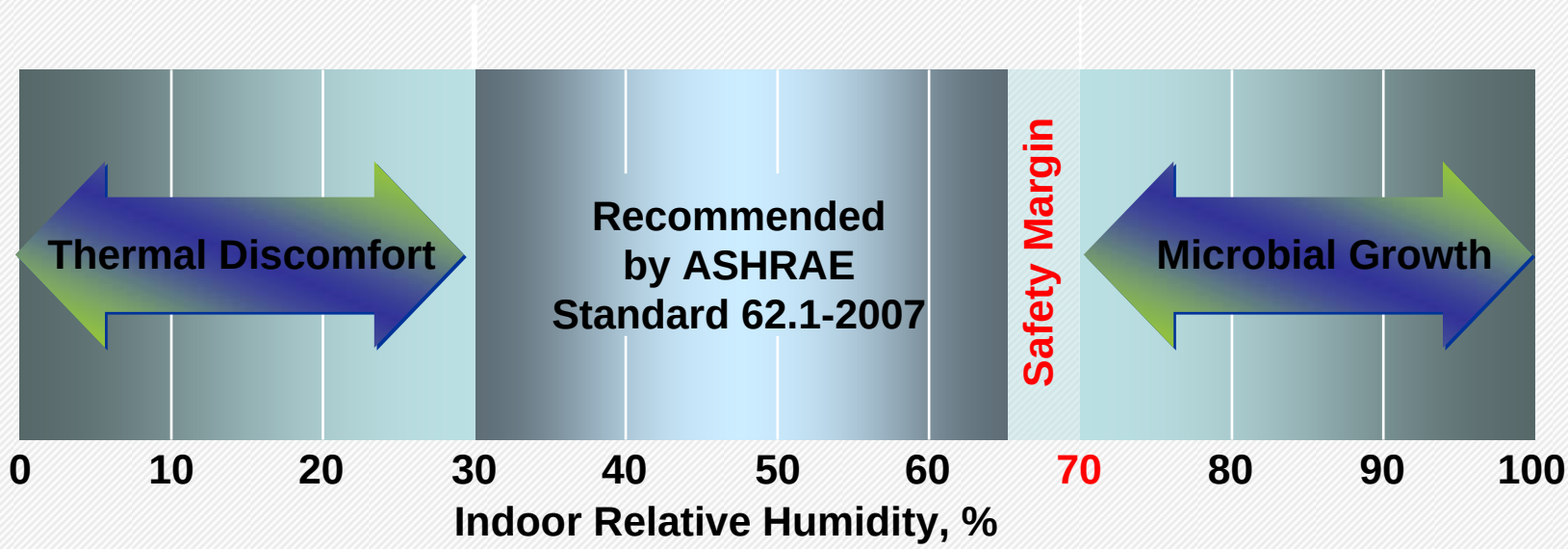
EQ5 Mould Prevention	1

Prevention of mould growth problems.

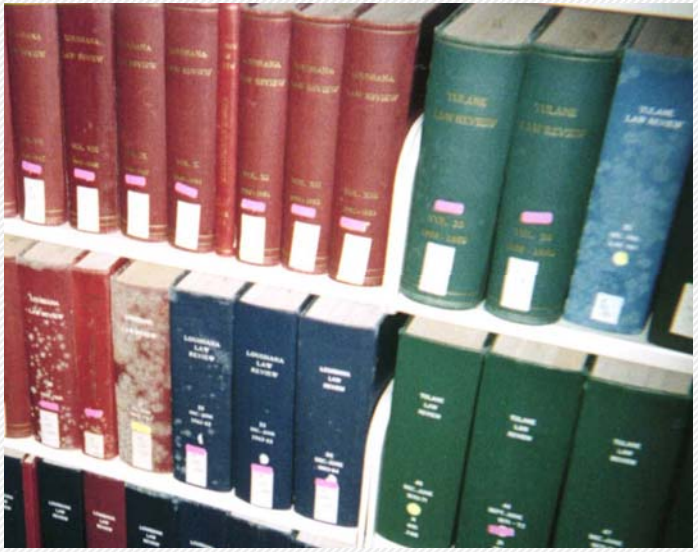
Design system/s which reduce the risk of mould growth and its associated detrimental impact on occupant health:-	
Where it is demonstrated that the mechanical air-conditioned ventilation system will maintain a positive indoor air pressure relative to the exterior and can actively control indoor air humidity to be **no more than 70% RH** without the use of active control that will consume additional energy.	

"Occupied space relative humidity shall not exceed 70% at … peak outdoor dew- point conditions..."

MS1525-2007



MOULD Growth



Ensure that excessive moisture in building is controlled during the Design, Construction and Operation stages by the consideration and the control of the following: i) Rainwater leakage through roof and walls ii) Infiltration of moist air iii) Diffusion of moisture through walls, roof and floors iv) Groundwater intrusion into basements and crawl spaces through walls and floors v) Leaking or burst pipes vi) Indoor moisture sources vii) Construction moisture OR The building is fully naturally ventilated	1

IAQ Management Plan During Construction

- Meet or exceed SMACNA Guidelines
- Protect materials
- Filters

2) Indoor Environmental Quality 21 pts

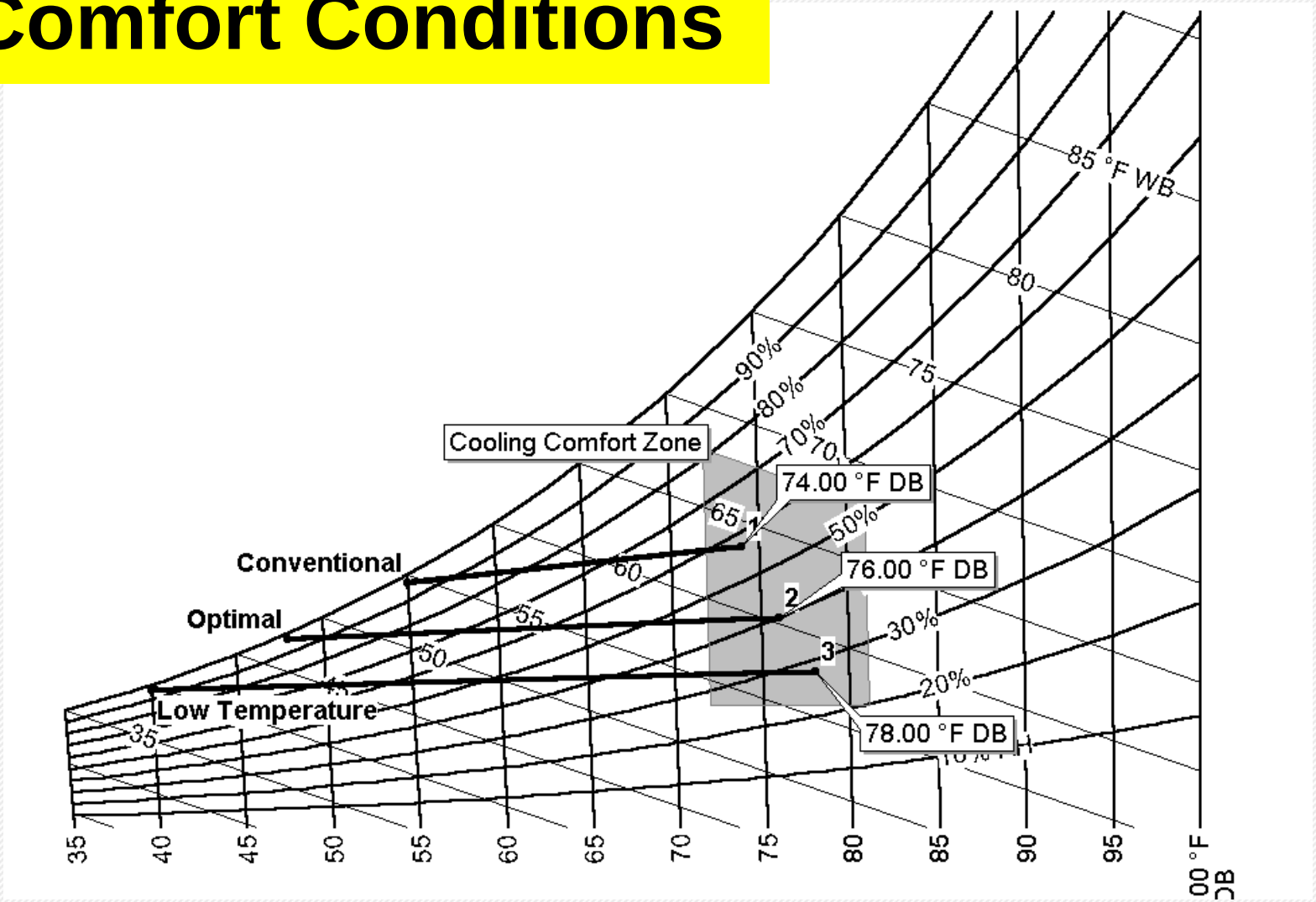
Air Quality		
EQ1	Minimum IAQ Performance	1
EQ2	Environmental Tobacco Control	1
EQ3	Carbon Dioxide Monitoring & Control	1
EQ4	Indoor Air Pollutants	2
EQ5	Mould Prevention	1
Thermal Comfort		
EQ6	Thermal Comfort Control	2
EQ7	Air Change Effectiveness	1

EQ6 Thermal Comfort Control	2

Encourage provision of close comfort control.

Provide a high level of thermal comfort system control by individual occupants or by specific groups in multi-occupant spaces to promote the productivity, comfort and well-being of building occupants:-	
Design to ASHRAE Standard 55 **in conjunction with the relevant localised parameters** as listed in MS 1525	1

Comfort Conditions



ASHRAE Std 55: Comfort Zone-80% Of People Are Satisfied

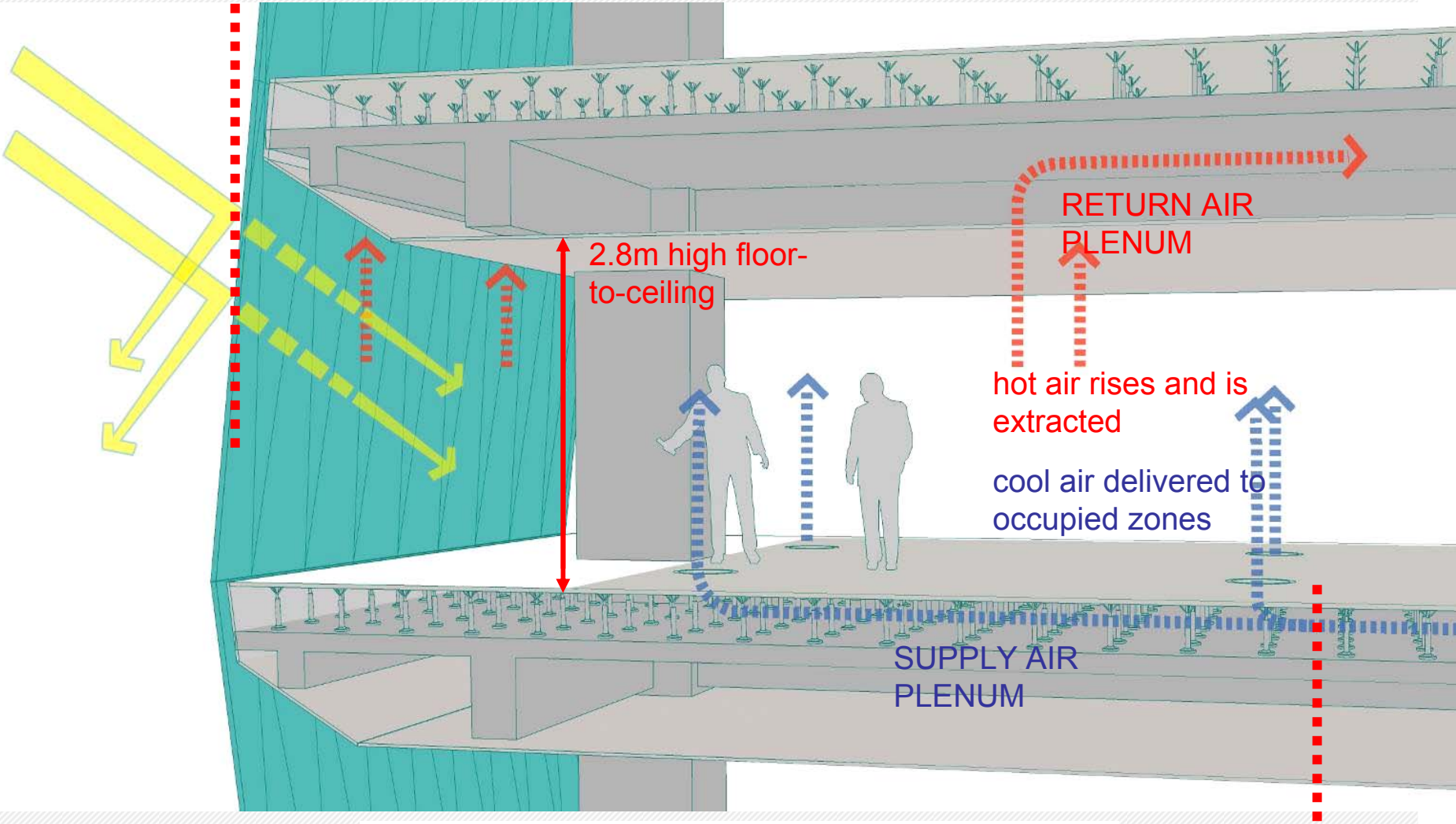
EQ6 Thermal Comfort Control cont'd	2
Provide individual comfort controls for ≥ 50% of the building occupants to enable adjustments to suit individual task needs and preferences. AND Provide comfort system controls for all shared multi-occupant spaces to enable adjustments to suit group needs and preferences. *Conditions for thermal comfort include the primary factors of air temperature, radiant temperature, air speed and humidity. Comfort system control for this purpose is defined as the provision of control over at least one of these primary factors in the occupants' local environment.*	1

EQ7 Air Change Effectiveness	1

Recognise innovative air side strategies.

Provide effective delivery of clean air through reduced mixing with indoor pollutants in order to promote a healthy indoor environment. Demonstrate that the Air Change Effectiveness (ACE) meets the following criteria for at least 90% of the NLA:	1
The ventilation systems are designed to achieve an ACE of ≥0.95 when measured in accordance with ASHRAE 129-1997: Measuring air change effectiveness where ACE is to be measured in the breathing zone (nominally 1.0 m from finished floor level)	

Unitized performance façade utilizing spectrally selective insulated glazing to filter infrared and UV-light, deflecting heat whilst allowing maximum daylight penetration into office space



Raised floor system allows for ductless underfloor air-conditioning as well as structured cabling system for maximum flexibility and scalability

Lighting, Visual & Acoustic Comfort	
EQ8 Daylighting	2
EQ9 Daylight Glare Control	1
EQ10 Electric Lighting Levels	1
EQ11 High Frequency Ballasts	1
EQ12 External Views	2
EQ13 Internal Noise Levels	1
Verification	
EQ14 IAQ Before & During Occupancy	2
EQ15 Post Occupancy Comfort Survey	2

EQ14 IAQ Before & During Occupancy	2

Ensure achievement of high sustainable IAQ.

Reduce indoor air quality problems resulting from the construction process in order to help sustain the comfort and well-being of building occupants. Develop and implement an Indoor Air Quality (IAQ) Management Plan for the Pre-Occupancy phase as follows:-	

EQ14 IAQ Before & During Occupancy	2

1. Perform a building flush out by supplying outdoor air to provide not less than 10 airchanges/hour for at least 30 minutes operation before occupancy and continuous minimum 1 ACH during the initial 14 days occupancy of the completed building OR 2. If low VOC materials and low formaldehyde composite wood are used, then building flush out can be performed by supplying outdoor air to provide not less than 10 airchanges/hour for at least 15 minutes operation or not less than 6 airchanges/hour for at least 30 minutes operation and continuous 1ACH during the initial 7 days occupancy of the completed building OR 3. Within 12 months of occupancy, conduct IAQ testing to demonstrate maximum concentrations for pollutants are not exceeded according to the Indoor Air Quality Code of Malaysia.	1

EQ14 IAQ Before & During Occupancy	2

During Occupancy Stage: Where a permanent air flushing system of at least 10 airchanges/hour operation is installed for use during occupancy stage	1

EQ15 Post Occupancy Comfort Survey	2

Ensure occupants truly benefit from the design intents.

Provide for the assessment of comfort of the building occupants:-	
Conduct a post-occupancy comfort survey of building occupants within 12 months after occupancy/building completion. This survey should collect anonymous responses about thermal comfort, visual comfort and acoustic comfort in a building. It should include an assessment of overall satisfaction with thermal, visual and acoustic performance and identification of thermal-related, visual-related and acoustic-related problems. AND	

EQ15 Post Occupancy Comfort Survey	2

Develop a plan for corrective action if the survey results indicate that more than 20% of occupants are dissatisfied with the overall comfort in the building. This plan should include measurement of relevant environmental variables in problem areas. *The relevant environmental variables include 1) Temperature, relative humidity, air speed and mean radiant temperature, 2) Lighting level and glare problem, 3) Background noise level, 4) Odour problem, CO2 level, VOCs, and particulate concentration*	2

3. Sustainable Site & Management 16 pts

Site Planning	
SM1 Site Selection	1
SM2 Brownfield Redevelopment	1
SM3 Development Density & Community Connectivity	2
SM4 Environment Management	2
Construction Management	
SM5 Earthworks, Pollution Control	1
SM6 QLASSIC Construction	1
SM7 Workers' Site Amenities	1

Transportation		
SM8	Public Transport Accessibility	1
SM9	Green Vehicles Priority	1
SM10	Parking Capacity	1
Design		
SM11	Stormwater Control	1
SM12	Greenery & Roof	2
SM13	Building User Manual	1

3. Sustainable Site & Management 16 pts

Site Planning	
SM1 Site Selection	1
SM2 Brownfield Redevelopment	1
SM3 Development Density & Community Connectivity	2
SM4 Environment Management	2
Construction Management	
SM5 Earthworks, Pollution Control	1
SM6 QLASSIC Construction	1
SM7 Workers' Site Amenities	1

SM3 Development Density & Community Connectivity	2

Channel development to urban area with existing infrastructure, protect greenfield and preserve habitat and natural resources:-	
A) DEVELOPMENT DENSITY	
Construct a new building or renovate an existing building on a previously developed site AND in a community with a minimum density of 20,300 m2 per hectare net (87,000 ft2 per acre net)	1

SM3 Development Density & Community Connectivity cont'd	2

B) COMMUNITY CONNECTIVITY	
Construct a new building or renovate an existing building on a previously developed site AND within 1 km of a residential zone or neighbourhood with an average density of 25 units per hectare net (10 units per acre net) AND within 1 km of at least 10 Basic Services AND with pedestrian access between the building and the services.	1
Basic Services include, but are not limited to:	
1) Bank; 2) Place of Worship; 3) Convenience / Grocery; 4) Day Care; 5) Police Station; 6) Fire Station; 7) Beauty; 8) Hardware; 9) Laundry; 10) Library; 11) Medical / Dental; 12) Senior Care Facility; 13) Park; 14) Pharmacy; 15) Post Office; 16) Restaurant; 17) School; 18) Supermarket; 19) Theatre; 20) Community Centre; 21) Fitness Centre.	
Proximity is determined by drawing a 1 km radius around the main building entrance on a site map and counting the services found within that radius.	

3. Sustainable Site & Management 16 pts

Site Planning	
SM1 Site Selection	1
SM2 Brownfield Redevelopment	1
SM3 Development Density & Community Connectivity	2
SM4 Environment Management	2
Construction Management	
SM5 Earthworks, Pollution Control	1
SM6 QLASSIC Construction	1
SM7 Workers' Site Amenities	1

SM6 QLASSIC Construction	1

Reward for achieving minimum score of 70% using QLASSIC Assessment System.

Achieve quality of workmanship in construction works:-	
Subscribe to independent method to assess and evaluate quality of workmanship of building project based on CIDB's CIS 7: Quality Assessment System for Building Construction Work (QLASSIC). Must achieve a minimum score of 70 %	1

SM7 Workers' Site Amenities | 1

Need to create and implement a Site Amenities Plan to achieve the objective of ensuring adequate health and hygiene facilities are available for workers in order to minimize pollution caused by workers.

SM7 Workers' Site Amenities cont'd	1

Reduce pollution from construction activities by controlling pollution from waste and rubbish from workers. Create and implement a Site Amenities Plan for all construction workers associated with the project:-	
The plan shall describe the measures implemented to accomplish the following objectives: a) Proper accommodation for construction workers at the site or at temporary rented accommodation nearby. b) Prevent pollution of storm sewer or receiving stream by having proper septic tank. c) Prevent polluting the surrounding area from open burning and proper disposal of domestic waste. d) Provide adequate health and hygiene facilities for workers on site.	1

Transportation		
SM8	Public Transport Accessibility	1
SM9	Green Vehicles Priority	1
SM10	Parking Capacity	1
Design		
SM11	Stormwater Control	1
SM12	Greenery & Roof	2
SM13	Building User Manual	1

SM8 Public Transport Accessibility	1

Reduce pollution and land development impacts from private car use. During site selection process, give preference to sites that are located within 1km radius of existing public transportation system, measured from the main entrance of the development or building.

Reduce pollution and land development impacts from automobile use:-	
Locate project within 1 km of an existing, or planned and funded, commuter rail, light rail or subway station. OR Locate project within 500 m of at least one bus stop.	1

SM9 Green Vehicles Priority	1

Provide preferred parking areas for fuel efficient vehicles, to encourage the use of such vehicles (e.g. hybrid vehicles).

Encourage use of green vehicles:-	
Provide low-emitting and fuel-efficient vehicles for 5% of Full-Time Equivalent (FTE) occupants AND provide preferred parking for these vehicles. *"Preferred parking" refers to the parking spots that are closest to the main entrance of the project (exclusive of spaces designated for handicapped or parking passes provided at a discounted price).*	1

SM10 Parking Capacity	1

Reward for not over-providing parking capacity. This is to encourage the use of public transport and carpools and reduce single occupancy private vehicle use. The environmental benefits of travelling by public transport include the reduction in the emission of greenhouse gases by private cars, thereby reducing urban pollution and traffic congestion.

Discourage over-provision of car parking capacity:-	
Size parking capacity to meet, but not to exceed the minimum local zoning requirements, AND provide preferred parking for carpools or vanpools for 5% of the total provided parking spaces.	1

Transportation		
SM8	Public Transport Accessibility	1
SM9	Green Vehicles Priority	1
SM10	Parking Capacity	1
Design		
SM11	Stormwater Control	1
SM12	Greenery & Roof	2
SM13	Building User Manual	1

SM12 Greenery & Roof	2

Minimize impact on microclimate and human wildlife habitat.

Reduce heat island (thermal gradient difference between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat:-	
A) Hardscape & Greenery Application:	
1) Provide any combination of the following strategies for 50% of the site hardscape (including sidewalks, courtyards, plazas and parking lots): a) Shade (within 5 years of occupancy); b) Paving materials with a Solar Reflectance Index (SRI) of at least 29; c) Open grid pavement system;	1

SM12 Greenery & Roof cont'd	2

B) Roof Application:

1) Use roofing material with a Solar Reflectance Index (SRI) equal to or greater than the value in the table below for a minimum of 75% of the roof surface; OR

2) Install a vegetated roof for at least 50% of the roof area; OR

3) Install high albedo and vegetated roof surfaces that, in combination, meet the following criteria:

(Area of SRI Roof / 0.75) + (Area of vegetated roof / 0.5) ≥ Total Roof Area

Roof Type	*Slope*	*SRI*
Low-Sloped Roof	*< 2:12*	*78*
Steep-Sloped Roof	*> 2:12*	*29*

1

SM12 Greenery & Roof cont'd	2

Reward for achieving any option. Roof application includes roofs over individual parking lots and roofs over parking structures.

For vegetated roofs, refer also SM4.

The use of greenery on rooftops can help alleviate urban heat island effects through shading and evaporative cooling. It also enhances aesthetics and provides a more pleasant working environment, which is also discussed in Indoor Environment Quality.

SM13 Building User Manual	1

A Building User Manual is intended to inform occupants about the active and passive design features that should be maintained throughout the lifespan of the building.

Document Green building design features and strategies for user information and guide to sustain performance during occupancy:-	
Provide a Building User Manual which documents passive and active features that should not be downgraded.	1

4) Materials & Resources 11pts

Reused & Recycled Materials		
MR1	Material reuse and selection	2
MR2	Recycled Content Materials	2
Sustainable Resources		
MR3	Regional Materials	1
MR4	Sustainable Timber	1
Waste Management		
MR5	Storage and Collection of Recyclables	1
MR6	Construction Waste Management	2
Green Products		
MR7	Refrigerants & Clean Agents	2

4) Materials & Resources 11pts

Reused & Recycled Materials		
MR1	Material reuse and selection	2
MR2	Recycled Content Materials	2
Sustainable Resources		
MR3	Regional Materials	1
MR4	Sustainable Timber	1
Waste Management		
MR5	Storage and Collection of Recyclables	1
MR6	Construction Waste Management	2
Green Products		
MR7	Refrigerants & Clean Agents	2

MR5 Storage and Collection of Recyclables	1

Provide dedicated areas and storage bins for non-hazardous materials for recycling during **BOTH** construction and building occupancy.

Facilitate reduction of waste generated during construction and during building occupancy that is hauled and disposed off in landfills:-	
During Construction, provide dedicated area/s and storage for collection of non-hazardous materials for recycling, AND During Building Occupancy, provide permanent recycle bins.	1

MR6 Construction Waste Management	2

Develop and implement a construction waste management plan that, as a minimum identifies the materials to be diverted from disposal regardless of whether the materials will be sorted on site or co-mingled. Quantify by measuring total truck loads of waste sent for disposal:-	
Recycle and/or salvage ≥ 50% volume of non-hazardous construction debris OR	1
Recycle and/or salvage ≥ 75% volume of non-hazardous construction debris.	2

4) Materials & Resources 11pts

Reused & Recycled Materials		
MR1	Material reuse and selection	2
MR2	Recycled Content Materials	2
Sustainable Resources		
MR3	Regional Materials	1
MR4	Sustainable Timber	1
Waste Management		
MR5	Storage and Collection of Recyclables	1
MR6	Construction Waste Management	2
Green Products		
MR7	Refrigerants & Clean Agents	2

MR7 Refrigerants & Clean Agents	2

Demonstrate leadership in accelerating phase-out of all Ozone Depleting Substances.

Recognise and promote use of low Global Warming Substances.

Use environmentally-friendly Refrigerants and Clean Agents exceeding Malaysia's commitment to the Montreal & Kyoto protocols:-	
Use zero Ozone Depleting Potential (ODP) products: non-CFC and non-HCFC refrigerants/clean agents;	1
Use non-synthetic (natural) refrigerants/clean agents with zero ODP and negligible Global Warming Potential.	1

5) Water Efficiency — 10 points

Water Harvesting & Recycling	
WE1 Rainwater Harvesting	2
WE2 Water Recycling	2
Increased Efficiency	
WE3 Water Efficient Irrigation	2
WE4 Water Efficient Fittings	2
WE5 Metering and Leak Detection System	2

5) Water Efficiency — 10 points

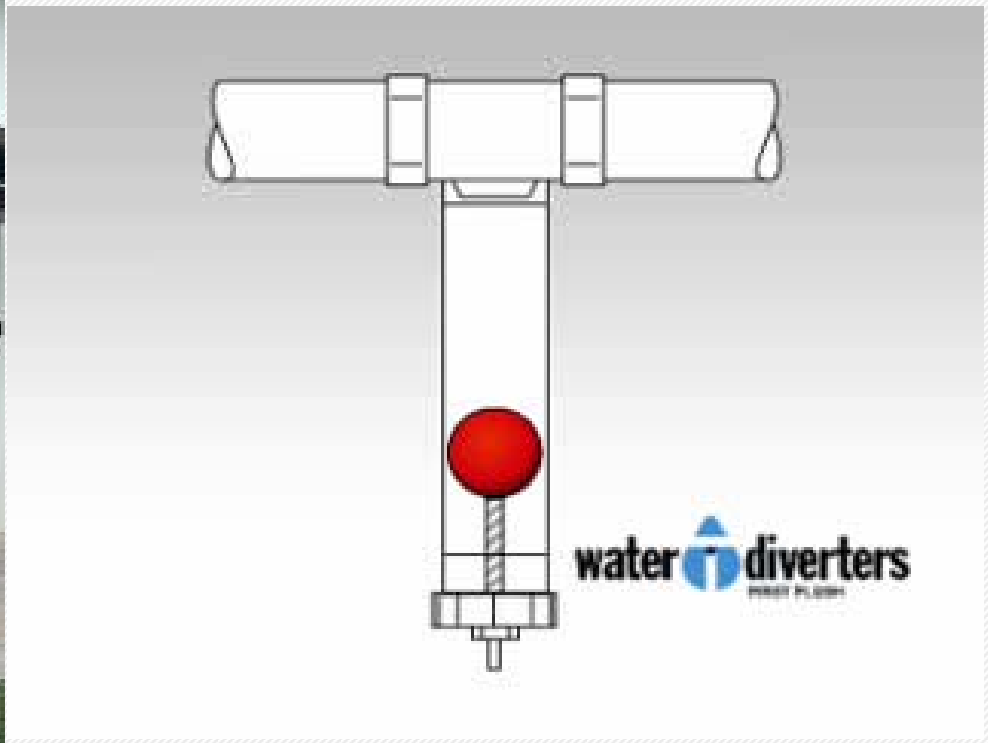
Water Harvesting & Recycling	
WE1 Rainwater Harvesting	2
WE2 Water Recycling	2
Increased Efficiency	
WE3 Water Efficient Irrigation	2
WE4 Water Efficient Fittings	2
WE5 Metering and Leak Detection System	2

WE1 Rainwater Harvesting	2

Promote Rainwater Harvesting

Encourage rainwater harvesting that will lead to reduction in potable water consumption:-	
Rainwater harvesting that leads to ≥15% reduction in potable water consumption, OR	1
Rainwater harvesting that leads to ≥30% reduction in potable water consumption	2

Typical Details On First Flash Rainwater and Water Diverter (Commercial Usage)



5) Water Efficiency — 10 points

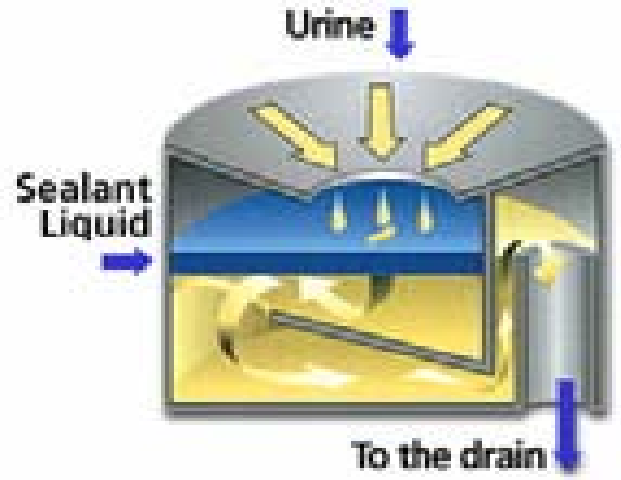
Water Harvesting & Recycling	
WE1 Rainwater Harvesting	2
WE2 Water Recycling	2
Increased Efficiency	
WE3 Water Efficient Irrigation	2
WE4 Water Efficient Fittings	2
WE5 Metering and Leak Detection System	2

WE4 Water Efficient Fittings	2

Minimise wastage of energy intensive treated water.

Encourage reduction in potable water consumption through use of efficient devices:-	
Reduce annual potable water consumption by ≥30%, OR	1
Reduce annual potable water consumption by ≥50%	2

Waterless Urinal & Cartridge



WE5 Metering and Leak Detection System	2

Minimise unnecessary loss of potable water.

Encourage the design of systems that monitors and manages water consumption:-	
Use of sub-meters to monitor and manage major water usage for cooling towers, irrigation, kitchens and tenancy use	1
Link all water sub-meters to EMS to facilitate early detection of water leakage	1

6) Innovation — 7 points

IN1	Innovation in Design & Environment Design Initiatives	6
IN2	Green Building Index Facilitator	1

IN1 Innovation in Design & Environment Design Initiatives	6

Reward innovation and initiatives

Provide design team and project the opportunity to be awarded points for exceptional performance above the requirements set by GBI rating system:-	
1 point for each approved innovation and environmental design initiative up to a maximum of 6 points, such as;	
Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling tower make-up water etc;	

IN1 Innovation in Design & Environment Design Initiatives cont'd	6

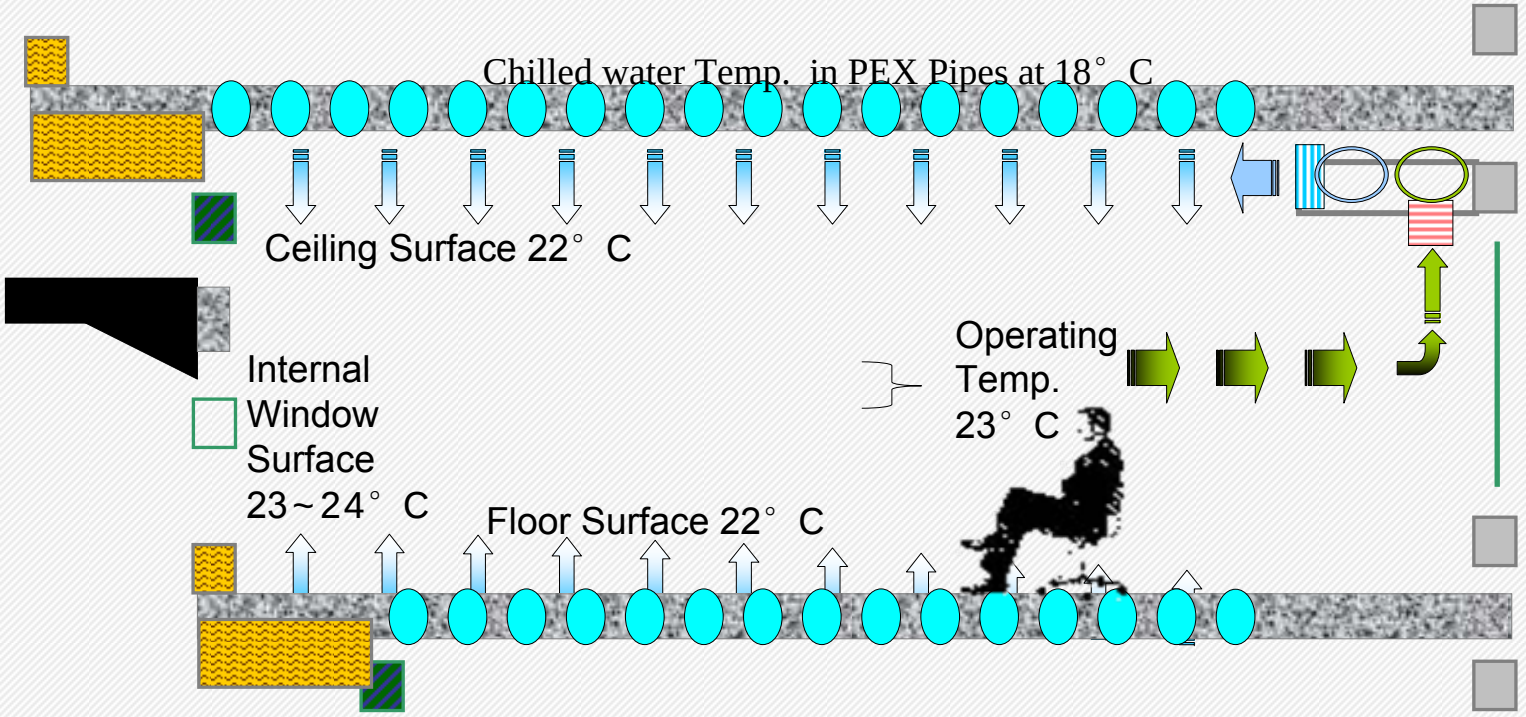
Co-generation / Tri-generation system;Thermal / PCM / Thermal Mass storage system (accounting for at least 25% of total required capacity); Solar thermal technology / Solar Airconditioners (generating at least 10% of total required capacity); Heat recovery system (contributing to at least 10% of total required capacity); Heat pipe technology;Light pipes;Auto-condenser tube cleaning system (fitted to plant equipment serving at least 50% of total capacity); Non-chemical water treatment system (serving at least 50% of total capacity);	

IN1 Innovation in Design & Environment Design Initiatives cont'd	6

Mixed mode / low energy ventilation system; Advanced air filtration technology (serving at least 50% of the NLA); Waterless urinals (fitted to all male toilets); Central vacuum system (serving at least 50% of NLA); Central Pneumatic Waste Collection system; Self-cleaning façade; Electrochromic glazed façade; Refrigerant leakage detection and recycling facilities; Recycling of all fire system water during regular testing;	6

ACTIVE STRATEGY:

Radiant Floor & Thermal Storage System



Electrochromic Glazing

OFF

ON

THANK YOU