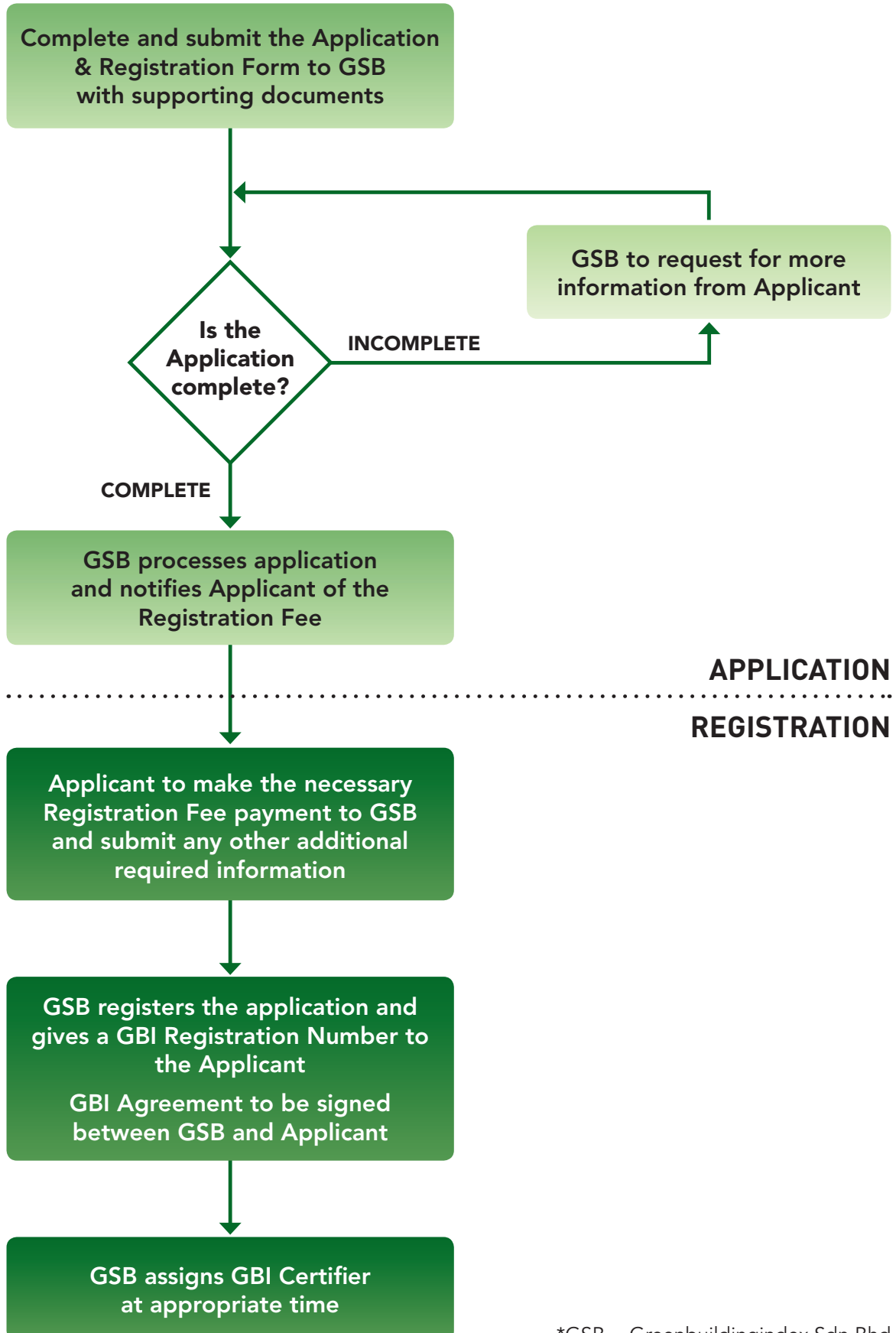
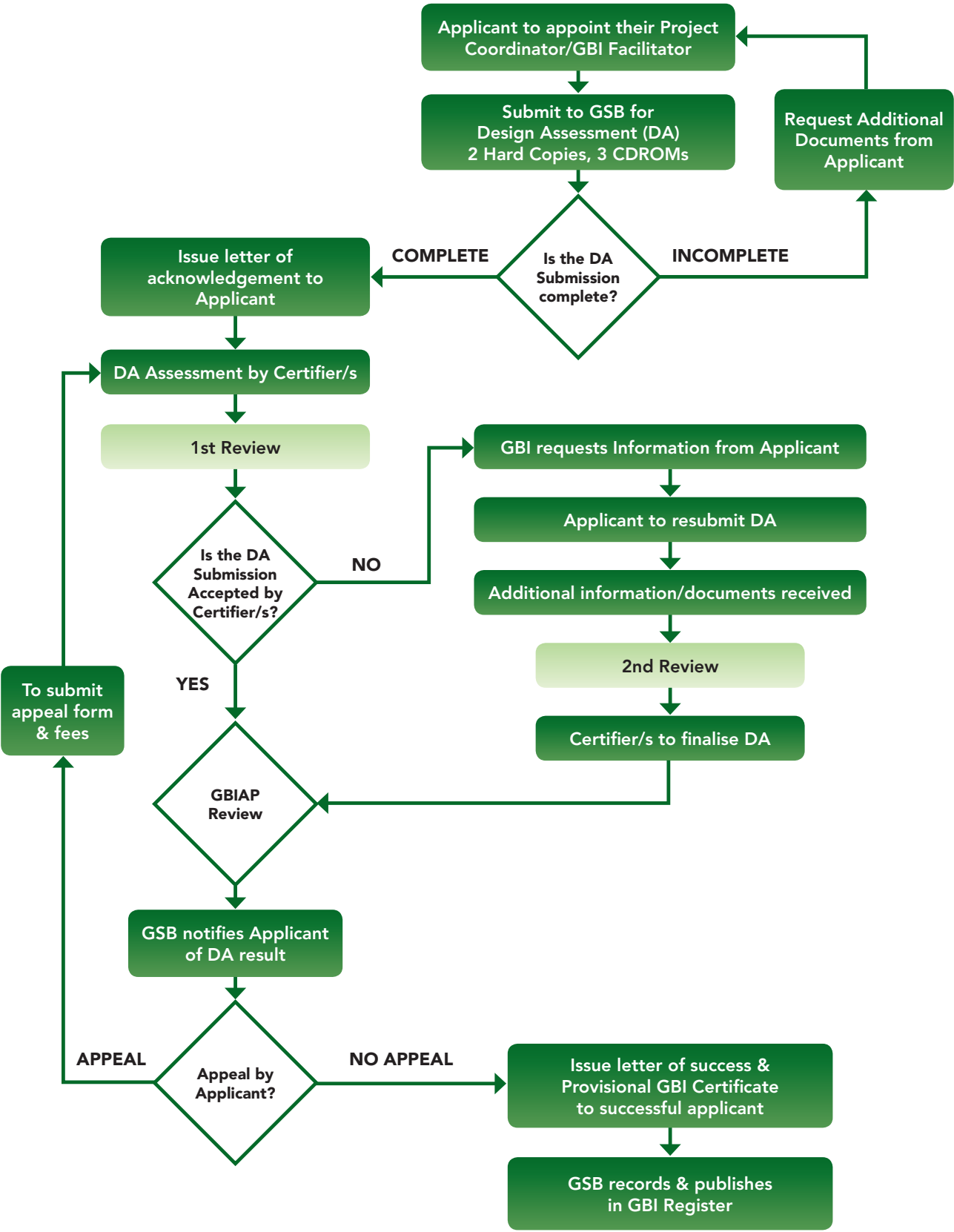


STAGE 1 APPLICATION & REGISTRATION

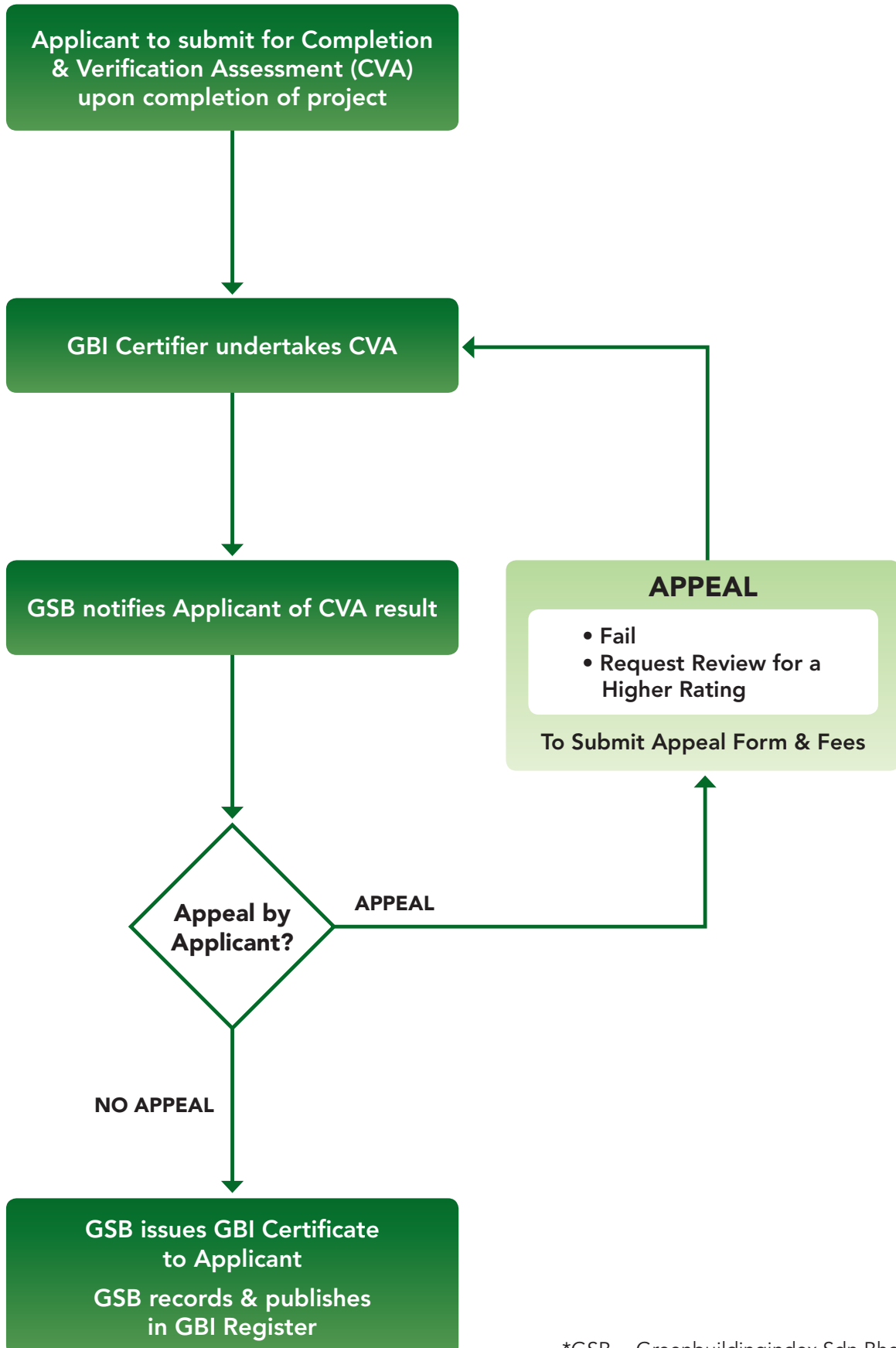


STAGE 2 DESIGN ASSESSMENT (DA)



*GSB = Greenbuildingindex Sdn Bhd

STAGE 3 COMPLETION & VERIFICATION ASSESSMENT (CVA)





**INDUSTRIAL NEW
CONSTRUCTION (INC)
DESIGN REFERENCE GUIDE
& SUBMISSION FORMAT**

VERSION 1.01 | SEPTEMBER 2011

www.greenbuildingindex.org | info@greenbuildingindex.org

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INTRODUCTION

The purpose of the Green Building Index Design Reference Guide is to establish a guidance document to assist project teams in understanding the criteria for each of the main components of the Green Building Index Rating Tool. The project team can use the document as a guide when submitting for the Green Building Index as it clearly identifies examples of how and what is required for completing the submission. Each of the main six criteria's are further divided into the corresponding sub-sections in obtaining the necessary credit points. This guide is indicative and not an exhaustive/definitive reference to the Green Building Index rating tool.

The basic framework of this document sets out for each subsection the intent, description, requirements, approach & implementation and in some occasions, calculations to achieve the credit point for each sub-section. The Green Building Index Design Reference Guide further becomes the base curriculum for the training of facilitators on the Green Building Index Rating Tools.

To attain the Green Building Index classification, the procedures are as follows:

- STAGE 1 APPLICATION & REGISTRATION**
- STAGE 2 DESIGN ASSESSMENT (DA)**
- STAGE 3 COMPLETION & VERIFICATION ASSESSMENT (CVA)**

A summary of the stages is described below:

STAGE 1 | APPLICATION & REGISTRATION

Complete and Submit application form with Owner's information, project contact details, project information and any supporting documents to Greenbuildingindex Sdn Bhd (GSB). Upon acceptance & approval of the application documentation, the registration fee will be confirmed dependent on the size of the project. On payment of fees, a GBI registration number will be given, and the terms and conditions duly signed between owner and GSB. A GBI Certifier will be assigned for the duration of the project.

GBI Registration Fees can be obtained from www.greenbuildingindex.org

GBI Terms & Conditions

An agreement setting out the terms and conditions between Project owner and Greenbuildingindex Sdn Bhd is to be duly signed at this stage.

STAGE 2 | DESIGN ASSESSMENT (DA)

Appraisal conducted upon the submission by the Project Design team / Client (Architect/Engineer/ Building Owner or Developer directly or through a GBI Facilitator) of comprehensive design and other necessary documents for Green Building Index Assessment. After acceptance of registration from GBI, the Project Design team & client should proceed to collect information for each of the six criteria completing the submittal requirements described under each detailed sub-section. It is recommended that the information submitted is based on preconstruction information (ie tender documentation stage) when all parameters of the design have been finalised. A Provisional Design Assessment certificate is given at this stage. A summary Design Assessment (DA) checklist is provided to determine target scoring.

STAGE 3 | COMPLETION & VERIFICATION ASSESSMENT (CVA)

Appraisal conducted upon CPC of the project when all necessary documents are re-submitted according to as-built information and calculations by the Project Design Team / Client (Architect/Engineer/Building Owner or Developer directly or through a GBI Facilitator). The Completion & Verification Assessment confirms that the targeted criteria have been properly implemented and achieved, or otherwise, for the intended classification.

GBI verifies within 12 months of CPC (or CCC/OC/OP whichever is the later); or earlier, if occupancy is not less than 50%, on the project classification. The verification process involves verifying the actual measured energy and water use, sustainable measures, indoor comfort survey results and action plan, Building Manual and Sustainable Maintenance program. A full Certification is given at this stage. A summary Completion & Verification Assessment (CVA) checklist is provided to determine target scoring.

APPEAL PROCEDURES

Appeal can be submitted (with fee paid) after receiving the Design Assessment result or after receiving the Completion & Verification Assessment results.

VALIDITY OF CERTIFICATION

The validity of the certification is limited for three years. This is to encourage sustainable building maintenance management throughout the life of the building.

CERTIFIERS & FACILITATORS

GBI Certifiers perform the detailed assessment and accrediting tasks of building projects submitted to the GBI Accreditation Panel (GBIAP) for final certification.

GBI Facilitators provide services to enable building projects to achieve GBI Accreditation. A GBI Facilitator is a registered person with GSB having completed the training and examinations conducted by GSB.

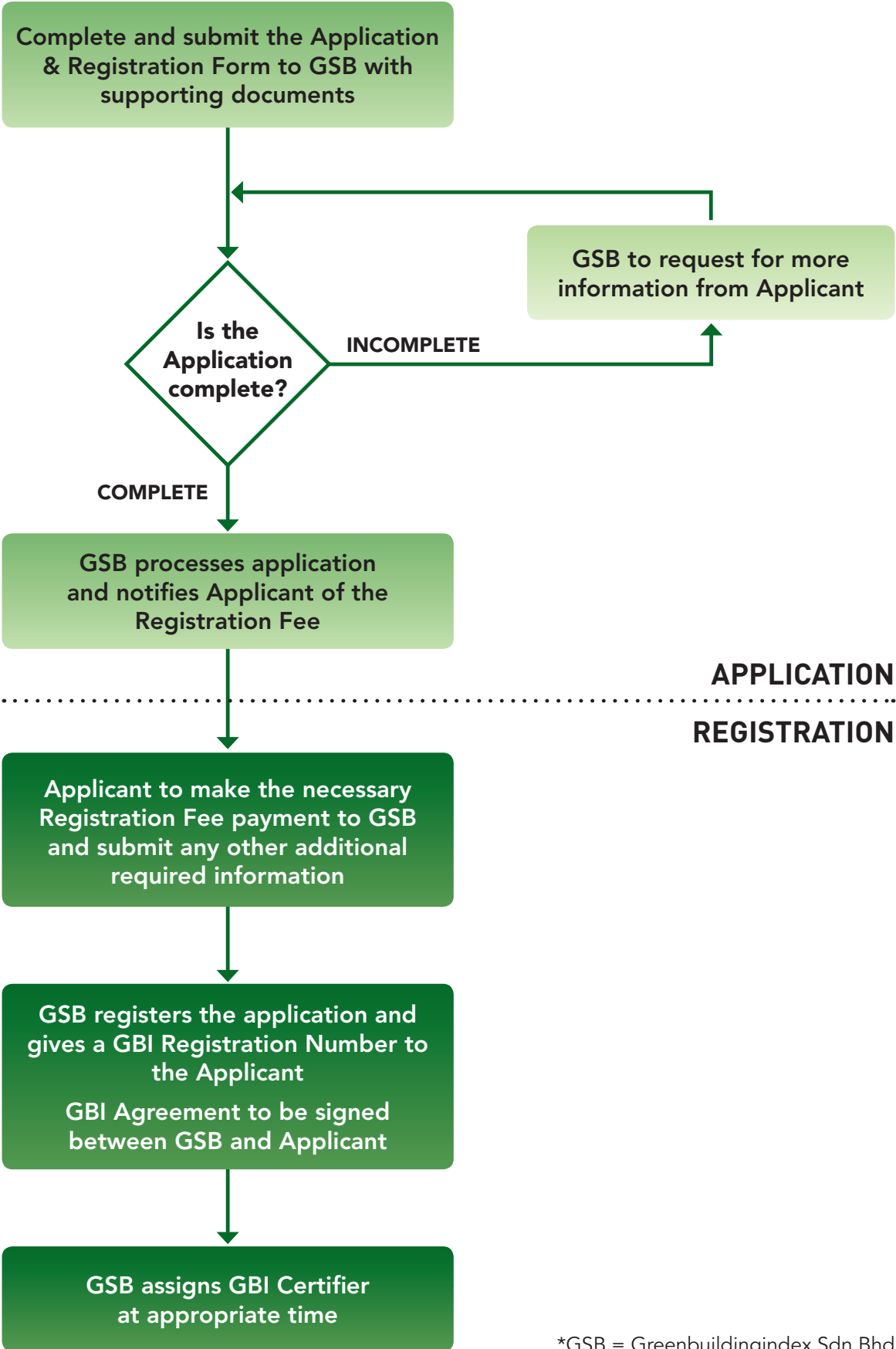
GBI TERMS & CONDITIONS

An agreement setting out the terms and conditions between the Project owner and Greenbuildingindex Sdn Bhd.



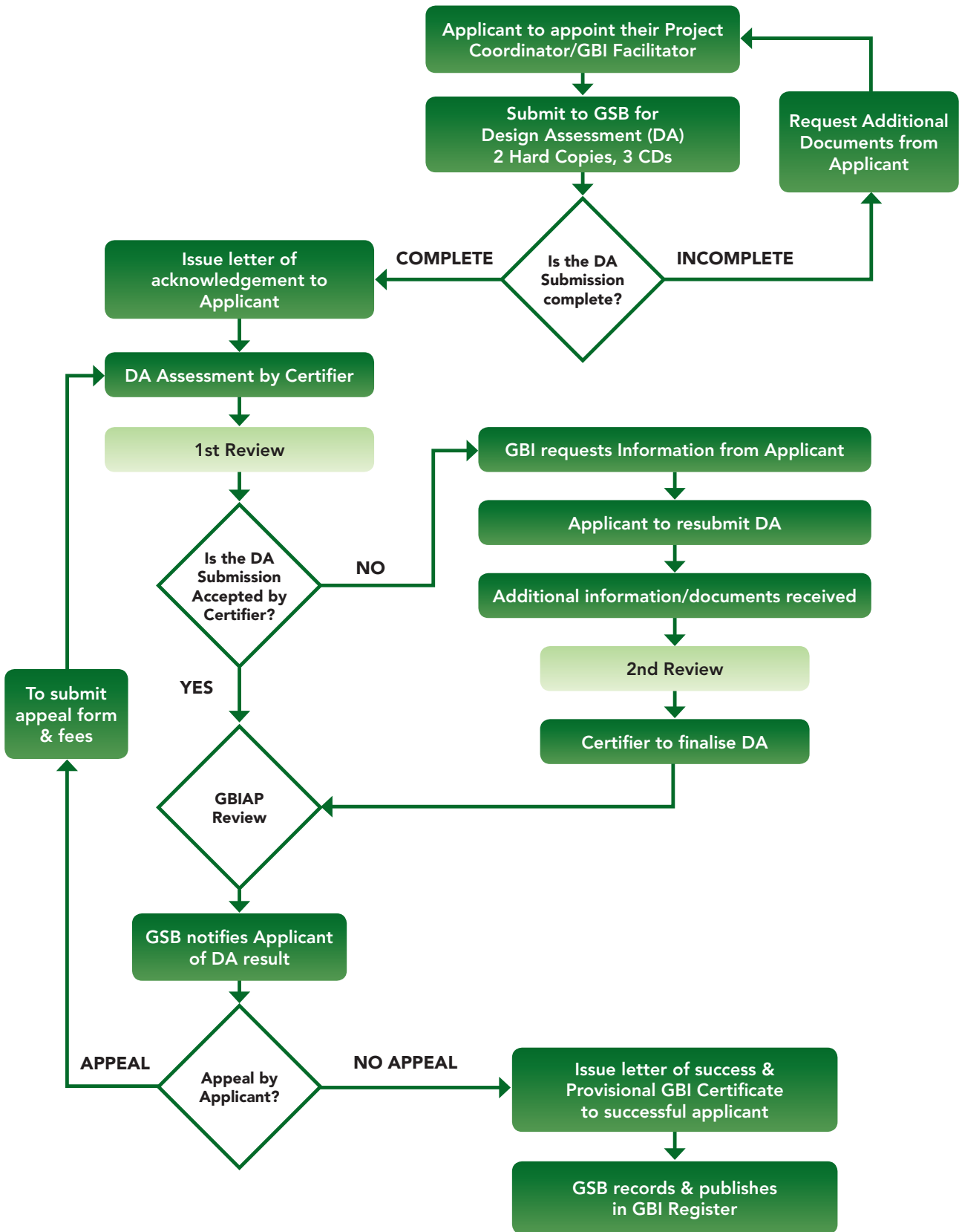
**INDUSTRIAL NEW
CONSTRUCTION (INC)
PROCEDURES**

STAGE 1 APPLICATION & REGISTRATION



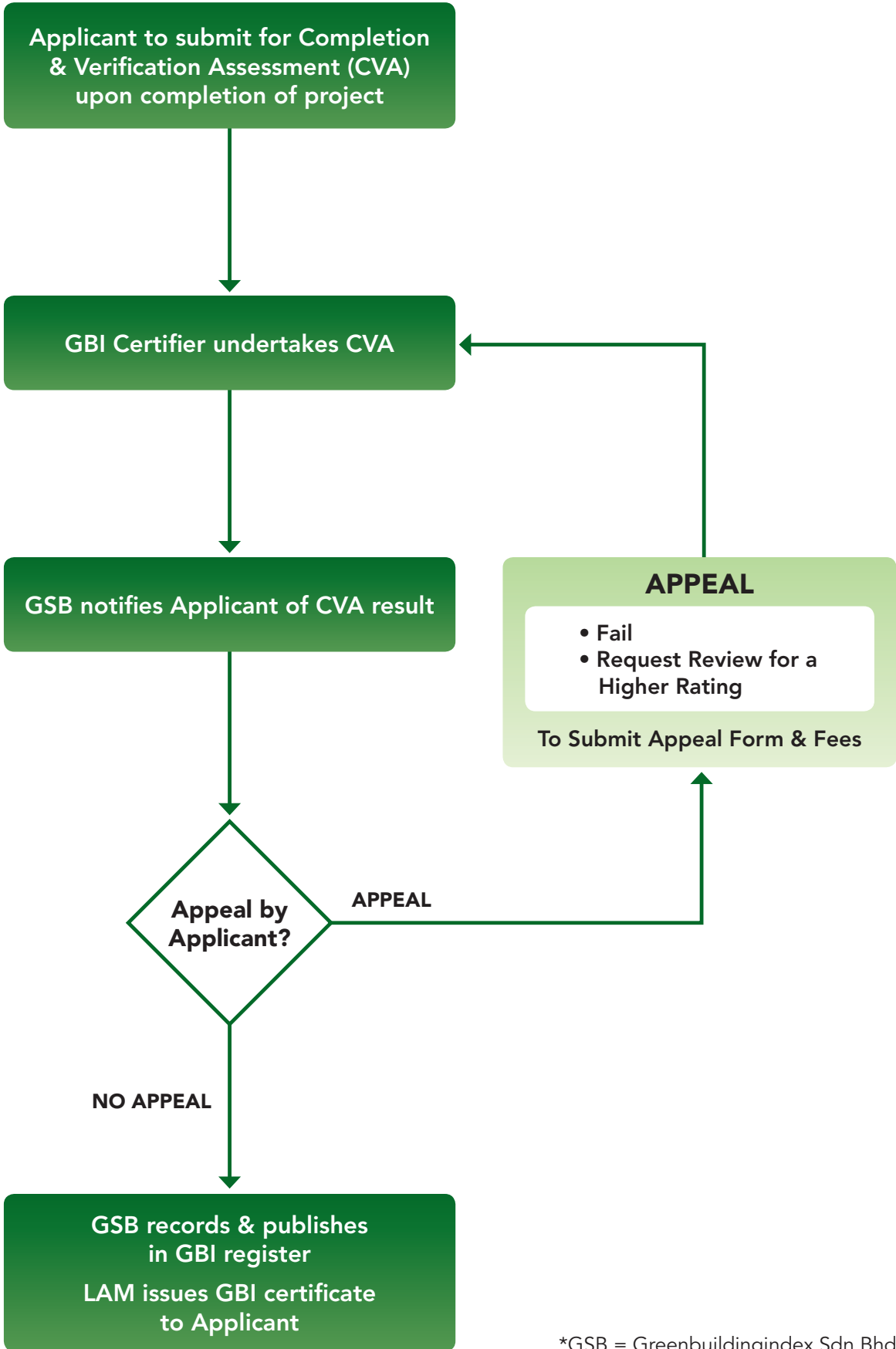
*GSB = Greenbuildingindex Sdn Bhd

STAGE 2 DESIGN ASSESSMENT (DA)



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STAGE 3 COMPLETION & VERIFICATION ASSESSMENT (CVA)



*GSB = Greenbuildingindex Sdn Bhd



**INDUSTRIAL NEW
CONSTRUCTION (INC)
CRITERIA CHECKLIST
& SUBMISSION FORMAT**

INDUSTRIAL NEW CONSTRUCTION (INC) PROJECT INFORMATION

NAME OF BUILDING	
ADDRESS OF BUILDING	
POSTCODE	
STATE	

APPLICANT	
CONTACT PERSON	

ARCHITECT	
CIVIL ENGINEER	
STRUCTURAL ENGINEER	
MECHANICAL ENGINEER	
ELECTRICAL ENGINEER	
QUANTITY SURVEYOR	
LAND SURVEYOR	
LANDSCAPE CONSULTANT	
OTHER SPECIALIST CONSULTANT(S)	
MAIN CONTRACTOR	
LOCAL AUTHORITY	
TOTAL GROSS FLOOR AREA	
LAND AREA FOR LANDED PROPERTY	

BUILDING AND INDUSTRIAL PROCESS DESCRIPTION	

INDUSTRIAL NEW CONSTRUCTION (INC)

ASSESSMENT CRITERIA OVERALL POINTS SCORE

PART	ITEM	MAXIMUM POINTS
1	Energy Efficiency (EE)	33
2	Indoor Environmental Quality (EQ)	22
3	Sustainable Site Planning & Management (SM)	18
4	Material & Resources (MR)	10
5	Water Efficiency (WE)	10
6	Innovation (IN)	7
TOTAL SCORE		100

GREEN BUILDING INDEX CLASSIFICATION

POINTS	GBI RATING
86 points and above	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

INDUSTRIAL NEW CONSTRUCTION (INC) ASSESSMENT CRITERIA SCORE SUMMARY

PART	CRITERIA	ITEM	POINTS	SUBMITTER	GBI	
1	EE	ENERGY EFFICIENCY				
		Design				
		EE1	Minimum EE Performance	1		
		EE2	Lighting Zoning	3		
		EE3	Electrical Sub-metering	1		
		EE4	Renewable Energy & Onsite Energy Capture/Recovery	8		
		EE5	Advanced or Improved EE Performance - BEI and/or EUI	10		
		Commissioning				
		EE6	Enhanced Commissioning	4		
		EE7	On-going Post Occupancy Commissioning	2		
		Verification & Maintenance				
		EE8	EE Verification	2		
	EE9	Sustainable Maintenance	2			
2	EQ	INDOOR ENVIRONMENTAL QUALITY				
		Air Quality				
		EQ1	Minimum IAQ Performance	1		
		EQ2	Environmental Tobacco Smoke (ETS) Control	1		
		EQ3	Carbon Dioxide Monitoring and Control	1		
		EQ4	Indoor Air Pollutant & Industrial Chemical Exposure	3		
		EQ5	Mould Prevention	1		
		Thermal Comfort				
		EQ6	Thermal Comfort: Design & Controllability of Systems	2		
		EQ7	Air Change Effectiveness	1		
		EQ8	Breakout Spaces	1		
		Lighting, Visual & Acoustic Comfort				
		EQ9	Daylighting	2		
		EQ10	Daylight Glare Control	1		
		EQ11	Electric Lighting Levels	1		
		EQ12	High Frequency Ballasts	1		
	EQ13	External Views	2			
	EQ14	Internal Noise Levels	1			
	Verification					
	EQ15	IAQ Before & During Occupancy	2			
	EQ16	Post Occupancy Comfort Survey: Verification	1			

GREEN BUILDING INDEX DESIGN REFERENCE GUIDE & SUBMISSION FORMAT

PART	CRITERIA	ITEM	POINTS	SUBMITTER	GBI	
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT				
	Site Planning					
	SM1	Site Selection	1			
	SM2	Brownfield Redevelopment	1			
	SM3	Development Density & Community Connectivity	2			
	SM4	Environment Management	2			
	SM5	Noise Pollution	1			
	Construction Management					
	SM6	Earthworks - Construction Activity Pollution Control	1			
	SM7	QLASSIC	1			
	SM8	Workers Site Amenities	1			
	Transportation					
	SM9	Public Transportation Access & Transportation Plan	1			
	SM10	Green Vehicle Priority	1			
	SM11	Parking Capacity	1			
SM12	Cargo Delivery Route and Proximity	1				
Design						
SM13	Stormwater Design - Quality & Quantity Control	1				
SM14	Greenery & Roof	2				
SM15	Building User Manual	1				
4	MR	MATERIALS & RESOURCES				
	Reused & Recycled Materials					
	MR1	Materials Reuse and Selection	2			
	MR2	Recycled Content Materials	2			
	Sustainable Resources					
	MR3	Regional Materials	1			
	MR4	Sustainable Timber	1			
	Waste Management					
	MR5	Storage & Collection of Recyclables	1			
	MR6	Construction Waste Management	2			
Green Products						
MR6	Refrigerants & Clean Agents	1				
5	WE	WATER EFFICIENCY				
	Water Harvesting & Recycling					
	WE1	Rainwater Harvesting	2			
	WE2	Water Recycling	2			
	Increased Efficiency					
	WE3	Water Efficient Irrigation/Landscaping	2			
WE4	Water Reduction	2				
WE5	Metering & Leak Detection System	2				
6	IN	INNOVATION				
	IN1	Innovation & Environmental Design Initiatives	6			
	IN2	Green Building Index Facilitator	1			
TOTAL POINTS			100			

INDUSTRIAL NEW CONSTRUCTION (INC)

The Industrial New Construction (INC) Reference Guide is formatted in reference to the Industrial New Construction (INC) Tool. It is envisaged that this reference guide is a live document that from time to time will be updated for the benefit of the end users.

The Reference guide has been formatted to form part of the basic criteria checklist for all documentation submissions for both the Design Assessment (DA) and Completion & Verification Assessment (CVA). The front cover sheet of the individual criteria is to be attached with documentation drawings, project narratives and technical submissions. The criteria checklist is to be signed by the Principal Submitting Person (in short "PSP"), Submitting Person (in short "SP") or Specialist (in short "S") together with the client's (in short "C"). Where the retrofitting works do not require appointment of the full compliment of consultants, the sole or lead consultant will sign in lieu.

Enclosed the summary checklist together with the corresponding signatories required for each criteria.

PART	CRITERIA	ITEM	REQUIRED SIGNATORIES
1	EE	ENERGY EFFICIENCY	
	EE1	Minimum EE Performance	PSP and C
	EE2	Lighting Zoning	SP and C
	EE3	Electrical Sub-metering	SP and C
	EE4	Renewable Energy & Onsite Energy Capture/Recovery	SP/S and C
	EE5	Advanced or Improved EE Performance – BEI and/or EUI	SP/S and C
	EE6	Enhanced Commissioning	SP/S and C
	EE7	On-going Post Occupancy Commissioning	SP/S and C
	EE8	EE Verification	SP/S and C
	EE9	Sustainable Maintenance	SP/S and C
2	EQ	INDOOR ENVIRONMENTAL QUALITY	
	EQ1	Minimum IAQ Performance	SP and C
	EQ2	Environmental Tobacco Smoke (ETS) Control	PSP and C
	EQ3	Carbon Dioxide Monitoring and Control	SP and C
	EQ4	Indoor Air Pollutant & Industrial Chemical Exposure	PSP and C
	EQ5	Mould Prevention	PSP/SP and C
	EQ6	Thermal Comfort: Design & Controllability of Systems	SP and C
	EQ7	Air Change Effectiveness	SP and C
	EQ8	Breakout Spaces	PSP and C
	EQ9	Daylighting	PSP and C
	EQ10	Daylight Glare Control	PSP and C
	EQ11	Electric Lighting Levels	SP and C
	EQ12	High Frequency Ballasts	SP and C
	EQ13	External Views	PSP and C
	EQ14	Internal Noise Levels	PSP/SP/S and C
	EQ15	IAQ Before & During Occupancy	SP/S and C
EQ16	Post Occupancy Comfort Survey: Verification	S and C	
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT	
	SM1	Site Selection	PSP and C
	SM2	Brownfield Redevelopment	PSP and C
	SM3	Development Density & Community Connectivity	PSP and C
	SM4	Environment Management	PSP and C
	SM5	Noise Pollution	PSP and C
	SM6	Earthworks – Construction Activity Pollution Control	SP and C
	SM7	QLASSIC	PSP and C
	SM8	Workers' Site Amenities	PSP and C
	SM9	Public Transportation Access & Transportation Plan	PSP and C
	SM10	Green Vehicle Priority	PSP and C
	SM11	Parking Capacity	PSP and C
	SM12	Cargo Delivery Route and Proximity	PSP and C
	SM 13	Stormwater Design – Quality & Quantity Control	SP and C
	SM14	Greenery & Roof	PSP/SP and C
SM15	Building User Manual	S and C	

GREEN BUILDING INDEX DESIGN REFERENCE GUIDE & SUBMISSION FORMAT

PART	CRITERIA	ITEM	REQUIRED SIGNATORIES
4	MR	MATERIALS & RESOURCES	
	MR1	Materials Reuse and Selection	PSP/QS and C
	MR2	Recycled Content Materials	PSP/QS and C
	MR3	Regional Materials	PSP/QS and C
	MR4	Sustainable Timber	PSP/QS and C
	MR5	Storage & Collection of Recyclables	PSP/S/QS AND C
	MR6	Construction Waste Management	PSP/QS AND C
	MR7	Refrigerants & Clean Agents	SP and C
5	WE	WATER EFFICIENCY	
	WE1	Rainwater Harvesting	PSP/SP/S and C
	WE2	Water Recycling	SP/S and C
	WE3	Water Efficient Irrigation/Landscaping	SP and C
	WE4	Water Reduction	PSP/SP/S and C
	WE5	Metering & Leak Detection System	SP and C
6	IN	INNOVATION	
	IN1	Innovation & Environmental Design Initiatives	PSP/SP/S and C
	IN2	Green Building Index Facilitator	S and C

PSP is defined as Architect or Engineer (similar to the definition in Certificate of Completion & Compliance, CCC)

SP is defined as Engineer, Landscape Architect, Planner and Quantity Surveyor (QS).

S is defined as Specialist which includes Facilitator, Project Manager, Facilities Manager, Energy or Sustainable Consultant and Commissioning Specialist.

C is defined as Client or client's assigned representative.

SUBMISSION FORMAT & SIGNATURES

All submission information shall be attached to their respective cover criteria sheet along with relevant signatures for each of the criteria. The criteria checklist is to be marked by the submitter on all project documentation as described under "Required Submission for Design Assessment (DA)" or "Required Submission for Completion & Verification Assessment (CVA)". Please leave the GBI's column for the administration of GSB. All documents must be duly verified and signed as part of the procedural requirements. GSB will return documents that are not submitted in full compliance for corrective action.

The following is the recommended format of all documents that will form the Design Assessment (DA) & Completion & Verification Assessment (CVA) submission;

1. All Drawings, Plans, Sections and Elevations to be formatted on A3 size paper, with respective scale or scales clearly indicated. Should drawings be too small for legibility, provide a key plan with part plans for full clarity of building information.
2. All Perspectives to fit A3 size paper.
3. All Reports to be A4 format. Signature of Qualified submitting professional should form part of the submission.
4. Clearly mark the Design Assessment Checklist or Completion & Verification Checklist on submission of documentations together with a Design Submission form.

All submission to be saved into CDROM pdf format. Two (2) hard copies and three (3) copies of CDROM are to be submitted to GSB.



**INDUSTRIAL NEW
CONSTRUCTION (INC)
ASSESSMENT CRITERIA**

INDUSTRIAL NEW CONSTRUCTION (INC)
ENERGY EFFICIENCY
(EE)

INDUSTRIAL NEW CONSTRUCTION (INC)
ENERGY EFFICIENCY (EE)

EE1	MINIMUM EE PERFORMANCE	1 POINT
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INTENT

To create energy efficiency (EE) awareness and promote the use of MS 1525.

DESCRIPTION

Establish minimum energy efficiency (EE) performance to reduce energy consumption in industrial buildings, thus reducing CO₂ emission to the atmosphere. Meet the following minimum EE requirements as stipulated in MS 1525.

REQUIREMENTS

Submit calculations for Overall Thermal Transfer Value (OTTV) ≤ 50 and Roof Thermal Transfer Value (RTTV) ≤ 25. Use of the BEIT software or other GBI approved software is acceptable,

AND

Provision of Energy Management System where Air Conditioned space ≥ 4,000m²

APPROACH & IMPLEMENTATION

Wall insulation can be achieved in many ways, such as, but not limited to, using autoclaved lightweight concretes, composite insulated walls, double brickwalls and many other construction systems. Glazing should be optimally sized. The use of Insulated Glazing Units and/or performance glazing such as low-e and/or spectrally selective glazing is encouraged. Roof should be insulated with suitable insulation materials to prevent heat gain into occupied spaces.

POTENTIAL TECHNOLOGIES & STRATEGIES

Design the building envelope, HVAC, lighting and other systems to maximize energy performance.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Plans and elevations marking out walls & apertures used for the calculation coloured blue; and walls & apertures not used for calculation coloured red. Recommended scale 1: 200	<input type="radio"/>	<input type="radio"/>
2. OTTV calculations for each facing wall and RTTV calculation for roof	<input type="radio"/>	<input type="radio"/>
3. Description of wall, roof & aperture materials specified.	<input type="radio"/>	<input type="radio"/>
4. Calculations of U-values for roof and walls.	<input type="radio"/>	<input type="radio"/>
5. Proposed Glazing specifications on Shading Coefficient, U-values and Visible Light Transmission.	<input type="radio"/>	<input type="radio"/>
6. Confirm provision of Energy Management System where air conditioned space ≥ 4,000m ² .	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built plans and elevations marking out walls & apertures used for the calculation coloured blue; and walls & apertures not used for calculation coloured red.	<input type="radio"/>	<input type="radio"/>
2. OTTV calculations for each facing wall and roof.	<input type="radio"/>	<input type="radio"/>
3. Description of built wall & aperture materials with U-value calculation	<input type="radio"/>	<input type="radio"/>
4. Manufacturer issued glazing specification on shading coefficient, U-values and Visible Light Transmission.	<input type="radio"/>	<input type="radio"/>
5. Description of as-installed Energy Management System and I/O schedule.	<input type="radio"/>	<input type="radio"/>
6. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE
SUBMITTING PROFESSIONAL	NAME	DESIGNATION	COMPANY	SIGNATURE
CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

INDUSTRIAL NEW CONSTRUCTION (INC) ENERGY EFFICIENCY (EE)

EE2	LIGHTING ZONING	3 POINTS
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INTENT

To provide flexible lighting controls so as to optimise energy savings.

DESCRIPTION

Encourage and recognise lighting design practices that offer greater flexibility for light switching, making it easier to light only occupied areas

REQUIREMENTS

1 point: Awarded for all individual or enclosed spaces to be individually switched; and the size of individually switched lighting zones shall not exceed 100m² for 90% of the NLA; with switching clearly labelled and easily accessible by building occupants.

1 point: Awarded for provision of auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylit areas, if any.

1 point: Awarded for provision of motion sensors or equivalent to complement lighting zoning for at least 25% NLA.

APPROACH & IMPLEMENTATION

Decreasing the size of lighting zones allows for more flexible control over lighting giving owners/tenants the ability to reduce energy consumption and costs by only lighting those areas or zones that are occupied or required.

POTENTIAL TECHNOLOGIES & STRATEGIES

Design lighting zones by increasing switching flexibility with controls by individual switches and/or automated sensing devices.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Drawings of floor plans clearly showing every proposed individually switched lighting zone and its coverage area.	<input type="radio"/>	<input type="radio"/>
2. Electrical schematic drawings showing the locations and extent of switching, the area controlled by the switch and automated control sensing system detailed.	<input type="radio"/>	<input type="radio"/>
3. Report to include the areas of all switched zones and confirmation that the total areas meet the percentage NLA requirements.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built Drawings of floor plans clearly showing each individually switched lighting zone and its coverage area.	<input type="radio"/>	<input type="radio"/>
2. As-Built Electrical schematic drawings showing the locations and extent of switching, the area controlled by the switch and automated control sensing system detailed.	<input type="radio"/>	<input type="radio"/>
3. Report to include the exact areas of all switched zones and confirmation that the total area meets the percentage NLA requirements.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE
SUBMITTING PROFESSIONAL	NAME	DESIGNATION	COMPANY	SIGNATURE
CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

INDUSTRIAL NEW CONSTRUCTION (INC) ENERGY EFFICIENCY (EE)

EE3	ELECTRICAL SUB-METERING	1 POINT
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INTENT

To monitor energy consumption of key building services as well as all tenancy and industrial plant areas.

DESCRIPTION

Encourage and recognise the provision of energy sub-metering to facilitate energy monitoring of base building services and industrial plant processes.

REQUIREMENTS

- 1 point:** Provide separate sub-metering for all energy use $\geq 100\text{kVA}$; with separate sub-metering for
- 1) Lighting, **AND**
 - 2) Power, **AND**
 - 3) Industrial processes

APPROACH & IMPLEMENTATION

For typical industrial buildings, separate metering shall be provided for car parks; chillers; AHUs; lifts; common area lighting and power and any additional item including plant equipment or process which carries an energy use $\geq 100\text{kVA}$.

For speculative industrial buildings, compliance is by demonstrating commitment and provision to install meters for separate tenancy and plant areas. As a minimum this is to be provided on each floor and to each wing or other clearly separable area or zone.

Where Energy Management System (EMS) is provided, all meters should be linked to the EMS for monitoring and recording, and control where appropriate.

POTENTIAL TECHNOLOGIES & STRATEGIES

Utilise Energy Management System (EMS) for measurement and management of energy usage including Maximum Demand Limiting.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. An extract from the specification detailing the installation requirements for electrical sub-meters that meets the credit criteria.	<input type="radio"/>	<input type="radio"/>
2. Clearly marked electrical schematic drawings showing the proposed locations of meters and the usage served by those meters.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built Electrical schematic drawings showing the exact locations of meters and the building usage served by those meters.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE
SUBMITTING PROFESSIONAL	NAME	DESIGNATION	COMPANY	SIGNATURE
CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

**INDUSTRIAL NEW CONSTRUCTION (INC)
ENERGY EFFICIENCY (EE)**

EE4	RENEWABLE ENERGY & ONSITE ENERGY CAPTURE/RECOVERY	8 POINTS
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INTENT

To promote use of all forms of renewable energy and/or onsite energy capture/recovery to reduce environmental impact and emission of CO₂.

DESCRIPTION

The use of renewable energy systems and/or onsite energy capture/recovery will help to defer the need for power plant-up and promote green energy use. Calculate the project performance by expressing the energy produced by the renewable energy systems and/or onsite energy capture/recovery as a percentage of the building annual energy use. In the context of the built environment in Malaysia, the most likely form of renewable energy would be derived from BIPV, STC and biomass. Other forms of renewable energy are also applicable with their appropriate conversion into equivalent electrical energy for calculation purposes.

REQUIREMENTS

- 1 point :** Awarded where 0.5% or 5 kWp whichever is the greater, of the equivalent total electricity consumption is generated by Renewable Energy (RE) and/or onsite energy capture/recovery, **OR**
- 2 points :** Awarded where 1.0% or 10 kWp whichever is the greater, **OR**
- 4 points :** Awarded where 1.5% or 20 kWp whichever is the greater, **OR**
- 6 points :** Awarded where 2.0% or 40 kWp whichever is the greater, **OR**
- 8 points :** Awarded where 2.5% or 60 kWp whichever is the greater.

- Notes:**
- i) Electricity includes other forms of energy.
 - ii) Building annual energy use for this criterion excludes energy consumed by the industrial plant process.

APPROACH & IMPLEMENTATION

Assess the project for renewable energy potential such as solar, wind, geothermal, low-impact hydro, biomass and other non-polluting technologies. Building Integrated Photo Voltaic (BIPV) is recommended to be used to generate renewable electricity in non-residential buildings in the Malaysian climate. The BIPV system can be grid connected or stand-alone system with or without battery pack to store excess energy production. Solar Thermal Cooling (STC) is also highly recommended for application in industrial buildings.

POTENTIAL TECHNOLOGIES & STRATEGIES

Assess the project for non-polluting and renewable energy potential such as solar, wind, geothermal, low-impact hydro, biomass and bio-gas strategies. When applying these strategies, take advantage of FiT where applicable.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Plans and elevations marking out areas allocated to house renewable energy equipment.	<input type="radio"/>	<input type="radio"/>
2. Describe proposed technology to be used, including documenting total kWp or equivalent to be installed.	<input type="radio"/>	<input type="radio"/>
3. Predict reduced total electricity consumption by the building and percentage of renewable energy to be generated.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built plans and elevations marking out installation and location of renewable energy equipment.	<input type="radio"/>	<input type="radio"/>
2. Manufacturer's technical specification of the renewable energy equipment.	<input type="radio"/>	<input type="radio"/>
3. As-Measured kWp or equivalent renewable energy generated.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC) ENERGY EFFICIENCY (EE)

EE5	ADVANCED EE PERFORMANCE – BEI AND/OR EUI	10 POINTS
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INTENT

To encourage enhancement of building and industrial plant process EE performance thereby reduce CO₂ emission.

REQUIREMENTS

Demonstrate that Energy Efficiency (EE) performance exceeds the baseline minimum to reduce energy consumption in the building and/or the industrial plant process. For building, improve Building Energy Intensity (BEI) as defined by GBI [use of GBI approved software is permitted]. For industrial plant process, use Energy Use Intensity (EUI) to compare against baseline data for similar plant process [baseline EUI shall be furnished by applicant for GBI acceptance]. Use BEI or EUI if either building or industrial plant process energy use constitutes more than 75% of the total energy use. Otherwise, calculate both BEI and EUI with the lower point score applicable, for award of points as follows:

1 point	where BEI ≤ 180 kWh/m ² /year or EUI improvement ≥ 10%
3 points	where BEI ≤ 150 kWh/m ² /year or EUI improvement ≥ 25%
4 points	where BEI ≤ 140 kWh/m ² /year or EUI improvement ≥ 30%
5 points	where BEI ≤ 130 kWh/m ² /year or EUI improvement ≥ 35%
6 points	where BEI ≤ 120 kWh/m ² /year or EUI improvement ≥ 40%
7 points	where BEI ≤ 110 kWh/m ² /year or EUI improvement ≥ 45%
8 points	where BEI ≤ 100 kWh/m ² /year or EUI improvement ≥ 50%
10 points	where BEI ≤ 90 kWh/m ² /year or EUI improvement ≥ 55%

APPROACH & IMPLEMENTATION

Cutting edge technologies and materials should be fully explored for application. For passive design applications, consider use of better insulation materials, such as wall insulation of autoclaved lightweight concrete, composite insulated wall, double brickwalls or other options. Glazing should be optimally sized and the use of performance glazing such as low-e and/or spectrally selective glazing is encouraged. Roof insulation should also be properly addressed. For active design applications, consider EE products for all components and educate users on need to reduce plug loads both in procurement policy and usage.

POTENTIAL TECHNOLOGIES & STRATEGIES

Design the building envelope and systems to maximize energy performance. Adopt the most energy efficient design concepts and strategies for both the building and plant process. For plant process, explore opportunities for energy recovery and/or reuse. Quantify BEI and/or EUI performance as compared to a baseline building/plant. Use of appropriate simulation software tools is encouraged.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. All documentation provided for EE1 (cross referenced)	<input type="radio"/>	<input type="radio"/>
2. Submit predicted BEI and/or EUI calculations.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Actual verified BEI achieved for completed building.	<input type="radio"/>	<input type="radio"/>
2. Actual EMS printouts.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC) ENERGY EFFICIENCY (EE)

EE6	ENHANCED COMMISSIONING	4 POINTS
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INTENT

To ensure building and industrial plant process energy related systems are installed to achieve proper commissioning so as to realise their full potential and intent. This will serve to eliminate the bad practice of not fully commissioning the installed systems.

REQUIREMENTS

Appoint an independent GBI recognised Commissioning Specialist (CxS) to ensure comprehensive commissioning is performed for all the building/plant energy related systems in accordance with ASHRAE Commissioning Guideline or other GBI approved equivalent standard/s by:

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

APPROACH & IMPLEMENTATION

Appointment of a CxS to provide commissioning advice (including accessibility and maintainability provisions) to the Client and to monitor and verify commissioning of the building and industrial plant process energy related systems.

POTENTIAL TECHNOLOGIES & STRATEGIES

Installation of state-of-the-art measuring devices and sensors compatible with the installed EMS will aid in commissioning and also enhance EE.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Confirmation letter from the CxS of his appointment and scope of works in accordance with the GBI CxS requirements.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Documentary evidence that the full scope of CxS works have been carried out during the contract administration phase.	<input type="radio"/>	<input type="radio"/>
2. The final commissioning report including recommendations to the client regarding the performance of the commissioned building energy related systems.	<input type="radio"/>	<input type="radio"/>
3. A copy of the systems manual as described in the CxS scope of works.	<input type="radio"/>	<input type="radio"/>
4. Documented evidence of training of building management staff.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
ENERGY EFFICIENCY (EE)

EE7	ON-GOING POST OCCUPANCY COMMISSIONING	2 POINTS
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INTENT

To ensure up-to-date on-going post occupancy/post plant operation commissioning are carried out for all tenancy fit-out and plant modification changes are completed.

REQUIREMENTS

1 point: Awarded where professional engineer/specialist reviews all tenancy fit-out plans / plant modification to ensure original design intent is not compromised and upon completion of the fit-out / plant modification works, verify and fine-tune the installations to suit.

1 point: Awarded where the CxS carries out a full post/re-commissioning of the energy related systems to verify that their performance is sustained in conjunction with the completed tenancy fit-outs / plant modifications within 12 months of practical completion (or earlier if there is at least 50% occupancy/plant operation).

APPROACH & IMPLEMENTATION

Professional engineer/specialist must check all fit-out designs and plant modifications. The CxS shall carry out the post occupancy commissioning for all tenancy areas after fit-out changes / plant modification changes are completed.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Declaration that post occupancy/modification commissioning will be undertaken.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Document what has been approved and constructed for post-occupancy fit-out/plant mod.	<input type="radio"/>	<input type="radio"/>
2. CxS to verify re-commissioning works, if applicable.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
ENERGY EFFICIENCY (EE)

EE8	EE VERIFICATION	2 POINTS
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INTENT

To verify predicted energy use of key building services and industrial plant process.

REQUIREMENTS

1 point: Awarded for the use of Energy Management System to monitor and analyse energy consumption including reading of sub-meters, **AND**

1 point: Fully commission EMS including Maximum Demand Limiting programme within 12 months of practical completion (or earlier if there is at least 50% building occupancy and plant operation).

APPROACH & IMPLEMENTATION

Fully commission the maximum demand limiting programme and utilise EMS to monitor energy consumption.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Declaration of commitment to carry out EE verification upon completion.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Actual verified BEI/EUI achieved, Renewable Energy generated and Water consumption for completed building/plant.	<input type="radio"/>	<input type="radio"/>
2. Where EMS is installed, comprehensive printouts of EMS results including Maximum Demand Limiting program setting.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
ENERGY EFFICIENCY (EE)

EE9	SUSTAINABLE MAINTENANCE	2 POINTS
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INTENT

To ensure the energy related systems will continue to perform as intended beyond 12 months Defects & Liability period.

REQUIREMENTS

1 point : Awarded where at least 50% of permanent 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 energy services, **AND**

Set up a permanent Energy Monitoring Committee (EMC) to ensure that plant energy performance is continuously monitored and improved.

1 point : Awarded for providing a designated facility maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage, **AND**

Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).

APPROACH & IMPLEMENTATION

Ensure the maintenance team fully participates in the testing and commissioning stage, understand the design intent and provide a 3-year sustainable maintenance program.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Identify building maintenance room and facilities in the design floor plan.	<input type="radio"/>	<input type="radio"/>
2. Commitment to deploy at least 50% of permanent maintenance team to be on-board one (1) to three (3) months before practical completion and to fully participate in the Testing & Commissioning of all energy services with organisation chart and staff positions identified.	<input type="radio"/>	<input type="radio"/>
3. Commitment to provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Documentary evidence that 50% of the maintenance team were involved in the full testing & commissioning of the building / plant process energy related systems.	<input type="radio"/>	<input type="radio"/>
2. Comprehensive list of maintenance tools and instrumentation, and inventory storage items.	<input type="radio"/>	<input type="radio"/>
3. Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget for facility maintenance (inclusive of staffing and outsourced contracts).	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
**INDOOR ENVIRONMENTAL
QUALITY (EQ)**

INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ1	MINIMUM IAQ PERFORMANCE	1 POINT
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INTENT

To provide for minimum IAQ performance in building and plant to ensure comfort and well-being of occupants.

DESCRIPTION

Design provision to meet the minimum requirements of ventilation rate in ASHRAE 62.1 or local building code, whichever is the more stringent.

REQUIREMENTS

Meet the minimum requirements specified in ASHRAE 62.1 or local building code whichever is stricter.

APPROACH & IMPLEMENTATION

Designing ventilation system to meet the minimum requirement specified in ASHRAE 62.1 ensures adequate fresh air is available to occupants in the space. The Ventilation Rate Procedure or the Indoor Air Quality Procedures can be used to determine the minimum required ventilation rates for various applications. Ventilation Rate Procedure is more straightforward to apply. The IAQ Procedure of ASHRAE 62.1 is a performance-based procedure that addresses designing the ventilation system to maintain acceptable levels of known contaminants.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Description of the ventilation design.	<input type="radio"/>	<input type="radio"/>
2. Schematic to illustrate the ventilation system design.	<input type="radio"/>	<input type="radio"/>
3. Summary table with calculations to illustrate how the delivered minimum outdoor airflow to each zone and the outdoor air intake for the system meet the requirements of ASHRAE and/or local code.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings to illustrate the ventilation system design.	<input type="radio"/>	<input type="radio"/>
2. Summary report to describe the ventilation design and how it complies with ASHRAE 62.1 and/or the local code including information regarding the fresh air intake volumes and any special conditions that affect the ventilation design.	<input type="radio"/>	<input type="radio"/>
3. Detailed calculations or simulations to show how the delivered minimum outdoor airflow to each zone and outdoor airflow air intake for the system meet the requirements in ASHRAE and/or local code.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ2	ENVIRONMENTAL TOBACCO SMOKE (ETS) CONTROL	1 POINT
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INTENT

To minimize exposure of building and plant occupants to Environmental Tobacco Smoke.

DESCRIPTION

Avoid health problems associated with tobacco smoke by preventing possible contamination in the building and plant, thereby reducing health risks to occupants linked to "second-hand smoke".

REQUIREMENTS

Prohibit smoking in the building and plant area; and locate any exterior designated smoking areas at least 10m away from entries, outdoor air intakes and operable windows, **OR**

Prohibit smoking in the building and plant area except in designated smoking room, and establish negative pressure in the smoking rooms together with provision of effective air filtration system.

APPROACH & IMPLEMENTATION

Prohibition of smoking in air-conditioned public building is already mandatory under Malaysian Law. This credit can be achieved by strictly enforcing prohibition of smoking in the premises, through supervision or signage. If designated smoking areas are provided outside the premises, ensure that the tobacco smoke does not enter the rest of the premises or the ventilation system.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Description of strategies to be employed in the premises to achieve this credit (by means of management policy or signage proposal).	<input type="radio"/>	<input type="radio"/>
2. Plans showing the location of exterior and/or interior designated smoking areas, if any.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings identifying location of exterior and/or interior designated smoking areas	<input type="radio"/>	<input type="radio"/>
2. Summary report describing strategies undertaken to ensure prohibition of smoking indoors can be enforced and strategies implemented to ensure that tobacco smoke will not enter the premises or ventilation system where exterior and/or interior smoking area is provided.	<input type="radio"/>	<input type="radio"/>
3. Photographic evidence of strategies adopted.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ3	CARBON DIOXIDE MONITORING AND CONTROL	1 POINT
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INTENT

To provide capacity for effective ventilation system monitoring and control so as to ensure comfort and well-being of building and plant occupants.

DESCRIPTION

Use carbon dioxide monitoring and control system to deliver the required outdoor air to the occupants to suit variation in occupancy.

REQUIREMENTS

Install carbon dioxide (CO₂) monitoring and control system with at least one (1) CO₂ sensor at main return air points on each floor to facilitate continuous monitoring and adjustment of outside air ventilation rates to each floor, and ensure independent control of ventilation rates to maintain CO₂ level < 1,000 ppm.

APPROACH & IMPLEMENTATION

Use of carbon dioxide monitoring system is a typical energy conservation measure to ensure different spaces receive adequate outdoor air for their current occupancy and the ventilation system can adjust the ventilation rate to meet changing requirements. This helps to ensure occupants will receive adequate outdoor air at all times.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submission of ventilation and control schematics together with description of how CO ₂ monitoring and controls are integrated into the ventilation design.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings showing the installed sensors and controls.	<input type="radio"/>	<input type="radio"/>
2. Summary report on the ventilation design and CO ₂ monitoring and control system including information regarding the location, quantity of installed sensors, the operational parameters and set points.	<input type="radio"/>	<input type="radio"/>
3. Manufacturer's information confirming the specifications of the CO ₂ sensors.	<input type="radio"/>	<input type="radio"/>
4. Photographic evidence of typical installations.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ4	INDOOR AIR POLLUTANTS & INDUSTRIAL CHEMICAL EXPOSURE	3 POINTS
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INTENT

To minimize detrimental impact on occupants’ health from finishes that emits internal air pollutants and exposure to industrial chemicals.

DESCRIPTION

Encourage the use and specification of healthy materials and finishes which contain low volatile organic compounds (VOC) and formaldehyde.

REQUIREMENTS

1 point: Use low VOC paint and coating throughout the building and plant area. Paints and Coatings to comply with requirements specified in international labelling schemes recognized by GBI, **AND**

Use low VOC carpet or flooring throughout the building. Carpets to comply with requirements specified in international labelling schemes recognized by GBI. Other types of flooring to comply with requirements under FloorScore developed by Science Certification System or equivalent, **AND**

Use low VOC adhesive and sealant or no adhesive or sealant used.

1 point: Use products with no added urea formaldehyde. These include:

1. Composite wood and agrifiber products defined as: particleboard, medium density fibreboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores, **AND**
2. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies, **AND**
3. Insulation foam, **AND**
4. Draperies.

1 point : Minimise air pollutants from building and plant by using environmental friendly house keeping chemicals and minimise microbial contamination and NOX emission.

APPROACH & IMPLEMENTATION

The credit requirements should be clearly stated in project specifications. Provide cut-sheets, material safety data sheets, certificates and test reports. Submittal of the compliance documentation is a pre-requisite for product approval.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report identifying areas where the low VOC materials will be installed and how the credit compliance is to be met.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings showing where low VOC materials or products are used.	<input type="radio"/>	<input type="radio"/>
2. List of products installed that meet the credit requirements, and their specifications.	<input type="radio"/>	<input type="radio"/>
3. Manufacturer’s information including data sheets, certificates, test reports etc to demonstrate credit compliance.	<input type="radio"/>	<input type="radio"/>
4. Photographic evidence of each typical low VOC installation.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC) INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ5	MOULD PREVENTION	1 POINT
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INTENT

To prevent microbial contamination in the building and plant area to ensure the health and well-being of occupants.

DESCRIPTION

Design system(s) which reduce the risk of mould growth and its associated detrimental impact on occupant health.

REQUIREMENTS

Demonstrate that the air-conditioning and mechanical 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.

Ensure that excessive moisture in building and plant area is controlled during the Design, Construction and Operation stages by the consideration and the control of the following:

- Rainwater leakage through roof and walls
- Infiltration of moist air
- Diffusion of moisture through walls, roof and floors
- Groundwater intrusion into basements and crawl spaces through walls and floors
- Leaking or burst pipes
- Indoor moisture sources
- Construction moisture

OR

The above mentioned measures are not necessary or applicable for any part of the building or plant area that is not air-conditioned.

APPROACH & IMPLEMENTATION

The most effective way to control indoor mould growth is through elimination of moisture. It is important to dry water damaged areas and items within 24 to 48 hours to prevent mould growth. Humidity in spaces and ductwork has to be controlled throughout construction and occupation of the premises.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report outlining the strategies adopted to meet the credit requirements.	<input type="radio"/>	<input type="radio"/>
2. A copy of specifications for the strategies to be carried out.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings or As-Built specifications confirming that the industrial building has been constructed in accordance with the strategies adopted.	<input type="radio"/>	<input type="radio"/>
2. Manufacturer's information on all relevant materials specified for mould prevention and/or resistance, to verify credit compliance.	<input type="radio"/>	<input type="radio"/>
3. Documentation evidence during construction of the precautions taken for mould prevention, e.g. photographs of material storage and protection for items that are susceptible to mould growth as identified in the DA submission stage.	<input type="radio"/>	<input type="radio"/>
4. Provide 24-hour record (during full occupancy) of Temperature-Relative Humidity measurements for at least two (2) areas acceptable to the GBI Certifier.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ6	THERMAL COMFORT: DESIGN & CONTROLLABILITY OF SYSTEMS	2 POINTS
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INTENT

To provide a thermal environment that is comfortable and supports the productivity and well-being of building and plant occupants.

DESCRIPTION

Provide a high level of thermal comfort system control by individual occupant or by specific groups in multi-occupant spaces to promote the productivity, comfort and well-being of occupants.

REQUIREMENTS

1 point: Provide a high level of thermal comfort system control by individual occupant or by specific groups in multi-occupant spaces to promote the productivity, comfort and well-being of occupants. Design to ASHRAE 55 in conjunction with the relevant localised parameters as listed in MS1525.

1 point: Provide individual comfort control for ≥ 50% of the occupants to enable adjustments to suit individual task needs and preferences, **AND**

Provide comfort system control for all shared multi-occupant spaces to enable adjustments to suit group needs and preferences, **AND**

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.

APPROACH & IMPLEMENTATION

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.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Describe how the project will fulfil the requirements on provision of individual control for at least 50% of occupants and also provision of controls for shared multi-occupant spaces.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Summary report that includes information on the methods used to establish thermal conditions for the project and how the system design addresses the design criteria.	<input type="radio"/>	<input type="radio"/>
2. Provide 72-hour record (during full occupancy) of temperature measurement for at least two (2) areas acceptable to the GBI Certifier, to verify the specified close thermal comfort condition.	<input type="radio"/>	<input type="radio"/>
3. Summary report on the individual types of control and the controls for multi-occupant spaces that are provided to achieve the credit compliance.	<input type="radio"/>	<input type="radio"/>
4. Photographic evidence of each typical type of sensor and control installed.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission	<input type="radio"/>	<input type="radio"/>

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NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ7	AIR-CHANGE EFFECTIVENESS	1 POINT
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INTENT

To ensure effective delivery of clean air through reduced mixing with indoor pollutants in order to promote a healthy indoor environment.

DESCRIPTION

Prevent or minimize short-circuiting of outdoor ventilation air through recirculation of supply and return air.

REQUIREMENTS

Demonstrate that the Air Change Effectiveness (ACE) meets the following criteria for at least 90% of the NLA (air-conditioned areas only):

The ventilation system is designed to achieve an $ACE \geq 0.95$ when measured in accordance with ASHRAE 129. Measure air change effectiveness, where ACE is to be measured within the breathing zone (nominally 1.0m from finished floor level).

APPROACH & IMPLEMENTATION

Compliance may be met either through measurement of the completed building in accordance to ASHRAE 129 or equivalent or using CFD simulations or implementation of accepted airside design strategy such as UFAD (Under Floor Air Distribution), LLD (Low Level Displacement), personalised ventilation system, etc.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report detailing the design criteria that has been adopted for each type of space in the development.	<input type="radio"/>	<input type="radio"/>
2. Describe how the ventilation system meets the credit compliance.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings to show the ventilation system.	<input type="radio"/>	<input type="radio"/>
2. Summary report detailing the ventilation design criteria adopted for each type of space in the building.	<input type="radio"/>	<input type="radio"/>
3. Record of measurement to demonstrate compliance of this credit requirement.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ8	BREAKOUT SPACES	1 POINT
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INTENT

To reduce worker's fatigue.

DESCRIPTION

Provide breakout space to reduce worker's fatigue for at least 5% of employees per shift.

REQUIREMENTS

Provide breakout space to reduce worker's fatigue for at least 5% of employees per shift.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Plans and elevations marking out areas for breakout spaces.	<input type="radio"/>	<input type="radio"/>
2. Description of strategies to be employed in the building to achieve this credit (by means of management policy or signage proposal).	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings identifying location of breakout spaces.	<input type="radio"/>	<input type="radio"/>
2. Summary report describing strategies undertaken.	<input type="radio"/>	<input type="radio"/>
3. Photographic evidence of strategies adopted.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ9	DAYLIGHTING	2 POINTS
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INTENT

To ensure provision of good levels of daylighting for building and plant occupants.

DESCRIPTION

Provide good level of diffused daylight into interior of building and plant.

REQUIREMENTS

1 point: Demonstrate that $\geq 30\%$ of the NLA has a Daylight Factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level, **OR**

2 points: Demonstrate that $\geq 50\%$ of the NLA has a Daylight Factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level.

Note: Refer to MS1525 for the description and calculation of Daylight Factor.

APPROACH & IMPLEMENTATION

Daylight system for building includes window, façade shading/light deflecting devices (e.g. lightshelves), roof lights and atrium spaces. The Daylight Factor is the ratio of indoor light level measured on the working plane to the outdoor light level during overcast conditions with no direct sun. For a daylight space, to ensure visual comfort, the lighting level should be fairly uniform with no great contrast.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)	SUBMITTER	GBI
1. Summary report with diagrams, of the design daylight strategies including for glare control that will be undertaken to meet the credit requirements.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. As-Built drawings and specifications demonstrating that the daylighting system has been constructed according to design drawings/specifications. Typical As-Built floor plans and sections showing position of glare control system.	<input type="radio"/>	<input type="radio"/>
2. Typical floor plans with Daylight Factor measurement results.	<input type="radio"/>	<input type="radio"/>
3. Site plan incorporating height of existing buildings or planned buildings surrounding the building together with solar diagrams & sun path.	<input type="radio"/>	<input type="radio"/>
4. Summary of Daylight Factor results.	<input type="radio"/>	<input type="radio"/>
5. Manufacturer’s Information on the daylighting system used, if custom-made.	<input type="radio"/>	<input type="radio"/>
6. Furnish photographs of each type of typical device installed.	<input type="radio"/>	<input type="radio"/>
7. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ10	DAYLIGHT GLARE CONTROL	1 POINT
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INTENT

To reduce discomfort of glare from natural light.

DESCRIPTION

Ensure daylighting system is designed with adequate and proper glare control in order not to negate the benefits of daylighting.

REQUIREMENTS

Where blinds or screens are fitted on glazing and atrium as a base building, incorporate provisions to meet the following criteria:

1. Eliminate glare from all direct sun penetration and keep horizontal workspace luminance level below 2000 lux;
2. Eliminate glare from diffused sky radiation for occupant workspace at viewing angles of 15° to 60° from the horizontal at eye level (typically 1.2m from floor level);
3. Control with an automatic monitoring system (for atrium and windows with incident direct sun light only - not applicable for fixed blinds/screens); **AND**
4. Equip with a manual override function accessible by occupants (not applicable for fixed blinds/screens).

APPROACH & IMPLEMENTATION

Glare issues typically arise during periods of low angle sun (early mornings and late afternoons) and during periods with bright sky. Glare control should therefore be designed to ensure both a view out and some level of daylight when the systems are engaged.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Typical floor plans and sections showing variable position of glare control system.	<input type="radio"/>	<input type="radio"/>
2. Brief description of proposed control mechanism to be provided.	<input type="radio"/>	<input type="radio"/>
3. Summary report to describe how view and daylight is assured when glare control system is engaged.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings and specifications to confirm that building is constructed according to design drawing and specifications.	<input type="radio"/>	<input type="radio"/>
2. Typical As-Built floor plans and sections showing position of glare control system.	<input type="radio"/>	<input type="radio"/>
3. Description of control mechanism installed.	<input type="radio"/>	<input type="radio"/>
4. Manufacturer's Information on the blind and control systems provided.	<input type="radio"/>	<input type="radio"/>
5. Summary report to describe how view and daylight is assured when glare control system is engaged.	<input type="radio"/>	<input type="radio"/>
6. Furnish photographs of each type of typical glazed control system installed.	<input type="radio"/>	<input type="radio"/>
7. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ11	ELECTRIC LIGHTING LEVELS	1 POINT
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INTENT

To ensure lighting level is not over-designed.

DESCRIPTION

Ensure lighting level is designed in accordance to MS1525 for different types of spaces.

REQUIREMENTS

Demonstrate that lighting design maintains a luminance level of no more than specified in MS1525 for 90% of NLA (building and industrial plant area) as measured at the working plane (800 mm above the floor level).

APPROACH & IMPLEMENTATION

The ambient lighting level should be designed in accordance with the luminance level recommended in MS1525. Task lighting may be provided for occupants who require a higher lighting level either for their own preference or for various task needs.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report of lighting design brief to illustrate how the credit will be met.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings showing the lighting layout plans.	<input type="radio"/>	<input type="radio"/>
2. Photometric measurements to illustrate that the lighting level fulfils the credit requirement.	<input type="radio"/>	<input type="radio"/>
3. Furnish photographs of typical floor lighting installation.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ12	HIGH FREQUENCY BALLASTS	1 POINT
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INTENT

To provide for comfortable visual working environment for occupants.

DESCRIPTION

Provision of view to the outside for building occupants to achieve benefits of connectivity with the outdoor Increase workplace comfort by avoiding low frequency flickers that may be associated with fluorescent light fittings.

REQUIREMENTS

Install high frequency ballasts in fluorescent luminaires over a minimum of 90% of NLA (building and plant area).

APPROACH & IMPLEMENTATION

Specify high frequency ballasts in fluorescent luminaires. The use of high frequency ballasts in the range of 20kHz and higher will provide smoother, non-flickering lamp operation. At this frequency, the flicker is totally undetectable to the human eye and sensory faculty.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Description of design strategy to achieve installation of high frequency ballasts for minimum 90% of NLA	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built lighting plans to identify location of the 90% NLA of fluorescent luminaires installed with high frequency ballasts.	<input type="radio"/>	<input type="radio"/>
2. Manufacturer's information confirming the specifications of high frequency ballasts installed.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ13	EXTERNAL VIEWS	2 POINTS
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INTENT

To reduce eyestrain for building occupants by providing long distance views and visual connection to the outdoor.

DESCRIPTION

Provision of view to the outside for building occupants to achieve benefits of connectivity with the outdoor environment.

REQUIREMENTS

1 point: Demonstrating that ≥ 60% of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level, **OR**

2 points: Demonstrating that ≥ 75% of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.

APPROACH & IMPLEMENTATION

Column free spaces and low interior partitions should be designed if possible. Offices should locate open plan areas along the perimeter of the façade, while private offices and areas not regularly occupied should be placed at the core of the building. Maintaining the views for spaces near the core is the primary design objective.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Typical floor plans to identify how external view for the spaces is maintained.	<input type="radio"/>	<input type="radio"/>
2. Design strategy of the interior layout that will be designed or recommended to maintain view to the outside.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built plans including interior layout confirming that there is direct line of sight to outside through vision glazing between 0.8 and 2.2m above the finish floor level for the required spaces.	<input type="radio"/>	<input type="radio"/>
2. For buildings where fit-out is not done, recommended interior layout shall be provided to tenants.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ14	INTERNAL NOISE LEVELS	1 POINT
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INTENT

To ensure building is designed to maintain a comfortable acoustic environment for occupants.

DESCRIPTION

Maintain internal noise level at an acceptable and tolerable level.

REQUIREMENTS

Demonstrate that 90% of the NLA (office component only) do not exceed the following ambient internal noise level:

- Within the entire building general office, space noise does not exceed 40 dBAeq, **OR**
- Within the baseline building office space, the sound level does not exceed 45 dBAeq for open plan and does not exceed 40 dBAeq for closed offices.

APPROACH & IMPLEMENTATION

Excessive noise can cause discomfort to occupants. Some of the solutions to ensure acceptable noise level is maintained include:

- Specify internal acoustics lining up to 5-10m of the AHU discharge duct
- Specify use of duct silencers or sound attenuators
- Specify acoustical ceiling
- Specify furniture with sound absorbing surfaces on both sides
- Locate photocopiers, fax machines away from the main office areas in a separate area
- Insulate partition cavities
- Mechanical equipment room to be located away from office and conference rooms

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Design report on strategies to ensure internal noise level is maintained at the prescribed levels.	<input type="radio"/>	<input type="radio"/>
2. Floor plans showing location of Core, M&E, and equipment rooms.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Report describing the measured internal and external noise sources and features installed to achieve required noise level.	<input type="radio"/>	<input type="radio"/>
2. As-Built drawings showing noise control features.	<input type="radio"/>	<input type="radio"/>
3. Manufacturer's data sheets of the acoustic materials used in building.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC) INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ15	IAQ BEFORE & DURING OCCUPANCY	2 POINTS
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INTENT

To maintain good Indoor Air Quality condition both before building/plant occupancy and during occupancy.

DESCRIPTION

Reduce indoor air quality problems resulting from the construction process in order to help sustain the comfort and well-being of occupants/workers.

REQUIREMENTS

1 Point: Develop and implement an Indoor Air Quality (IAQ) Management Plan for the Pre-Occupancy phase as follows:

Option 1: Perform a building flush-out by supplying outdoor air to provide not less than 10 air changes/hour (ACH) for at least 30 minutes operation before occupancy and continuous minimum 1 ACH during the initial 14 days occupancy of the completed building/plant, **OR**

Option 2: If low VOC materials and low formaldehyde composite wood are used, then building/plant flush-out can be performed by supplying outdoor air to provide not less than 10 ACH for at least 15 minutes operation or not less than 6 ACH for at least 30 minutes operation and continuous 1 ACH during the initial 7 days occupancy of the completed building/plant, **OR**

Option 3: Conduct IAQ testing to demonstrate maximum concentrations of pollutants do not exceed that listed in the Indoor Air Quality Code of Malaysia within 12 months of occupancy.

1 Point: During Occupancy Stage:

Where a permanent air flushing system of at least 10 airchanges/hour operation is installed for use during occupancy stage.

APPROACH & IMPLEMENTATION

Options 1 and 2, flush-out procedure may begin once all fit-out work is completed. As the purpose of flushing out is to evacuate air-borne contaminants in the building, the most effective way is to use non-polluting interior materials as a source control.

Option 3, IAQ testing procedure to confirm major contaminants are below recognized acceptable levels. This will help to ensure good indoor air quality for occupants.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report outlining the strategies and procedures to be taken to meet the credit requirements.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Report on flush-out procedure including the actual dates of the flush-out.	<input type="radio"/>	<input type="radio"/>
2. If IAQ testing is carried out, a report to outline the procedures undertaken and the results of the testing to verify if the credit requirements are met or not. If not, corrective measures must be taken.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ16	POST OCCUPANCY COMFORT SURVEY: VERIFICATION	1 POINT
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INTENT

To provide for assessment of comfort of the building occupants/plant workers.

DESCRIPTION

Conduct post occupancy comfort survey of building occupants/plant workers and to undertake measures to rectify the problems identified during the survey.

REQUIREMENTS

- 1) Conduct an occupancy comfort survey of occupants/workers annually. This survey should collect anonymous responses about thermal comfort, visual comfort and acoustic comfort in a building/plant. 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**
- 2) Develop a plan for corrective action if the survey results indicate that more than 20% of occupants/workers 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.

APPROACH & IMPLEMENTATION

Provide a systematic process and system for occupants to provide feedback on their indoor environmental comfort. The survey should collect responses from a significant and representative sample of occupants. The subjective survey should be accompanied with objective measurements of the relevant environmental variables. Short term monitoring or spot measurements should be done once problem areas have been identified through the survey. Corrective actions should then be undertaken to rectify the problem areas identified to improve the indoor environmental conditions of the occupants.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report of the strategies that will be undertaken to meet the credit compliance.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Survey questionnaire used to collect responses from the occupants.	<input type="radio"/>	<input type="radio"/>
2. Objective measurement plan illustrating the areas and measurements undertaken.	<input type="radio"/>	<input type="radio"/>
3. Analysis report of the results of the survey and measurements.	<input type="radio"/>	<input type="radio"/>
4. Corrective action plan and measures undertaken to rectify the problem.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
**SUSTAINABLE SITE PLANNING
& MANAGEMENT (SM)**

INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM1	SITE SELECTION	1 POINT
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INTENT

To avoid development of inappropriate sites and to reduce environmental impact from the location of the building/plant.

DESCRIPTION

Minimize ecological damage to existing natural features, water bodies, flora and fauna.

REQUIREMENTS

Do not develop building/plant, hardscape, road or parking area on a site or part of a site that meets any one of the following criteria:

1. Prime farmland as defined by the Structure Plan for the area or the National Physical Plan.
2. Forest reserve or State Environmental Protection Zone that is specifically identified as habitat for endangered species.
3. Within 30m of any wetlands as defined by the Structure Plan of the area OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever is the more stringent.
4. Previously undeveloped land that is within 30m of Mean High Water Spring (MHWS) sea level which supports or could support wildlife or recreational use, or statutory requirements whichever is more stringent.
5. Previously undeveloped land that is within 20m of lake, river, stream and tributary which support or could support wildlife or recreational use.
6. Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is provided.

APPROACH & IMPLEMENTATION

During site selection process, give preference to sites that have low ecological value or are not environmentally sensitive. If unavoidable, locate the building in a suitable location and with a minimal footprint so as to minimize disruption of environmentally sensitive areas.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Survey plan and Site plan showing footprint of building/plant and its setback dimensions in relationship to existing natural features such as lakes, river, streams, tributaries, beaches, etc. Recommended scale 1:500.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built site plans showing footprint of building/plant and dimensions in relationship to existing natural features such as lakes, rivers, streams, tributaries, beaches, etc. Recommended scale 1:500.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM2	BROWNFIELD REDEVELOPMENT	1 POINT
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INTENT

To redevelop and rehabilitate existing damaged or used site which is complicated by environmental contamination. This serves to channel development to brownfield sites thereby reducing pressure on greenfield sites.

DESCRIPTION

Existing damaged or contaminated sites are typically old industrial sites, old rubbish dumpsites, former mining land, former petrol stations, etc., where contaminating industrial activities had taken place.

REQUIREMENTS

Reduce pressure on undeveloped land by rehabilitating damaged site where development is complicated by environmental contamination, thereby reducing pressure on undeveloped land.

APPROACH & IMPLEMENTATION

Conduct a soil condition test to determine the level of contamination.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit a brief historical report on the usage of the land and prepare a report on the level of contamination certified by an approved testing laboratory.	<input type="radio"/>	<input type="radio"/>
2. Submit an EIA report containing on the level of contamination and proposed mitigating action to be taken, such as the removal, remediation and replacement of contaminated soil/ matter, and other actions deemed appropriate.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit a report and photographs of works carried out during decontamination process.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC) SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM3	DEVELOPMENT DENSITY & COMMUNITY CONNECTIVITY	2 POINTS
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INTENT

Channel development to urban area with existing infrastructure, protect greenfield and preserve habitat and natural resources.

DESCRIPTION

A higher density development or redevelopment will help minimise opening up new greenfield sites, to preserve existing habitat and natural resources, and minimise the use of private mode of transportation.

REQUIREMENTS

1 point: Development Density

Construct building/plant on previously developed site **AND** in a community with a minimum density of 20,300m² per hectare net (87,000 sqft per acre net); OR within approved industrial zones.

1 point: Community Connectivity

Construct a new building/plant or renovate an existing building/plant on a previously developed site **AND** within 1km of a residential zone or neighbourhood with an average density of 25 units per hectare net (10 units per acre net) **AND** within 1km of at least 10 Basic Services **AND** with pedestrian access between the building/plant and the services.

Basic Services include, but are not limited to:

- | | | | |
|-----------------------|------------------------|---------------|--------------------|
| • Bank | • Beauty | • Park | • Theatre |
| • Place of Worship | • Hardware | • Pharmacy | • Community Centre |
| • Convenience/Grocery | • Laundry | • Post Office | • Fitness Centre |
| • Day Care | • Library | • Restaurant | |
| • Police Station | • Medical/Dental | • School | |
| • Fire Station | • Senior Care facility | • Supermarket | |

APPROACH & IMPLEMENTATION

During site selection process, give preference to sites that are within an urban area, where existing infrastructure is available.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit Gross Floor Area calculations and density calculations.	<input type="radio"/>	<input type="radio"/>
2. Take note that the density calculation must include the area of the project being built and is based on a typical four-storey town centre/commercial centre.	<input type="radio"/>	<input type="radio"/>
3. Site plan showing building/plant location in connection to the above Basic Services, indicating covered walkways, pedestrian access and other connections like linkbridges and underground links. Provide legend for all Basic Services.	<input type="radio"/>	<input type="radio"/>
4. Proximity is determined by drawing a 1km radius around the main building/plant entrance on a site map and counting the services found within that radius.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Final As-Built density calculations.	<input type="radio"/>	<input type="radio"/>
2. As-built Site plan showing locations of all existing services, covered walkways, pedestrian access and other connections like link bridges and underground links.	<input type="radio"/>	<input type="radio"/>
3. Provide legend colours to differentiate the types of services.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC) SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM4
ENVIRONMENT MANAGEMENT
2 POINTS

INTENT

To conserve existing natural area and restore damaged area to provide habitat and promote biodiversity.

To maximise Open Space by providing a high ratio of open space to development footprint to promote biodiversity. Alternatively to adopt existing standard in Industrial Environmental Management.

DESCRIPTION

Encourage protection or restoration of the habitat and maximise the ecological diversity by introducing native or adaptive vegetation. Maximise potential for open spaces on grade or on rooftops. One useful strategy is to carefully place building to ensure minimum disruption to the existing ecosystems by minimizing the building/plant footprint. Another is to restore the site area with native or adaptive vegetation; or by increasing the total area for planting by introducing planting on the roof.

Greenfield sites are those that are not previously developed or graded and remain in a natural state. Previously developed sites are those that previously contained building, roadway, parking lot, or were graded or altered by direct human activity.

REQUIREMENTS

Conserve existing natural area and restore damaged area to provide habitat and promote biodiversity.

Maximise Open Space by providing a high ratio of open space to development footprint to promote biodiversity:

1 point: Conservation

- On previously developed or graded site, restore or protect a minimum of 50% of the site area (excluding the building footprint) with native or adaptive vegetation. Native or adaptive plants indigenous to a locality or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds. Applicable also to landscaping on rooftops and roof gardens so long as the plants meet the definition of native or adaptive vegetation, **OR**
- On greenfield sites, limit all site disturbance to within 12m beyond the building/plant perimeter; 3m beyond surface walkway, patio, surface parking and utilities less than 300mm in diameter; 4.5m beyond primary roadway curb and main utility branch trench; and 7.5m beyond constructed area with permeable surface (such as previous paving area, storm water detention facility and playing field) that require additional staging area in order to limit compaction in the constructed area.

1 point: Open Space

- Reduce by 25%, the development footprint (defined as the total area of the building/plant footprint, hardscape, access road and parking) and/or provide vegetated open space within the project boundary to exceed the local zoning's open space requirement for the site by 25%, **OR**
- For areas with no local zoning requirement, provide vegetated open space adjacent to the building/plant whose area is equal to that of the building/plant footprint, **OR**
- Where zoning ordinance exists, but there is no requirement for open space (zero), provide vegetated open space equal to 20% of the project's site area.

CONTINUED ON NEXT PAGE

**INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM4	ENVIRONMENT MANAGEMENT (CONTINUED)	2 POINTS
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APPROACH & IMPLEMENTATION

For previously developed or graded sites, during concept design for multi buildings development, ensure that the proposed buildings are located close to one another. This enables more land to be freed up for planting. For a single building/plant development, minimise the footprint or plinth area for the same purpose.

For greenfield sites, similar approach is recommended.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Site plan showing setback dimensions, outlines of building/plant plinth, hardscape and softscape areas (Landscape). (to scale)	<input type="radio"/>	<input type="radio"/>
2. Landscape plans showing the percentage of area covered by native or adaptive vegetation. (to scale)	<input type="radio"/>	<input type="radio"/>
3. Name list of plants and characteristics.		

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built coloured Site Plan with marked up outline of building/plant plinth, hardscape and softscape areas.	<input type="radio"/>	<input type="radio"/>
2. Landscape As-Built plans showing the percentage area covered by nature or adaptive vegetation.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM5	NOISE POLLUTION	1 POINT
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INTENT

To reduce noise levels diffused from building/plant.

DESCRIPTION

Encourage and recognise buildings/plants that minimise noise levels diffused from the building/plant outside.

REQUIREMENTS

1 point: Awarded where the building/plant envelope is designed to reduce noise penetration by at least NR20dBA when in standard operation mode.

APPROACH & IMPLEMENTATION

Excessive external noise pollution noise will cause discomfort to the neighbourhood. Solutions to mitigate external noise pollution would include:

- Installing sound attenuators to reduce airborne noise emanating from equipment.
- Locating noisy equipment within purpose built enclosures.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Design report on strategies to ensure external noise level is maintained at the prescribed levels.	<input type="radio"/>	<input type="radio"/>
2. Floor plans showing location of the relevant equipment.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Report describing the measured external noise sources and features installed to achieve required noise level.	<input type="radio"/>	<input type="radio"/>
2. As-Built drawings showing noise control features.	<input type="radio"/>	<input type="radio"/>
3. Manufacturer's data sheets of the acoustic materials used.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM6	EARTHWORKS – CONSTRUCTION ACTIVITY POLLUTION CONTROL	1 POINT
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INTENT

To reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation.

DESCRIPTION

Construction sites are usually responsible for significant environmental pollution. Encourage the introduction of and implementation of a policy to achieve ALL 3 control objectives for soil erosion, sedimentation (and surface run-off), and air pollution.

REQUIREMENTS

Create and implement an Erosion and Sedimentation Control (ESC) Plan for all construction activities associated with the project. The ESC Plan shall conform to the erosion and sedimentation requirements of the approved Earthworks Plans OR Local erosion and sedimentation control standards and codes, whichever is the more stringent. The plan shall describe the measures implemented to accomplish the following objectives:

- Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.
- Prevent sedimentation of storm sewer or receiving stream.
- Prevent polluting the air with dust and particulate matter.

APPROACH & IMPLEMENTATION

A proper ESC Plan should be adopted and understood by consultant and owner early during design stage and captured in the tender exercise.

This is followed by a strict implementation of the ESC Plan during construction.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit proposed ESC Plan.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit ESC report, complete with photographic evidence and site reports verified by qualified person.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM7	QLASSIC	1 POINT
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INTENT

To achieve quality of workmanship in construction works by subscribing to CIDB’s Quality Assessment System for Building Construction (QLASSIC).

DESCRIPTION

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

REQUIREMENTS

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).Project should achieve a minimum score of 70%.

APPROACH & IMPLEMENTATION

- In the Project Quality Plan, QLASSIC is to be adopted and understood by all consultants and owner early during design stage and captured in the tender of works.
- All contractors and sub-contractors are to be aware of QLASSIC score targets (tender documentation).
- All contractors and sub-contractors are to be QLASSIC compliance at tender stage and Strict Implementation of QLASSIC during construction to be monitored by qualified person.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit Project Quality Plan and commitment to subscribe to QLASSIC.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Certified by CIDB of score achieved.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM8	WORKERS' SITE AMENITIES	1 POINT
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INTENT

To reduce pollution from construction activities by providing proper amenities for workers.

DESCRIPTION

Controlling pollution from waste and rubbish produced by workers is as vital as that from all other construction processes.

REQUIREMENTS

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:

- Proper accommodation for construction workers at the site or at temporary rented accommodation nearby.
- Prevent pollution of storm sewer or receiving stream by having proper septic tank.
- Prevent polluting the surrounding area from open burning and proper disposal of domestic waste.
- Provide adequate health and hygiene facilities for workers on site.

APPROACH & IMPLEMENTATION

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit Site Plan showing location of all staff and workers' amenities and health & hygiene facilities.	<input type="radio"/>	<input type="radio"/>
2. Submit Building Plan of Site Amenities (to scale).	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Report, complete with photographic evidence and site reports verified by qualified person.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM9	PUBLIC TRANSPORTATION ACCESS & TRANSPORTATION PLAN	1 POINT
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INTENT

To reduce pollution and land development impacts from automobile use.

DESCRIPTION

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.

REQUIREMENTS

Reduce pollution and land development impacts from automobile use:

- Locate project within 1km of an existing, or planned and funded, commuter rail, light rail or subway station, **OR**
- Locate project within 500m of at least one bus stop, **OR**
- Transportation Plan provided to include provision of Factory Bus service, subsidies for Green Vehicles, Car Pool strategies, Van Pool, pick-up service from train station, etc.

APPROACH & IMPLEMENTATION

During concept design stage, plan the building/plant in a manner whereby easy access is available for building/plant users to commute using public transport.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit Site plan showing the site and building orientation, and highlight the locations of existing and planned public transport facilities. (Aerial Google Map is acceptable). Mark the radii from the building entrance to the various transportation systems.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built Site Plan with marked up transportation system facilities and complete with photographic verification.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM10	GREEN VEHICLE PRIORITY – LOW EMITTING & FUEL EFFICIENT VEHICLES	1 POINT
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INTENT

To reduce pollution and land development impacts from automobile use.

DESCRIPTION

Provide preferred parking areas for green vehicles, thereby encouraging the use of such vehicles (e.g. hybrid or electric vehicles).

REQUIREMENTS

Encourage use of green vehicles:

- Provide preferred parking for low-emitting and fuel-efficient vehicles by allocating 5% of the total car parks of the building.
- “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).

APPROACH & IMPLEMENTATION

Set aside the required number of car park bays to be provided for green vehicles. To further encourage the usage of green vehicles, locate the required car park bays near lift lobbies and/or main entrance.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit calculations for provision of 5% required car park bays for green vehicles.	<input type="radio"/>	<input type="radio"/>
2. Plans showing the locations and numbers of car park bays reserved for green vehicles.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit As-Built plans showing locations and the allocated 5% car park bays for green vehicles.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM11	PARKING CAPACITY	1 POINT
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INTENT

To reduce pollution and land development impacts from single occupancy vehicle use.

DESCRIPTION

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.

REQUIREMENTS

Discourage over-provision of car parking capacity:

- Size parking capacity not exceeding the minimum local zoning requirements, **AND**
- Provide preferred parking for carpools or vanpools for 5% of the total provided parking spaces.

APPROACH & IMPLEMENTATION

During design planning stage, work out the minimum required number of car park bays. Consult with and inform the local authorities at all times.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit detailed calculation showing the minimum number of car park bays required by the local authorities, and the number of bays provided.	<input type="radio"/>	<input type="radio"/>
2. Submit plans showing location for preferred parking for carpools or vanpools.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit final car park calculations verified by qualified persons.	<input type="radio"/>	<input type="radio"/>
2. Submit As-Built drawings indicating the preferred parking for carpools or vanpools.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM12	CARGO DELIVERY ROUTE AND PROXIMITY	1 POINT
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INTENT

To reduce pollution impacts from cargo transportation use.

DESCRIPTION

Proximity to Major Cargo Transport, e.g. airport, seaport, highway, railway.

REQUIREMENTS

Credit point is awarded where the building/plant is within 10km of at least 2 major cargo services. Major Cargo services are considered to be the following:

- Airport
- Seaport
- Railway station or Rail Yard; **AND** are accessible to Major Freeway entrance/exit (within 5km).

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit Site plan showing proximity from site to the major cargo services destination eg. Airport, Seaport or Railway Station. (Aerial Google Map is acceptable). Mark the radii from the building/plant entrance to the various transportation systems.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit as-built plans of site to the major cargo services destination. Mark the radii from the building/plant entrance to the various transportation systems.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM13	STORMWATER DESIGN – QUALITY & QUANTITY CONTROL	1 POINT
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INTENT

To limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, and managing storm water runoff. Reduce or eliminate water pollution by reducing impervious cover, increasing onsite infiltration, eliminating sources of contaminants, and removing pollutants from storm water runoff.

DESCRIPTION

Minimise impact of stormwater pollution due to development.

REQUIREMENTS

Limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, and managing storm water runoff. Reduce or eliminate water pollution by reducing impervious cover, increasing onsite infiltration, eliminating sources of contaminants, and removing pollutants from storm water runoff:-

Option 1: If Existing Imperviousness is < 50%

Implement a storm water management plan that prevents the post development peak discharge rate and quantity from exceeding the pre-development peak discharge rate and quantity in conformance to the Storm Water Management Manual for Malaysia (MSMA).

Option 2: If Existing Imperviousness is > 50%

Implement a storm water management plan that results in a 25% decrease in the volume of storm water runoff required under MSMA.

For either condition, implement a storm water management plan that reduces impervious cover, promotes infiltration, and captures and treats the storm water runoff from 90% of the average annual rainfall using acceptable best management practice (BMPs).

APPROACH & IMPLEMENTATION

During concept design stage, conduct a thorough site evaluation on hydrology of site and prepare a study to reduce the risk of water contamination to nearby water bodies by controlling the quality and quantity of stormwater runoff from the building.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit preliminary study report complying with MSMA requirements.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Report, complete with photographic evidence and site reports signed off by qualified person on final stormwater design and management.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM14	GREENERY & ROOF	2 POINTS
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INTENT

To reduce heat island effect (thermal gradient difference between developed and undeveloped areas) so as to minimize impact on microclimate and human and wildlife habitat.

DESCRIPTION

- Minimize impact on microclimate and human wildlife habitat.
- Reward for achieving any option. Roof application includes roofs over individual parking lots and roofs over parking structures.
- The use of greenery on rooftops can help alleviate urban heat island effects through shading and evaporative cooling. It also enhances aesthetics to the surrounding and provides a more pleasant working environment, which is also discussed in Indoor Environment Quality.

REQUIREMENTS

1 Point: Hardscape & Greenery Application

- 1) Provide any combination of the following strategies for 50% of the site hardscape (including sidewalks, courtyards, plazas and parking lots):
 - Shade (within 5 years of occupancy);
 - Paving materials with a Solar Reflectance Index (SRI) of at least 29;
 - Open grid pavement system;

1 Point: 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:

$(\text{Area of SRI Roof} / 0.75) + (\text{Area of vegetated roof} / 0.5) > \text{Total Roof Area}$

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

APPROACH & IMPLEMENTATION

During concept design, ensure landscaping design is incorporated, and choice of materials with preferred SRI is considered. Where possible, introduce landscaping to exposed roof surfaces. Plants used should be of either native or adaptive types.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit Site plan and Roof Plan showing the extent of proposed hardscape and greenery (softscape) (To scale).	<input type="radio"/>	<input type="radio"/>
2. Section drawing of the rooftop showing details of built-up roof greenery (To scale)	<input type="radio"/>	<input type="radio"/>
3. List of names of native or adaptive vegetation and their characteristics.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built plans and sections of roof (to scale). Submit list of materials used and their SRI values	<input type="radio"/>	<input type="radio"/>
2. Submit photographs of roof and materials.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**INDUSTRIAL NEW CONSTRUCTION (INC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM15	BUILDING USER MANUAL	1 POINT
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INTENT

To document Green building design features and strategies for user information and guide to sustain performance during occupation.

DESCRIPTION

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.

REQUIREMENTS

Provide (include updating) a Building User Manual which documents passive and active features that should not be downgraded.

APPROACH & IMPLEMENTATION

The preparation of the Building User Manual should commence during design concept stage and continue to be developed during all subsequent stages up to and including retro-fitting works. Participation by all consultants and building owner is recommended.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Commitment to develop Building User Manual and furnish framework of contents.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Building User Manual.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
MATERIALS & RESOURCES
(MR)

INDUSTRIAL NEW CONSTRUCTION (INC)
MATERIALS & RESOURCES (MR)

MR1	MATERIALS REUSE AND SELECTION	2 POINTS
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INTENT

To encourage designers to specify the usage of reused building materials in new buildings.

DESCRIPTION

Reuse building materials and products to reduce demand for virgin materials and reduce creation of waste. This serves to reduce environmental impact associated with extraction and processing of virgin resources. Integrate building design and its buildability with selection of reused building materials, taking into account embodied energy, durability, carbon content and life cycle costs.

REQUIREMENTS

- 1 point:** Where reused products/materials constitute $\geq 2\%$ of the project's total material cost value, **OR**
2 points: Where reused products/materials constitute $\geq 5\%$ of the project's total material cost value.

APPROACH & IMPLEMENTATION

The following approach can achieve this credit by using:

Reused Materials found on site: Fixed components such as doors, cabinetries, posts etc. that no longer serve their original function are refurbished, reconditioned and installed for a different use or in a different location.

Reused Materials found off site: Use of salvaged materials found off site which must have either been previously used or moved/relocated from another facility.

Temporary structures: Temporary formwork, framing and structures etc that can be reused many times before disposal (10 or more cycles of usage) can also be included. If the temporary structures are not a new procurement for this project but have been used previously in other project/s, state the number of uses remaining. The use of system formwork is encouraged.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. List of anticipated reused or salvaged materials for the project.	<input type="radio"/>	<input type="radio"/>
2. Cost of each proposed reused or salvaged materials.	<input type="radio"/>	<input type="radio"/>
3. Establish the estimated Total Cost of the materials for the project excluding MEP items (or use 45% as default value for materials costs; i.e. Total Materials Cost may be derived by multiplying the total construction cost by 0.45) for the project.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Documentation during the construction stage including photographs of the reused materials.	<input type="radio"/>	<input type="radio"/>
2. List of reused or salvaged materials used in the project after completion and their locations in the building.	<input type="radio"/>	<input type="radio"/>
3. Cost of each reused or salvaged materials either based on actual cost paid or replacement value of the material.	<input type="radio"/>	<input type="radio"/>
4. Provide the Actual Total Cost of the materials in the project.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)

MATERIALS & RESOURCES (MR)

MR2

RECYCLED CONTENT MATERIALS

2 POINTS

INTENT

To encourage designers to specify the use of recycled content materials in new buildings.

DESCRIPTION

Increase demand for building products that incorporate recycled content materials in their production. Recycled content shall be defined in accordance with the International Organization for Standardization, Document ISO 14021: Environmental labels and declarations – Self declared environmental claims (Type II environmental labelling).

REQUIREMENTS

1 point: Where use of materials with recycled content is such that the sum of post-consumer recycled plus one half of the pre-consumer content constitutes $\geq 10\%$ (based on cost) of the total value of materials in the project, **OR**

2 points: Where use of materials with recycled content is such that the sum of post-consumer recycled plus one half of the pre-consumer content constitutes at least 30% (based on cost) of the total value of materials in the project.

APPROACH & IMPLEMENTATION

The goal in using materials with recycled content should be established during the design phase. The project team must identify materials with recycled content and such availability should be coordinated (as early as possible) by the project team with the contractor, subcontractors and suppliers.

The quantum and value of the recycled content of the materials to the total material cost must be documented by the project team.

A recycled content claim may be made only for materials that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer)

Post-consumer content is given twice the weightage as it is lot more labour intensive to collect scrap or end of lifecycle product, transport it to the manufacturing plants, treat it, before finally including it into the manufacturing loop.

Formwork submitted as reused material cannot be double accounted under recycled content material since wood is a natural product and will not be considered to have recycled content. However a recycled content material claim may be made where wood fibre (pre- or post-consumer) is included along with another material to form a composite (e.g. recycled wood fibre mixed with recycled plastic to form a composite panel). Wood products made from discarded/off cut wood pieces (i.e. wood pieces that have been diverted from the waste stream) shall also qualify to be considered under this credit.

ISO 14021 definition of Recycled Content Materials:

1) Pre-consumer material

Material diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

2) Post-consumer material

Material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

CONTINUED ON NEXT PAGE

INDUSTRIAL NEW CONSTRUCTION (INC)
MATERIALS & RESOURCES (MR)

MR2	RECYCLED CONTENT MATERIALS (CONTINUED)	2 POINTS
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CONTINUED FROM PREVIOUS PAGE

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Calculation of the recycled content value of each material must be provided.	<input type="radio"/>	<input type="radio"/>
2. The percentage of post-consumer and/or pre-consumer recycled content can be established by cost: or by weight (converted to cost).	<input type="radio"/>	<input type="radio"/>
3. Information on source/supplier of materials with recycled content must be provided.	<input type="radio"/>	<input type="radio"/>
4. Submit estimated value of the materials with recycled content against the estimated total value of the materials for the project.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Documentation during the construction stage including photographs of the installed reused materials.	<input type="radio"/>	<input type="radio"/>
2. Calculation of the recycled content value of each material must be provided.	<input type="radio"/>	<input type="radio"/>
3. Information on source/supplier of the materials with recycled content must be provided.	<input type="radio"/>	<input type="radio"/>
4. Calculate the total percentage (based on cost) value of the materials with recycled content against the actual total value of the materials for the project. The percentage of post-consumer and/or pre-consumer recycled content must be established by cost.	<input type="radio"/>	<input type="radio"/>
5. Establish the estimated Total Cost of the materials excluding MEP items (or use the 45% default value for materials costs; i.e. Total Materials Cost may be derived by multiplying the total construction cost by 0.45) for the project	<input type="radio"/>	<input type="radio"/>
6. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC) MATERIALS & RESOURCES (MR)

MR3

REGIONAL MATERIALS

1 POINT

INTENT

To encourage sourcing of regional materials to reduce environmental impacts due to transportation.

DESCRIPTION

Use building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

REQUIREMENTS

Use building materials and products that are extracted, harvested or recovered, as well as manufactured, within 500km of the project site for > 20% (based on cost) of the total material value.

Mechanical, electrical and plumbing components shall not be included. Only include materials permanently installed in the project.

APPROACH & IMPLEMENTATION

This credit must be evaluated early in the design process as materials and products that can be sourced locally can be identified and included to complement the design intent.

Materials must be assembled as a finished product within the 500 km radius of project site. Assembly as defined for this credit, does not include on-site assembly, erection or installation of finished components, such as curtain-wall assemblies or systems furniture etc.

The project team needs to establish a project strategy with a list of products available regionally and this list needs to be verified with contractors and suppliers to ascertain the availability of the desired materials. This is to ensure a realistic approach to the sourcing of regional materials by the project team that will bring the focus onto materials that will contribute the most to this credit.

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**INDUSTRIAL NEW CONSTRUCTION (INC)
MATERIALS & RESOURCES (MR)**

MR3	REGIONAL MATERIALS (CONTINUED)	1 POINT
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CONTINUED FROM PREVIOUS PAGE

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)	SUBMITTER	GBI
1. List of products that are extracted/harvested/recovered and manufactured within 500km of the project site.	<input type="radio"/>	<input type="radio"/>
2. Provide the following: <ul style="list-style-type: none"> • Name of the manufacturer, • Product cost, AND • The distance between the project site and the manufacturer. 	<input type="radio"/>	<input type="radio"/>
3. Determine the estimated total Material Cost.	<input type="radio"/>	<input type="radio"/>
4. If only part of the raw materials for a particular product or assembly originates within 500 km of the project site, provide the percentage (by weight) that these materials is comprised of in the complete product	<input type="radio"/>	<input type="radio"/>
5. Calculate the percentage of regional materials used = Total Cost of Regional Materials (RM) / Total Material Cost (RM)	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. List of products that are extracted/harvested/recovered and manufactured within 500km of the project site after completion.	<input type="radio"/>	<input type="radio"/>
2. Provide the following: <ul style="list-style-type: none"> • Name of the manufacturer, • Product cost, AND • The distance between the project site and the manufacturer. 	<input type="radio"/>	<input type="radio"/>
3. Determine the Actual Total Material Cost. If only part of the raw materials for a particular product or assembly originates within 500 km of the project site, provide the percentage (by weight) that these materials is comprised of in the complete product	<input type="radio"/>	<input type="radio"/>
4. Calculate the percentage of regional materials used = Total Cost of Regional Materials (RM) / Total Material Cost (RM).	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
MATERIALS & RESOURCES (MR)

MR4	SUSTAINABLE TIMBER	1 POINT
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INTENT

To promote responsible forest management.

DESCRIPTION

Encourage environmentally responsible forest management.

REQUIREMENTS

Where ≥ 50% of wood-based materials and products used are certified. These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. To include wood materials permanently installed and also temporarily purchased for the project. Compliance with Forest Stewardship Council and Malaysian Timber Certification Council requirements.

APPROACH & IMPLEMENTATION

Establish the volume and types of wood products used in the project. Check the availability of the wood species and products that complies with FSC and MTCC requirements by making contact with the local vendors, suppliers and manufacturers that provide the required certifications.

Provide a list of certified vendors, suppliers and manufacturers to the contract bidders.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. List all new wood products specified in the project and identify which components are FSC and MTCC certified.	<input type="radio"/>	<input type="radio"/>
2. Indicate the estimated volume of each wood product.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. List all new wood products used in the project and identify which components are FSC and MTCC certified.	<input type="radio"/>	<input type="radio"/>
2. The volume of each wood product must be shown.	<input type="radio"/>	<input type="radio"/>
3. The vendor's chain-of-custody (COC) number must be shown in the invoice to verify FSC and MTCC certifications.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
MATERIALS & RESOURCES (MR)

MR5	STORAGE & COLLECTION OF RECYCLABLES	1 POINT
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INTENT

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

DESCRIPTION

Facilitate reduction of waste generated during construction and during building/plant occupancy that is hauled and disposed of in landfills.

REQUIREMENTS

Provide dedicated area/s and storage for collection of non-hazardous materials for recycling during construction, **AND**

Provide permanent recycle bins and where applicable, dedicated scheduled waste area complying with EQA on scheduled waste requirement during building/plant occupancy.

APPROACH & IMPLEMENTATION

During construction, designate a dedicated area where on-site sorting of waste materials can be stored in separate skips for collection to recycling facilities.

During Building Occupancy, designate storage areas for recyclable materials that are clearly labelled for recycling, placed within accessible reach of the building occupants and in a location with easy vehicular access to facilitate collection.

The size of the storage space allocated should be adequate to store the recyclable waste volume generated by the building occupants/operation.

Identify and include a list of recycling facilities that are able to handle and treat the recyclable waste diverted from landfills by the building occupants/operation.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit an outline of the Sustainable Purchasing Policy with its objective, scope and responsibilities, best practices and procurement strategies, etc.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit a comprehensive Sustainable Procurement Policy outlining in details its objectives, scope and responsibilities, best practices and procurement strategies, procedures and staffing.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
MATERIALS & RESOURCES (MR)

MR6	CONSTRUCTION WASTE MANAGEMENT	2 POINTS
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INTENT

To reduce and recycle construction waste materials and divert from disposal to landfills.

DESCRIPTION

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. Use Compactor and Baler for waste disposal.

REQUIREMENTS

Quantify by measuring total truck loads of waste sent for disposal:

- 1 point:** Recycle and/or salvage > 50% volume of non-hazardous construction debris, **OR**
- 2 points:** Recycle and/or salvage > 75% volume of non-hazardous construction debris.

APPROACH & IMPLEMENTATION

A waste management plan must be developed and types of construction waste identified. Excavated soil must be excluded in the calculation.

Identify construction haulers and recyclers to handle the designated construction waste and ensure that records are kept to verify that the materials diverted have been recycled or salvaged as intended.

Use of pre-cast reduces waste produced on site.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Tabulate the anticipated diverted/recycled/landfill waste and the estimated quantity of the diverted/recycled/landfill waste.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit verified record of truck loads of diverted/recycled/landfill waste against total truck loads, supported by copy of the construction waste management plan.	<input type="radio"/>	<input type="radio"/>
2. A detailed project construction waste management plan produced by the contractor must be submitted along with evidence supporting the waste recycling programme such as Photographs, waste receipts from recycling facilities, authorized documents from the receiving sites/plants/recycling facilities, tabulation of waste disposed and recycled, etc.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
MATERIALS & RESOURCES (MR)

MR7	REFRIGERANTS & CLEAN AGENTS	1 POINT
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INTENT

To demonstrate leadership in accelerating phase-out of all Ozone Depleting Substances. Recognise and promote use of low Global Warming Substances.

DESCRIPTION

Use environmentally-friendly Refrigerants and Clean Agents exceeding Malaysia’s commitment to the Montreal & Kyoto protocols.

REQUIREMENTS

Use zero Ozone Depleting Potential (ODP) products: non-CFC & non-HCFC refrigerants AND clean agents,

APPROACH & IMPLEMENTATION

Use synthetic refrigerants (for HVAC) and clean agents (for fire fighting) with zero ODP such as HFCs that exceeds Malaysia’s commitment to the Montreal & Kyoto protocols.

Use non-synthetic (natural) refrigerants (for HVAC) and clean agents (for fire fighting) with zero ODP and negligible Global Warming Potential (GWP) such as water, hydrocarbon, carbon dioxide, ammonia and etc (for HVAC); and nitrogen, argon, water mist and etc (for fire fighting); will qualify for additional credit point under Innovation.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit proposed types of refrigerants and clean agents to be used and/or if no refrigerants and clean agents will be used.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit list of as-installed refrigerants and clean agents.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
WATER EFFICIENCY
(WE)

INDUSTRIAL NEW CONSTRUCTION (INC)
WATER EFFICIENCY (WE)

WE1	RAINWATER HARVESTING	2 POINTS
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INTENT

To encourage rainwater harvesting that will lead to reduction in potable water consumption.

DESCRIPTION

Maximise rainwater collection from rooftop or runoff rainwater systems for building consumption and/or irrigation.

REQUIREMENTS

- 1 point:** Rainwater harvesting that leads to $\geq 15\%$ reduction in potable water consumption, **OR**
2 points: Rainwater harvesting that leads to $\geq 30\%$ reduction in potable water consumption.

APPROACH & IMPLEMENTATION

The two (2) main approaches to rainwater harvesting are collection of runoff rainwater from surrounding site and roof top rainwater harvesting. Both systems require separate water storage tanks and additional pressure boosting equipment may be required. Gravity fed system is encouraged to avoid additional energy use for pumping. Use rainwater for non-potable applications such as toilets and urinal flushing, landscape irrigation, washing floors, industrial process, etc.

Water purifying system may be necessary depending on the application and methodology of harvesting the rainwater. Where rainwater filtration/purification is required, use of ozone or activated oxygen in lieu of chlorine or other GHG chemicals, is preferred to obviate negative environmental impact.

Rainwater harvesting calculation method and parameters adopted using GBI recognized Standards, Codes or Guides are acceptable.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)	SUBMITTER	GBI
1. A technical report describing the concept and details of rainwater collection, conveyance system (gutters/downpipes or equivalent), filtration system (if any), storage facility and distribution system.	<input type="radio"/>	<input type="radio"/>
2. The technical report shall include schematics showing how the rainwater is to be harvested and utilised.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Final as-installed calculation of rainwater harvested, storage tank capacity and building usage distribution system.	<input type="radio"/>	<input type="radio"/>
2. As-Built drawings for rainwater harvesting system and storage tank location (Recommended scale 1:200).	<input type="radio"/>	<input type="radio"/>
3. Furnish photographs of as installed main equipment and components.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
WATER EFFICIENCY (WE)

WE2	WATER RECYCLING	2 POINTS
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INTENT

To encourage water recycling that will lead to reduction in potable water consumption.

DESCRIPTION

Encourage recycling of greywater and/or blackwater for building and irrigation use to reduce discharge to external sewer, thereby reducing the overall building potable water consumption.

Encourage and recognise building design that reduces water flow to sewerage treatment plants.

REQUIREMENTS

Treat and recycle the following percentage of wastewater leading to reduction in potable water consumption:

1 point: For ≥ 10% or more wastewater being treated and recycled, **OR**

2 points: For ≥ 30% or more wastewater being treated and recycled.

APPROACH & IMPLEMENTATION

Water treatment systems and re-use technology options are acceptable for treating greywater and blackwater. The treated water is then recycled for use in irrigation, toilet flushing etc. Sand filters can be a cost effective treatment technique.

POTENTIAL TECHNOLOGIES & STRATEGIES

Consider channelling greywater from sinks, showers and other sources to wastewater treatment plant.

Options for on-site wastewater treatment include packaged biological nutrient removal systems and high efficiency filtration systems can be considered.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Preliminary calculation to demonstrate the percentage of wastewater to be treated and recycled.	<input type="radio"/>	<input type="radio"/>
2. A technical report describing the concept and details of the recycling and treatment plant, conveyance system, storage facility and distribution system.	<input type="radio"/>	<input type="radio"/>
3. The technical report shall include schematics showing how the wastewater is recycled, stored and utilised.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Final as-installed calculation of the recycled and treated wastewater, storage tank capacity and distribution system.	<input type="radio"/>	<input type="radio"/>
2. As-Built drawings for wastewater recycling and treatment system, and storage tank location (to scale).	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
WATER EFFICIENCY (WE)

WE3	WATER EFFICIENT IRRIGATION/ LANDSCAPING	2 POINTS
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INTENT

To encourage and recognise the design of landscaping system that minimises or does not require the use of potable water supply from the local water authority.

DESCRIPTION

The main aim is to reduce the consumption of potable water for landscape irrigation. This may be achieved through the use of native or adaptive plants to reduce potable water consumption.

REQUIREMENTS

- 1 point:** For reducing potable water consumption for landscape irrigation by 50% or more, **OR**
- 2 points:** For not using potable water at all for landscape irrigation.

APPROACH & IMPLEMENTATION

Design a water-efficient landscape by selecting native or adaptive plants that require minimal water. Reduce or eliminate use of potable water for landscape irrigation system.

POTENTIAL TECHNOLOGIES & STRATEGIES

Perform soil / climate analysis to determine appropriate plant material and design the landscape with native or adaptive plants to reduce or eliminate irrigation requirements. Where irrigation is required, use high efficiency equipment and/or climate based controllers.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. A brief description of the system with references to Guidelines used, calculations, and an explanation of how the system meets the requirement for the credit.	<input type="radio"/>	<input type="radio"/>
2. A brief report by a landscape architect detailing the selection of native adaptive vegetation and the water efficient irrigation system and demonstrating that it will meet all the requirements for the credit.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built plans showing the detail location of the planted native adaptive vegetation and installed water efficient irrigation system (to scale).	<input type="radio"/>	<input type="radio"/>
2. Calculation of the reduction of potable water for landscape irrigation.	<input type="radio"/>	<input type="radio"/>
3. Furnish photographs of the vegetation installed.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
WATER EFFICIENCY (WE)

WE4	WATER REDUCTION	2 POINTS
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INTENT

To encourage reduction in potable water consumption through use of efficient devices/industrial process.

REQUIREMENTS

1 point: Reduce annual potable water consumption by $\geq 30\%$, **OR**

2 points: Reduce annual potable water consumption by $\geq 50\%$.

APPROACH & IMPLEMENTATION

The use of water efficient water closets, wash hand basins or shower heads or systems which has the potential to reduce potable water consumption in the building and industrial process.

Specify the use of automatic self-closing faucets, electronic or otherwise, to eliminate wastage through faucets left running unnecessarily.

Specify the use of modified waterless urinals.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. A brief description of the system and an explanation of how the system meets the requirement for the credit.	<input type="radio"/>	<input type="radio"/>
2. Submit proposed makes of the intended fittings.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Actual verified water consumption for the building.	<input type="radio"/>	<input type="radio"/>
2. Tabulation of all as-installed water efficient fittings and calculations to verify percentage of water saved to meet the requirement for the credit.	<input type="radio"/>	<input type="radio"/>
3. Submit manufacturer's details of the installed fittings.	<input type="radio"/>	<input type="radio"/>
4. Furnish photographs of each type of water efficient fittings as installed.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
WATER EFFICIENCY (WE)

WE5	METERING & LEAK DETECTION SYSTEM	2 POINTS
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INTENT

To encourage the design of systems that allows monitoring and management of water consumption.

REQUIREMENTS

1 point: Use of sub-meters to monitor and manage major water usage for cooling towers, irrigation, kitchens, tenancy use, and industrial process use.

1 point: Link all water sub-meters to EMS to facilitate early detection of water leakage.

APPROACH & IMPLEMENTATION

Specify the provisions of sub-meters for major water consuming system/equipment.

Incorporate EMS monitoring system of sub-meters.

POTENTIAL TECHNOLOGIES & STRATEGIES

To incorporate provisions of analogue or digital flow water sub-meters.

Incorporation of EMS monitoring will enable early detection of water leakage and contain water wastage.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Describe proposed provision of sub-meters of all major water consuming system/equipment and interface with EMS.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit tabulated inventory of as-installed sub-meters.	<input type="radio"/>	<input type="radio"/>
2. As-Built plans of the building showing the location of sub-meters.	<input type="radio"/>	<input type="radio"/>
3. Furnish photographs of typical sub-meter installed.	<input type="radio"/>	<input type="radio"/>
4. Sample of actual EMS report recording consumption and simulated leakage.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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INDUSTRIAL NEW CONSTRUCTION (INC)
INNOVATION
(IN)

**INDUSTRIAL NEW CONSTRUCTION (INC)
INNOVATION (IN)**

IN1	INNOVATION & ENVIRONMENTAL DESIGN INITIATIVES	6 POINTS
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INTENT

To provide opportunity for the project to be awarded points for exceptional performance above the requirements set by GBI rating system.

DESCRIPTION

Reward innovation and initiatives.

REQUIREMENTS

Encourage project team to score 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, for innovative ideas such as, but not limited to:

- Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling tower make-up water, etc.
- Co-generation / Tri-generation system
- Thermal / PCM / Thermal Mass storage system (accounting for at least 25% of total required capacity)
- Solar thermal technology / Solar Air conditioners (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 accounting for at least 1% of NLA
- Auto-condenser tube cleaning system (fitted to plant equipment serving at least 50% of total capacity)
- Non-chemical water treatment system for condenser or chilled water circuit (e.g. air and dirt separator, vacuum degasser, etc)
- Dynamic balancing control valve system (for entire chilled water system)
- Mixed mode / low energy ventilation system
- Advanced air filtration technology (serving at least 50% of the 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
- Use non-synthetic (natural) Refrigerants AND Clean Agents with zero ODP and negligible Global Warming Potential
- ISO 14000 series certification
- Recycling of all fire systems water during regular testing
- Use of Industrialized Building System (IBS) with minimum CIDB IBS score of 30

APPROACH & IMPLEMENTATION

During Concept Design Stage, commence discussions on all possible innovation ideas to be incorporated into the building early. Late incorporation of innovation ideas may be difficult and costly.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Report on each innovation, how it is derived, and how it would assist in reducing energy and/or improving sustainable design.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Full documentation and photographic evidence of each innovation, and the process from commencement to commissioning, complete with drawings, manuals and maintenance write-up.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE	
SUBMITTING PROFESSIONAL	NAME	DESIGNATION	COMPANY	SIGNATURE	
CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE	

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

**INDUSTRIAL NEW CONSTRUCTION (INC)
INNOVATION (IN)**

IN2	GREEN BUILDING INDEX FACILITATOR	1 POINT
------------	---	----------------

INTENT

To support and encourage the design integration required for Green Building Index rated buildings and to streamline the application and certification process.

DESCRIPTION

Encourage and promote green technology service providers.

REQUIREMENTS

Support and encourage the design integration required for Green Building Index rated buildings and to streamline the application and certification process, where:

At least one principal participant of the project team shall be a Green Building Index Facilitator who is engaged at the onset of the design process until completion of construction and Green Building Index certification is obtained. Name of the GBI Facilitator shall be inserted in GBI Application & Registration Form.

APPROACH & IMPLEMENTATION

Appoint a Green Building Index Facilitator early to assist in the concept design stage, and ensure that the Facilitator follows through the entire project.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Proof of appointment of the named GBI Facilitator.	<input type="radio"/>	<input type="radio"/>
2. GBI Facilitator to present DA submission to GBI Certifier.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. GBI Facilitator to present CVA submission to GBI Certifier.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE
SUBMITTING PROFESSIONAL	NAME	DESIGNATION	COMPANY	SIGNATURE
CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

ACKNOWLEDGEMENTS

GSB would like to thank all contributors for efforts in preparing the INDUSTRIAL NEW CONSTRUCTION (INC) Design Reference Guide Version 1.0. The following are the main contributors to the formation of this document:

GBI INDUSTRIAL NEW CONSTRUCTION (INC)

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**NON-RESIDENTIAL
EXISTING BUILDING
(NREB)**

**DESIGN REFERENCE GUIDE
& SUBMISSION FORMAT**

VERSION 1.01 | SEPTEMBER 2011

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INTRODUCTION

The purpose of the Green Building Index Design Reference Guide is to establish a guidance document to assist project teams in understanding the criteria for each of the main components of the Green Building Index Rating Tool. The project team can use the document as a guide when submitting for the Green Building Index as it clearly identifies examples of how and what is required for completing the submission. Each of the main six criteria's are further divided into the corresponding sub-sections in obtaining the necessary credit points. This guide is indicative and not an exhaustive/definitive reference to the Green Building Index rating tool.

The basic framework of this document sets out for each subsection the intent, description, requirements, approach & implementation and in some occasions calculations to achieve the credit point for each sub-section. The Green Building Index Design Reference Guide further becomes the base curriculum for the training of facilitators on the Green Building Index Rating Tools.

To attain the Green Building Index classification, the procedures are as follows:

- STAGE 1 APPLICATION & REGISTRATION**
- STAGE 2 DESIGN ASSESSMENT (DA)**
- STAGE 3 COMPLETION & VERIFICATION ASSESSMENT (CVA)**

A summary of the stages is described below:

STAGE 1 | APPLICATION & REGISTRATION

Complete and Submit application form with Owner's information, project contact details, project information and any supporting documents to GreenbuildingIndex Sdn Bhd (GSB). Upon acceptance & approval of the application documentation, the registration fee will be confirmed dependent on the size of the project. On payment of fees, a GBI registration number will be given, and the terms and conditions duly signed between owner and GSB. A GBI Certifier will be assigned for the duration of the project.

GBI Registration Fees can be obtained from www.greenbuildingindex.org

GBI Terms & Conditions

An agreement spelling out the terms and conditions between Project owner and Greenbuildingindex Sdn Bhd to be duly signed at this stage.

STAGE 2 | DESIGN ASSESSMENT (DA)

Appraisal conducted upon the submission by the Project Design team / Client (Architect/Engineer/ Building Owner or Developer directly or through a GBI Facilitator) of comprehensive design and other necessary documents for Green Building Index Assessment. After acceptance of registration from GBI, the Project Design team & client should proceed to collect information for each of the six criteria completing the submittal requirements described under each detailed sub-section. It is recommended that the information submitted is based on preconstruction information (ie tender documentation stage) when all parameters of the design have been finalised. A Provisional Design Assessment certificate is given at this stage. A summary Design Assessment (DA) checklist is provided to determine target scoring.

STAGE 3 | COMPLETION & VERIFICATION ASSESSMENT (CVA)

Appraisal conducted upon CPC of the project when all necessary documents are re-submitted according to as-built information and calculations by the Project Design Team / Client (Architect/Engineer/Building Owner or Developer directly or through a GBI Facilitator). The Completion & Verification Assessment confirms that the targeted criteria have been properly implemented and achieved, or otherwise, for the intended classification.

GBI verifies within 12 months of CPC (or CCC/OC/OP whichever is the later); or earlier, if occupancy is not less than 50%, on the project classification. The verification process involves verifying the actual measured energy and water use, sustainable site measures, indoor comfort survey results and action plan, Building Manual and Sustainable Maintenance program. A full Certification is given at this stage. A summary Completion & Verification Assessment (CVA) checklist is provided to determine target scoring.

APPEAL PROCEDURES

Appeal can be submitted (with fee paid) after receiving the Design Assessment result or after receiving the Completion & Verification Assessment results.

VALIDITY OF CERTIFICATION

The validity of the certification is limited for three years. This is to encourage sustainable building maintenance management throughout the life of the building.

CERTIFIERS & FACILITATORS

GBI Certifiers perform the detailed assessment and accrediting tasks of building projects submitted to the GBI Accreditation Panel (GBIAP) for final certification.

GBI Facilitators provide services to enable building projects to achieve GBI Accreditation. A GBI Facilitator is a registered person with GSB having completed the training and examinations conducted by GSB.

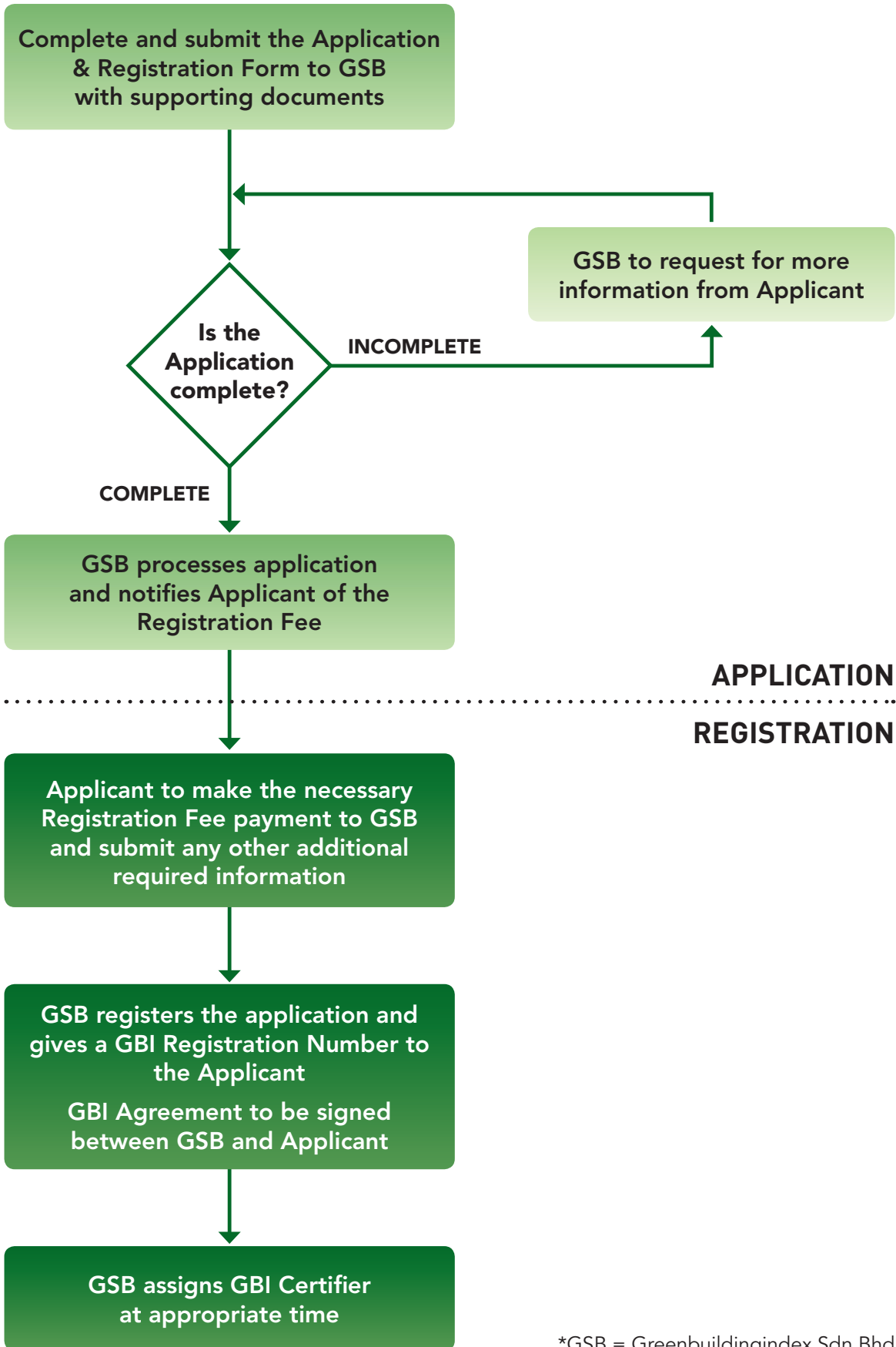
GBI TERMS & CONDITIONS

An agreement setting out the terms and conditions between the Project owner and GreenbuildingIndex Sdn Bhd.



**NON-RESIDENTIAL EXISTING
BUILDING (NREB)
PROCEDURES**

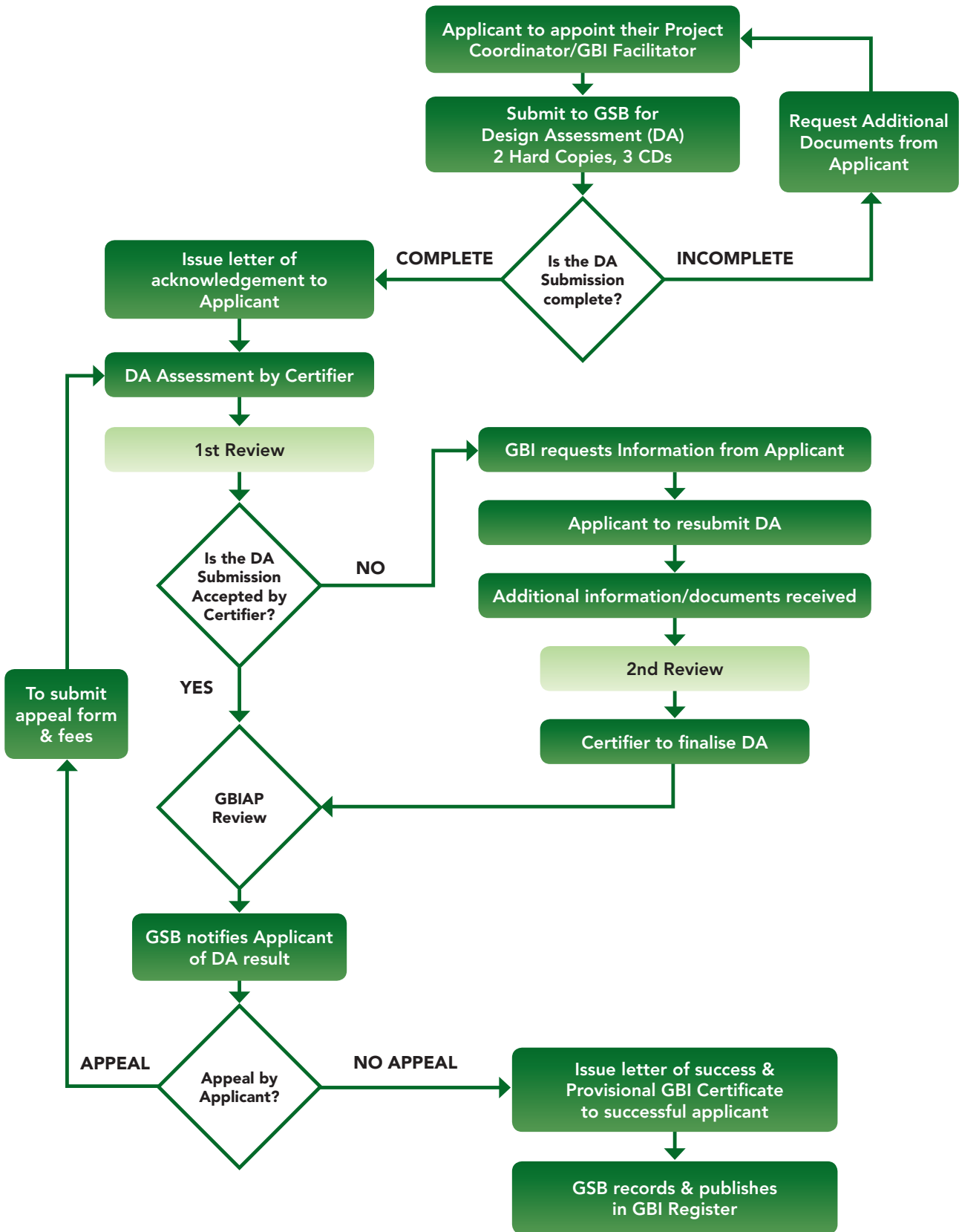
STAGE 1 APPLICATION & REGISTRATION



**APPLICATION
REGISTRATION**

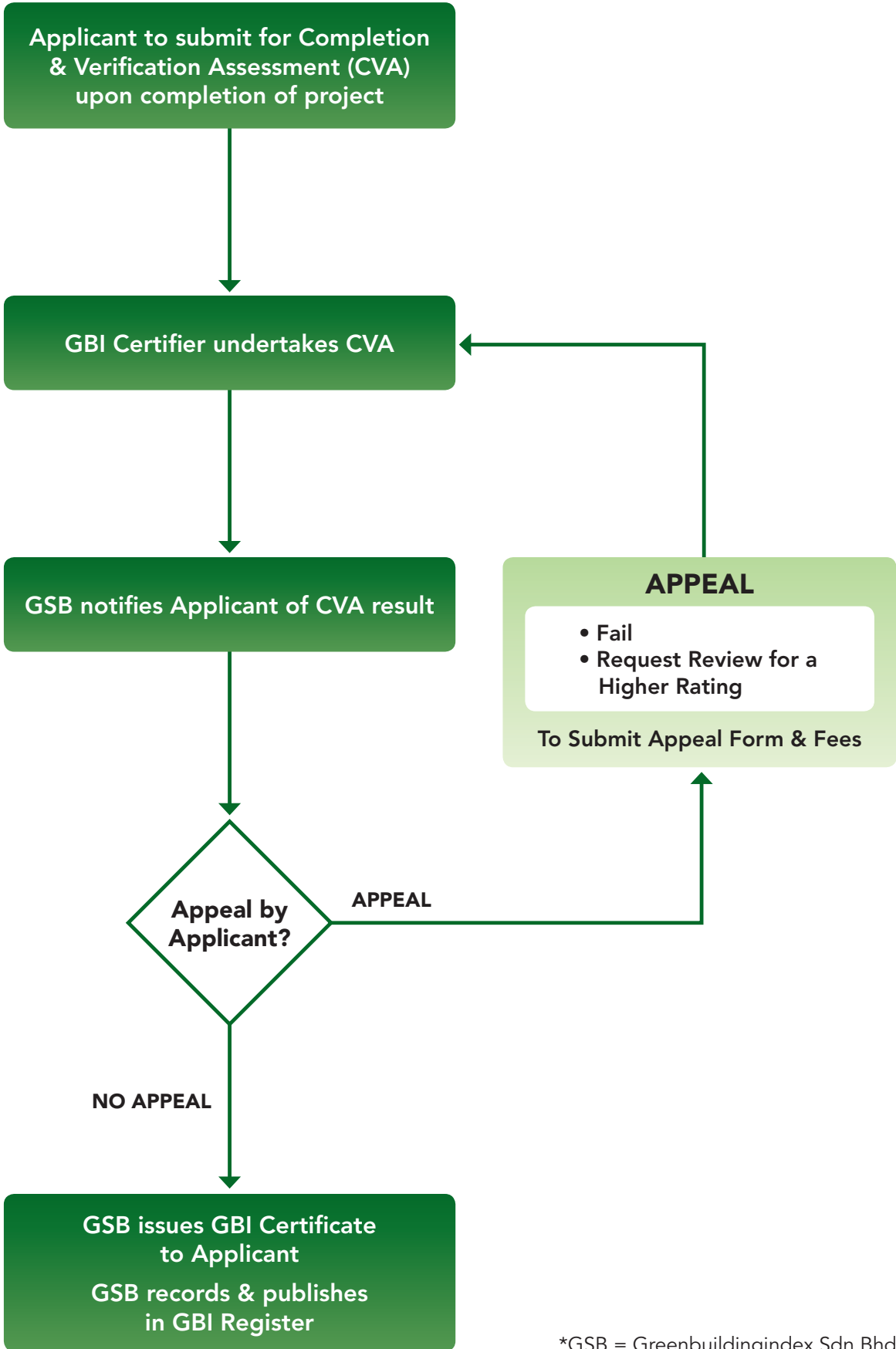
*GSB = Greenbuildingindex Sdn Bhd

STAGE 2 DESIGN ASSESSMENT (DA)



*GSB = Greenbuildingindex Sdn Bhd

STAGE 3 COMPLETION & VERIFICATION ASSESSMENT (CVA)



*GSB = Greenbuildingindex Sdn Bhd



**NON-RESIDENTIAL
EXISTING BUILDING (NREB)
CRITERIA CHECKLIST
& SUBMISSION FORMAT**

NON-RESIDENTIAL EXISTING BUILDING (NREB) PROJECT INFORMATION

PROJECT NAME	
PROJECT ADDRESS	
POSTCODE	
STATE	

APPLICANT	
CONTACT PERSON	

ARCHITECT	
CIVIL ENGINEER	
STRUCTURAL ENGINEER	
MECHANICAL ENGINEER	
ELECTRICAL ENGINEER	
QUANTITY SURVEYOR	
LAND SURVEYOR	
LANDSCAPE CONSULTANT	
OTHER SPECIALIST CONSULTANT(S)	
MAIN CONTRACTOR	
LOCAL AUTHORITY	
TOTAL GROSS FLOOR AREA	
LAND AREA FOR LANDED PROPERTY	

BUILDING DESCRIPTION	

NON-RESIDENTIAL EXISTING BUILDING (NREB)

ASSESSMENT CRITERIA OVERALL POINTS SCORE

PART	ITEM	MAXIMUM POINTS
1	Energy Efficiency (EE)	38
2	Indoor Environmental Quality (EQ)	21
3	Sustainable Site Planning & Management (SM)	10
4	Material & Resources (MR)	9
5	Water Efficiency (WE)	12
6	Innovation (IN)	10
TOTAL SCORE		100

GREEN BUILDING INDEX CLASSIFICATION

POINTS	GBI RATING
86+ points	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

NON-RESIDENTIAL EXISTING BUILDING (NREB) ASSESSMENT CRITERIA SCORE SUMMARY

PART	CRITERIA	ITEM	POINTS	SUBMITTER	GBI
1	EE	ENERGY EFFICIENCY			
		Design			
	EE1	Minimum EE Performance	2		
	EE2	Lighting Zoning	3		
	EE3	Electrical Sub-metering	2		
	EE4	Renewable Energy	5		
	EE5	Advanced or Improved EE Performance - BEI	15		
		Commissioning			
	EE6	Enhanced or Re-commissioning	4		
	EE7	On-going Post Occupancy Commissioning	2		
		Verification & Maintenance			
	EE8	EE Monitoring & Improvement	2		
EE9	Sustainable Maintenance	3			
2	EQ	INDOOR ENVIRONMENTAL QUALITY			
		Air Quality			
	EQ1	Minimum IAQ Performance	1		
	EQ2	Environmental Tobacco Smoke (ETS) Control	1		
	EQ3	Carbon Dioxide Monitoring and Control	1		
	EQ4	Indoor Air Pollutants	2		
	EQ5	Mould Prevention	1		
		Thermal Comfort			
	EQ6	Thermal Comfort: Design & Controllability of Systems	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: Verification	2			

GREEN BUILDING INDEX DESIGN REFERENCE GUIDE & SUBMISSION FORMAT

PART	CRITERIA	ITEM	POINTS	SUBMITTER	GBI
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT			
		Facility Management			
	SM1	GBI Rated Design & Construction	1		
	SM2	Building Exterior Management	1		
	SM3	Integrated Pest Management, Erosion Control & Landscape Management	1		
		Transportation			
	SM4	Green Vehicle Priority – Low Emitting & Fuel Efficient Vehicles	1		
	SM5	Parking Capacity	1		
		Reduce Heat Island Effect			
	SM6	Greenery & Roof	4		
SM7	Building User Manual	1			
4	MR	MATERIALS & RESOURCES			
		Reused & Recycled Materials			
	MR1	Materials Reuse and Selection	1		
	MR2	Recycled Content Materials	1		
		Sustainable Materials & Resources and Policy			
	MR3	Sustainable Timber	1		
	MR4	Sustainable Purchasing Policy	1		
		Waste Management			
	MR5	Storage, Collection & Disposal of Recyclables	3		
	Green Products				
MR6	Refrigerants & Clean Agents	2			
5	WE	WATER EFFICIENCY			
		Water Harvesting & Recycling			
	WE1	Rainwater Harvesting	3		
	WE2	Water Recycling	2		
		Increased Efficiency			
	WE3	Water Efficient Irrigation/Landscaping	2		
	WE4	Water Efficient Fittings	3		
WE5	Metering & Leak Detection System	2			
6	IN	INNOVATION			
	IN1	Innovation in Design & Environmental Design Initiatives	9		
	IN2	Green Building Index Accredited Facilitator	1		
TOTAL POINTS			100		

NON-RESIDENTIAL EXISTING BUILDING (NREB)

The Non-Residential Existing Building (NREB) Reference Guide is formatted in reference to the Non-Residential Existing Building Tool. It is envisaged that this reference guide is a live document that from time to time will be updated for the benefit of the end users.

The Reference guide has been formatted to form part of the basic criteria checklist for all documentation submissions for both the Design Assessment (DA) and Completion & Verification Assessment (CVA). The front cover sheet of the individual criteria is to be attached with documentation drawings, project narratives and technical submissions. The criteria checklist is to be signed by the Principal Submitting Person (in short "PSP"), Submitting Person (in short "SP") or Specialist (in short "S") together with the client's (in short "C"). Where the retrofitting works do not require appointment of the full compliment of consultants, the sole or lead consultant will sign in lieu.

Enclosed the summary checklist together with the corresponding signatories required for each criteria.

PART	CRITERIA	ITEM	REQUIRED SIGNATORIES
1	EE	ENERGY EFFICIENCY	
	EE1	Minimum EE Performance	PSP and C
	EE2	Lighting Zoning	SP and C
	EE3	Electrical Sub-metering	SP and C
	EE4	Renewable Energy	SP/S and C
	EE5	Advanced or Improved EE Performance - BEI	SP/S and C
	EE6	Enhanced or Re-commissioning	SP/S and C
	EE7	On-going Post Occupancy Commissioning	SP/S and C
	EE8	EE Monitoring & Improvement	SP/S and C
	EE9	Sustainable Maintenance	SP/S and C
2	EQ	INDOOR ENVIRONMENTAL QUALITY	
	EQ1	Minimum IAQ Performance	SP and C
	EQ2	Environmental Tobacco Smoke (ETS) Control	PSP and C
	EQ3	Carbon Dioxide Monitoring and Control	SP and C
	EQ4	Indoor Air Pollutants	PSP and C
	EQ5	Mould Prevention	PSP/SP and C
	EQ6	Thermal Comfort: Design & Controllability of Systems	SP and C
	EQ7	Air Change Effectiveness	SP and C
	EQ8	Daylighting	PSP and C
	EQ9	Daylight Glare Control	PSP and C
	EQ10	Electric Lighting Levels	SP and C
	EQ11	High Frequency Ballasts	SP and C
	EQ12	External Views	PSP and C
	EQ13	Internal Noise Levels	PSP/SP/S and C
	EQ14	IAQ Before & During Occupancy	SP/S and C
EQ15	Post Occupancy Comfort Survey: Verification	S and C	
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT	
	SM1	GBI Rated Design & Construction	PSP/SP/S and C
	SM2	Building Exterior Management	PSP/SP/S and C
	SM3	Integrated Pest Management, Erosion Control & Landscape Management	PSP/SP/S and C
	SM4	Green Vehicle Priority – Low Emitting & Fuel Efficient Vehicles	PSP and C
	SM5	Parking Capacity	SP and C
	SM6	Greenery & Roof	PSP/SP and C
SM7	Building User Manual	S and C	

GREEN BUILDING INDEX DESIGN REFERENCE GUIDE & SUBMISSION FORMAT

PART	CRITERIA	ITEM	REQUIRED SIGNATORIES
4	MR	MATERIALS & RESOURCES	
	MR1	Materials Reuse and Selection	PSP/QS and C
	MR2	Recycled Content Materials	PSP/QS and C
	MR3	Sustainable Timber	PSP/QS and C
	MR4	Sustainable Purchasing Policy	PSP/S and C
	MR5	Storage, Collection & Disposal of Recyclables	PSP/S/QS and C
	MR6	Refrigerants & Clean Agents	PSP/QS and C
5	WE	WATER EFFICIENCY	
	WE1	Rainwater Harvesting	PSP/SP/S and C
	WE2	Water Recycling	SP/S and C
	WE3	Water Efficient Irrigation/Landscaping	SP and C
	WE4	Water Efficient Fittings	PSP/QS and C
	WE5	Metering & Leak Detection System	SP and C
6	IN	INNOVATION	
	IN1	Innovation in Design & Environmental Design Initiatives	PSP/SP/S and C
	IN2	Green Building Index Accredited Facilitator	S and C

PSP is defined as Architect or Engineer (similar to the definition in Certificate of Completion & Compliance, CCC)

SP is defined as Engineer, Landscape Architect, Planner and Quantity Surveyor (QS).

S is defined as Specialist which includes Facilitator, Project Manager, Facilities Manager, Energy or Sustainable Consultant and Commissioning Specialist.

C is defined as Client or client's assigned representative.

For NREB project without the full complement of the identified professionals, then the sole or lead professional may sign in lieu.

SUBMISSION FORMAT & SIGNATURES

All submission information shall be attached to their respective cover criteria sheet along with relevant signatures for each of the criteria. The criteria checklist is to be marked by the submitter on all project documentation as described under "Required Submission for Design Assessment (DA)" or "Required Submission for Completion & Verification Assessment (CVA)". Please leave the GBI's column for the administration of GSB. All documents must be duly verified and signed as part of the procedural requirements. GSB will return documents that are not submitted in full compliance for corrective action.

The following is the recommended format of all documents that will form the Design Assessment (DA) & Completion & Verification Assessment (CVA) submission;

1. All Drawings, Plans, Sections and Elevations to be formatted on A3 size paper, with respective scale or scales clearly indicated. Should drawings be too small for legibility, provide a key plan with part plans for full clarity of building information.
2. All Perspectives to fit A3 size paper.
3. All Reports to be A4 format. Signature of Qualified submitting professional should form part of the submission.
4. Clearly mark the Design Assessment Checklist or Completion & Verification Checklist on submission of documentations together with a Design Submission form.

All submissions to be saved into CD in PDF format. Two hard copies and three copies of CDs are to be submitted to GSB.



**NON-RESIDENTIAL EXISTING
BUILDING (NREB)
ASSESSMENT CRITERIA**

NON-RESIDENTIAL EXISTING BUILDING (NREB)
ENERGY EFFICIENCY
(EE)

NON-RESIDENTIAL EXISTING BUILDING (NREB) ENERGY EFFICIENCY (EE)

EE1	MINIMUM EE PERFORMANCE	2 POINTS
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INTENT

To create energy efficiency (EE) awareness and promote the use of MS 1525.

DESCRIPTION

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.

REQUIREMENTS

1 point: Awarded for Overall Thermal Transfer Value (OTTV) $\leq 50 \text{ W/m}^2$, and where applicable, Roof Thermal Transfer Value (RTTV) $\leq 25 \text{ W/m}^2$. Submit calculations for OTTV and RTTV. Use of the BEIT software or other GBI approved software is acceptable.

1 point: Awarded for Energy Management System.

APPROACH & IMPLEMENTATION

Wall insulation can be achieved in many ways, such as, but not limited to, using autoclaved lightweight concretes, composite insulated walls, double brickwalls and many other construction systems. Glazing should be optimally sized. The use of Insulated Glazing Units and/or performance glazing such as low-e and/or spectrally selective glazing is encouraged. Roof should be insulated with suitable insulation materials to prevent heat gain into occupied spaces.

POTENTIAL TECHNOLOGIES & STRATEGIES

Design the building envelope, HVAC, lighting and other systems to maximize energy performance.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Plans and elevations marking out walls & apertures used for the calculation coloured blue; and walls & apertures not used for calculation coloured red. Recommended scale 1: 200.	<input type="radio"/>	<input type="radio"/>
2. OTTV calculations for each facing wall and roof.	<input type="radio"/>	<input type="radio"/>
3. Description of wall & aperture materials specified.	<input type="radio"/>	<input type="radio"/>
4. Calculations of U-values for roof and walls.	<input type="radio"/>	<input type="radio"/>
5. Proposed Glazing specifications on Shading Coefficient, U-values and Visible Light Transmission.	<input type="radio"/>	<input type="radio"/>
6. Confirm provision of Energy Management System where air conditioned space $\geq 4000\text{m}^2$.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As Built plans and elevations marking out walls & apertures used for the calculation coloured blue; and walls & apertures not used for calculation coloured red.	<input type="radio"/>	<input type="radio"/>
2. OTTV calculations for each facing wall and roof.	<input type="radio"/>	<input type="radio"/>
3. Description of built wall & aperture materials with U-value calculation	<input type="radio"/>	<input type="radio"/>
4. Manufacturer issued glazing specification on shading coefficient, U-values and Visible Light Transmission.	<input type="radio"/>	<input type="radio"/>
5. Description of as-installed Energy Management System and I/O schedule.	<input type="radio"/>	<input type="radio"/>
6. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE
SUBMITTING PROFESSIONAL	NAME	DESIGNATION	COMPANY	SIGNATURE
CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

NON-RESIDENTIAL EXISTING BUILDING (NREB) ENERGY EFFICIENCY (EE)

EE2	LIGHTING ZONING	3 POINTS
------------	------------------------	-----------------

INTENT

To provide flexible lighting controls so as to optimise energy savings.

DESCRIPTION

Encourage and recognise lighting design practices that offer greater flexibility for light switching, making it easier to light only occupied areas.

REQUIREMENTS

1 point: Awarded for all individual or enclosed spaces to be individually switched; and the size of individually switched lighting zones shall not exceed 100m² for 90% of the NLA; with switching clearly labelled and easily accessible by building occupants.

1 point: Awarded for provision of auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylit areas, if any.

1 point: Awarded for provision of motion sensors or equivalent to complement lighting zoning for at least 25% NLA.

APPROACH & IMPLEMENTATION

Decreasing the size of lighting zones allows for more flexible control over lighting giving owners/tenants the ability to reduce energy consumption and costs by only lighting those areas or zones that are occupied or required.

POTENTIAL TECHNOLOGIES & STRATEGIES

Design lighting zones by increasing switching flexibility with controls by individual switches and/or automated sensing devices.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Drawings of floor plans clearly showing every proposed individually switched lighting zone and its coverage area.	<input type="radio"/>	<input type="radio"/>
2. Electrical schematic drawings showing the locations and extent of switching, the area controlled by the switch and automated control sensing system detailed.	<input type="radio"/>	<input type="radio"/>
3. Report to include the areas of all switched zones and confirmation that the total areas meet the percentage NLA requirements.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built Drawings of floor plans clearly showing each individually switched lighting zone and its coverage area.	<input type="radio"/>	<input type="radio"/>
2. As-Built Electrical schematic drawings showing the locations and extent of switching, the area controlled by the switch and automated control sensing system detailed.	<input type="radio"/>	<input type="radio"/>
3. Report to include the exact areas of all switched zones and confirmation that the total area meets the percentage NLA requirements.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
ENERGY EFFICIENCY (EE)**

EE3	ELECTRICAL SUB-METERING	2 POINTS
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INTENT

To monitor energy consumption of key building services as well as all tenancy areas.

DESCRIPTION

Encourage and recognise the provision of energy sub-metering to facilitate energy monitoring of base building services by tenants or end users.

REQUIREMENTS

1 point: Provide separate sub-metering for all energy use $\geq 100\text{kVA}$.

1 point: Provide separate sub-metering for

- 1) Lighting, **AND**
- 2) Power

at each floor or tenancy.

APPROACH & IMPLEMENTATION

For buildings with existing tenancies, separate metering shall be provided for car parks; chillers; AHUs; lifts; common area lighting and power and any additional item which carries an energy use $\geq 100\text{kVA}$.

For existing buildings with tentative space planning layouts, compliance is by demonstrating commitment and provision to install meters for separate tenancy areas. As a minimum this is to be provided on each floor and to each wing or other clearly separable tenancy area or zone.

Where Energy Management System (EMS) is provided, all meters should be linked to the EMS for monitoring and recording, and control where appropriate.

POTENTIAL TECHNOLOGIES & STRATEGIES

Utilise Energy Management System (EMS) for measurement and management of energy usage including Maximum Demand Limiting.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. An extract from the specification detailing the installation requirements for electrical sub-meters that meets the credit criteria.	<input type="radio"/>	<input type="radio"/>
2. Clearly marked electrical schematic drawings showing the proposed locations of meters and the usage served by those meters.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built Electrical schematic drawings showing the exact locations of meters and the building usage served by those meters.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB) ENERGY EFFICIENCY (EE)

EE4	RENEWABLE ENERGY	5 POINTS
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INTENT

To promote use of all forms of renewable energy to reduce environmental impact and emission of CO₂.

DESCRIPTION

The use of renewable energy systems will help to defer the need for power plant-up and promote green energy use. Calculate the project performance by expressing the energy produced by the renewable energy systems as a percentage of the building annual energy use. In the context of the built environment in Malaysia, the most likely form of renewable energy would be derived from BIPV. Other forms of renewable energy are also applicable with their appropriate conversion into equivalent electrical energy for calculation purposes.

REQUIREMENTS

- 1 point :** Awarded where 0.25 % of the Maximum [electricity] Demand (MD) is supplied by Renewable Energy (RE) or 2 kWp RE is installed, whichever is the greater, **OR**
- 2 points :** Awarded where 0.5 % or 5 kWp whichever is the greater, **OR**
- 3 points :** Awarded where 1.0 % or 10 kWp whichever is the greater, **OR**
- 4 points :** Awarded where 1.5 % or 20 kWp whichever is the greater, **OR**
- 5 points :** Awarded where 2.0 % or 40 kWp whichever is the greater.

- Notes:**
- i) Electricity includes other forms of energy.
 - ii) Where MD is not available/applicable then calculation shall be based on total energy usage.

APPROACH & IMPLEMENTATION

Assess the project for renewable energy potential such as solar, wind, geothermal, low-impact hydro, biomass and other non-polluting technologies. Building Integrated Photo Voltaic (BIPV) is recommended to be used to generate renewable electricity in non-residential buildings in the Malaysian climate. The BIPV system can be grid connected or stand-alone system with or without battery pack to store excess energy production.

POTENTIAL TECHNOLOGIES & STRATEGIES

Assess the project for non-polluting and renewable energy potential such as solar, wind, geothermal, low-impact hydro, biomass and bio-gas strategies. When applying these strategies, take advantage of net metering with the local utility.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Plans and elevations marking out areas allocated to house renewable energy equipment.	<input type="radio"/>	<input type="radio"/>
2. Describe proposed technology to be used, including documenting total kWp or equivalent to be installed.	<input type="radio"/>	<input type="radio"/>
3. Predicted reduced MD/total electricity consumption by the building and percentage of renewable energy to be generated.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built plans and elevations marking out installation and location of renewable energy equipment.	<input type="radio"/>	<input type="radio"/>
2. Manufacturer's technical specification of the renewable energy equipment.	<input type="radio"/>	<input type="radio"/>
3. As-Measured kWp or equivalent renewable energy generated.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB) ENERGY EFFICIENCY (EE)

EE5
**ADVANCED OR IMPROVED
EE PERFORMANCE - BEI**
15 POINTS

INTENT

To encourage enhancement of building EE performance thereby reducing CO₂ emission.

REQUIREMENTS

Up to 15 points are awarded where it is demonstrated that Energy Efficiency (EE) performance exceeds the baseline minimum to reduce energy consumption in the building. Achieve Building Energy Intensity (BEI) as defined by GBI [use of BEIT Software (limited to GBI Certified or Silver rating only) or other GBI approved softwares is acceptable], for award of points as follows:

2 points	where BEI ≤ 150 kWh/m ² /year
3 points	where BEI ≤ 140 kWh/m ² /year
5 points	where BEI ≤ 130 kWh/m ² /year
8 points	where BEI ≤ 120 kWh/m ² /year
10 points	where BEI ≤ 110 kWh/m ² /year
12 points	where BEI ≤ 100 kWh/m ² /year
15 points	where BEI ≤ 90 kWh/m ² /year

Demonstrate Energy savings over the last 3 years from Existing Building historical BEI baseline, to be improved, for award of points as follows:

2 points	where improvement ≥ 20% AND BEI ≤ 200 kWh/m ² /year
3 points	where improvement ≥ 25% AND BEI ≤ 180 kWh/m ² /year
5 points	where improvement ≥ 30% AND BEI ≤ 150 kWh/m ² /year
8 points	where improvement ≥ 40% AND BEI ≤ 140 kWh/m ² /year
10 points	where improvement ≥ 50% AND BEI ≤ 130 kWh/m ² /year
12 points	where improvement ≥ 60% AND BEI ≤ 120 kWh/m ² /year
15 points	where improvement ≥ 70% AND BEI ≤ 110 kWh/m ² /year

Note: BEI values given above are applicable to Office Buildings. Refer to GBI for BEI values for other categories of Non-Residential Buildings.

APPROACH & IMPLEMENTATION

Cutting edge technologies and materials should be fully explored for application. For passive design applications, consider use of better insulation materials, such as wall insulation of autoclaved lightweight concrete, composite insulated wall, double brickwalls or other options. Glazing should be optimally sized and the use of performance glazing such as low-e and/or spectrally selective glazing is encouraged. Roof insulation should also be properly addressed. For active design applications, consider EE products for all components and educate users on need to reduce plug loads both in procurement policy and usage..

POTENTIAL TECHNOLOGIES & STRATEGIES

Design the building envelope and systems to maximize energy performance. Adopt the most energy efficient design concepts and strategies. Quantify BEI performance as compared to a baseline building (refer to MS1525) or the existing building with the aid of appropriate simulation software tools as appropriate.

CONTINUED ON NEXT PAGE

**NON-RESIDENTIAL EXISTING BUILDING (NREB)
ENERGY EFFICIENCY (EE)**

EE5	ADVANCED EE PERFORMANCE	15 POINTS
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CONTINUED FROM PREVIOUS PAGE

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)	SUBMITTER	GBI
1. All documentation provided for EE1 (cross referenced)	<input type="radio"/>	<input type="radio"/>
2. Submit predicted BEI calculations. (For GBI Certified or Silver rating, may use static energy calculation using manual method or software programs such as BEIT or other GBI approved software programs; for GBI Gold or Platinum, must use dynamic energy simulation using GBI approved software programs with accompanying report to be submitted.)	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Actual verified BEI achieved for completed building.	<input type="radio"/>	<input type="radio"/>
2. Actual EMS printouts.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
ENERGY EFFICIENCY (EE)

EE6	ENHANCED COMMISSIONING / RE-COMMISSIONING OF BUILDING ENERGY SYSTEMS	4 POINTS
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INTENT

To ensure building's energy related system are installed to achieve proper commissioning so as to realise their full potential and intent. This will serve to eliminate the bad practice of not fully commissioning the installed systems.

REQUIREMENTS

Appoint an independent GBI recognised Commissioning Specialist (CxS) to ensure a comprehensive commissioning / re-commissioning / retro 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:

- Implementing improvements to ensure the building's major energy using systems are repaired, operated and maintained effectively to optimize energy performance.
- Developing a commissioning or ongoing commissioning plan for the building's major energy-using systems.
- Providing training for management staff to build awareness and skills in a broad range of sustainable building operation topics, including energy efficiency and building, equipment and systems operations and maintenance.
- Updating the building operating plan as necessary to reflect any changes in occupancy schedule, equipment runtime schedule, design set points and lighting levels.

APPROACH & IMPLEMENTATION

Appointment of a CxS to provide commissioning advice (including accessibility and maintainability provisions) to the Client and to monitor and verify commissioning of the building's energy related systems.

POTENTIAL TECHNOLOGIES & STRATEGIES

Installation of state-of-the-art measuring devices and sensors compatible with the installed EMS that will aid in commissioning and also enhance EE.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Confirmation letter from the CxS of his appointment and scope of works in accordance with the GBI CxS requirements.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Documentary evidence that the full scope of CxS works have been carried out during the contract administration phase.	<input type="radio"/>	<input type="radio"/>
2. The final commissioning report including recommendations to the client regarding the performance of the commissioned building energy related systems.	<input type="radio"/>	<input type="radio"/>
3. A copy of the systems manual as described in the CxS scope of works.	<input type="radio"/>	<input type="radio"/>
4. Documented evidence of training of building management staff.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
ENERGY EFFICIENCY (EE)**

EE7	ON-GOING POST OCCUPANCY COMMISSIONING	2 POINTS
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INTENT

To ensure up-to-date on-going post occupancy commissioning are carried out for all tenancy areas after fit-out changes are completed, if any, so that the intended EE and IEQ are fully sustained.

REQUIREMENTS

1 point: Awarded where professional engineer reviews 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 point: Awarded where the CxS carries out a full re-commissioning of the building's energy related systems for affected tenancy areas to verify that their performance is sustained in conjunction with the completed tenancy fit-out changes.

APPROACH & IMPLEMENTATION

Professional engineers must check all fit-out designs. The CxS shall carry out the post occupancy commissioning for all tenancy areas after fit-out changes are completed.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Declaration that post occupancy commissioning will be undertaken.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Document what has been approved and constructed for post-occupancy fit-out's.	<input type="radio"/>	<input type="radio"/>
2. CxS to verify re-commissioning of post occupancy fit-out, if applicable.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
ENERGY EFFICIENCY (EE)**

EE8	EE MONITORING & IMPROVEMENT	2 POINTS
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INTENT

To provide for ongoing accountability of the building energy consumption over time.

REQUIREMENTS

1 point: Awarded for the use of Energy Management System to monitor and trend log building system performance for system efficiency including parameters for plant sequencing, etc, **AND**

Monitor sub-metering of building systems to track energy consumption of major building uses and other end use applications e.g. by categorising into building systems or floors.

1 point: Fully commission EMS and activate Maximum Demand Limiting programme, **AND**

Compile, summarise and submit BEI, Fuel and Water Consumption of the building to GSB on an annual basis during the 3-years validity period or earlier whenever requested by GSB. Submissions shall include monthly energy and water bills.

APPROACH & IMPLEMENTATION

Fully commission the maximum demand limiting programme and utilise EMS to monitor energy consumption.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Declaration of commitment to carry out EE verification upon completion.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Actual verified BEI achieved, Renewable Energy generated and Water consumption for completed building.	<input type="radio"/>	<input type="radio"/>
2. Where EMS is installed, comprehensive printouts of EMS results including Maximum Demand Limiting program setting.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
ENERGY EFFICIENCY (EE)**

EE9	SUSTAINABLE MAINTENANCE	3 POINTS
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INTENT

To ensure the building’s energy related systems will continue to perform as intended with proper and sustainable maintenance.

REQUIREMENTS

1 point : Awarded where at least 75% of permanent building maintenance team participate in the commissioning of all building energy services.

1 point : Awarded for providing a designated building maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage

1 point : Provision of evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).

APPROACH & IMPLEMENTATION

Ensure the maintenance team fully participates in the testing and commissioning stage, understand the design intent and provide a 3-year sustainable maintenance program.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Identify building maintenance room and facilities in the design floor plan.	<input type="radio"/>	<input type="radio"/>
2. Commitment to deploy at least 75% of permanent building maintenance team to participate in commissioning of all building energy services with organisation chart and staff positions identified.	<input type="radio"/>	<input type="radio"/>
3. Commitment to provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Documentary evidence that 75% of the maintenance team were involved in the full testing & commissioning of the building energy related systems.	<input type="radio"/>	<input type="radio"/>
2. Comprehensive list of maintenance tools and instrumentation, and inventory storage items.	<input type="radio"/>	<input type="radio"/>
3. Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget for facility maintenance (inclusive of staffing and outsourced contracts).	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
**INDOOR ENVIRONMENTAL
QUALITY (EQ)**

NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ1	MINIMUM IAQ PERFORMANCE	1 POINT
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INTENT

To provide for minimum IAQ performance in buildings to ensure comfort and well-being of building occupants.

DESCRIPTION

Meet the minimum requirements of ventilation rate in ASHRAE 62.1 or local building code, whichever is the more stringent.

REQUIREMENTS

Meet the minimum requirements specified in ASHRAE 62.1 or local building code whichever is stricter.

APPROACH & IMPLEMENTATION

Designing building ventilation system to meet the minimum requirement specified in ASHRAE 62.1 ensures adequate fresh air is available to occupants in the space. The Ventilation Rate Procedure or the Indoor Air Quality Procedures can be used to determine the minimum required ventilation rates for various applications. Ventilation Rate Procedure is more straight-forward to apply. The IAQ Procedure of ASHRAE 62.1 is a performance-based procedure that addresses designing the ventilation system to maintain acceptable levels of known contaminants.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Description of the project ventilation design.	<input type="radio"/>	<input type="radio"/>
2. Schematic to illustrate the project ventilation system design.	<input type="radio"/>	<input type="radio"/>
3. Summary table with calculations to illustrate how the delivered minimum outdoor airflow to each zone and the outdoor air intake for the system meet the requirements of ASHRAE and/or local code.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As built drawings to illustrate the project ventilation system design.	<input type="radio"/>	<input type="radio"/>
2. Summary report to describe the ventilation design and how it complies with ASHRAE 62.1 and/or the local code including information regarding the fresh air intake volumes and any special conditions that affect the project ventilation design.	<input type="radio"/>	<input type="radio"/>
3. Detailed calculations or simulations to show how the delivered minimum outdoor airflow to each zone and outdoor airflow air intake for the system meet the requirements in ASHRAE and/or local code.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ2	ENVIRONMENTAL TOBACCO SMOKE (ETS) CONTROL	1 POINT
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INTENT

To minimize exposure of building occupants to Environmental Tobacco Smoke.

DESCRIPTION

Avoid health problems associated with tobacco smoke by preventing possible contamination in the building, thereby reducing health risks to occupants linked to "second-hand smoke".

REQUIREMENTS

Prohibit smoking in the building and locate any exterior designated smoking areas away from entries, outdoor air intakes and operable windows, **OR**

Prohibit smoking in the building except in designated smoking rooms and establish negative pressure in the smoking rooms together with provision of effective air filtration system.

APPROACH & IMPLEMENTATION

Prohibition of smoking in air-conditioned public building is already mandatory under Malaysian Law. This credit can be achieved by strictly enforcing prohibition of smoking in the building, through supervision or signage. If designated smoking areas are provided outside the building, ensure that the tobacco smoke does not enter the rest of the building or the ventilation system.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Description of strategies to be employed in the building to achieve this credit (by means of management policy or signage proposal).	<input type="radio"/>	<input type="radio"/>
2. Plans showing the location of exterior and/or interior designated smoking areas, if any.	<input type="radio"/>	<input type="radio"/>
3. Ventilation design schematics and description illustrating provision of effective air filtration system and maintenance of negative pressure for the smoking room (where designated smoking room in the building is provided)	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings identifying location of exterior and/or interior designated smoking areas	<input type="radio"/>	<input type="radio"/>
2. Summary report describing strategies undertaken to ensure prohibition of smoking indoors can be enforced and strategies implemented to ensure that tobacco smoke will not enter the building or ventilation system where exterior and/or interior smoking area is provided.	<input type="radio"/>	<input type="radio"/>
3. Photographic evidence of strategies adopted.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ3	CARBON DIOXIDE MONITORING AND CONTROL	1 POINT
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INTENT

To provide capacity for effective ventilation system monitoring and control so as to ensure comfort and well-being of building occupants.

DESCRIPTION

Use carbon dioxide monitoring and control system to deliver the required outdoor air to the occupants to suit variation in occupancy.

REQUIREMENTS

Install carbon dioxide (CO₂) monitoring and control system with at least one (1) CO₂ sensor at main return air points on each floor to facilitate continuous monitoring and adjustment of outside air ventilation rates to each floor, and ensure independent control of ventilation rates to maintain CO₂ level < 1,000 ppm.

APPROACH & IMPLEMENTATION

Use of carbon dioxide monitoring system is a typical energy conservation measure to ensure different spaces receive adequate outdoor air for their current occupancy and the ventilation system can adjust the ventilation rate to meet changing requirements. This helps ensure occupants will receive adequate outdoor air at all times.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submission of ventilation and control schematics together with description of how CO ₂ monitoring and controls are integrated into the ventilation design.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings showing the installed sensors and controls.	<input type="radio"/>	<input type="radio"/>
2. Summary report on the ventilation design and CO ₂ monitoring and control system including information regarding the location, quantity of installed sensors, the operational parameters and set points.	<input type="radio"/>	<input type="radio"/>
3. Manufacturer’s information confirming the specifications of the CO ₂ sensors.	<input type="radio"/>	<input type="radio"/>
4. Photographic evidence of typical installations.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ4	INDOOR AIR POLLUTANTS	2 POINTS
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INTENT

To minimize detrimental impact on occupant health through the use of materials with minimal volatile organic compounds (VOC) and formaldehyde content.

DESCRIPTION

Encourage the use and specification of healthy materials and finishes which contain low volatile organic compounds (VOC) and formaldehyde.

REQUIREMENTS

1 point : Use low VOC paint and coating throughout the building. Paints and Coatings to comply with requirements specified in international labelling schemes recognized by GBI, **AND**

Use low VOC carpet or flooring throughout the building. Carpets to comply with requirements specified in international labelling schemes recognized by GBI. Other types of flooring to comply with requirements under FloorScore developed by Science Certification System or equivalent, **AND**

Use low VOC adhesive and sealant or no adhesive or sealant used. Adhesives and sealants to comply with requirements specified in international labelling schemes recognized by GBI.

1 point : Use products with no added urea formaldehyde. These include:

1. Composite wood and agrifiber products defined as: particleboard, medium density fibreboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores, **AND**
2. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies, **AND**
3. Insulation foam, **AND**
4. Draperies

APPROACH & IMPLEMENTATION

The credit requirements should be clearly stated in project specifications. Provide cut-sheets, material safety data sheets, certificates and test reports. Submittal of the compliance documentation is a pre-requisite for product approval.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report identifying areas where the low VOC materials will be installed and how the credit compliance is to be met.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As built drawings showing where low VOC materials or products are used.	<input type="radio"/>	<input type="radio"/>
2. List of products installed that meet the credit requirements, and their specifications.	<input type="radio"/>	<input type="radio"/>
3. Manufacturer’s information including data sheets, certificates, test reports etc to demonstrate credit compliance.	<input type="radio"/>	<input type="radio"/>
4. Photographic evidence of each typical low VOC installation.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ5	MOULD PREVENTION	1 POINT
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INTENT

To prevent microbial contamination in the building to ensure the health and well-being of building occupants.

DESCRIPTION

Design system(s) which reduce the risk of mould growth and its associated detrimental impact on occupant health.

REQUIREMENTS

Demonstrate that the air-conditioning and mechanical 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 primary active reheat system (which consumes additional energy).

Ensure that excessive moisture in building is taken into consideration during the retrofitting exercise, and be controlled and monitored during construction and operation stages by control of the following:

- Rainwater leakage through roof and walls
- Infiltration of moist air
- Diffusion of moisture through walls, roof and floors
- Groundwater intrusion into basements and crawl spaces through walls and floors
- Leaking or burst pipes
- Indoor moisture sources
- Construction moisture

OR

The above mentioned measures are not necessary or applicable if the building is fully naturally ventilated.

APPROACH & IMPLEMENTATION

The most effective way to control indoor mould growth is through elimination of moisture. It is important to dry water damaged areas and items within 24 to 48 hours to prevent mould growth. Humidity in spaces and ductwork has to be controlled throughout construction and occupation of the building.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report outlining the strategies adopted to meet the credit requirements.	<input type="radio"/>	<input type="radio"/>
2. A copy of specifications for the strategies to be carried out.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings or As-Built specifications confirming that the building has been retrofitted in accordance with the strategies adopted.	<input type="radio"/>	<input type="radio"/>
2. Manufacturer's information on all relevant materials specified for mould prevention and/or resistance, to verify credit compliance.	<input type="radio"/>	<input type="radio"/>
3. Documentation evidence during construction of the precautions taken for mould prevention, e.g. photographs of material storage and protection for items that are susceptible to mould growth as identified in the DA submission stage.	<input type="radio"/>	<input type="radio"/>
4. Provide 24-hour record (during full occupancy) of Temperature-Relative Humidity measurements for at least two (2) areas acceptable to the GBI Certifier.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ6	THERMAL COMFORT: DESIGN & CONTROLLABILITY OF SYSTEMS	2 POINTS
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INTENT

To provide a thermal environment that is comfortable and supports the productivity and well-being of building occupants.

DESCRIPTION

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.

REQUIREMENTS

1 point : Provide individual comfort control for $\geq 50\%$ of the building occupants to enable adjustments to suit individual task needs and preferences, **AND**

Provide comfort system control for all shared multi-occupant spaces to enable adjustments to suit group needs and preferences.

APPROACH & IMPLEMENTATION

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.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Describe how the project will fulfil the requirements on provision of individual control for at least 50% of building occupants and also provision of controls for shared multi-occupant spaces.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Summary report that includes information on the methods used to establish thermal conditions for the project and how the system design addresses the design criteria.	<input type="radio"/>	<input type="radio"/>
2. Provide 72-hour record (during full occupancy) of temperature measurement for at least two (2) areas acceptable to the GBI Certifier, to verify the specified close thermal comfort condition.	<input type="radio"/>	<input type="radio"/>
3. Summary report on the individual types of control and the controls for multi-occupant spaces that are provided to achieve the credit compliance.	<input type="radio"/>	<input type="radio"/>
4. Photographic evidence of each typical type of sensor and control installed.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ7	AIR-CHANGE EFFECTIVENESS	1 POINT
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INTENT

To ensure effective delivery of clean air through reduced mixing with indoor pollutants in order to promote a healthy indoor environment.

DESCRIPTION

Prevent or minimize short-circuiting of outdoor ventilation air through recirculation of supply and return air.

REQUIREMENTS

Demonstrate that the Air Change Effectiveness (ACE) meets the following criteria for at least 90% of the NLA:

The ventilation system is designed to achieve an ACE ≥ 0.95 when measured in accordance with ASHRAE 129. Measure air change effectiveness, where ACE is to be measured within the breathing zone (nominally 1.0 m from finished floor level).

APPROACH & IMPLEMENTATION

Compliance may be met either through measurement of the completed building in accordance to ASHRAE 129 or equivalent or using CFD simulations or implementation of accepted airside design strategy such as UFAD (Under Floor Air Distribution), personalised ventilation system, etc.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)	SUBMITTER	GBI
1. Summary report detailing the design criteria that has been adopted for each type of space in the development.	<input type="radio"/>	<input type="radio"/>
2. Describe how the ventilation system meets the credit compliance.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. As-Built drawings to show the ventilation system.	<input type="radio"/>	<input type="radio"/>
2. Summary report detailing the ventilation design criteria adopted for each type of space in the building.	<input type="radio"/>	<input type="radio"/>
3. Record of measurement to demonstrate compliance of this credit requirement.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB) INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ8	DAYLIGHTING	2 POINTS
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INTENT

To ensure provision of good levels of daylighting for building occupants.

DESCRIPTION

Design and implement good level of diffused daylight into interior of building.

REQUIREMENTS

1 point: Demonstrate that $\geq 30\%$ of the NLA has a Daylight Factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level, **OR**

2 points: Demonstrate that $\geq 50\%$ of the NLA has a Daylight Factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level.

Note:

- a) Refer to MS1525 for the description and calculation of Daylight Factor.
- b) Refer to GBI for non office applications.

APPROACH & IMPLEMENTATION

Daylight system for building includes window, façade shading/light deflecting devices (e.g. lightshelves), roof lights and atrium spaces. The Daylight Factor is the ratio of indoor light level measured on the working plane to the outdoor light level during overcast conditions with no direct sun. For a daylit space, to ensure visual comfort, the lighting level should be fairly uniform with no great contrast.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report with diagrams, of the design daylight strategies including for glare control that will be undertaken to meet the credit requirements.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings and specifications demonstrating that the daylighting system has been constructed according to design drawings/specifications.	<input type="radio"/>	<input type="radio"/>
2. Typical floor plans with Daylight Factor measurement results.	<input type="radio"/>	<input type="radio"/>
3. Site plan incorporating height of existing buildings or planned buildings surrounding the building together with solar diagrams & sun path.	<input type="radio"/>	<input type="radio"/>
4. Summary of Daylight Factor results.	<input type="radio"/>	<input type="radio"/>
5. Manufacturer's Information on the daylighting system used, if custom-made.	<input type="radio"/>	<input type="radio"/>
6. Furnish photographs of each type of typical device installed.	<input type="radio"/>	<input type="radio"/>
7. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ9	DAYLIGHT GLARE CONTROL	1 POINT
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INTENT

To reduce discomfort of glare from natural light.

DESCRIPTION

Ensure daylighting system is designed with adequate and proper glare control in order not to negate the benefits of daylighting.

REQUIREMENTS

Where blinds or screens are fitted on glazing and atrium as a base building, incorporate provisions to meet the following criteria;

1. Eliminate glare from all direct sun penetration and keep horizontal workspace luminance level below 2000 lux; **AND**
2. Eliminate glare from diffused sky radiation for occupant workspace at viewing angles of 15° to 60° from the horizontal at eye level (typically 1.2m from floor level); **AND**
3. Control with an automatic monitoring system (for atrium and windows with incident direct sun light only - not applicable for fixed blinds/screens); **AND**
4. Equip with a manual override function accessible by occupants (not applicable for fixed blinds/screens).

APPROACH & IMPLEMENTATION

Glare issues typically arise during periods of low angle sun (early mornings and late afternoons) and during periods with bright sky. Glare control should therefore be designed to ensure both a view out and some level of daylight when the systems are engaged.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Typical floor plans and sections showing variable position of glare control system.	<input type="radio"/>	<input type="radio"/>
2. Brief description of proposed control mechanism to be provided.	<input type="radio"/>	<input type="radio"/>
3. Summary report to describe how view and daylight is assured when glare control system is engaged.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings and specifications to confirm that building is constructed according to design drawing and specifications.	<input type="radio"/>	<input type="radio"/>
2. Typical As-Built floor plans and sections showing position of glare control system.	<input type="radio"/>	<input type="radio"/>
3. Description of control mechanism installed.	<input type="radio"/>	<input type="radio"/>
4. Manufacturer's Information on the blind and control systems provided.	<input type="radio"/>	<input type="radio"/>
5. Summary report to describe how view and daylight is assured when glare control system is engaged.	<input type="radio"/>	<input type="radio"/>
6. Furnish photographs of each type of typical glazed control system installed.	<input type="radio"/>	<input type="radio"/>
7. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ10	ELECTRIC LIGHTING LEVELS	1 POINT
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INTENT

To ensure lighting level is not over-designed.

DESCRIPTION

Ensure lighting level is designed in accordance to MS1525 for different types of spaces.

REQUIREMENTS

Demonstrate that (office) lighting design maintains a luminance level of no more than specified in MS1525 for 90% of NLA as measured at the working plane (800 mm above the floor level).

Note: For non office applications, refer to GBI for working plane height.

APPROACH & IMPLEMENTATION

The ambient lighting level should be designed in accordance with the luminance level recommended in MS1525. Task lighting may be provided for occupants who require a higher lighting level either for their own preference or for various task needs.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report of lighting design brief to illustrate how the credit will be met.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings showing the lighting layout plans.	<input type="radio"/>	<input type="radio"/>
2. Photometric measurements to illustrate that the lighting level fulfils the credit requirement.	<input type="radio"/>	<input type="radio"/>
3. Furnish photographs of typical floor lighting installation.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ11	HIGH FREQUENCY BALLASTS	1 POINT
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INTENT

To provide for comfortable visual working environment for occupants.

DESCRIPTION

Increase workplace amenity by avoiding low frequency flickers that may be associated with fluorescent light fittings.

REQUIREMENTS

Install high frequency ballasts in fluorescent luminaires over a minimum of 90% of NLA.

APPROACH & IMPLEMENTATION

Specify high frequency ballasts in fluorescent luminaires. The use of high frequency ballasts in the range of 20kHz and higher will provide smoother, non-flickering lamp operation. At this frequency, the flicker is totally undetectable to the human eye and sensory faculty.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Description of design strategy to achieve installation of high frequency ballasts for minimum 90% of NLA	<input type="checkbox"/>	<input type="checkbox"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built lighting plans to identify location of the 90% NLA of fluorescent luminaries installed with high frequency ballasts.	<input type="checkbox"/>	<input type="checkbox"/>
2. Manufacturer's information confirming the specifications of high frequency ballasts installed.	<input type="checkbox"/>	<input type="checkbox"/>
3. Describe any deviation or addition to the DA submission.	<input type="checkbox"/>	<input type="checkbox"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ12	EXTERNAL VIEWS	2 POINTS
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INTENT

To reduce eyestrain for building occupants by providing long distance views and visual connection to the outdoor.

DESCRIPTION

Provision of view to the outside for building occupants to achieve benefits of connectivity with the outdoor environment.

REQUIREMENTS

1 point: Demonstrating that ≥ 60% of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level. *OR*

2 points: Demonstrating that ≥ 75% of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.

Note: Refer to GBI for non office applications.

APPROACH & IMPLEMENTATION

Column free spaces and low interior partitions should be designed if possible. Offices should locate open plan areas along the perimeter of the façade, while private offices and areas not regularly occupied should be placed at the core of the building. Maintaining the views for spaces near the core is the primary design objective.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Typical floor plans to identify how external view for the spaces is maintained.	<input type="radio"/>	<input type="radio"/>
2. Design strategy of the interior layout that will be designed or recommended to maintain view to the outside.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built plans including interior layout confirming that there is direct line of sight to outside through vision glazing between 0.8 and 2.2m above the finish floor level for the required spaces.	<input type="radio"/>	<input type="radio"/>
2. For buildings where fit-out is not done, recommended interior layout shall be provided to tenants.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ13	INTERNAL NOISE LEVELS	1 POINT
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INTENT

To ensure building is designed to maintain a comfortable acoustic environment for occupants.

DESCRIPTION

Maintain internal noise level at an acceptable and tolerable level.

REQUIREMENTS

Demonstrate that 90% of the NLA do not exceed the following ambient internal noise level:

- Within the entire building general office, space noise does not exceed 40 dBAeq, **OR**
- Within the baseline building office space, the sound level does not exceed 45 dBAeq for open plan and does not exceed 40 dBAeq for closed offices.

APPROACH & IMPLEMENTATION

Excessive noise can cause discomfort to occupants. Some of the solutions to ensure acceptable noise level is maintained include:

- Specify internal acoustics lining up to 5-10m of the AHU discharge duct
- Specify use of duct silencers or sound attenuators
- Specify acoustical ceiling
- Specify furniture with sound absorbing surfaces on both sides
- Locate photocopiers, fax machines away from the main office areas in a separate area
- Insulate partition cavities
- Mechanical equipment room to be located away from office and conference rooms

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Design report on strategies to ensure internal noise level is maintained at the prescribed levels.	<input type="radio"/>	<input type="radio"/>
2. Floor plans showing location of Core, M&E, and equipment rooms.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Report describing the measured internal and external noise sources and features installed to achieve required noise level.	<input type="radio"/>	<input type="radio"/>
2. As built drawings showing noise control features.	<input type="radio"/>	<input type="radio"/>
3. Manufacturer's data sheets of the acoustic materials used in building.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB) INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ14	IAQ BEFORE & DURING OCCUPANCY	2 POINTS
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INTENT

To maintain good Indoor Air Quality condition both before building occupancy and during building occupancy.

DESCRIPTION

Reduce indoor air quality problems resulting from the construction process in order to help sustain the comfort and well-being of building occupants.

REQUIREMENTS

1 Point: Develop and implement an Indoor Air Quality (IAQ) Management Plan to effect this requirement as follows:

Option 1: Perform a building flush-out by supplying outdoor air to provide not less than 10 air changes/hour (ACH) for at least 30 minutes operation before occupancy and continuous minimum 1 ACH during the initial 14 days occupancy of the completed building, **OR**

Option 2: If low VOC materials and low formaldehyde composite wood are used (EQ4 is achieved), then building flush-out can be performed by supplying outdoor air to provide not less than 10 ACH for at least 15 minutes operation, **OR**

Option 3: Conduct IAQ testing to demonstrate maximum concentrations of pollutants do not exceed that listed in the Indoor Air Quality Code of Malaysia.

1 Point: Permanent Air Purging System:

Where a permanent air flushing system of at least 10 airchanges/hour operation is installed and operated at least once a year during occupancy stage

APPROACH & IMPLEMENTATION

Options 1 and 2, flush-out procedure may begin once all retro-fitting work is completed. As the purpose of flushing out is to evacuate air-borne contaminants in the building, the most effective way is to use non-polluting interior materials as a source control.

Option 3, IAQ testing procedure to confirm major contaminants are below recognized acceptable levels. This will help to ensure good indoor air quality for occupants.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report outlining the strategies and procedures to be taken to meet the credit requirements.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Report on building flush-out procedure including the actual dates of the flush-out.	<input type="radio"/>	<input type="radio"/>
2. If IAQ testing is carried out, a report to outline the procedures undertaken and the results of the testing to verify if the credit requirements are met or not. If not, corrective measures must be taken.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
INDOOR ENVIRONMENTAL QUALITY (EQ)**

EQ15	POST OCCUPANCY COMFORT SURVEY : VERIFICATION	2 POINTS
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INTENT

To provide for assessment of comfort of the building occupants.

DESCRIPTION

Conduct post occupancy comfort survey of building occupants and to undertake measures to rectify the problems identified during the survey.

REQUIREMENTS

Conduct an occupancy comfort survey of building occupants. 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**

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.

APPROACH & IMPLEMENTATION

Provide a systematic process and system for occupants to provide feedback on their indoor environmental comfort. The survey should collect responses from a significant and representative sample of occupants. The subjective survey should be accompanied with objective measurements of the relevant environmental variables. Short term monitoring or spot measurements should be done once problem areas have been identified through the survey. Corrective actions should then be undertaken to rectify the problem areas identified to improve the indoor environmental conditions of the occupants.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report of the strategies that will be undertaken to meet the credit compliance.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Survey questionnaire used to collect responses from the occupants.	<input type="radio"/>	<input type="radio"/>
2. Objective measurement plan illustrating the areas and measurements undertaken.	<input type="radio"/>	<input type="radio"/>
3. Analysis report of the results of the survey and measurements.	<input type="radio"/>	<input type="radio"/>
4. Corrective action plan and measures undertaken to rectify the problem.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
**SUSTAINABLE SITE PLANNING
& MANAGEMENT (SM)**

**NON-RESIDENTIAL EXISTING BUILDING (NREB)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM1	GBI RATED DESIGN & CONSTRUCTION	1 POINT
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INTENT

To give due recognition to a building with previous green rating or with energy efficiency audit report which is still valid.

DESCRIPTION

Encourage building to subscribe to continuous improvements and maintaining its green rating and energy efficiency effort.

REQUIREMENTS

Awarded if the building has been previously GBI (or other GBI approved Green Rating system) rated under any category, **OR** within the last 12 months a comprehensive Energy Efficiency Audit has been conducted.

APPROACH & IMPLEMENTATION

Maintain green rating of the building throughout its life span through sustainable practices and conforming to the GBI requirement. Continuously pay attention to the energy efficiency needs of the building by conducting annual energy audits where necessary.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Furnish past GBI certificate or other GBI approved Green Building Certificate OR valid Energy Efficiency Audit report (not more than 12 months old).	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Furnish past GBI certificate or other GBI approved Green Building Certificate OR valid Energy Efficiency Audit report (not more than 12 months old).	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM2	BUILDING EXTERIOR MANAGEMENT	1 POINT
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INTENT

To mitigate pollution to the environment when carrying out maintenance of building exterior.

DESCRIPTION

Promote conscious use of environmentally friendly products to carry out building management works.

REQUIREMENTS

Employ environmentally sensitive building exterior management plan to reduce pollution. Use environmentally non-polluting methods and chemicals for cleaning of building exterior including maintenance equipment, chemicals, paint and sealants.

APPROACH & IMPLEMENTATION

Develop a building management plan that identifies environmentally non-polluting and non-wasteful methodology for exterior management plan and source for environmentally friendly cleaning agents to be used.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit building exterior management plan and intended list of non-polluting cleaning agents / products.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Furnish as implemented building exterior management plan.	<input type="radio"/>	<input type="radio"/>
2. Comprehensive list of non-polluting cleaning agents / products procured including names of suppliers and eco certificates.	<input type="radio"/>	<input type="radio"/>
3. Photographic and documentation evidence of actual applications at site.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM3	INTEGRATED PEST MANAGEMENT, EROSION CONTROL & LANDSCAPE MANAGEMENT	1 POINT
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INTENT

To preserve the natural environment of the building exterior through adopting environmentally sensitive management measures.

DESCRIPTION

Promote the awareness and need to use least toxic chemicals for exterior maintenance as well as effect erosion and sedimentation controls.

REQUIREMENTS

Employ environmentally sensitive management to preserve the site’s natural components. Minimise harmful chemical use, energy waste, water waste, air pollution, solid waste and/or chemical runoff such as gasoline and oil. The following operational elements must be addressed:

1. Use of least toxic chemical pesticides, minimum use of chemicals and use only in targeted locations and only for targeted species. Conduct routine inspection and monitoring **AND**
2. Erosion and sedimentation control for ongoing landscape operations including measures that prevent erosion and sedimentation, prevent air pollution from dust or particulate matter and restore eroded areas.

APPROACH & IMPLEMENTATION

Practise environmentally sensitive management measures for integrated pest management, erosion & sedimentation control and landscape management. When and where possible, use only organic pesticides and fertilizers; and products that solely consist of biodegradable substances that are not passed through the food chain of pests

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit Pest Management Plan	<input type="radio"/>	<input type="radio"/>
2. Submit Erosion & Sedimentation Control Plan	<input type="radio"/>	<input type="radio"/>
3. Submit Landscape Management Plan	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit as implemented Pest Management Plan and photographic evidence of activity in compliance.	<input type="radio"/>	<input type="radio"/>
2. Submit as implemented Erosion & Sedimentation Control Plan and photographic evidence of activity in compliance.	<input type="radio"/>	<input type="radio"/>
3. Submit as implemented Landscape Management Plan and photographic evidence of activity in compliance.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition from the DA.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM4	GREEN VEHICLE PRIORITY - LOW EMITTING & FUEL EFFICIENT VEHICLES	1 POINT
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INTENT

To reduce pollution and land development impacts from automobile use.

DESCRIPTION

Provide preferred parking areas for green vehicles, thereby encouraging the use of such vehicles (e.g. hybrid or electric vehicles).

REQUIREMENTS

Encourage use of green vehicles:

- Provide preferred parking for low-emitting and fuel-efficient vehicles by allocating 5% of the total car parks of the building.
- "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).

APPROACH & IMPLEMENTATION

Set aside the required number of car park bays to be provided for green vehicles. To further encourage the usage of green vehicles, locate the required car park bays near lift lobbies.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit calculations for provision of 5% required car park bays for green vehicles.	<input type="radio"/>	<input type="radio"/>
2. Plans showing the locations and numbers of car park bays reserved for green vehicles.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit As-Built plans showing locations and the allocated 5% car park bays for green vehicles.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM5	PARKING CAPACITY	1 POINT
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INTENT

To reduce pollution and land development impacts from single occupancy vehicle use.

DESCRIPTION

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.

REQUIREMENTS

Discourage over-provision of car parking capacity:

- Size parking capacity not exceeding the minimum local zoning requirements, **AND**
- Provide preferred parking for carpools or vanpools for 5% of the total provided parking spaces.

APPROACH & IMPLEMENTATION

During retro-fitting planning stage, work out the minimum required number of car park bays. Consult with and inform the local authorities at all times.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit detailed calculation showing the minimum number of car park bays required by the local authorities, and the number of bays provided.	<input type="radio"/>	<input type="radio"/>
2. Submit plans showing location for preferred parking for carpools or vanpools.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit final car park calculations verified by qualified persons.	<input type="radio"/>	<input type="radio"/>
2. Submit As-Built drawings indicating the preferred parking for carpools or vanpools.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM6	GREENERY & ROOF	4 POINTS
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INTENT

To reduce heat island effect (thermal gradient difference between developed and undeveloped areas) so as to minimize impact on microclimate and human and wildlife habitat.

DESCRIPTION

- Minimize impact on microclimate and human wildlife habitat.
- Reward for achieving any option. Roof application includes roofs over individual parking lots and roofs over parking structures.
- The use of greenery on rooftops can help alleviate urban heat island effects through shading and evaporative cooling. It also enhances aesthetics to the surrounding and provides a more pleasant working environment, which is also discussed in Indoor Environment Quality.

REQUIREMENTS

2 Points: Hardscape & Greenery Application

1. Provide any combination of the following strategies for 50% of the site hardscape (including sidewalks, courtyards, plazas and parking lots):
 - Shade (within 5 years of occupancy);
 - Paving materials with a Solar Reflectance Index (SRI) of at least 29;
 - Open grid pavement system;

2 Points: 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:
 - $(\text{Area of SRI Roof} / 0.75) + (\text{Area of vegetated roof} / 0.5) > \text{Total Roof Area}$
 - **Roof Type Slope SRI Value**
 Low-Sloped < 2:12 78
 Steep-Sloped > 2:12 29

APPROACH & IMPLEMENTATION

During retro-fit planning stage, ensure landscaping design is incorporated, and choice of materials with preferred SRI is considered. Where possible, introduce landscaping to exposed roof surfaces. Plants used should be of either native or adaptive types.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit Site plan and Roof Plan showing the extent of proposed hardscape and greenery (softscape) (To scale).	<input type="radio"/>	<input type="radio"/>
2. Section drawing of the rooftop showing details of built-up roof greenery (To scale)	<input type="radio"/>	<input type="radio"/>
3. List of names of native or adaptive vegetation and their characteristics.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built plans and sections of roof (to scale). Submit list of materials used and their SRI values	<input type="radio"/>	<input type="radio"/>
2. Submit photographs of roof and materials.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM7	BUILDING USER MANUAL	1 POINT
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INTENT

To document Green building design features and strategies for user information and guide to sustain performance during occupation.

DESCRIPTION

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.

REQUIREMENTS

Provide a Building User Manual which documents all the passive and active features that are part of the building, and highlight all passive and active features that should not be downgraded.

APPROACH & IMPLEMENTATION

The preparation of the Building User Manual should commence during design concept stage and continue to be developed during all subsequent stages up to and including retro-fitting works. Participation by all consultants and building owner is recommended.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Commitment to develop Building User Manual and furnish framework of contents.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Building User Manual.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
MATERIALS AND RESOURCES
(MR)

NON-RESIDENTIAL EXISTING BUILDING (NREB) MATERIALS AND RESOURCES (MR)

MR1	MATERIALS REUSE AND SELECTION	1 POINT
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INTENT

To encourage designers to specify the usage of reused building materials when retrofitting buildings.

DESCRIPTION

Reuse building materials and products to reduce demand for virgin materials and reduce creation of waste. This serves to reduce environmental impact associated with extraction and processing of virgin resources. Integrate building design and its buildability with selection of reused building materials, taking into account their embodied energy, durability, carbon content and life cycle costs.

REQUIREMENTS

1 point: Where reused products/materials constitute $\geq 20\%$ of the project's total retrofit material cost value.

APPROACH & IMPLEMENTATION

Salvage and use old/disused materials such as columns, beams, wall & floor panelling, bricks, door frames, decorative items, furniture, tiles, etc in the green refurbishment of existing buildings.

The following approach can achieve this credit by using:

Reused Materials found on site: Fixed components such as doors, cabinetries, posts etc. that no longer serve their original function are refurbished, reconditioned and installed for a different use or in a different location.

Reused Materials found off site: Use of salvaged materials found off site. They must be previously used or they may be relocated from another facility.

Temporary structures: Temporary formwork, framing and structures etc that can be reused many times before disposal (5-10 cycles of usage) can also be included. If the temporary structures are not new procurement for this project but have been used previously in other project/s, state the number of re-use that are remaining (e.g. use of system formwork is encouraged).

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Provide a narrative describing the materials reuse strategy for the project	<input type="radio"/>	<input type="radio"/>
2. List of anticipated reused or salvaged materials for the project.	<input type="radio"/>	<input type="radio"/>
3. Cost of each proposed reused or salvaged materials.	<input type="radio"/>	<input type="radio"/>
4. Establish the estimated Total Cost of the materials for the project excluding MEP items (or use the 45% default value for materials costs; i.e. Total Materials Cost may be derived by multiplying the total construction cost by 0.45) for the project.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Documentation during the construction stage including photographs of the reused materials.	<input type="radio"/>	<input type="radio"/>
2. List of reused or salvaged materials used in the project after completion and their locations in the building.	<input type="radio"/>	<input type="radio"/>
3. Cost of each reused or salvaged materials either based on actual cost paid or replacement value of the material.	<input type="radio"/>	<input type="radio"/>
4. Provide the Actual Total Cost of the materials in the project.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
MATERIALS AND RESOURCES (MR)

MR2	RECYCLED CONTENT MATERIALS	1 POINT
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INTENT

To encourage designers to specify the usage of recycled content materials when retrofitting buildings.

DESCRIPTION

Increase demand for building products that incorporate recycled content materials in their production. (Recycled content shall be defined in accordance with the ISO 14021 document).

REQUIREMENTS

1 point: Where use of materials with recycled content is such that the sum of post-consumer recycled plus one half of the pre-consumer content constitutes $\geq 20\%$ (based on cost) of project's total retrofit material cost value.

APPROACH & IMPLEMENTATION

The goal in using materials with recycled content should be established during the design phase. The project team must identify materials with recycled content and such availability should be coordinated (as early as possible) by the project team with the contractor, subcontractors and suppliers.

The quantum and value of the recycled content of the materials to the total material cost must be documented by the project team.

A recycled content claim may be made only for materials that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer)

Post consumer content is given twice the weightage as it is lot more labour intensive to collect scrap or end of lifecycle products, transport it to the manufacturing plants, treat it, before finally including it into the manufacturing loop.

Formwork submitted as reused material cannot be double accounted under recycled material since wood which is a natural product, will not be considered to have recycled content. However, where recycled wood (pre-or post consumer) fiber is included into another material to form a composite (eg. recycled wood fibre mixed with recycled plastic to form a composite), these will be considered.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Calculation of the recycled content value of each material must be provided.	<input type="radio"/>	<input type="radio"/>
2. The percentage of post-consumer and/or pre-consumer recycled content can be established by cost: or by weight (converted to cost).	<input type="radio"/>	<input type="radio"/>
3. Information on the sources/suppliers on the materials with recycled content must be provided.	<input type="radio"/>	<input type="radio"/>
4. Submit estimated value of the materials with recycled content against the estimated total value of the materials for the project.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Documentation during the construction stage including photographs of the installed reused materials.	<input type="radio"/>	<input type="radio"/>
2. Calculation of the recycled content value of each material must be provided.	<input type="radio"/>	<input type="radio"/>
3. Information on the sources/suppliers on the materials with recycled content must be provided.	<input type="radio"/>	<input type="radio"/>
4. Calculate the total percentage (based on cost) value of the materials with recycled content against the actual total value of the materials for the project. The percentage of post-consumer and/or pre-consumer recycled content must be established by cost.	<input type="radio"/>	<input type="radio"/>
5. Establish the estimated Total Cost of the materials excluding MEP items (or use the 45% default value for materials costs; i.e. Total Materials Cost may be derived by multiplying the total construction cost by 0.45) for the project	<input type="radio"/>	<input type="radio"/>
6. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
MATERIALS AND RESOURCES (MR)**

MR3	SUSTAINABLE TIMBER	1 POINT
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INTENT

To promote responsible forest management.

DESCRIPTION

Encourage environmentally responsible forest management.

REQUIREMENTS

Where ≥ 75% of wood-based materials and products used in the retrofit works are certified. These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. To include wood materials permanently installed and also temporarily purchased for the project. Compliance with Forest Stewardship Council and Malaysian Timber Certification Council requirements.

APPROACH & IMPLEMENTATION

Establish the volume and types of wood products used in the project. Check the availability of the wood species and products that complies with FSC and MTCC requirements by making contact with the local vendors, suppliers and manufacturers that provide the required certifications.

Provide a list of certified vendors, suppliers and manufacturers to the contract bidders.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. List all new wood products specified in the project and identify which components are FSC and MTCC certified.	<input type="radio"/>	<input type="radio"/>
2. Indicate the estimated volume of each wood product.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. List all new wood products used in the project and identify which components are FSC and MTCC certified.	<input type="radio"/>	<input type="radio"/>
2. The volume of each wood product must be shown.	<input type="radio"/>	<input type="radio"/>
3. The vendor's chain-of-custody (COC) number must be shown in the invoice to verify FSC and MTCC certifications.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
MATERIALS AND RESOURCES (MR)

MR4	SUSTAINABLE PURCHASING POLICY	1 POINT
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INTENT

To promote the use of sustainable consumer products apart from building maintenance and operational needs, through the adoption of a sustainable purchasing policy.

DESCRIPTION

It is essential to extend environmental protection to cover the day to day operation of a building through the implementation of a sustainable purchasing policy by the owners and tenancies.

REQUIREMENTS

Develop a Sustainable Purchasing policy that must cover product purchases within the building and management's control.

APPROACH & IMPLEMENTATION

Sustainable purchasing policy involves commitment to the environment, economic and social aspects of the society. Procurement of products should consider the sustainability of their raw materials used, production energy consumed, environmental impact, reusable or recyclable contents, biodegradability and so forth.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit an outline of the Sustainable Purchasing Policy with its objective, scope and responsibilities, best practices and procurement strategies, etc.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit a comprehensive Sustainable Purchasing Policy outlining in details its objectives, scope and responsibilities, best practices and procurement strategies, procedures and staffing.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
MATERIALS AND RESOURCES (MR)**

MR5	STORAGE, COLLECTION & DISPOSAL OF RECYCLABLES	3 POINTS
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INTENT

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

DESCRIPTION

Facilitate reduction of waste generated during retrofit construction and during building occupancy that is hauled and disposed off in landfills.

REQUIREMENTS

1 point: Provide recycling facilities/infrastructure for sorting and separate collection of recyclable waste for recycling during construction (consumables - glass, paper, metal, equipment, addition & alteration construction wastes)

1 point: Promote and encourage waste minimization and recycling among occupants, tenants and visitors through various avenues

1 point: Promote waste sorting, collecting, quantifying, monitoring and recycling of a large range of waste generated in-house.

APPROACH & IMPLEMENTATION

During retrofit construction, designate a dedicated area where on-site sorting of waste materials can be stored in separate skips for collection to recycling facilities.

During Building Occupancy, designate storage areas for recyclable materials that are clearly labelled for recycling, placed within accessible reach of the building occupants and in a location with easy vehicular access to facilitate collection.

The size of the storage space allocated should be adequate to store the recyclable waste volume generated by the building occupants/operation.

Identify and include a list of recycling facilities that are able to handle and treat the recyclable waste diverted from landfills by the building occupants/operation.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Floor plans showing the proposed locations of the storage areas for recyclables and their proximity to the building entrance and vehicular access point/s.	<input type="radio"/>	<input type="radio"/>
2. Ensure that the space provided for recyclables is in addition to the storage space allocated for general waste.	<input type="radio"/>	<input type="radio"/>
3. Describe proposed promotional activities to encourage recycling within the building.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-built plans showing the locations of the storage area for recyclables. The plans should indicate the proximity of the storage from the building entrance.	<input type="radio"/>	<input type="radio"/>
2. Photographs showing the location, size, storage provision and labelling of dedicated facilities during construction.	<input type="radio"/>	<input type="radio"/>
3. Write up of promotional activities to encourage recycling within the building including evidence of such promotional activities carried out.	<input type="radio"/>	<input type="radio"/>
4. A waste recycling strategy and plan that identifies types of recyclable materials diverted from landfills as well as recycling facilities that have been signed up to handle the recyclable waste	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
MATERIALS AND RESOURCES (MR)**

MR6	REFRIGERANTS & CLEAN AGENTS	2 POINTS
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INTENT

To demonstrate leadership in accelerating phase-out of all Ozone Depleting Substances. Recognise and promote use of low Global Warming Substances.

DESCRIPTION

Use environmentally-friendly Refrigerants and Clean Agents exceeding Malaysia’s commitment to the Montreal & Kyoto protocols.

REQUIREMENTS

- 1 point:** Use zero Ozone Depleting Potential (ODP) products: non-CFC and non-HCFC refrigerants **AND** clean agents,
- 1 point:** Use non-synthetic (natural) refrigerants **AND** clean agents with zero ODP and negligible Global Warming Potential.

APPROACH & IMPLEMENTATION

Use synthetic refrigerants (for HVAC) and clean agents (for fire fighting) with zero ODP such as HFCs that exceeds Malaysia’s commitment to the Montreal & Kyoto protocols.

Use non-synthetic (natural) refrigerants (for HVAC) and clean agents (for fire fighting) with zero ODP and negligible Global Warming Potential (GWP) such as water, hydrocarbon, carbon dioxide, ammonia and etc (for HVAC); and nitrogen, argon, water mist and etc (for fire fighting).

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit proposed types of refrigerants and clean agents to be used and/or if no refrigerants or clean agents will be used.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit list of as-installed refrigerants and clean agents.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
WATER EFFICIENCY
(WE)

**NON-RESIDENTIAL EXISTING BUILDING (NREB)
WATER EFFICIENCY (WE)**

WE1	RAINWATER HARVESTING	3 POINTS
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INTENT

To encourage rainwater harvesting that will lead to reduction in potable water consumption.

DESCRIPTION

Maximise rainwater collection from rooftop or runoff rainwater systems for building consumption and/or irrigation.

REQUIREMENTS

Rainwater harvesting that achieves the following percentage in reduction of potable water consumption:

- 1 point:** For ≥ 5% or more reduction, **OR**
- 2 points:** For ≥ 15% or more reduction, **OR**
- 3 points:** For ≥ 30% or more reduction.

Submit calculation demonstrating reduction in water consumption compared to the existing building's water usage which includes potable water used for cooling towers, fountains, pools, etc.

APPROACH & IMPLEMENTATION

The two (2) main approaches to rainwater harvesting are collection of runoff rainwater from surrounding site and roof top rainwater harvesting. Both systems require separate water storage tanks and additional pressure boosting equipment may be required. Gravity fed system is encouraged to avoid additional energy use for pumping. Use rainwater for non-potable applications such as toilets and urinal flushing, landscape irrigation, washing clothes etc.

Water purifying system may be necessary depending on the application and methodology of harvesting the rainwater. Where rainwater filtration/purification is required, use of ozone or activated oxygen in lieu of chlorine or other GHG chemicals, is preferred to obviate negative environmental impact.

Rainwater harvesting calculation method and parameters adopted using GBI recognized Standards, Codes or Guides are acceptable.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. A technical report describing the concept and details of rainwater collection, conveyance system (gutters/downpipes or equivalent), filtration system (if any), storage facility and distribution system.	<input type="radio"/>	<input type="radio"/>
2. The technical report shall include schematics showing how the rainwater is to be harvested and utilised, including calculation of annual water consumption and reduction achievable from using harvested rainwater based on historical rainfall data.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Final as-installed calculation of rainwater harvested, storage tank capacity and building usage distribution system.	<input type="radio"/>	<input type="radio"/>
2. As Built drawings for rainwater harvesting system and storage tank location (Recommended scale 1:200).	<input type="radio"/>	<input type="radio"/>
3. Furnish photographs of as installed main equipment and components.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE
SUBMITTING PROFESSIONAL	NAME	DESIGNATION	COMPANY	SIGNATURE
CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

NON-RESIDENTIAL EXISTING BUILDING (NREB) WATER EFFICIENCY (WE)

WE2	WATER RECYCLING	2 POINTS
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INTENT

To encourage water recycling that will lead to reduction in potable water consumption.

DESCRIPTION

Encourage recycling of greywater and/or blackwater for building and irrigation use to reduce discharge to external sewer, thereby reducing the overall building potable water consumption.

Encourage and recognise building design that reduces water flow to sewerage treatment plants.

REQUIREMENTS

Treat and recycle the following percentage of wastewater leading to reduction in potable water consumption:

1 point: For ≥ 10% or more wastewater being treated and recycled, **OR**

2 points: For ≥ 30% or more wastewater being treated and recycled.

APPROACH & IMPLEMENTATION

Water treatment systems and re-use technology options are acceptable for treating greywater and blackwater. The treated water is then recycled for use in irrigation, toilet flushing etc. Sand filters can be a cost effective treatment technique.

POTENTIAL TECHNOLOGIES & STRATEGIES

Consider channelling greywater from sinks, showers and other sources to wastewater treatment plant.

Options for on-site wastewater treatment include packaged biological nutrient removal systems and high efficiency filtration systems can be considered.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Preliminary calculation to demonstrate the percentage of wastewater to be treated and recycled.	<input type="radio"/>	<input type="radio"/>
2. A technical report describing the concept and details of the recycling and treatment plant, conveyance system, storage facility and distribution system.	<input type="radio"/>	<input type="radio"/>
3. The technical report shall include schematics showing how the wastewater is recycled, stored and utilised.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Final as-installed calculation of the recycled and treated wastewater, storage tank capacity and distribution system.	<input type="radio"/>	<input type="radio"/>
2. As Built drawings for wastewater recycling and treatment system, and storage tank location (to scale).	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE
SUBMITTING PROFESSIONAL	NAME	DESIGNATION	COMPANY	SIGNATURE
CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
WATER EFFICIENCY (WE)

WE3	WATER EFFICIENT IRRIGATION/ LANDSCAPING	2 POINTS
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INTENT

To encourage and recognise the design of landscaping system that minimises or does not require the use of potable water supply from the local water authority.

DESCRIPTION

The main aim is to reduce the consumption of potable water for landscape irrigation. This may be achieved through the use of native or adaptive plants to reduce potable water consumption.

REQUIREMENTS

- 1 point:** For reducing potable water consumption for landscape irrigation by 50% or more, **OR**
- 2 points:** For not using potable water at all for landscape irrigation.

APPROACH & IMPLEMENTATION

Design a water-efficient landscape by selecting native or adaptive plants that require minimal water. Reduce or eliminate use of potable water for landscape irrigation system.

POTENTIAL TECHNOLOGIES & STRATEGIES

Perform soil / climate analysis to determine appropriate plant material and design the landscape with native or adaptive plants to reduce or eliminate irrigation requirements. Where irrigation is required, use high efficiency equipment and/or climate based controllers.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. A brief description of the system with references to Guidelines used, calculations, and an explanation of how the system meets the requirement for the credit.	<input type="radio"/>	<input type="radio"/>
2. A brief report by a landscape architect detailing the selection of native adaptive vegetation and the water efficient irrigation system and demonstrating that it will meet all the requirements for the credit.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As built plans showing the detail location of the planted native adaptive vegetation and installed water efficient irrigation system (to scale).	<input type="radio"/>	<input type="radio"/>
2. Calculation of the reduction of potable water for landscape irrigation.	<input type="radio"/>	<input type="radio"/>
3. Furnish photographs of the vegetation installed.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE
SUBMITTING PROFESSIONAL	NAME	DESIGNATION	COMPANY	SIGNATURE
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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
WATER EFFICIENCY (WE)**

WE4	WATER EFFICIENT FITTINGS	3 POINTS
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INTENT

To encourage reduction in potable water consumption through use of efficient devices.

REQUIREMENTS

1) With reference to Utility calculations:

1 point: For reduction of $\geq 20\%$ or more annual potable water consumption, **OR**

2 points: For reduction of $\geq 30\%$ or more annual potable water consumption, **OR**

3 points: For reduction of $\geq 50\%$ or more annual potable water consumption.

OR

2) From existing 3-year average water consumption record, reduce annual potable water use by:

1 point: For reduction of $\geq 20\%$ or more annual potable water consumption, **OR**

2 points: For reduction of $\geq 30\%$ or more annual potable water consumption, **OR**

3 points: For reduction of $\geq 50\%$ or more annual potable water consumption.

Submit with reference to Utility calculations or from existing 3-year average water consumption record to demonstrate that the fittings selected will reduce the potable water consumption compared to the building base conditions.

APPROACH & IMPLEMENTATION

The use of water efficient water closets, wash hand basins or shower heads or systems which has the potential to reduce potable water consumption in the building.

Specify the use of automatic self-closing faucets, electronic or otherwise, to eliminate wastage through faucets left running unnecessarily.

Specify the use of modified waterless urinals.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. A brief description of the system and an explanation of how the system meets the requirement for the credit.	<input type="radio"/>	<input type="radio"/>
2. Submit proposed makes of the intended fittings.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Actual verified water consumption for the building	<input type="radio"/>	<input type="radio"/>
2. Tabulation of all as-installed water efficient fittings and calculations to verify percentage of water saved to meet the requirement for the credit.	<input type="radio"/>	<input type="radio"/>
3. Submit manufacturer's details of the installed fittings.	<input type="radio"/>	<input type="radio"/>
4. Furnish photographs of each type of water efficient fittings as installed.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the DA submission.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE	
SUBMITTING PROFESSIONAL	NAME	DESIGNATION	COMPANY	SIGNATURE	
CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE	

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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
WATER EFFICIENCY (WE)**

WE5	METERING & LEAK DETECTION SYSTEM	2 POINTS
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INTENT

To encourage the design of systems that allows monitoring and management of water consumption.

REQUIREMENTS

1 point: For incorporation of sub-meters to monitor and manage major water usage for cooling towers, irrigation, kitchens and tenancy use.

1 point: For linking sub-meters to EMS to facilitate early detection of water leakage.

APPROACH & IMPLEMENTATION

Specify the provisions of sub-meters for major water consuming systems/equipment.

Incorporate EMS monitoring system of sub-meters.

POTENTIAL TECHNOLOGIES & STRATEGIES

To incorporate provisions of analogue or digital flow water sub-meters.

Incorporation of EMS monitoring will enable early detection of water leakage and contain water wastage.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Describe proposed provision of sub-meters of all major water consuming system/equipment and interface with EMS.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit tabulated inventory of as-installed sub-meters.	<input type="radio"/>	<input type="radio"/>
2. As built plans of the building showing the location of sub-meters.	<input type="radio"/>	<input type="radio"/>
3. Furnish photographs of typical sub-meter installed.	<input type="radio"/>	<input type="radio"/>
4. Sample of actual EMS report recording consumption and simulated leakage.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE	
SUBMITTING PROFESSIONAL	NAME	DESIGNATION	COMPANY	SIGNATURE	
CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE	

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NON-RESIDENTIAL EXISTING BUILDING (NREB)
INNOVATION
(IN)

NON-RESIDENTIAL EXISTING BUILDING (NREB) INNOVATION (IN)

IN1
INNOVATION
9 POINTS

INTENT

To provide opportunity for the project to be awarded points for exceptional performance above the requirements set by GBI rating system.

DESCRIPTION

Reward innovation and initiatives.

REQUIREMENTS

Encourage project team to score 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 9 points, for innovative ideas such as, but not limited to:

- Use of Industrialized Building System (IBS) for the retrofit component (minimum CIDB IBS score of 30);
- Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling tower make-up water or other suitable application;
- Co-generation / Tri-generation system;
- Thermal / PCM / Thermal Mass storage system (accounting for at least 25% of total required cooling capacity);
- Solar thermal technology / Solar Air conditioners (generating at least 10% of total required cooling capacity);
- Heat recovery system (contributing to at least 10% of total required capacity);
- Heat pipe technology (contributing to at least 50% of relevant applications);
- Light pipes (generating at least 1% of the total lighting capacity);
- 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);
- Air and dirt separator system for chilled water system
- Vacuum degasser cleaning system for chilled water piping system
- Dynamic balancing control valve system (for entire chilled water system)
- Mixed mode / low energy ventilation system;
- Advanced air filtration technology (serving at least 50% of the GFA);
- Waterless urinals (fitted to at least 75% male toilets);
- Central vacuum system (serving at least 50% of NLA);
- Central Pneumatic Waste Collection system (serving at least 50% of NLA);
- Self-cleaning façade (for at least 10% of facade);
- Electrochromic glazed façade (for at least 10% of facade);
- Refrigerant leakage detection and recycling facilities (for at least 90% of HVAC plant);
- Car park mechanical ventilation fans provided with VSD and controlled by CO2/CO sensors;
- Recycling of all fire systems (sprinkler and wet riser) water during regular testing;

Project team may submit any innovation not listed above to GBI for consideration and approval of credit point.

CONTINUED ON NEXT PAGE

**NON-RESIDENTIAL EXISTING BUILDING (NREB)
INNOVATION (IN)**

IN1	INNOVATION	9 POINTS
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CONTINUED FROM PREVIOUS PAGE

APPROACH & IMPLEMENTATION

During Concept Design Stage, commence discussions on all possible innovation ideas to be incorporated into the building early. Late incorporation of innovation ideas may be difficult and costly.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Report on each innovation, how it is derived, and how it would assist in reducing energy and/or improving sustainable design.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Full documentation and photographic evidence of each innovation, and the process from commencement to commissioning, complete with drawings, manuals and maintenance write-up.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE
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**NON-RESIDENTIAL EXISTING BUILDING (NREB)
INNOVATION (IN)**

IN2	GREEN BUILDING INDEX FACILITATOR	1 POINT
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INTENT

To support and encourage the design integration required for Green Building Index rated buildings and to streamline the application and certification process.

DESCRIPTION

Encourage and promote green technology service providers.

REQUIREMENTS

Support and encourage the design integration required for Green Building Index rated buildings and to streamline the application and certification process, where:

At least one principal participant of the project team shall be a Green Building Index Facilitator who is engaged at the onset of the design process until completion of construction and Green Building Index certification is obtained. Name of the GBI Facilitator shall be inserted in GBI Application & Registration Form.

APPROACH & IMPLEMENTATION

Appoint a Green Building Index Facilitator early to assist in the concept design stage, and ensure that the Facilitator follows through the entire project.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Proof of appointment of the named GBI Facilitator.	<input type="radio"/>	<input type="radio"/>
2. GBI Facilitator to present DA submission to GBI Certifier.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. GBI Facilitator to present CVA submission to GBI Certifier.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE
SUBMITTING PROFESSIONAL	NAME	DESIGNATION	COMPANY	SIGNATURE
CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE

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ACKNOWLEDGEMENTS

GSB would like to thank all contributors for efforts in preparing the Non-Residential Existing Building (NREB) Design Reference Guide Version 1.0. The following are the main contributors to the formation of this document:

NON-RESIDENTIAL EXISTING BUILDING (NREB)

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WHAT IS THE GREEN BUILDING INDEX?

The Green Building Index (GBI) is Malaysia's industry recognised green rating tool for buildings to promote sustainability in the built environment and raise awareness among Developers, Architects, Engineers, Planners, Designers, Contractors and the Public about environmental issues and our responsibility to the future generations.

The GBI rating tool provides an opportunity for developers and building owners to design and construct green, sustainable buildings that can provide energy savings, water savings, a healthier indoor environment, better connectivity to public transport and the adoption of recycling and greenery for their projects and reduce our impact on the environment.

GBI is developed specifically for the Malaysian-tropical climate, environmental and developmental context, cultural and social needs and is created to:

- Define green buildings by establishing a common language and standard of measurement;
- Promote integrated, whole-building designs that provides a better environment for all;
- Recognise and reward environmental leadership;
- Transform the built environment to reduce its negative environmental impact; and
- Ensure new buildings remain relevant in the future and existing buildings are refurbished and upgraded to improve the overall quality of our building stock.

GREEN BUILDING INDEX ORGANISATION

1 GBI ACCREDITATION PANEL (GBIAP)

The GBI rating system will be regulated by the GBI Accreditation Panel (GBIAP), an independent committee consisting of senior building professionals that will be reviewing and awarding the GBI rating to qualified projects. The GBIAP comprises leading industry professionals recognised for their contribution in sustainable developments in Malaysia. They have been actively involved in every step of the rating system's development, ensuring that the rating system is fully tested and compliant to both local and international standards and best practices.

2 GBI CERTIFIERS

The roles and responsibility of GBI Certifiers are to perform the detailed assessment and accreditation of building projects submitted to the GBI Accreditation Panel for GBI Certification.

3 GBI FACILITATORS

The roles and responsibility of GBI Facilitators are to provide services to enable building projects to achieve GBI accreditation.

HOW DOES GBI WORK?

The GBI certification process starts with an assessment of the building design by a certifier appointed by Greenbuildingindex Sdn Bhd. A Provisional certification is then issued, with the final certification issued when the completed building has been verified according to the design. To maintain the certification, the building is reassessed every three years. Points are given for performance above benchmarks and current industry practice. Depending on the scores achieved, the buildings will be awarded one of four types of ratings: Certified, Silver, Gold and Platinum.

The assessment of commercial and residential properties under the GBI rating tool is based on six main criteria as follows:

1 ENERGY EFFICIENCY (EE)

Improve energy consumption by optimising building orientation, minimizing solar heat gain through the building envelope, harvesting natural lighting, adopting the best practices in building services including use of renewable energy, and ensuring proper testing, commissioning and regular maintenance.

2 INDOOR ENVIRONMENT QUALITY (EQ)

Achieve good quality performance in indoor air quality, acoustics, visual and thermal comfort. These will involve the use of low volatile organic compound materials, application of quality air filtration, proper control of air temperature, movement and humidity.

3 SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

Selecting appropriate sites with planned access to public transportation, community services, open spaces and landscaping. Avoiding and conserving environmentally sensitive areas through the redevelopment of existing sites and brownfields. Implementing proper construction management, storm water management and reducing the strain on existing infrastructure capacity.

4 MATERIALS & RESOURCES (MR)

Promote the use of environment-friendly materials sourced from sustainable sources and recycling. Implement proper construction waste management with storage, collection and re-use of recyclables and construction formwork and waste.

5 WATER EFFICIENCY (WE)

Rainwater harvesting, water recycling and water-saving fittings.

6 INNOVATION (IN)

Innovative design and initiatives that meet the objectives of the GBI.

GREEN BUILDING INDEX REGISTRATION FEES

SIZE OF PROJECT	TOTAL GROSS FLOOR AREA (m ²)	REGISTRATION FEES (RM)
SINGLE RESIDENCE	Below 2,000	5,000.00
SMALL	Up to 4,000	8,000.00
INTERMEDIATE	4,001 to 10,000	10,000.00
MEDIUM	10,001 to 30,000	20,000.00
LARGE	30,001 to 50,000	32,000.00
EXTRA LARGE	50,001 to 100,000	45,000.00
MEGA PROJECT	Above 100,000	Assessment fee will be determined on a project-by-project basis

PROJECT ASSESSMENT

Fee as per prescribed includes:

- 1 Design Assessment (DA)
- 1 Completion & Verification Assessment (CVA)

APPEAL

A flat rate of RM1,000.00 per credit point

* Rates shown are as of the date of the application and registration and may be revised from time to time as appropriate.
* Rates shown are excluding Government Service Tax (GST)



**GBI ASSESSMENT CRITERIA
INDUSTRIAL EXISTING BUILDING (IEB)**

VERSION 1.0 | JUNE 2011

www.greenbuildingindex.org | info@greenbuildingindex.org

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ACKNOWLEDGEMENT & COPYRIGHT

The Green Building Index has been developed by PAM and ACEM for the purposes as mentioned above and may be subject to further updating and/or modification in future.

The Green Building Index (GBI) is based upon the existing rating tools such as the Singapore Green Mark and the Australian Green Star system, amongst others which have been extensively modified for the Malaysian application. Grateful acknowledgment is made to the owners of copyright for these systems for use of their documents, information and materials in the development of the GBI.

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The GBI is no substitute for professional advice. Users are advised to consult with appropriate and accredited professional advisors for advice concerning specific matters pertaining to the GBI before adopting or using it. PAM and ACEM disclaim any responsibility for positions taken by users in their individual cases or for any misunderstandings and losses, direct or indirectly, on the part of the users.

PAM and ACEM do not endorse or otherwise acknowledge the GBI rating achieved by the use of the GBI. PAM and ACEM offer a formal certification process for ratings; which service provides for independent third party review of points claimed to ensure that all credits can be demonstrated to be achieved by the provision of the necessary documentary evidence. Use of the GBI without formal certification by PAM and ACEM does not entitle the user or any other party to promote the achieved GBI rating. Notwithstanding the above, neither the GBI formalization nor any certification issued by PAM and ACEM shall be used for advertising or product/services endorsement purposes.

INDEMNIFICATION

To the extent permitted by applicable law, by using the GBI, the user agrees to defend, indemnify, and hold harmless, PAM and ACEM, their officers, employees, members, representatives and agents from and against all claims and expenses of whatsoever kind and amount, arising out of the user's use of the GBI or materials and information contained therein and not to pursue any cause of action whatsoever against PAM and ACEM under any conceivable circumstances.

INTRODUCTION

WHAT IS THE GREEN BUILDING INDEX (GBI)?

The Green Building Index is an environmental rating system for buildings developed by PAM (Pertubuhan Arkitek Malaysia / Malaysian Institute of Architects) and ACEM (the Association of Consulting Engineers Malaysia). The Green Building Index is Malaysia's first comprehensive rating system for evaluating the environmental design and performance of Malaysian buildings based on the six (6) main criterias of Energy Efficiency, Indoor Environment Quality, Sustainable Site Planning & Management, Materials & Resources, Water Efficiency, and Innovation.

The Green Building Index is fundamentally derived from existing rating tools, including the Singapore Green Mark and the Australian Green Star system, but extensively modified for relevance to the Malaysian tropical weather, environmental context, cultural and social needs.

This PAM/ACEM GBI initiative aims to assist the building industry in its march towards sustainable development. The GBI environmental rating system is created to:

- **Define green building by establishing a common language and standard of measurement;**
- **Promote integrated, whole-building design;**
- **Recognise and reward environmental leadership;**
- **Transform the built environment to reduce the environmental impact of development; and**
- **Ensure new buildings remain relevant in the future and existing buildings are refurbished and thereafter sustained properly to remain relevant.**

WHO CAN USE THE GBI INDUSTRIAL EXISTING BUILDING (IEB) RATING TOOL?

PAM/ACEM encourage all members of Project Teams, Building owners, Developers and other interested parties (including Contractors, Government and Design and Build Contractors) to use the Green Building Index to validate environmental initiatives of the design phase of existing industrial building construction or refurbishment; or construction and procurement phase of industrial buildings and their industrial process. Use of the Green Building Index is encouraged on all such projects to assess and improve their environmental attributes.

Use of the Green Building Index (Industrial) tool without formal certification by an independent accredited GBI Certifier does not entitle the user or any other party to promote the Green Building Index rating achieved. No fee is payable to PAM/ACEM for such use, however formal recognition of the Green Building Index rating - and the right to promote same - requires undertaking the formal certification process offered by PAM/ACEM.

All Green Building Index rating tools are reviewed regularly; please forward any feedback to info@pam.org.my.

HOW TO USE THE GBI INDUSTRIAL EXISTING BUILDING (IEB) RATING TOOL?

- Complete the Building Input worksheet as the building's type and location may affect the predicted rating.
- Complete the remaining worksheets by reviewing each credit in each category and entering the number of points you predict the building will achieve in the 'No. of Points Achieved' column. Calculators are provided for a number of the tool's credits.
- Enter any points that may be achieved but need to be confirmed in the 'Points to be Confirmed' column.
- Enter any comments required in the 'Comments' column.
- The predicted rating is shown in the Summary worksheet. More detail on point scores (both achieved and those to be confirmed) are shown in the Credit Summary and Graphical Summary worksheets at the end of the tool.

PROJECT INFORMATION

NAME OF BUILDING	
ADDRESS OF BUILDING	
POSTCODE	
STATE	

APPLICANT	
CONTACT PERSON	

ARCHITECT	
CIVIL ENGINEER	
STRUCTURAL ENGINEER	
MECHANICAL ENGINEER	
ELECTRICAL ENGINEER	
QUANTITY SURVEYOR	
LANDSCAPE CONSULTANT	
OTHER SPECIALIST CONSULTANT(S)	
MAIN CONTRACTOR	
LOCAL AUTHORITY	
TOTAL GROSS FLOOR AREA	
LAND AREA FOR LANDED PROPERTY	

BUILDING AND INDUSTRIAL PROCESS DESCRIPTION	

DETAIL ASSESSMENT CRITERIA SUMMARY OF FINAL SCORE

PART	ITEM	MAXIMUM POINTS	SCORE
1	Energy Efficiency	38	
2	Indoor Environmental Quality	22	
3	Sustainable Site Planning & Management	10	
4	Material & Resources	8	
5	Water Efficiency	12	
6	Innovation	10	
TOTAL SCORE		100	

GREEN BUILDING INDEX CLASSIFICATION

POINTS	GBI RATING
86 points and above	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

DETAIL ASSESSMENT CRITERIA SUMMARY OF CONTENTS

PART	CRITERIA	ITEM	POINTS	TOTAL	
1	EE	ENERGY EFFICIENCY			38
	Design & Performance				
	EE1	Minimum EE Performance	2		
	EE2	Lighting Zoning	3		
	EE3	Electrical Sub-metering	2		
	EE4	Renewable Energy & Onsite Energy Capture	8		
	EE5	Advanced or Improved EE Performance - BEI and/or EUI	10		
	Commissioning				
	EE6	Enhanced or Re-Commissioning or Retro Commissioning	5		
	EE7	On-going Post Occupancy Commissioning	2		
	Monitoring, Improvement & Maintenance				
	EE8	EE Monitoring & Improvement	2		
EE9	Sustainable Maintenance	4			
2	EQ	INDOOR ENVIRONMENTAL QUALITY			22
	Air Quality				
	EQ1	Minimum IAQ Performance	1		
	EQ2	Environmental Tobacco Smoke (ETS) Control	1		
	EQ3	Carbon Dioxide Monitoring and Control	1		
	EQ4	Indoor Air Pollutant & Industrial Chemicals	3		
	EQ5	Mould Prevention	1		
	Occupant Comfort				
	EQ6	Thermal Comfort: Controllability of Systems	2		
	EQ7	Air Change Effectiveness	1		
	EQ8	Breakout Space	1		
	Lighting, Visual & Acoustic Comfort				
	EQ9	Daylighting	2		
	EQ10	Daylight Glare Control	1		
	EQ11	Electric Lighting Levels	1		
	EQ12	High Frequency Ballasts	1		
EQ13	External Views	2			
EQ14	Internal Noise Levels	1			
Verification					
EQ15	IAQ Before & During Occupancy	2			
EQ16	Post Occupancy Comfort Survey: Verification	1			

DETAIL ASSESSMENT CRITERIA SUMMARY OF CONTENTS (CONTINUED)

PART	CRITERIA	ITEM	POINTS	TOTAL
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT		10
	Facility Management			
	SM1	GBI Rated Design & Construction	1	
	SM2	Building Exterior Management	1	
	SM3	Integrated Pest Management, Erosion Control & Landscape Management	1	
	Transportation			
	SM4	Green Vehicle Priority	1	
	SM5	Parking Capacity	1	
	Reduce Heat Island Effect			
SM6	Greenery & Roof	4		
SM7	Building User Manual	1		
4	MR	MATERIALS & RESOURCES		8
	Reused & Recycled Materials			
	MR1	Materials Reuse and Selection	1	
	MR2	Recycled Content Materials	1	
	Sustainable Materials & Resources and Policy			
	MR3	Sustainable Timber	1	
	MR4	Sustainable Purchasing Policy	1	
	Waste Management			
MR5	Storage, Collection & Disposal of Recyclables	3		
Green Products				
MR6	Refrigerants & Clean Agents	1		
5	WE	WATER EFFICIENCY		12
	Water Harvesting & Recycling			
	WE1	Rainwater Harvesting	3	
	WE2	Water Recycling	3	
	Increased Efficiency			
	WE3	Water Efficient - Irrigation/Landscaping	2	
	WE4	Water Efficient Fittings	2	
WE5	Metering & Leak Detection System	2		
6	IN	INNOVATION		10
	IN1	Innovation & Environmental Initiatives	9	
	IN2	Green Building Index Facilitator	1	
			TOTAL POINTS	100

1

ENERGY EFFICIENCY (EE)

DESIGN & PERFORMANCE | COMMISSIONING | MONITORING, IMPROVEMENT & MAINTENANCE

38 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
DESIGN & PERFORMANCE				
EE1	MINIMUM EE PERFORMANCE			
	Building envelope to achieve minimum energy efficiency (EE) performance so as to reduce energy consumption, thereby reducing CO ₂ emission to the atmosphere. To meet the following minimum EE requirements as stipulated in MS 1525:		2	
	a. Submit calculations for OTTV ≤ 50 and RTTV ≤ 25 (use of BEIT software or other GBI approved softwares is permitted), AND	1		
	b. Install Energy Management Control system where Air-conditioned space ≥ 4000 m ²	1		
EE2	LIGHTING ZONING			
	Provide flexible lighting controls to optimise energy savings:		3	
	All individual or enclosed spaces to be individually switched; and the size of individually switched lighting zones shall not exceed 100m ² for 90% of the NLA (building and industrial plant area); with switching clearly labelled and easily accessible by occupants.	1		
	Provide auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylight areas and/or provide task lighting for at least 25% (separate from motion sensor provision) of industrial plant area.	1		
	Provide motion sensors or equivalent to complement lighting zoning for at least 25% NLA of building OR provide task lighting for at least 25% (separate from auto-sensor provision) of industrial plant area.	1		
EE3	ELECTRICAL SUB-METERING			
	Monitor energy consumption of key building services, tenancy and industrial plant areas:- Provide sub-metering for all energy uses ≥ 100kVa; with separate sub-metering for lighting and separately for power, and for industrial processes.	2	2	
EE4	RENEWABLE ENERGY & ONSITE ENERGY CAPTURE/RECOVERY			
	Encourage use of renewable energy and/or onsite energy capture/recovery.		8	
	Where 0.25 % or 2 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery, OR	1		
	Where 0.50 % or 5 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery, OR	2		
	Where 0.75 % or 7.5 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery, OR	3		
	Where 1.00 % or 10 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery, OR	4		
	Where 1.25 % or 15 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery, OR	5		
	Where 1.50 % or 20 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery, OR	6		
	Where 2.0 % or 40 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery, OR	7		
	Where 2.5 % or 60 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery.	8		

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR INDUSTRIAL EXISTING BUILDING (IEB)

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
DESIGN & PERFORMANCE (CONTINUED)				
EE5	ADVANCED OR IMPROVED EE PERFORMANCE - BEI AND/OR EUI			
	1) Exceed Energy Efficiency (EE) performance better than the baseline minimum to reduce energy consumption in the building and/or the industrial plant process. For the building, improve Building Energy Intensity (BEI) as defined by GBI (use of GBI approved software is permitted). For industrial plant process, use Energy Use Intensity (EUI) to compare against baseline data for similar plant process (baseline EUI shall be furnished by applicant for GBI acceptance). Use BEI or EUI if either building or industrial plant process energy use constitutes more than 75% of the total energy use. Otherwise, calculate both BEI and EUI with the lower point score applicable.		10	
	BEI ≤ 180 or EUI improvement ≥ 10%	1		
	BEI ≤ 150 or EUI improvement ≥ 25%	3		
	BEI ≤ 140 or EUI improvement ≥ 30%	4		
	BEI ≤ 130 or EUI improvement ≥ 35%	5		
	BEI ≤ 120 or EUI improvement ≥ 40%	6		
	BEI ≤ 110 or EUI improvement ≥ 45%	7		
	BEI ≤ 100 or EUI improvement ≥ 50%	8		
	BEI ≤ 90 or EUI improvement ≥ 55%	10		
	OR			
	2) Demonstrate Energy savings over the last 3 years from Existing Building/Plant historical BEI/EUI baseline, to improve by:			
	BEI ≥ 15% with resultant BEI ≤ 200 or EUI improvement ≥ 10%	1		
	BEI ≥ 20% with resultant BEI ≤ 190 or EUI improvement ≥ 25%	2		
	BEI ≥ 25% with resultant BEI ≤ 180 or EUI improvement ≥ 30%	3		
	BEI ≥ 30% with resultant BEI ≤ 150 or EUI improvement ≥ 35%	5		
	BEI ≥ 40% with resultant BEI ≤ 140 or EUI improvement ≥ 40%	6		
	BEI ≥ 50% with resultant BEI ≤ 130 or EUI improvement ≥ 45%	7		
	BEI ≥ 60% with resultant BEI ≤ 120 or EUI improvement ≥ 50%	8		
	BEI ≥ 70% with resultant BEI ≤ 110 or EUI improvement ≥ 55%	10		
COMMISSIONING				
EE6	ENHANCED OR RE-COMMISSIONING OR RETRO COMMISSIONING			
	Ensure the energy related systems of the building and industrial process are properly commissioned so as to realise their full potential. Appoint a GBI recognised Commissioning Specialist (CxS) to perform the commissioning for all the facility's energy related systems in accordance with ASHRAE Commissioning Guideline or other GBI approved equivalent standard by:		5	
	a. Implement improvements to ensure building/plant's major energy using systems are repaired, operated and maintained effectively to optimize energy performance.	5		
	b. Develop a commissioning or ongoing commissioning plan for the building/plant's major energy-using systems.			
	c. Provide training for staff to build awareness and skills in a broad range of sustainable building/plant operations, including energy efficiency, equipment and systems operations and maintenance.			
	d. Update the building/plant operating plan as necessary to reflect any changes in the occupancy/production schedule, equipment runtime schedule, design set points and lighting levels.			
EE7	ON-GOING POST OCCUPANCY COMMISSIONING			
	Carry out post occupancy/ post process operation commissioning for all tenancy and industrial areas after fit-out/plant modification changes are completed:		2	
	a. Design engineer shall review all fit-out plans/plant modifications to ensure original design intent is not compromised and upon completion of the fit-out/plant modification works, verify and fine-tune the installations to suit	1		
	b. CxS shall carry out a full post/re-commissioning of the energy related systems to verify that their performance is sustained in conjunction with the completed fit-outs/modifications.	1		

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR INDUSTRIAL EXISTING BUILDING (IEB)

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
MONITORING, IMPROVEMENT & MAINTENANCE				
EE8	EE MONITORING & IMPROVEMENT			
	<p>1) Use Energy Management System to monitor and trend log energy consumption for building and plant process,</p> <p>AND</p> <p>Monitor sub-metering of building system and plant process to track energy consumption of major uses and other end use applications e.g. by categorising into building/plant systems or floors etc.</p>	1	2	
	<p>2) Fully commission EMS and activate Maximum Demand Limiting programme,</p> <p>AND</p> <p>Compile, summarise and submit BEI/EUI, Fuel and Water Consumption of building/plant to GBI on an annual basis during the 3-years validity period or earlier whenever requested by GBI. Submission shall include monthly energy and water bills.</p>	1		
EE9	SUSTAINABLE MAINTENANCE			
	<p>Ensure the energy related systems will continue to perform as intended with proper and sustainable maintenance:</p>		4	
	a. At least 75% of permanent maintenance team to participate in the commissioning of all energy services	1		
	b. Set up a permanent Energy Monitoring Committee (EMC) to ensure that building/plant energy performance is continuously monitored and improved.	1		
	c. Provide for a designated facility maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage	1		
	d. Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts) for building and plant process.	1		
ENERGY EFFICIENCY (EE) TOTAL			38	

2

INDOOR ENVIRONMENTAL QUALITY (EQ)

AIR QUALITY | OCCUPANT COMFORT | LIGHTING, VISUAL & ACOUSTIC COMFORT | VERIFICATION

22 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
AIR QUALITY				
EQ1	MINIMUM IAQ PERFORMANCE			
	Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in building (and industrial plant area where applicable), thus contributing to the comfort and well-being of the occupants: Meet the minimum requirements of ventilation rate in ASHRAE 62.1 or the local building code whichever is the more stringent.	1	1	
EQ2	ENVIRONMENTAL TOBACCO SMOKE (ETS) CONTROL			
	Prohibit smoking in the building and industrial plant area; and locate any exterior designated smoking areas at least 10m away from entries, outdoor air intakes and operable windows, OR Prohibit smoking in the building and industrial plant area except in designated smoking rooms and establish negative pressure in the smoking rooms together with provision of effective air filtration system.	1	1	
EQ3	CARBON DIOXIDE MONITORING AND CONTROL			
	Provide response monitoring of carbon dioxide levels to ensure delivery of optimal outside air requirements: Install carbon dioxide (CO ₂) monitoring and control system with at least one (1) CO ₂ sensor at all main return air points on each air-conditioned floor/zone to facilitate continuous monitoring and adjustment of outside air ventilation rates to each floor/zone, and ensure independent control of ventilation rates to maintain CO ₂ level ≤ 1,000ppm	1	1	
EQ4	INDOOR AIR POLLUTANT & INDUSTRIAL CHEMICAL EXPOSURE			
	Reduce detrimental impact on occupant/worker's health from finishes that emit internal air pollutants and exposure to industrial chemicals: Use low VOC paint and coating throughout the building. Paints and Coatings to comply with requirements specified in international labelling schemes recognized by GBI, AND Use low VOC carpet or flooring throughout the building. Carpets to comply with requirements specified in international labelling schemes recognized by GBI. Other types of flooring to comply with requirements under FloorScore developed by Science Certification System or equivalent, AND Use low VOC adhesive and sealant or no adhesive or sealant used.	1	3	
	Use products with no added urea formaldehyde. These include: a. Composite wood and agrifiber products defined as: particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores, AND b. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies, AND c. Insulation foam, AND d. Draperies	1		
	Minimise air pollutants of industrial plant process by using environmental friendly house keeping chemicals and minimise microbial contamination and NOX emission	1		
EQ5	MOULD PREVENTION			
	Design system(s) which reduce the risk of mould growth and its associated detrimental impact on occupant health: Demonstrate 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. Ensure that excessive moisture in building is controlled during the Design, Construction and Operation stages by the consideration and the control of the following: a. Rainwater leakage through roof and walls b. Infiltration of moist air c. Diffusion of moisture through walls, roof and floors d. Groundwater intrusion into basements and crawl spaces through walls and floors e. Leaking or burst pipes f. Indoor moisture sources g. Construction moisture OR The building is fully naturally ventilated	1	1	

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR INDUSTRIAL EXISTING BUILDING (IEB)

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
OCCUPANT COMFORT				
EQ6	THERMAL COMFORT: CONTROLLABILITY OF SYSTEMS			
	Provide a high level of thermal comfort system control by individual occupant/worker or by specific groups in multi-occupant/worker spaces to promote the productivity, comfort and well-being of occupants and plant workers:			
	Design to ASHRAE 55 in conjunction with the relevant localised parameters as listed in MS1525.	1	2	
	a. Provide individual comfort control for $\geq 50\%$ of the occupants/workers to enable adjustments to suit individual task needs and preferences, AND b. Provide comfort system controls for all shared multi-occupant/worker spaces to enable adjustments to suit group needs and preferences.	1		
	<i>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/workers' local environment.</i>			
EQ7	AIR CHANGE EFFECTIVENESS			
	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 (air-conditioned areas only): The ventilation systems are designed to achieve an ACE of ≥ 0.95 when measured in accordance with ASHRAE 129: Measuring air change effectiveness where ACE is to be measured in the breathing zone (nominally 1.0m from finished floor level)	1	1	
EQ8	BREAKOUT SPACE			
	Provide breakout space to reduce worker's fatigue for at least 5% of employees per shift.	1	1	
LIGHTING, VISUAL & ACOUSTIC COMFORT				
EQ9	DAYLIGHTING			
	Provide good levels of daylighting for building occupants and plant workers:			
	Demonstrate that $\geq 30\%$ of the NLA has a daylight factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level, OR	1	2	
	Demonstrate that $\geq 50\%$ of the NLA has a daylight factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level.	2		
EQ10	DAYLIGHT GLARE CONTROL			
	Reduce discomfort of glare from natural light. Where blinds or screens are fitted on all glazing and atrium as a base building, incorporate provisions to meet the following criteria: 1) Eliminate glare from all direct sun penetration and keep horizontal workspace lux level below 2000, AND 2) Eliminate glare from diffuse sky radiation for occupant workspace at viewing angles of 15° to 60° from the horizontal at eye level (typically 1.2m from floor level), AND 3) Control with an automatic monitoring system (for atrium and windows with incident direct sun light only - not applicable for fixed blinds/screens), AND 4) Equip with a manual override function accessible by occupants (not applicable for fixed blinds/screens).	1	1	
EQ11	ELECTRIC LIGHTING LEVELS			
	Baseline building and plant lighting not to be over designed: Demonstrate that lighting design maintains a luminance level of no more than specified in MS1525 for 90% of NLA (building and industrial plant area) as measured at the working plane (800 mm above the floor level).	1	1	
EQ12	HIGH FREQUENCY BALLASTS			
	Increase workplace amenity by avoiding low frequency flicker that may be associated with fluorescent lighting: Install high frequency ballasts in fluorescent luminaires over a minimum of 90% of NLA (building and industrial plant area).	1	1	

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR INDUSTRIAL EXISTING BUILDING (IEB)

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
LIGHTING, VISUAL & ACOUSTIC COMFORT (CONTINUED)				
EQ13	EXTERNAL VIEWS			
	Reduce eyestrain for building occupants by allowing long distance views and provision of visual connection to the outdoor. Note that this requirement is applicable to the office building component of the industrial plant only.		2	
	Demonstrate that $\geq 60\%$ of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.	1		
	Demonstrate that $\geq 75\%$ of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.	2		
EQ14	INTERNAL NOISE LEVELS			
	Maintain internal noise levels at an appropriate level. Demonstrate that 90% of the NLA (office component only) do not exceed the following ambient internal noise levels: 1) Within the entire baseline building general office, space noise from the building services does not exceed 40dBAeq, OR 2) Within the baseline building office space, the sound level does not exceed 45dBAeq for open plan and not exceed 40dBAeq for closed offices.	1	1	
VERIFICATION				
EQ15	IAQ BEFORE & DURING OCCUPANCY			
	Reduce indoor air quality problems resulting from the construction process (or inherent conditions) in order to improve and sustain the comfort and well-being of occupants/workers. Develop and implement an Indoor Air Quality (IAQ) Management Plan to effect this requirement as follows:		2	
	1) Perform a building/plant flush out by supplying outdoor air to provide not less than 10 airchanges/hour for at least 30 minutes operation and continuous minimum 1 ACH for the next 14 days, OR 2) If low VOC materials and low formaldehyde composite wood are used, then building/plant 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 for the next 7 days, OR 3) Conduct IAQ testing to demonstrate maximum concentrations for pollutants are not exceeded according to the Indoor Air Quality Code of Malaysia.	1		
	Permanent Air Purging System: Where a permanent air flushing system of at least 10 airchanges/hour operation is installed and operated at least once a year during occupancy stage.	1		
EQ16	POST OCCUPANCY COMFORT SURVEY: VERIFICATION			
	Provide for the assessment of comfort of the building occupants/plant workers: 1) Conduct an occupancy comfort survey of occupants/workers annually. This survey should collect anonymous responses about thermal comfort, visual comfort and acoustic comfort in a building/plant. 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 2) Develop a plan for corrective action if the survey results indicate that more than 20% of occupants/workers are dissatisfied with the overall comfort in the building/plant. 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, CO ₂ level, VOCs, and particulate concentration	1	1	
INDOOR ENVIRONMENTAL QUALITY (EQ) TOTAL			22	

3

SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

FACILITY MANAGEMENT | TRANSPORTATION | REDUCE HEAT ISLAND EFFECT

10 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
FACILITY MANAGEMENT				
SM1	GBI RATED DESIGN & CONSTRUCTION			
	If the building/plant has been previously GBI (or other GBI approved Green Rating system) rated under any category, OR within the last 12 months a comprehensive Energy Efficiency Audit has been conducted.	1	1	
SM2	BUILDING EXTERIOR MANAGEMENT			
	1) Employ environmentally sensitive building exterior management plan to reduce pollution, AND 2) Use environmentally non-polluting methods and chemicals for cleaning of building exterior including maintenance equipment, chemicals, paint and sealants.	1	1	
SM3	INTEGRATED PEST MANAGEMENT, EROSION CONTROL & LANDSCAPE MANAGEMENT			
	Employ environmentally sensitive management to preserve the site's natural components. Minimise harmful chemical use, energy waste, water waste, air pollution, solid waste and/or chemical runoff such as gasoline and oil. The following operational elements must be addressed: 1) Use of least toxic chemical pesticides, minimum use of chemicals and use only in targeted locations and only for targeted species. Conduct routine inspection and monitoring, AND 2) Erosion and sedimentation control for ongoing landscape operations including measures that prevent erosion and sedimentation, prevent air pollution from dust or particulate matter and restore eroded areas.	1	1	
TRANSPORTATION				
SM4	GREEN VEHICLE PRIORITY - LOW EMITTING & FUEL EFFICIENT VEHICLES			
	Encourage use of green vehicles: Provide preferred parking for low-emitting and fuel-efficient vehicles comprising 5% of total parking bays. <i>"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).</i>	1	1	
SM5	PARKING CAPACITY			
	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	1	
REDUCE HEAT ISLAND EFFECT				
SM6	GREENERY & ROOF			
	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; 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: <i>(Area of SRI Roof / 0.75) + (Area of vegetated roof / 0.5) ≥ Total Roof Area</i> <i>Roof Type Slope SRI</i> <i>Low-Sloped Roof < 2:12 78</i> <i>Steep-Sloped Roof > 2:12 29</i>	2	4	
SM7	BUILDING USER MANUAL			
	Document Green building/plant design features and strategies for user information and guide to sustain performance during occupancy: Provide (include updating) a Building User Manual which documents passive and active features that should not be downgraded.	1	1	
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM) TOTAL			10	

4

MATERIALS & RESOURCES (MR)

REUSED & RECYCLED MATERIALS | SUSTAINABLE MATERIALS & RESOURCES AND POLICY | WASTE MANAGEMENT | GREEN PRODUCTS

8 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
REUSED & RECYCLED MATERIALS				
MR1	MATERIALS REUSE AND SELECTION			
	Reuse building materials and products to reduce demand for virgin materials and reduce creation of waste. This serves to reduce environmental impact associated with extraction and processing of virgin resources. Integrate building design and its buildability with selection of reused building materials, taking into account their embodied energy, durability, carbon content and life cycle costs:		1	
	Where reused products/materials constitutes $\geq 20\%$ of the project's total retrofit material cost value	1		
MR2	RECYCLED CONTENT MATERIALS			
	Increase demand for building products that incorporate recycled content materials in their production: (Recycled content shall be defined in accordance with the International Organization of Standards Document)		1	
	Where use of materials with recycled content is such that the sum of post-consumer recycled plus one-half of the pre-consumer content constitutes $\geq 20\%$ (based on cost) of the total retrofit material cost value in the project	1		
SUSTAINABLE MATERIALS & RESOURCES AND POLICY				
MR3	SUSTAINABLE TIMBER			
	Encourage environmentally responsible forest management: Where $\geq 75\%$ of wood-based materials and products used in the retrofit are certified. These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. To include wood materials permanently installed and also temporarily purchased for the project. Compliant with Forest Stewardship Council and Malaysian Timber Certification Council requirements.	1	1	
MR4	SUSTAINABLE PURCHASING POLICY			
	Develop a Sustainable Purchasing Policy that must cover product purchases within the building/plant and management's control	1	1	
WASTE MANAGEMENT				
MR5	STORAGE & COLLECTION & DISPOSAL OF RECYCLABLES			
	Facilitate reduction of waste generated during retrofit construction and during building/plant occupancy that is hauled and disposed of in landfills:		3	
	Provide recycling facilities/infrastructure for sorting and separate collection of recyclable waste for recycling (consumables - glass, paper, metal, equipment, addition & alteration construction wastes)	1		
	Promote and encourage waste minimization and recycling among occupants, tenants and visitors through various avenues	1		
	Promote waste sorting, collecting, quantifying, monitoring and recycling of a large range of waste generated in-house.	1		
GREEN PRODUCTS				
MR6	REFRIGERANTS & CLEAN AGENTS			
	Use environmentally-friendly Refrigerants and Clean Agents exceeding Malaysia's commitment to the Montreal & Kyoto protocols:		1	
	Use zero Ozone Depleting Potential (ODP) products: non-CFC and non-HCFC Refrigerants AND Clean Agents.	1		
MATERIALS & RESOURCES (MR) TOTAL			8	

5

WATER EFFICIENCY (WE)

WATER HARVESTING & RECYCLING | INCREASED EFFICIENCY

12 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
WATER HARVESTING & RECYCLING				
WE1	RAINWATER HARVESTING			
	Encourage rainwater harvesting that will lead to reduction in potable water consumption:		3	
	Rainwater harvesting that leads to ≥ 5% reduction in potable water consumption, OR	1		
	Rainwater harvesting that leads to ≥ 15% reduction in potable water consumption, OR	2		
	Rainwater harvesting that leads to ≥ 30% reduction in potable water consumption.	3		
WE2	WATER RECYCLING			
	Encourage water recycling that will lead to reduction in potable water consumption:		3	
	Treat and recycle ≥ 10% wastewater leading to reduction in potable water consumption, OR	1		
	Treat and recycle ≥ 30% wastewater leading to reduction in potable water consumption, OR	2		
	Treat and recycle ≥ 50% wastewater leading to reduction in potable water consumption.	3		
INCREASED EFFICIENCY				
WE3	WATER EFFICIENT - IRRIGATION/LANDSCAPING			
	Reduce potable water consumption for landscape irrigation by:		2	
	1) 50%	1		
	2) 100%	2		
WE4	WATER REDUCTION			
	Encourage reduction in potable water consumption through use of efficient devices/industrial process:		2	
	1) With reference to Utility calculations, reduce annual potable water consumption by:			
	≥ 30%, OR	1		
	≥ 50%.	2		
	OR			
	2) From existing 3-year average water consumption record, reduce annual potable water use by:			
	≥ 30%, OR	1		
	≥ 50%.	2		
WE5	METERING & LEAK DETECTION SYSTEM			
	Encourage the design of systems that monitors and manages water consumption:		2	
	Use of sub-meters to monitor and manage major water usage for cooling towers, irrigation, kitchens, tenancy use, and industrial process use	1		
	Link all water sub-meters to EMS to facilitate early detection of water leakage	1		
WATER EFFICIENCY (WE) TOTAL			12	

6

INNOVATION (IN)

INNOVATION & ENVIRONMENTAL INITIATIVES | GBI FACILITATOR

10 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
IN1	INNOVATION & ENVIRONMENTAL INITIATIVES			
	<p>Provide existing industrial buildings the opportunity to be awarded points for exceptional performance above the requirements set by GBI rating system:</p> <p>1 point for each approved innovation and environmental initiative up to a maximum of 9 points, such as;</p> <ul style="list-style-type: none"> • Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling tower make-up water etc; • 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 accounting for at least 1% of NLA ; • Auto-condenser tube cleaning system (fitted to plant equipment serving at least 50% of total capacity); • Non-chemical water treatment system for condenser or chilled water circuit (eg. air and dirt separator, vacuum degasser, etc) ; • Dynamic balancing control valve system (for entire chilled water system) • Mixed mode / low energy ventilation system; • Advanced air filtration technology (serving at least 50% of the GFA); • 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; • Use non-synthetic (natural) Refrigerants AND Clean Agents with zero ODP and negligible Global Warming Potential; • ISO 14000 series certification; • Recycling of all fire system water during regular testing. 	9	9	
IN2	GREEN BUILDING INDEX FACILITATOR			
	<p>To support and encourage the integration required for Green Building Index rated buildings and to streamline the application and certification process:</p> <p>Engage the services of a Green Building Index Facilitator to assist in obtaining Green Building Index certification</p>	1	1	
INNOVATION (IN) TOTAL			10	



**GBI ASSESSMENT CRITERIA
INDUSTRIAL NEW CONSTRUCTION (INC)**

VERSION 1.0 | JUNE 2011

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ACKNOWLEDGEMENT & COPYRIGHT

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INTRODUCTION

WHAT IS THE GREEN BUILDING INDEX (GBI)?

The Green Building Index is an environmental rating system for buildings developed by PAM (Pertubuhan Arkitek Malaysia / Malaysian Institute of Architects) and ACEM (the Association of Consulting Engineers Malaysia). The Green Building Index is Malaysia's first comprehensive rating system for evaluating the environmental design and performance of Malaysian buildings based on the six (6) main criterias of Energy Efficiency, Indoor Environment Quality, Sustainable Site Planning & Management, Materials & Resources, Water Efficiency, and Innovation.

The Green Building Index is fundamentally derived from existing rating tools, including the Singapore Green Mark and the Australian Green Star system, but extensively modified for relevance to the Malaysian tropical weather, environmental context, cultural and social needs.

This PAM/ACEM GBI initiative aims to assist the building industry in its march towards sustainable development. The GBI environmental rating system is created to:

- **Define green building by establishing a common language and standard of measurement;**
- **Promote integrated, whole-building design;**
- **Recognise and reward environmental leadership;**
- **Transform the built environment to reduce the environmental impact of development; and**
- **Ensure new buildings remain relevant in the future and existing buildings are refurbished properly to remain relevant.**

WHO CAN USE THE GBI INDUSTRIAL NEW CONSTRUCTION (INC) TOOL?

PAM/ACEM encourage all members of Project Teams, Building owners, Developers and other interested parties (including Contractors, Government and Design and Build Contractors) to use the Green Building Index to validate environmental initiatives of the design phase of new industrial construction or base industrial building refurbishment; or construction and procurement phase of industrial buildings and their industrial process. Use of the Green Building Index is encouraged on all such projects to assess and improve their environmental attributes.

Use of the Green Building Index Industrial New Construction (INC) Tool without formal certification by an independent accredited GBI Certifier does not entitle the user or any other party to promote the Green Building Index rating achieved. No fee is payable to PAM/ACEM for such use, however formal recognition of the Green Building Index rating - and the right to promote same - requires undertaking the formal certification process offered by PAM/ACEM.

All Green Building Index rating tools are reviewed annually; please forward any feedback to info@greenbuildingindex.org

HOW TO USE THE GBI INDUSTRIAL NEW CONSTRUCTION (INC) TOOL?

- Complete the Building Input worksheet as the building's type and location may affect the predicted rating.
- Complete the remaining worksheets by reviewing each credit in each category and entering the number of points you predict the building will achieve in the 'No. of Points Achieved' column. Calculators are provided for a number of the tool's credits.
- Enter any points that may be achieved but need to be confirmed in the 'Points to be Confirmed' column.
- Enter any comments required in the 'Comments' column.
- The predicted rating is shown in the Summary worksheet. More detail on point scores (both achieved and those to be confirmed) are shown in the Credit Summary and Graphical Summary worksheets at the end of the tool.

PROJECT INFORMATION

NAME OF BUILDING	
ADDRESS OF BUILDING	
POSTCODE	
STATE	

APPLICANT	
CONTACT PERSON	

ARCHITECT	
CIVIL ENGINEER	
STRUCTURAL ENGINEER	
MECHANICAL ENGINEER	
ELECTRICAL ENGINEER	
QUANTITY SURVEYOR	
LAND SURVEYOR	
LANDSCAPE CONSULTANT	
OTHER SPECIALIST CONSULTANT(S)	
MAIN CONTRACTOR	
LOCAL AUTHORITY	
TOTAL GROSS FLOOR AREA	
LAND AREA FOR LANDED PROPERTY	

BUILDING AND INDUSTRIAL PROCESS DESCRIPTION	

DETAIL ASSESSMENT CRITERIA SUMMARY OF FINAL SCORE

PART	ITEM	MAXIMUM POINTS	SCORE
1	Energy Efficiency	33	
2	Indoor Environmental Quality	22	
3	Sustainable Site Planning & Management	18	
4	Material & Resources	10	
5	Water Efficiency	10	
6	Innovation	7	
TOTAL SCORE		100	

GREEN BUILDING INDEX CLASSIFICATION

POINTS	GBI RATING
86 points and above	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

DETAIL ASSESSMENT CRITERIA SUMMARY OF CONTENTS

PART	CRITERIA	ITEM	POINTS	TOTAL	
1	EE	ENERGY EFFICIENCY		33	
	Design & Performance				
	EE1	Minimum EE Performance	1		
	EE2	Lighting Zoning	3		
	EE3	Electrical Sub-metering	1		
	EE4	Renewable Energy & Onsite Energy Capture/Recovery	8		
	EE5	Advanced or Improved EE Performance - BEI and/or EUI	10		
	Commissioning				
	EE6	Enhanced Commissioning	4		
	EE7	On-going Post Occupancy Commissioning	2		
	Verification & Maintainence				
EE8	EE Verification	2			
EE9	Sustainable Maintenance	2			
2	EQ	INDOOR ENVIRONMENTAL QUALITY		22	
	Air Quality				
	EQ1	Minimum IAQ Performance	1		
	EQ2	Environmental Tobacco Smoke (ETS) Control	1		
	EQ3	Carbon Dioxide Monitoring and Control	1		
	EQ4	Indoor Air Pollutant & Industrial Chemical Exposure	3		
	EQ5	Mould Prevention	1		
	Occupant Comfort				
	EQ6	Thermal Comfort: Design & Controllability of Systems	2		
	EQ7	Air Change Effectiveness	1		
	EQ8	Breakout Spaces	1		
	Lighting, Visual & Acoustic Comfort				
	EQ9	Daylighting	2		
	EQ10	Daylight Glare Control	1		
	EQ11	Electric Lighting Levels	1		
	EQ12	High Frequency Ballasts	1		
EQ13	External Views	2			
EQ14	Internal Noise Levels	1			
Verification					
EQ15	IAQ Before & During Occupancy	2			
EQ16	Post Occupancy Comfort Survey: Verification	1			

DETAIL ASSESSMENT CRITERIA

SUMMARY OF CONTENTS (CONTINUED)

PART	CRITERIA	ITEM	POINTS	TOTAL
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT		18
	Site Planning			
	SM1	Site Selection	1	
	SM2	Brownfield Redevelopment	1	
	SM3	Development Density & Community Connectivity	2	
	SM4	Environment Management	2	
	SM5	Noise Pollution	1	
	Construction Management			
	SM6	Earthworks - Construction Activity Pollution Control	1	
	SM7	QLASSIC	1	
	SM8	Workers' Site Amenities	1	
	Transportation			
	SM9	Public Transportation Access & Transportation Plan	1	
	SM10	Green Vehicle Priority	1	
	SM11	Parking Capacity	1	
SM12	Cargo Delivery Route and Proximity	1		
Design				
SM13	Stormwater Design – Quality & Quantity	1		
SM14	Greenery & Roof	2		
SM15	Building User Manual	1		
4	MR	MATERIALS & RESOURCES		10
	Reused & Recycled Materials			
	MR1	Materials Reuse and Selection	2	
	MR2	Recycled Content Materials	2	
	Sustainable Resources			
	MR3	Regional Materials	1	
	MR4	Sustainable Timber	1	
	Waste Management			
	MR5	Storage & Collection of Recyclables	1	
MR6	Construction Waste Management	2		
Green Products				
MR7	Refrigerants & Clean Agents	1		
5	WE	WATER EFFICIENCY		10
	Water Harvesting & Recycling			
	WE1	Rainwater Harvesting	2	
	WE2	Water Recycling	2	
	Increased Efficiency			
	WE3	Water Efficient - Irrigation/Landscaping	2	
WE4	Water Reduction	2		
WE5	Metering & Leak Detection System	2		
6	IN	INNOVATION		7
	IN1	Innovation & Environmental Design Initiatives	6	
	IN2	Green Building Index Facilitator	1	
			TOTAL POINTS	100

1

ENERGY EFFICIENCY (EE)

DESIGN & PERFORMANCE | COMMISSIONING | VERIFICATION & MAINTENANCE

33 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
DESIGN & PERFORMANCE				
EE1	MINIMUM EE PERFORMANCE			
	Building envelope to achieve minimum energy efficiency (EE) performance so as to reduce energy consumption, thereby reducing CO ₂ emission to the atmosphere. To meet the following minimum EE requirements as stipulated in MS 1525:		1	
	a. Submit calculations for OTTV ≤ 50 and RTTV ≤ 25 (use of BEIT software or other GBI approved softwares is permitted) AND	1		
	b. Install Energy Management Control system where Air-conditioned space ≥ 4000 m ²			
EE2	LIGHTING ZONING			
	Provide flexible lighting controls to optimise energy savings:		3	
	All individual or enclosed spaces to be individually switched; and the size of individually switched lighting zones shall not exceed 100m ² for 90% of the NLA (building and industrial plant area); with switching clearly labelled and easily accessible by occupants.	1		
	Provide auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylight areas and/or provide task lighting for at least 25% (separate from motion sensor provision) of industrial plant area.	1		
	Provide motion sensors or equivalent to complement lighting zoning for at least 25% NLA of building OR provide task lighting for at least 25% (separate from auto-sensor provision) of industrial plant area.	1		
EE3	ELECTRICAL SUB-METERING			
	Monitor energy consumption of key building services, tenancy and industrial plant areas: Provide sub-metering for all energy uses ≥ 100kVa; with separate sub-metering for lighting and separately for power, and for industrial processes.	1	1	
EE4	RENEWABLE ENERGY & ONSITE ENERGY CAPTURE/RECOVERY			
	Encourage use of renewable energy and/or onsite energy capture/recovery.		8	
	Where 0.5% or 5 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery, OR	1		
	Where 1.0% or 10 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery, OR	2		
	Where 1.5% or 20 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery, OR	4		
	Where 2.0% or 40 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery, OR	6		
	Where 2.5% or 60 kWp whichever is the greater, of the equivalent total electricity consumption is generated by renewable energy and/or onsite energy capture/recovery.	8		
EE5	ADVANCED OR IMPROVED EE PERFORMANCE - BEI AND/OR EUI			
	Exceed Energy Efficiency (EE) performance better than the baseline minimum to reduce energy consumption in the building and/or the industrial plant process. For the building, improve Building Energy Intensity (BEI) as defined by GBI (use of GBI approved software is permitted). For industrial plant process, use Energy Use Intensity (EUI) to compare against baseline data for similar plant process (baseline EUI shall be furnished by applicant for GBI acceptance). Use BEI or EUI if either building or industrial plant process energy use constitutes more than 75% of the total energy use. Otherwise, calculate both BEI and EUI with the lower point score applicable.		10	
	BEI ≤ 180 or EUI improvement ≥ 10%	1		
	BEI ≤ 150 or EUI improvement ≥ 25%	3		
	BEI ≤ 140 or EUI improvement ≥ 30%	4		
	BEI ≤ 130 or EUI improvement ≥ 35%	5		
	BEI ≤ 120 or EUI improvement ≥ 40%	6		
	BEI ≤ 110 or EUI improvement ≥ 45%	7		
	BEI ≤ 100 or EUI improvement ≥ 50%	8		
	BEI ≤ 90 or EUI improvement ≥ 55%	10		

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR INDUSTRIAL NEW CONSTRUCTION (INC)

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
COMMISSIONING				
EE6	ENHANCED COMMISSIONING			
	<p>Ensure the energy related systems of the building and industrial process are properly commissioned so as to realise their full potential. Appoint a GBI recognised Commissioning Specialist (CxS) to perform the commissioning for all the facility's energy related systems in accordance with ASHRAE Commissioning Guideline or other GBI approved equivalent standard by:</p> <ol style="list-style-type: none"> 1. Conducting at least one commissioning design review during the detail design stage and back-check the review comments during the tender documentation stage. 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, building occupants and industrial plant workers are completed. 	4	4	
EE7	ON-GOING POST OCCUPANCY COMMISSIONING			
	<p>Carry out post occupancy/post process operation commissioning for all tenancy and industrial areas after fit-out/plant modification changes are completed:</p>			
	<p>1) Design engineer shall review all fit-out plans/plant modifications to ensure original design intent is not compromised and upon completion of the fit-out/plant modification works, verify and fine-tune the installations to suit.</p>	1	2	
	<p>2) Within 12 months of practical completion (or earlier if there is at least 50% occupancy/ plant operation), the CxS shall carry out a full post/re-commissioning of the energy related systems to verify that their performance is sustained in conjunction with the completed fit-outs/modifications.</p>	1		
VERIFICATION & MAINTENANCE				
EE8	EE VERIFICATION			
	<p>Verify predicted energy use of key building services and industrial plant process:</p>			
	<p>1) Use Energy Management System to monitor and analyse energy consumption including reading of sub-meters, AND</p> <p>2) Fully commission EMS including Maximum Demand Limiting programme within 12 months of practical completion (or earlier if there is at least 50% building occupancy or plant operation).</p>	2	2	
EE9	SUSTAINABLE MAINTENANCE			
	<p>Ensure the energy related systems will continue to perform as intended beyond the 12 months Defects & Liability Period:</p>			
	<p>1) At least 50% of permanent 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 energy services, AND</p> <p>2) Set up a permanent Energy Monitoring Committee (EMC) to ensure that plant energy performance is continuously monitored and improved.</p>	1	2	
	<p>3) Provide for a designated facility maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage, AND</p> <p>4) Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).</p>	1		
ENERGY EFFICIENCY (EE) TOTAL			33	

2

INDOOR ENVIRONMENTAL QUALITY (EQ)

AIR QUALITY | OCCUPANT COMFORT | LIGHTING, VISUAL & ACOUSTIC COMFORT | VERIFICATION

22 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
AIR QUALITY				
EQ1	MINIMUM IAQ PERFORMANCE			
	<p>Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in building (and industrial plant area where applicable), thus contributing to the comfort and well-being of the occupants:</p> <p>Meet the minimum requirements of ventilation rate in ASHRAE 62.1 or the local building code whichever is the more stringent.</p>	1	1	
EQ2	ENVIRONMENTAL TOBACCO SMOKE (ETS) CONTROL			
	<p>Meet the minimum requirements of ventilation rate in ASHRAE 62.1 or the local building code whichever is the more stringent; OR</p> <p>Prohibit smoking in the building and industrial plant area except in designated smoking rooms and establish negative pressure in the smoking rooms together with provision of effective air filtration system.</p>	1	1	
EQ3	CARBON DIOXIDE MONITORING AND CONTROL			
	<p>Provide response monitoring of carbon dioxide levels to ensure delivery of optimal outside air requirements:</p> <p>Install carbon dioxide (CO₂) monitoring and control system with at least one (1) CO₂ sensor at all main return air points on each air-conditioned floor/zone to facilitate continuous monitoring and adjustment of outside air ventilation rates to each floor/zone, and ensure independent control of ventilation rates to maintain CO₂ level ≤ 1,000ppm</p>	1	1	
EQ4	INDOOR AIR POLLUTANT & INDUSTRIAL CHEMICAL EXPOSURE			
	<p>Reduce detrimental impact on occupant/worker's health from finishes that emit internal air pollutants and exposure to industrial chemicals:</p>			
	<p>1) Use low VOC paint and coating throughout the building. Paints and Coatings to comply with requirements specified in international labelling schemes recognized by GBI, AND</p> <p>2) Use low VOC carpet or flooring throughout the building. Carpets to comply with requirements specified in international labelling schemes recognized by GBI. Other types of flooring to comply with requirements under FloorScore developed by Science Certification System or equivalent, AND</p> <p>3) Use low VOC adhesive and sealant or no adhesive or sealant used.</p>	1	3	
	<p>Use products with no added urea formaldehyde. These include:</p> <p>1) Composite wood and agrifiber products defined as: particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores, AND</p> <p>2) Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies, AND</p> <p>3) Insulation foam, AND</p> <p>4) Draperies.</p>	1		
	<p>Minimise air pollutants of industrial plant process by using environmental friendly house keeping chemicals and minimise microbial contamination and NOX emission.</p>	1		
EQ5	MOULD PREVENTION			
	<p>Design system(s) which reduce the risk of mould growth and its associated detrimental impact on occupant health:</p> <p>Demonstrate 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.</p> <p>Ensure that excessive moisture in building is controlled during the Design, Construction and Operation stages by the consideration and the control of the following:</p> <p>1) Rainwater leakage through roof and walls</p> <p>2) Infiltration of moist air</p> <p>3) Diffusion of moisture through walls, roof and floors</p> <p>4) Groundwater intrusion into basements and crawl spaces through walls and floors</p> <p>5) Leaking or burst pipes</p> <p>6) Indoor moisture sources</p> <p>7) Construction moisture</p> <p>OR</p> <p>The building is fully naturally ventilated</p>	1	1	

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR INDUSTRIAL NEW CONSTRUCTION (INC)

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
OCCUPANT COMFORT				
EQ6	THERMAL COMFORT: DESIGN & CONTROLLABILITY OF SYSTEMS			
	Provide a high level of thermal comfort system control by individual occupant/worker or by specific groups in multi-occupant/worker spaces to promote the productivity, comfort and well-being of occupants and plant workers:			
	Design to ASHRAE 55 in conjunction with the relevant localised parameters as listed in MS1525.	1		
	1) Provide individual comfort control for $\geq 50\%$ of the occupants/workers to enable adjustments to suit individual task needs and preferences., AND 2) Provide comfort system controls for all shared multi-occupant/worker spaces to enable adjustments to suit group needs and preferences. <i>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/workers' local environment.</i>	1	2	
EQ7	AIR CHANGE EFFECTIVENESS			
	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 (air-conditioned areas only): The ventilation systems are designed to achieve an ACE of ≥ 0.95 when measured in accordance with ASHRAE 129: Measuring air change effectiveness where ACE is to be measured in the breathing zone (nominally 1.0m from finished floor level).	1	1	
EQ8	BREAKOUT SPACES			
	Provide breakout space to reduce worker's fatigue for at least 5% of employees per shift.	1	1	
LIGHTING, VISUAL & ACOUSTIC COMFORT				
EQ9	DAYLIGHTING			
	Provide good levels of daylighting for building occupants and plant workers:			
	Demonstrate that $\geq 30\%$ of the NLA has a daylight factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level, OR	1	2	
	Demonstrate that $\geq 50\%$ of the NLA has a daylight factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level.	2		
EQ10	DAYLIGHT GLARE CONTROL			
	Reduce discomfort of glare from natural light. Where blinds or screens are fitted on all glazing and atrium as a base building, incorporate provisions to meet the following criteria; 1) Eliminate glare from all direct sun penetration and keep horizontal workspace lux level below 2000; AND 2) Eliminate glare from diffuse sky radiation for occupant workspace at viewing angles of 15° to 60° from the horizontal at eye level (typically 1.2m from floor level); AND 3) Control with an automatic monitoring system (for atrium and windows with incident direct sun light only - not applicable for fixed blinds/screens); AND 4) Equip with a manual override function accessible by occupants (not applicable for fixed blinds/screens)	1	1	
EQ11	ELECTRIC LIGHTING LEVELS			
	Baseline building and plant lighting not to be over designed: Demonstrate that lighting design maintains a luminance level of no more than specified in MS1525 for 90% of NLA (building and industrial plant area) as measured at the working plane (800mm above the floor level).	1	1	
EQ12	HIGH FREQUENCY BALLASTS			
	Increase workplace amenity by avoiding low frequency flicker that may be associated with fluorescent lighting: Install high frequency ballasts in fluorescent luminaires over a minimum of 90% of NLA (building and industrial plant area).	1	1	

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR INDUSTRIAL NEW CONSTRUCTION (INC)

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
LIGHTING, VISUAL & ACOUSTIC COMFORT (CONTINUED)				
EQ13	EXTERNAL VIEWS			
	Reduce eyestrain for building occupants by allowing long distance views and provision of visual connection to the outdoor. Note that this requirement is applicable to the office building component of the industrial plant only.		2	
	Demonstrate that $\geq 60\%$ of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.	1		
	Demonstrate that $\geq 75\%$ of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.	2		
EQ14	INTERNAL NOISE LEVELS			
	Maintain internal noise levels at an appropriate level. Demonstrate that 90% of the NLA (office component only) do not exceed the following ambient internal noise levels: 1) Within the entire baseline building general office, space noise from the building services does not exceed 40dBAeq, OR 2) Within the baseline building office space, the sound level does not exceed 45dBAeq for open plan and not exceed 40dBAeq for closed offices.	1	1	
VERIFICATION				
EQ15	IAQ BEFORE & DURING OCCUPANCY			
	Reduce indoor air quality problems resulting from the construction process in order to help sustain the comfort and well-being of occupants/workers. Develop and implement an Indoor Air Quality (IAQ) Management Plan for the Pre-Occupancy phase as follows:		2	
	1) Perform a building/plant 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/plant, OR 2) If low VOC materials and low formaldehyde composite wood are used, then building/plant 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/plant, 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		
	During Occupancy Stage: Where a permanent air flushing system of at least 10 airchanges/hour operation is installed for use during occupancy stage.	1		
EQ16	POST OCCUPANCY COMFORT SURVEY: VERIFICATION			
	Provide for the assessment of comfort of the building occupants/plant workers: A) Conduct an occupancy comfort survey of occupants/workers annually. This survey should collect anonymous responses about thermal comfort, visual comfort and acoustic comfort in a building/plant. 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 B) Develop a plan for corrective action if the survey results indicate that more than 20% of occupants/workers are dissatisfied with the overall comfort in the building/plant. 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, CO ₂ level, VOCs, and particulate concentration.	1	1	
INDOOR ENVIRONMENTAL QUALITY (EQ) TOTAL			22	

3

SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SITE PLANNING | CONSTRUCTION MANAGEMENT | TRANSPORTATION | DESIGN

18 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
SITE PLANNING				
SM1	SITE SELECTION			
	<p>Do not develop building/plant, hardscape, road or parking area on a site or part of a site that meet any one of the following criteria:</p> <ol style="list-style-type: none"> 1. Prime farmland as defined by the Structure Plan of the area or the National Physical Plan. 2. Forest reserve or State Environmental Protection Zones that is specifically identified as habitat for any species found on the endangered lists. 3. Within 30m of any wetlands as defined by the Structure Plan of the area OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever is more stringent. 4. Previously undeveloped land that is within 30m of Mean High Water Spring (MHWS) sea level which supports or could support wildlife or recreational use, or statutory requirements whichever is the more stringent. 5. Previously undeveloped land that is within 20m of lake, river, stream and tributary which support or could support wildlife or recreational use. 6. Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is provided. 	1	1	
SM2	BROWNFIELD REDEVELOPMENT			
	Reduce pressure on undeveloped land by rehabilitating damaged sites where development is complicated by environmental contamination, thereby reducing pressure on undeveloped land. This would typically involve old rubbish tips, former mining land, old factory sites, etc.	1	1	
SM3	DEVELOPMENT DENSITY & COMMUNITY CONNECTIVITY			
	<p>Channel development to urban area with existing infrastructure, protect greenfield and preserve habitat and natural resources:</p> <p>A) DEVELOPMENT DENSITY Construct building/plant on a previously developed site AND in a community with a minimum density of 20,300m² per hectare net (87,000 sqft per acre net); OR within approved industrial zones</p> <p>B) COMMUNITY CONNECTIVITY Construct a new building/plant or renovate an existing building/plant on a previously developed site AND within 1km 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/plant and the services.</p> <p>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.</p> <p>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.</p>	1	2	
SM4	ENVIRONMENT MANAGEMENT			
	<p>A) Conserve existing natural area and restore damaged area to provide habitat and promote biodiversity & B) Maximize Open Space by providing a high ratio of open space to development footprint to promote biodiversity. Alternatively to adopt existing standard in Industrial Environmental Management.</p> <p>A) Conservation: On previously developed or graded site, restore or protect a minimum of 50% of the site area (excluding the building footprint) with native or adaptive vegetation. Native or adaptive vegetation are plants indigenous to a locality or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds. Applicable also to landscaping on rooftops and roof gardens so long as the plants meet the definition of native or adaptive vegetation; OR</p> <p>On greenfield sites, limit all site disturbance to within 12m beyond the building perimeter; 3m beyond surface walkway, patio, surface parking and utilities less than 300mm in diameter; 4.5m beyond primary roadway curb and main utility branch trench; and 7.5m beyond constructed area with permeable surface (such as pervious paving area, storm water detention facility and playing field) that require additional staging area in order to limit compaction in the constructed area.</p> <p>B) Open Space: Reduce by 25%, the development footprint (defined as the total area of the building footprint, hardscape, access road and parking) and/or provide vegetated open space within the project boundary to exceed the local zoning's open space requirement for the site; OR</p> <p>For areas with no local zoning requirement (e.g. university campus, military bases), provide vegetated open space adjacent to the building whose area is equal to that of the building footprint; OR</p> <p>Where a zoning ordinance exists, but there is no requirement for open space (zero), provide vegetated open space equal to 20% of the project's site area.</p>	1	2	
		1		

Continued on next page >>

GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR INDUSTRIAL NEW CONSTRUCTION (INC)

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
SITE PLANNING (CONTINUED)				
SM5	NOISE POLLUTION			
	To encourage and recognise buildings/plants that minimise noise levels diffused from the building/plant outside. Credit point is awarded where the building/plant envelope is designed to reduce noise penetration by at least NR20dBA when in standard operation mode.	1	1	
CONSTRUCTION MANAGEMENT				
SM6	EARTHWORKS - CONSTRUCTION ACTIVITY POLLUTION CONTROL			
	<p>Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation.</p> <p>Create and implement an Erosion and Sedimentation Control (ESC) Plan for all construction activities associated with the project. The ESC Plan shall conform to the erosion and sedimentation requirements of the approved Earthworks Plans OR Local erosion and sedimentation control standards and codes, whichever is the more stringent.</p> <p>The plan shall describe the measures implemented to accomplish the following objectives:</p> <ol style="list-style-type: none"> 1. Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse. 2. Prevent sedimentation of storm sewer or receiving stream. 3. Prevent polluting the air with dust and particulate matter. 	1	1	
SM7	QLASSIC - QUALITY ASSESSMENT SYSTEM FOR BUILDING CONSTRUCTION WORK			
	<p>Achieve quality of workmanship in construction works:</p> <p>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%.</p>	1	1	
SM8	WORKERS' SITE AMENITIES			
	<p>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:</p> <p>The plan shall describe the measures implemented to accomplish the following objectives:</p> <ol style="list-style-type: none"> 1. Proper accommodation for construction workers at the site or at temporary rented accommodation nearby. 2. Prevent pollution of storm sewer or receiving stream by having proper septic tank. 3. Prevent polluting the surrounding area from open burning and proper disposal of domestic waste. 4. Provide adequate health and hygiene facilities for workers on site. 	1	1	
TRANSPORTATION				
SM9	PUBLIC TRANSPORTATION ACCESS & TRANSPORTATION PLAN			
	<p>Reduce pollution and land development impacts from automobile use:</p> <p>Locate project within 1km of an existing, or planned and funded, commuter rail, light rail or subway station.</p> <p>OR</p> <p>Locate project within 500m of at least one bus stop.</p> <p>OR</p> <p>Transportation Plan provided to include provision of Factory Bus service, subsidies for Green Vehicles, Car Pool strategies, Van Pool, pick-up service from train station, etc.</p>	1	1	
SM10	GREEN VEHICLE PRIORITY - LOW EMITTING & FUEL EFFICIENT VEHICLES			
	<p>Encourage use of green vehicles:</p> <p>Provide preferred parking for green vehicles for 5% of the total provided parking spaces.</p> <p>"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).</p>	1	1	
SM11	PARKING CAPACITY			
	<p>Discourage over-provision of car parking capacity:</p> <p>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.</p>	1	1	
SM12	CARGO DELIVERY ROUTE AND PROXIMITY			
	<p>Proximity to Major Cargo Transport, e.g. airport, seaport, highway, railway:</p> <p>Credit point is awarded where the building/plant is within 10km of at least 2 major cargo services: Major cargo services are considered to be the following (where they contain cargo facilities):</p> <ul style="list-style-type: none"> • Airport; • Seaport; • Railway Station or Rail Yard; AND <p>Are accessible to Major Freeway entrance/exit (within 5km).</p>	1	1	

Continued on next page >>

GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR INDUSTRIAL NEW CONSTRUCTION (INC)

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
DESIGN				
SM13	STORMWATER DESIGN – QUALITY & QUANTITY CONTROL			
	<p>Limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, and managing storm water runoff. Reduce or eliminate water pollution by reducing impervious cover, increasing onsite infiltration, eliminating sources of contaminants, and removing pollutants from storm water runoff:</p> <p>Condition 1: If existing imperviousness is ≤ 50%: Implement a storm water management plan that prevents the post development peak discharge rate and quantity from exceeding the pre-development peak discharge rate and quantity in conformance to the Storm Water Management Manual for Malaysia (MASMA).</p> <p>Condition 2: If existing imperviousness is > 50%: Implement a storm water management plan that results in a 25% decrease in the volume of storm water runoff required under MASMA.</p> <p>For either Condition, implement a storm water management plan that reduces impervious cover, promotes infiltration, and captures and treats the storm water runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs).</p>	1	1	
SM14	GREENERY & ROOF			
	<p>Reduce heat island (thermal gradient difference between developed and undeveloped areas) to minimise impact on microclimate and human and wildlife habitat:</p> <p>A) Hardscape & Greenery Application: Provide any combination of the following strategies for 50% of the site hardscape (including sidewalks, courtyards, plazas and parking lots):</p> <ol style="list-style-type: none"> 1. Shade (within 5 years of occupancy); 2. Paving materials with a Solar Reflectance Index (SRI) of at least 29; 3. Open grid pavement system; 	1	2	
	<p>B) Roof Application:</p> <ol style="list-style-type: none"> 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; 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 <p>Roof Type Slope SRI Low-Sloped Roof < 2:12 78 Steep-Sloped Roof > 2:12 29</p>	1		
SM15	BUILDING USER MANUAL			
	<p>Document Green building/plant design features and strategies for user information and guide to sustain performance during occupancy:</p> <p>Provide (include updating) a Building User Manual which documents passive and active features that should not be downgraded.</p>	1	1	
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM) TOTAL			18	

4

MATERIALS & RESOURCES (MR)

REUSED & RECYCLED MATERIALS | SUSTAINABLE RESOURCES | WASTE MANAGEMENT | GREEN PRODUCTS

11 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
REUSED & RECYCLED MATERIALS				
MR1	MATERIALS REUSE AND SELECTION			
	Reuse building materials and products to reduce demand for virgin materials and reduce creation of waste. This serves to reduce environmental impact associated with extraction and processing of virgin resources. Integrate building design and its buildability with selection of reused building materials, taking into account their embodied energy, durability, carbon content and life cycle costs:		2	
	Where reused products/materials constitutes $\geq 2\%$ of the project's total material cost value, OR	1		
	Where reused products/materials constitutes $\geq 5\%$ of the project's total material cost value	2		
MR2	RECYCLED CONTENT MATERIALS			
	Increase demand for building products that incorporate recycled content materials in their production: (Recycled content shall be defined in accordance with the International Organization of Standards Document)		2	
	Where use of materials with recycled content is such that the sum of post-consumer recycled plus one-half of the pre-consumer content constitutes $\geq 10\%$ (based on cost) of the total value of the materials in the project, OR	1		
	Where use of materials with recycled content is such that the sum of post-consumer recycled plus one-half of the pre-consumer content constitutes at least 30% (based on cost) of the total value of the materials in the project.	2		
SUSTAINABLE RESOURCES				
MR3	REGIONAL MATERIALS			
	Use building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation:	1	1	
	Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500km of the project site for $\geq 20\%$ (based on cost) of the total material value. Mechanical, electrical and plumbing components shall not be included. Only include materials permanently installed in the project.			
MR4	SUSTAINABLE TIMBER			
	Encourage environmentally responsible forest management:	1	1	
	Where $\geq 50\%$ of wood-based materials and products used are certified. These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. To include wood materials permanently installed and also temporarily purchased for the project. Compliance with Forest Stewardship Council and Malaysian Timber Certification Council requirements.			
WASTE MANAGEMENT				
MR5	STORAGE & COLLECTION OF RECYCLABLES			
	Facilitate reduction of waste generated during construction and during building/plant occupancy that is hauled and disposed of in landfills:	1	1	
	During Construction, provide dedicated area/s and storage for collection of non-hazardous materials for recycling, AND			
	During Building/Plant Occupancy, provide permanent recycle bins and where applicable, dedicated schedule waste area complying with EQA on schedule waste requirement.			
MR6	CONSTRUCTION WASTE MANAGEMENT			
	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. Use Compactor and Baler for waste disposal. Quantify by measuring total truck loads of waste sent for disposal:		2	
	Recycle and/or salvage $\geq 50\%$ volume of non-hazardous construction debris, OR	1		
	Recycle and/or salvage $\geq 75\%$ volume of non-hazardous construction debris.	2		
GREEN PRODUCTS				
MR7	REFRIGERANTS & CLEAN AGENTS			
	Use environmentally-friendly Refrigerants and Clean Agents exceeding Malaysia's commitment to the Montreal & Kyoto protocols:	1	1	
	Use zero Ozone Depleting Potential (ODP) products: non-CFC and non-HCFC refrigerants AND clean agents.			
MATERIALS & RESOURCES (MR) TOTAL			10	

5

WATER EFFICIENCY (WE)

WATER HARVESTING & RECYCLING | INCREASED EFFICIENCY

10 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
WATER HARVESTING & RECYCLING				
WE1	RAINWATER HARVESTING			
	Encourage rainwater harvesting that will lead to reduction in potable water consumption:		2	
	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		
WE2	WATER RECYCLING			
	Encourage water recycling that will lead to reduction in potable water consumption:		2	
	Treat and recycle ≥ 10% wastewater leading to reduction in potable water consumption, OR	1		
	Treat and recycle ≥ 30% wastewater leading to reduction in potable water consumption.	2		
INCREASED EFFICIENCY				
WE3	WATER EFFICIENT - IRRIGATION/LANDSCAPING			
	Encourage the design of system that does not require the use of potable water supply from the local water authority:		2	
	Reduce potable water consumption for landscape irrigation by ≥ 50% (e.g. through use of native or adaptive plants to reduce or eliminate irrigation requirement), OR	1		
	Not use potable water at all for landscape irrigation.	2		
WE4	WATER REDUCTION			
	Encourage reduction in potable water consumption through use of efficient devices/industrial process:		2	
	Reduce annual potable water consumption by ≥ 30%, OR	1		
	Reduce annual potable water consumption by ≥ 50%	2		
WE5	METERING & LEAK DETECTION SYSTEM			
	Encourage the design of systems that monitors and manages water consumption:		2	
	Use of sub-meters to monitor and manage major water usage for cooling towers, irrigation, kitchens, tenancy use, and industrial process use.	1		
	Link all water sub-meters to EMS to facilitate early detection of water leakage.	1		
WATER EFFICIENCY (WE) TOTAL			10	

6

INNOVATION (IN)

INNOVATION & ENVIRONMENTAL DESIGN INITIATIVES | GBI FACILITATOR

7 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
IN1	INNOVATION & ENVIRONMENTAL DESIGN INITIATIVES			
	<p>Provide design team and project the opportunity to be awarded points for exceptional performance above the requirements set by GBI rating system:</p> <p>1 point for each approved innovation and environmental design initiative up to a maximum of 6 points, such as:</p> <ul style="list-style-type: none"> • Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling tower make-up water, etc • Co-generation / Tri-generation system • Thermal / PCM / Thermal Mass storage system (accounting for at least 25% of total required capacity) • Solar thermal technology / Solar Air conditioners (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 accounting for at least 1% of NLA • Auto-condenser tube cleaning system (fitted to plant equipment serving at least 50% of total capacity) • Non-chemical water treatment system for condenser or chilled water circuit (eg. air and dirt separator, vacuum degasser, etc) • Dynamic balancing control valve system (for entire chilled water system) • Mixed mode / low energy ventilation system • Advanced air filtration technology (serving at least 50% of the GFA) • 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 • Use non-synthetic (natural) Refrigerants AND Clean Agents with zero ODP and negligible Global Warming Potential • ISO 14000 series certification • Recycling of all fire system water during regular testing 	6	6	
IN2	GREEN BUILDING INDEX FACILITATOR			
	<p>To support and encourage the integration required for Green Building Index rated buildings and to streamline the application and certification process:</p> <p>Engage the services of a Green Building Index Facilitator to assist in obtaining Green Building Index certification.</p>	1	1	
INNOVATION (IN) TOTAL			7	



GBI ASSESSMENT CRITERIA
FOR
NON-RESIDENTIAL EXISTING BUILDING (NREB)

FIRST EDITION | JANUARY 2011 | VERSION 1.1

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INTRODUCTION

WHAT IS THE GREEN BUILDING INDEX (GBI)?

The Green Building Index is an environmental rating system for buildings developed by PAM (Pertubuhan Arkitek Malaysia / Malaysian Institute of Architects) and ACEM (the Association of Consulting Engineers Malaysia). The Green Building Index is Malaysia's first comprehensive rating system for evaluating the environmental design and performance of Malaysian buildings based on the six (6) main criterias of Energy Efficiency, Indoor Environment Quality, Sustainable Site Planning & Management, Materials & Resources, Water Efficiency, and Innovation.

The Green Building Index is fundamentally derived from existing rating tools, including the Singapore Green Mark and the Australian Green Star system, but extensively modified for relevance to the Malaysian tropical weather, environmental context, cultural and social needs.

This GBI initiative aims to assist the building industry in its march towards sustainable development. The GBI environmental rating system is created to:

- **Define green building by establishing a common language and standard of measurement;**
- **Promote integrated, whole-building design;**
- **Recognise and reward environmental leadership;**
- **Transform the built environment to reduce the environmental impact of development; and**
- **Ensure new buildings remain relevant in the future and existing buildings are refurbished and thereafter sustained properly to remain relevant.**

WHO CAN USE THE GREEN BUILDING INDEX?

GSI encourages all members of Project Teams, Building owners, Developers and other interested parties (including Contractors, Government and Design and Build Contractors) to use the Green Building Index to validate environmental initiatives of the design phase of new non-residential construction or base non-residential building refurbishment; or construction and procurement phase of non-residential buildings. Use of the Green Building Index is encouraged on all such projects to assess and improve their environmental attributes.

Use of the Green Building Index (Non-Residential) tool without formal certification by an independent accredited GBI Certifier does not entitle the user or any other party to promote the Green Building Index rating achieved. No fee is payable to GSI for such use, however formal recognition of the Green Building Index rating - and the right to promote same - requires undertaking the formal certification process offered by GSI.

All Green Building Index rating tools are reviewed annually; please forward any feedback to info@greenbuildingindex.org.

HOW TO USE THE GREEN BUILDING INDEX?

- Complete the Building Input worksheet as the building's type and location may affect the predicted rating.
- Complete the remaining worksheets by reviewing each credit in each category and entering the number of points you predict the building will achieve in the 'No. of Points Achieved' column. Calculators are provided for a number of the tool's credits.
- Enter any points that may be achieved but need to be confirmed in the 'Points to be Confirmed' column.
- Enter any comments required in the 'Comments' column.
- The predicted rating is shown in the Summary worksheet. More detail on point scores (both achieved and those to be confirmed) are shown in the Credit Summary and Graphical Summary worksheets at the end of the tool.

PROJECT INFORMATION

NAME OF BUILDING	
ADDRESS OF BUILDING	
POSTCODE	
STATE	

APPLICANT	
CONTACT PERSON	

ARCHITECT	
CIVIL ENGINEER	
STRUCTURAL ENGINEER	
MECHANICAL ENGINEER	
ELECTRICAL ENGINEER	
QUANTITY SURVEYOR	
LANDSCAPE CONSULTANT	
OTHER SPECIALIST CONSULTANT(S)	
MAIN CONTRACTOR	
LOCAL AUTHORITY	
TOTAL GROSS FLOOR AREA	
LAND AREA FOR LANDED PROPERTY	

BUILDING DESCRIPTION	

DETAIL ASSESSMENT CRITERIA SUMMARY OF FINAL SCORE

PART	ITEM	MAXIMUM POINTS	SCORE
1	Energy Efficiency	38	
2	Indoor Environmental Quality	21	
3	Sustainable Site Planning & Management	10	
4	Material & Resources	9	
5	Water Efficiency	12	
6	Innovation	10	
TOTAL SCORE		100	

GREEN BUILDING INDEX CLASSIFICATION

POINTS	GBI RATING
≥ 86 points	Platinum
76 to ≤ 85 points	Gold
66 to ≤ 75 points	Silver
50 to ≤ 65 points	Certified

DETAIL ASSESSMENT CRITERIA

SUMMARY OF CONTENTS

PART	CRITERIA	ITEM	POINTS	TOTAL	
1	EE	ENERGY EFFICIENCY		38	
	Design & Performance				
	EE1	Minimum EE Performance	2		
	EE2	Lighting Zoning	3		
	EE3	Electrical Sub-metering	2		
	EE4	Renewable Energy	5		
	EE5	Advanced or Improved EE Performance - BEI	15		
	Commissioning				
	EE6	Enhanced or Re-commissioning	4		
	EE7	On-going Post Occupancy Commissioning	2		
	Monitoring, Improvement & Maintenance				
EE8	EE Monitoring & Improvement	2			
EE9	Sustainable Maintenance	3			
2	EQ	INDOOR ENVIRONMENTAL QUALITY		21	
	Air Quality				
	EQ1	Minimum IAQ Performance	1		
	EQ2	Environmental Tobacco Smoke (ETS) Control	1		
	EQ3	Carbon Dioxide Monitoring and Control	1		
	EQ4	Indoor Air Pollutants	2		
	EQ5	Mould Prevention	1		
	Thermal Comfort				
	EQ6	Thermal Comfort: Controllability of Systems	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	Occupancy Comfort Survey: Verification	2			

DETAIL ASSESSMENT CRITERIA SUMMARY OF CONTENTS (CONTINUED)

PART	CRITERIA	ITEM	POINTS	TOTAL
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT		10
	Facility Management			
	SM1	GBI Rated Design & Construction	1	
	SM2	Building Exterior Management	1	
	SM3	Integrated Pest Management, Erosion Control & Landscape Management	1	
	Transportation			
	SM4	Green Vehicle Priority - Low Emitting & Fuel Efficient Vehicles	1	
	SM5	Parking Capacity	1	
	Reduce Heat Island Effect			
SM6	Greenery & Roof	4		
SM7	Building User Manual	1		
4	MR	MATERIALS & RESOURCES		9
	Reused & Recycled Materials			
	MR1	Materials Reuse and Selection	1	
	MR2	Recycled Content Materials	1	
	Sustainable Materials & Resources and Policy			
	MR3	Sustainable Timber	1	
	MR4	Sustainable Purchasing Policy	1	
	Waste Management			
MR5	Storage, Collection & Disposal of Recyclables	3		
Green Products				
MR6	Refrigerants & Clean Agents	2		
5	WE	WATER EFFICIENCY		12
	Water Harvesting & Recycling			
	WE1	Rainwater Harvesting	3	
	WE2	Water Recycling	2	
	Increased Efficiency			
	WE3	Water Efficient - Irrigation/Landscaping	2	
	WE4	Water Efficient Fittings	3	
WE5	Metering & Leak Detection System	2		
6	IN	INNOVATION		10
	IN1	Innovation & Environmental Initiatives	9	
	IN2	Green Building Index Facilitator	1	
			TOTAL POINTS	100

1

ENERGY EFFICIENCY (EE)

DESIGN & PERFORMANCE | COMMISSIONING | MONITORING, IMPROVEMENT & MAINTENANCE

38 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
DESIGN & PERFORMANCE				
EE1	MINIMUM EE PERFORMANCE			
	Building envelope and installations to achieve minimum energy efficiency (EE) performance so as to reduce energy consumption in buildings, thus reducing CO2 emission to the atmosphere. Building Envelope to meet the following minimum EE requirements as stipulated in MS 1525:2007:		2	
	1) OTTV ≤ 50, RTTV ≤ 25. Submit calculations (use of BEIT software or other GBI approved software is acceptable)	1		
	2) Install Energy Management Control system.	1		
EE2	LIGHTING ZONING			
	Provide flexible lighting controls to optimise energy savings:		3	
	All individual or enclosed spaces to be individually switched; and the size of individually switched lighting zones shall not exceed 100m ² for 90% of the NLA; with switching clearly labelled and easily accessible by building occupants.	1		
	Provide auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylight areas, if any	1		
	Provide motion sensors or equivalent to complement lighting zoning for at least 25% NLA	1		
EE3	ELECTRICAL SUB-METERING & TENANT SUB-METERING			
	Monitor energy consumption of key building services as well as all tenancy areas:		2	
	Provide sub-metering for all energy use ≥ 100kVa	1		
	Provide separate sub-metering for 1) Lighting, AND 2) Power at each floor or tenancy.	1		
EE4	RENEWABLE ENERGY			
	Encourage use of renewable energy:		5	
	Where 0.25 % of the maximum electricity demand (M.D.) is supplied by Renewable Energy (RE) or 2 kWp RE is installed, whichever is the greater, OR	1		
	Where 0.5 % of the maximum electricity demand (M.D.) is supplied by Renewable Energy (RE) or 5 kWp RE is installed, whichever is the greater, OR	2		
	Where 1.0 % of the maximum electricity demand (M.D.) is supplied by Renewable Energy (RE) or 10 kWp RE is installed, whichever is the greater, OR	3		
	Where 1.5 % of the maximum electricity demand (M.D.) is supplied by Renewable Energy (RE) or 20 kWp RE is installed, whichever is the greater, OR	4		
	Where 2.0 % of the maximum electricity demand (M.D.) is supplied by Renewable Energy (RE) or 40 kWp RE is installed, whichever is the greater.	5		

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NREB

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
DESIGN & PERFORMANCE (CONTINUED)				
EE5	ADVANCED OR IMPROVED EE PERFORMANCE - BEI			
	1) Exceed Energy Efficiency (EE) performance better than the baseline minimum to reduce energy consumption in the building. Achieve Building Energy Intensity (BEI) \leq 150 kWh/m ² .yr (refer to GBI for different building types) as defined under GBI reference (use of BEIT Software or other GBI approved software is acceptable). Higher points with improving BEI as follows:	2	15	
	BEI \leq 140	3		
	BEI \leq 130	5		
	BEI \leq 120	8		
	BEI \leq 110	10		
	BEI \leq 100	12		
	BEI \leq 90	15		
	OR			
	2) Demonstrate Energy savings over the last 3 years from Existing Building historical BEI baseline, to improve by:			
	\geq 20% AND with resultant BEI \leq 200	2		
	\geq 25% AND with resultant BEI \leq 180	3		
	\geq 30% AND with resultant BEI \leq 150	5		
	\geq 40% AND with resultant BEI \leq 140	8		
	\geq 50% AND with resultant BEI \leq 130	10		
	\geq 60% AND with resultant BEI \leq 120	12		
	\geq 70% AND with resultant BEI \leq 110	15		
COMMISSIONING				
EE6	ENHANCED COMMISSIONING/RE-COMMISSIONING/RETRO COMMISSIONING OF BUILDING ENERGY SYSTEMS			
	Enhanced Commissioning/Re-Commissioning/Retro Commissioning of Building Energy Systems		4	
	<p>Ensure building's energy related systems are properly commissioned so as to realise their full potential. Appoint a GBI recognised Commissioning Specialist (CxS) to perform the commissioning for all the building's energy related systems in accordance with ASHRAE Commissioning Guideline or other GBI approved equivalent standard by:-</p> <ul style="list-style-type: none"> • Implement improvements to ensure building's major energy using systems are repaired, operated and maintained effectively to optimize energy performance. • Develop a commissioning or ongoing commissioning plan for the building's major energy-using systems. • Provide training for management staff to build awareness and skills in a broad range of sustainable building operations topics, including energy efficiency and building, equipment and systems operations and maintenance. • Update the building operating plan as necessary to reflect any changes in the occupancy schedule, equipment runtime schedule, design set points and lighting levels. 	4		
EE7	ON-GOING POST OCCUPANCY COMMISSIONING			
	Carry out up-to-date on-going post occupancy commissioning for all tenancy areas after fit-out changes are completed, if any.		2	
	1) Professional Engineer shall review all tenancy fit-out plans to ensure original design intent is not compromised and sign off the completed works.	1		
	2) CxS shall carry out re-commissioning of the building's energy related systems for the affected tenancy areas.	1		

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NREB

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
MONITORING, IMPROVEMENT & MAINTENANCE				
EE8	EE MONITORING & IMPROVEMENT			
	1) Use Energy Management System to monitor and trend log building system performance for HVAC system efficiency including parameters for plant sequencing, etc., AND Monitor sub-metering of building systems to track energy consumption of major building uses and other end use applications e.g. by categorising into building systems or floors.	1	2	
	2) Fully commission and activate Maximum Demand Limiting programme, AND Compile, summarise and submit BEI, Fuel and Water Consumption of the building to GBI on an annual basis during the 3-years validity period or earlier whenever requested by GBI. Submissions shall include monthly energy and water bills.	1		
EE9	SUSTAINABLE MAINTENANCE			
	Ensure the building's energy related systems will continue to perform as intended with proper and sustainable maintenance:- 1) At least 75% of permanent building maintenance team to participate in the commissioning of all building energy services.	1	3	
	2) Provide for a designated building maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage.	1		
	3) Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).	1		
ENERGY EFFICIENCY (EE) TOTAL			38	

2

INDOOR ENVIRONMENTAL QUALITY (EQ)

AIR QUALITY | THERMAL COMFORT | LIGHTING, VISUAL & ACOUSTIC COMFORT | VERIFICATION

21 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
AIR QUALITY				
EQ1	MINIMUM IAQ PERFORMANCE			
	Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in building, thus contributing to the comfort and well-being of the occupants: Meet the minimum requirements of ventilation rate in ASHRAE 62.1:2007 or the local building code whichever is the more stringent.	1	1	
EQ2	ENVIRONMENTAL TOBACCO SMOKE (ETS) CONTROL			
	Minimize exposure of building occupants, indoor surfaces, and ventilation air distribution systems to Environmental Tobacco Smoke (ETS): 1) Prohibit smoking in the building and locate any exterior designated smoking areas away from entries, outdoor air intakes and operable windows, OR 2) Prohibit smoking in the building except in designated smoking rooms and establish negative pressure in the smoking rooms together with provision of effective air filtration system.	1	1	
		1		

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NREB

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
AIR QUALITY (CONTINUED)				
EQ3	CARBON DIOXIDE MONITORING AND CONTROL			
	<p>Provide response monitoring of carbon dioxide levels to ensure delivery of minimum outside air requirements:</p> <p>Install carbon dioxide (CO₂) monitoring and control system with at least one (1) CO₂ sensor at all main return points on each floor to facilitate continuous monitoring and adjustment of outside air ventilation rates to each floor, and ensure independent control of ventilation rates to maintain CO₂ level ≤ 1,000 ppm</p>	1	1	
EQ4	INDOOR AIR POLLUTANTS			
	<p>Reduce detrimental impact on occupant health from finishes that emit internal air pollutants:</p> <p>1) Use low VOC paint and coating throughout the building. Paints and Coatings to comply with requirements specified in international labelling schemes recognized by GBI, AND</p> <p>2) Use low VOC carpet or flooring throughout the building. Carpets to comply with requirements specified in international labelling schemes recognized by GBI. Other types of flooring to comply with requirements under FloorScore developed by Science Certification System or equivalent, AND</p> <p>3) Use low VOC adhesive and sealant or no adhesive or sealant used.</p>	1	2	
	<p>Use products with no added urea formaldehyde. These include:</p> <p>1) Composite wood and agrifiber products defined as: particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores, AND</p> <p>2) Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies, AND</p> <p>3) Insulation foam, AND</p> <p>4) Draperies.</p>	1		
EQ5	MOULD PREVENTION			
	<p>Design system(s) which reduce the risk of mould growth and its associated detrimental impact on occupant health:</p> <p>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.</p> <p>Ensure that excessive moisture in building is controlled during the retrofit Design, Construction and Operation stages by the consideration and the control of the following:</p> <p>1) Rainwater leakage through roof and walls 2) Infiltration of moist air 3) Diffusion of moisture through walls, roof and floors 4) Groundwater intrusion into basements and crawl spaces through walls and floors 5) Leaking or burst pipes 6) Indoor moisture sources 7) Construction moisture OR The building is fully naturally ventilated</p>	1	1	
THERMAL COMFORT				
EQ6	THERMAL COMFORT: CONTROLLABILITY OF SYSTEMS			
	<p>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:</p> <p>1) Provide individual comfort controls for ≥ 50% of the building occupants to enable adjustments to suit individual task needs and preferences, AND</p> <p>2) Provide comfort system controls for all shared multi-occupant spaces to enable adjustments to suit group needs and preferences.</p> <p><i>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.</i></p>	2	2	

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NREB

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
THERMAL COMFORT (CONTINUED)				
EQ7	AIR CHANGE EFFECTIVENESS			
	<p>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:</p> <p>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).</p>	1	1	
LIGHTING, VISUAL & ACOUSTIC COMFORT				
EQ8	DAYLIGHTING			
	<p>Provide good levels of daylighting for building occupants:-</p> <p>Demonstrate that $\geq 30\%$ of the NLA has a daylight factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level, OR</p> <p>Demonstrate that $\geq 50\%$ of the NLA has a daylight factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level</p> <p><i>(Refer to GBI on requirement variance for applications other than Office Buildings)</i></p>	1	2	
		2		
EQ9	DAYLIGHT GLARE CONTROL			
	<p>Reduce discomfort of glare from natural light. Where blinds or screens are fitted on all glazing and atrium as a base building, incorporate provisions to meet the following criteria:</p> <p>1) Eliminate glare from all direct sun penetration and keep horizontal workspace lux level below 2000, AND</p> <p>2) Eliminate glare from diffuse sky radiation for occupant workspace at viewing angles of 15° to 60° from the horizontal at eye level (typically 1.2m from floor level), AND</p> <p>3) Control with an automatic monitoring system (for atrium and windows with incident direct sun light only - not applicable for fixed blinds/screens), AND</p> <p>4) Equip with a manual override function accessible by occupants (not applicable for fixed blinds/screens).</p>	1	1	
EQ10	ELECTRIC LIGHTING LEVELS			
	<p>Baseline building office lighting not to be over designed:</p> <p>Demonstrate that office lighting design maintains a luminance level of no more than specified in MS1525 for 90% of NLA as measured at the working plane (800mm above the floor level).</p>	1	1	
EQ11	HIGH FREQUENCY BALLASTS			
	<p>Increase workplace amenity by avoiding low frequency flicker that may be associated with fluorescent lighting:</p> <p>Install high frequency ballasts in fluorescent luminaires over a minimum of 90% of NLA.</p>	1	1	
EQ12	EXTERNAL VIEWS			
	<p>Reduce eyestrain for building occupants by allowing long distance views and provision of visual connection to the outdoor.</p> <p>Demonstrate that $\geq 60\%$ of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.</p> <p>Demonstrate that $\geq 75\%$ of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.</p>	1	2	
		2		
EQ13	INTERNAL NOISE LEVELS			
	<p>Maintain internal noise levels at an appropriate level. Demonstrate that 90% of the NLA do not exceed the following ambient internal noise levels:</p> <p>1) Within the entire baseline building general office, space noise from the building services does not exceed 40dBAeq, OR</p> <p>2) Within the baseline building office space, the sound level does not exceed 45dBAeq for open plan and not exceed 40dBAeq for closed offices</p>	1	1	

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NREB

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
VERIFICATION				
EQ14	IAQ BEFORE / DURING OCCUPANCY			
	Reduce indoor air quality problems resulting from the construction process (or inherent conditions) in order to improve and sustain the comfort and well-being of building occupants. Develop and implement an Indoor Air Quality (IAQ) Management Plan to effect this requirement as follows:			
	1) Perform a building flush out by supplying outdoor air to provide not less than 10 airchanges/hour for at least 30 minutes operation and continuous minimum 1 ACH for the next 14 days, OR	1	2	
	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, OR			
	3) Conduct IAQ testing to demonstrate maximum concentrations for pollutants are not exceeded according to the Indoor Air Quality Code of Malaysia.			
	Permanent Air Purging System: Where a permanent air flushing system of at least 10 airchanges/hour operation is installed and operated at least once a year during occupancy stage	1		
EQ15	OCCUPANCY COMFORT SURVEY: VERIFICATION			
	Provide for the assessment of comfort of the building occupants:			
	1) Conduct an occupancy comfort survey of building occupants. 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	2	2	
	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.			
	<i>The relevant environmental variables include:</i> <ul style="list-style-type: none"> • Temperature, relative humidity, air speed and mean radiant temperature, • Lighting level and glare problem, • Background noise level, • Odour problem, CO₂ level, VOCs, and particulate concentration 			
INDOOR ENVIRONMENTAL QUALITY (EQ) TOTAL			21	

3

SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

FACILITY MANAGEMENT | TRANSPORTATION | REDUCE HEAT ISLAND EFFECT

10 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
FACILITY MANAGEMENT				
SM1	GBI RATED DESIGN & CONSTRUCTION			
	If the building has been previously GBI (or other GBI approved Green Rating system) rated under any category, OR within the last 12 months a comprehensive Energy Efficiency Audit has been conducted.	1	1	
SM2	BUILDING EXTERIOR MANAGEMENT			
	Employ environmentally sensitive building exterior management plan to reduce pollution.			
	Use environmentally non-polluting methods and chemicals for cleaning of building exterior including maintenance equipment, chemicals, paint and sealants.	1	1	

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NREB

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
FACILITY MANAGEMENT (CONTINUED)				
SM3	INTEGRATED PEST MANAGEMENT, EROSION CONTROL & LANDSCAPE MANAGEMENT			
	<p>Employ environmentally sensitive management to preserve the site's natural components. Minimise harmful chemical use, energy waste, water waste, air pollution, solid waste and/or chemical runoff such as gasoline and oil. The following operational elements must be addressed:</p> <p>1) Use of least toxic chemical pesticides, minimum use of chemicals and use only in targeted locations and only for targeted species. Conduct routine inspection and monitoring, AND</p> <p>2) Erosion and sedimentation control for ongoing landscape operations including measures that prevent erosion and sedimentation, prevent air pollution from dust or particulate matter and restore eroded areas.</p>	1	1	
TRANSPORTATION				
SM4	GREEN VEHICLE PRIORITY - LOW EMITTING & FUEL EFFICIENT VEHICLES			
	<p>Encourage use of green vehicles:</p> <p>Provide preferred parking for low-emitting and fuel-efficient vehicles for 5% of the total car parking lots.</p> <p><i>"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)</i></p>	1	1	
SM5	PARKING CAPACITY			
	<p>Discourage over-provision of car parking capacity:</p> <p>1) Size parking capacity not to exceed the minimum local zoning requirements, AND</p> <p>2) Provide preferred parking for carpools or vanpools for 5% of the total provided parking spaces.</p>	1	1	
REDUCE HEAT ISLAND EFFECT				
SM6	GREENERY & ROOF			
	<p>Reduce heat island (thermal gradient difference between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat:</p> <p>A) HARDSCAPE & GREENERY APPLICATION:</p> <p>1) Provide any combination of the following strategies for 50% of the site hardscape (including sidewalks, courtyards, plazas and parking lots):</p> <ul style="list-style-type: none"> • Shade (within 5 years of occupancy), • Paving materials with a Solar Reflectance Index (SRI) of at least 29, • Open grid pavement system. <p>B) ROOF APPLICATION:</p> <p>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</p> <p>2) Install a vegetated roof for at least 50% of the roof area; OR</p> <p>3) Install high albedo and vegetated roof surfaces that, in combination, meet the following criteria:</p> <ul style="list-style-type: none"> • $(\text{Area of SRI Roof} / 0.75) + (\text{Area of vegetated roof} / 0.5) \geq \text{Total Roof Area}$ • Roof Type Slope SRI • Low-Sloped Roof < 2:12 78 • Steep-Sloped Roof > 2:12 29 	2		
		2	4	
SM7	BUILDING USER MANUAL			
	<p>Document Green building design features and strategies for user information and guide to sustain performance during occupancy:</p> <p>Provide (include updating) a Building User Manual which documents passive and active features that should not be downgraded.</p>	1	1	
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM) TOTAL			10	

4

MATERIALS & RESOURCES (MR)

REUSED AND RECYCLED MATERIALS | SUSTAINABLE MATERIALS & RESOURCES AND POLICY | WASTE MANAGEMENT | GREEN PRODUCTS

9 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
REUSED AND RECYCLED MATERIALS				
MR1	MATERIAL REUSE AND SELECTION			
	<p>Reuse building materials and products to reduce demand for virgin materials and reduce creation of waste. This serves to reduce environmental impact associated with extraction and processing of virgin resources. Integrate building design and its buildability with selection of reused building materials, taking into account their embodied energy, durability, carbon content and life cycle costs:</p> <p>Where reused products/materials constitutes $\geq 20\%$ of the project's total retrofit material cost value</p>	1	1	
MR2	RECYCLED CONTENT MATERIALS			
	<p>Increase demand for building products that incorporate recycled content materials in their production:</p> <p><i>(Recycled content shall be defined in accordance with the International Organization of Standards Document)</i></p> <p>Where use of materials with recycled content is such that the sum of post-consumer recycled plus one-half of the pre-consumer content constitutes $\geq 20\%$ (based on cost) of project's total retrofit material cost value.</p>	1	1	
SUSTAINABLE MATERIALS & RESOURCES AND POLICY				
MR3	SUSTAINABLE TIMBER			
	<p>Encourage environmentally responsible forest management:</p> <p>Where $\geq 75\%$ of wood-based materials and products used in the retrofit works are certified.</p> <p><i>These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. To include wood materials permanently installed and also temporarily purchased for the project. Compliant with Forest Stewardship Council and Malaysian Timber Certification Council requirements.</i></p>	1	1	
MR4	SUSTAINABLE PURCHASING POLICY			
	Develop a Sustainable Purchasing policy that must cover product purchases within the building and management's control.	1	1	
WASTE MANAGEMENT				
MR5	STORAGE, COLLECTION & DISPOSAL OF RECYCLABLES			
	Facilitate reduction of waste generated during retrofit construction and during building occupancy that is hauled and disposed of in landfills:		3	
	Provide recycling facilities/infrastructure for sorting and separate collection of recyclable waste for recycling (consumables - glass, paper, metal, equipment, addition & alteration construction wastes),	1		
	Promote and encourage waste minimization and recycling among occupants, tenants and visitors through various avenues,	1		
	Promote waste sorting, collecting, quantifying, monitoring and recycling of a large range of waste generated in-house.	1		
GREEN PRODUCTS				
MR6	REFRIGERANTS & CLEAN AGENTS			
	Use environmentally-friendly Refrigerants and Clean Agents exceeding Malaysia's commitment to the Montreal & Kyoto protocols:		2	
	Use zero Ozone Depleting Potential (ODP) products: non-CFC and non-HCFC refrigerants AND clean agents,	1		
	Use non-synthetic (natural) refrigerants AND clean agents with zero ODP and negligible Global Warming Potential.	1		
MATERIALS & RESOURCES (MR) TOTAL			9	

5

WATER EFFICIENCY (WE)

WATER HARVESTING & RECYCLING | INCREASED EFFICIENCY

12 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
WATER HARVESTING & RECYCLING				
WE1	RAINWATER HARVESTING			
	Encourage rainwater harvesting that will lead to reduction in potable water consumption:		3	
	Rainwater harvesting that leads to ≥ 5% reduction in potable water consumption, OR	1		
	Rainwater harvesting that leads to ≥ 15% reduction in potable water consumption, OR	2		
	Rainwater harvesting that leads to ≥ 30% reduction in potable water consumption	3		
WE2	WATER RECYCLING			
	Encourage water recycling that will lead to reduction in potable water consumption:-		2	
	Treat and recycle ≥ 10% wastewater leading to reduction in potable water consumption, OR	1		
	Treat and recycle ≥ 30% wastewater leading to reduction in potable water consumption	2		
INCREASED EFFICIENCY				
WE3	WATER EFFICIENT - IRRIGATION/LANDSCAPING			
	Reduce potable water consumption for landscape irrigation by:		2	
	1) 50%	1		
	2) 100%	2		
WE4	WATER EFFICIENT FITTINGS			
	Encourage reduction in potable water consumption through use of efficient devices:		3	
	1) With reference to Utility calculations;			
	• Reduce annual potable water consumption by ≥ 20%, OR	1		
	• Reduce annual potable water consumption by ≥ 30%, OR	2		
	• Reduce annual potable water consumption by ≥ 50%	3		
	OR			
	2) From existing 3-year average water consumption record, reduce annual potable water use by:			
	• ≥ 20%	1		
	• ≥ 30%	2		
	• ≥ 50%	3		
WE5	METERING & LEAK DETECTION SYSTEM			
	Encourage the design of systems that monitors and manages water consumption:		2	
	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		
WATER EFFICIENCY (WE) TOTAL			12	

6

INNOVATION (IN)

INNOVATION & ENVIRONMENTAL INITIATIVES | GBI FACILITATOR

10 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
IN1	INNOVATION & ENVIRONMENTAL INITIATIVES			
	<p>Provide Existing Buildings the opportunity to be awarded points for exceptional performance above the requirements set by GBI rating system:</p> <p>1 point for each approved innovation and environmental initiative up to a maximum of 9 points, such as:</p> <ul style="list-style-type: none"> • Use of IBS - Industrialized Building System for the retrofit component (must achieve a minimum CIDB IBS score of 30) • Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling tower make-up water etc, • Co-generation / Tri-generation system, • Thermal / PCM / Thermal Mass storage system (accounting for at least 25% of total required capacity), • Solar thermal technology / Solar Thermal Cooling (generating at least 10% of total required capacity), • Heat recovery system (contributing to at least 10% of total required capacity), • Heat pipe technology (for at least 50% of relevant applications), • Light pipes accounting for at least 1% of NLA, • 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 capacities of plants for HVAC, Boilers, Pools, etc.), • Mixed mode / low energy ventilation system, • Advanced air filtration technology (serving at least 50% of the GFA), • Waterless urinals (fitted to all male toilets), • Central vacuum system (serving at least 50% of NLA), • Central Pneumatic Waste Collection system (serving at least 50% of NLA); • Self-cleaning façade (for at least 10% of façade), • Electrochromic glazed façade (for at least 10% of façade), • Refrigerant leakage detection and recycling facilities (for at least 90% of HVAC plant), • Car park mechanical ventilation fans provided with VSD and controlled by CO₂/CO sensors, • Recycling of all fire system water during regular testing. 	9	9	
IN2	GREEN BUILDING INDEX FACILITATOR			
	<p>To support and encourage the integration required for Green Building Index rated buildings and to streamline the application and certification process:</p> <p>Engage the services of a Green Building Index Facilitator to assist in obtaining Green Building Index certification</p>	1	1	
INNOVATION (IN) TOTAL			10	



GBI ASSESSMENT CRITERIA
FOR
NON-RESIDENTIAL NEW CONSTRUCTION (NRNC)

FIRST EDITION | APRIL 2009 | VERSION 1.0

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INTRODUCTION

WHAT IS THE GREEN BUILDING INDEX (GBI)?

The Green Building Index is an environmental rating system for buildings developed by PAM (Pertubuhan Arkitek Malaysia / Malaysian Institute of Architects) and ACEM (the Association of Consulting Engineers Malaysia). The Green Building Index is Malaysia's first comprehensive rating system for evaluating the environmental design and performance of Malaysian buildings based on the six (6) main criterias of Energy Efficiency, Indoor Environment Quality, Sustainable Site Planning & Management, Materials & Resources, Water Efficiency, and Innovation.

The Green Building Index is developed specifically for the Malaysian tropical weather, environmental and developmental context, cultural and social needs.

The GBI initiative aims to assist the building industry in its march towards sustainable development. The GBI environmental rating system is created to:

- **Define green buildings by establishing a common language and standard of measurement;**
- **Promote integrated, whole-building design;**
- **Recognise and reward environmental leadership;**
- **Transform the built environment to reduce it's environmental impact; and**
- **Ensure new buildings remain relevant in the future and existing buildings are refurbished and upgraded properly to remain relevant.**

WHO CAN USE THE GREEN BUILDING INDEX?

GSB encourages all members of Project Teams, Building owners, Developers and other interested parties (including Contractors, Government and Design & Build Contractors) to use the Green Building Index to validate environmental initiatives at the design phase of new construction or base building refurbishment; or construction and procurement phase of buildings. Use of the Green Building Index is encouraged on all such projects to assess and improve their environmental attributes.

Use of the Green Building Index tool without formal certification by an independent accredited GBI Certifier does not entitle the user or any other party to promote the Green Building Index rating achieved. No fee is payable to GSB for such use, however formal recognition of the Green Building Index rating - and the right to promote same - requires undertaking the formal certification process offered by Greenbuildingindex Sdn Bhd.

All Green Building Index rating tools are reviewed annually; please forward any feedback to info@greenbuildingindex.org

PROJECT INFORMATION

PROJECT NAME	
PROJECT ADDRESS	
POSTCODE	
STATE	

APPLICANT	
CONTACT PERSON	

ARCHITECT	
CIVIL ENGINEER	
STRUCTURAL ENGINEER	
MECHANICAL ENGINEER	
ELECTRICAL ENGINEER	
QUANTITY SURVEYOR	
LAND SURVEYOR	
LANDSCAPE CONSULTANT	
OTHER SPECIALIST CONSULTANT(S)	
MAIN CONTRACTOR	
LOCAL AUTHORITY	
TOTAL GROSS FLOOR AREA	
LAND AREA FOR LANDED PROPERTY	

BUILDING DESCRIPTION	

ASSESSMENT CRITERIA OVERALL POINTS SCORE

PART	ITEM	MAXIMUM POINTS	SCORE
1	Energy Efficiency	35	
2	Indoor Environmental Quality	21	
3	Sustainable Site Planning & Management	16	
4	Material & Resources	11	
5	Water Efficiency	10	
6	Innovation	7	
TOTAL SCORE		100	

GREEN BUILDING INDEX CLASSIFICATION

POINTS	GBI RATING
86+ points	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

ASSESSMENT CRITERIA SCORE SUMMARY

PART	CRITERIA	ITEM	POINTS	TOTAL
1	EE	ENERGY EFFICIENCY		35
	Design			
	EE1	Minimum EE Performance	1	
	EE2	Lighting Zoning	3	
	EE3	Electrical Sub-metering	1	
	EE4	Renewable Energy	5	
	EE5	Advanced EE Performance - BEI	15	
	Commissioning			
	EE6	Enhanced Commissioning	3	
	EE7	Post Occupancy Commissioning	2	
	Verification & Maintenance			
EE8	EE Verification	2		
EE9	Sustainable Maintenance	3		
2	EQ	INDOOR ENVIRONMENTAL QUALITY		21
	Air Quality			
	EQ1	Minimum IAQ Performance	1	
	EQ2	Environmental Tobacco Smoke (ETS) Control	1	
	EQ3	Carbon Dioxide Monitoring and Control	1	
	EQ4	Indoor Air Pollutants	2	
	EQ5	Mould Prevention	1	
	Thermal Comfort			
	EQ6	Thermal Comfort: Design & Controllability of Systems	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: Verification	2		

GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NRNC

PART	CRITERIA	ITEM	POINTS	TOTAL
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT		16
	Site Planning			
	SM1	Site Selection	1	
	SM2	Brownfield Redevelopment	1	
	SM3	Development Density & Community Connectivity	2	
	SM4	Environment Management	2	
	Construction Management			
	SM5	Earthworks - Construction Activity Pollution Control	1	
	SM6	QLASSIC	1	
	SM7	Workers' Site Amenities	1	
	Transportation			
	SM8	Public Transportation Access	1	
	SM9	Green Vehicle Priority	1	
	SM10	Parking Capacity	1	
Design				
SM11	Stormwater Design – Quantity & Quality Control	1		
SM12	Greenery & Roof	2		
SM13	Building User Manual	1		
4	MR	MATERIALS & RESOURCES		11
	Reused & Recycled Materials			
	MR1	Materials reuse and selection	2	
	MR2	Recycled content materials	2	
	Sustainable Resources			
	MR3	Regional Materials	1	
	MR4	Sustainable Timber	1	
	Waste Management			
MR5	Storage & Collection of recyclables	1		
MR6	Construction waste management	2		
Green Products				
MR7	Refrigerants & Clean Agents	2		
5	WE	WATER EFFICIENCY		10
	Water Harvesting & Recycling			
	WE1	Rainwater Harvesting	2	
	WE2	Water Recycling	2	
	Increased Efficiency			
	WE3	Water Efficient - Irrigation/Landscaping	2	
WE4	Water Efficient Fittings	2		
WE5	Metering & Leak Detection System	2		
6	IN	INNOVATION		7
	IN1	Innovation in Design & Environmental Design Initiatives	6	
	IN2	Green Building Index Accredited Facilitator	1	
TOTAL POINTS				100

1

ENERGY EFFICIENCY (EE)

DESIGN | COMMISSIONING | VERIFICATION & MAINTENANCE

35 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
DESIGN				
EE1	MINIMUM EE PERFORMANCE			
	Establish minimum energy efficiency (EE) performance to reduce energy consumption in buildings, thus reducing CO ₂ emission to the atmosphere. Meet the following minimum EE requirements as stipulated in MS 1525:2007: 1) OTTV ≤ 50, RTTV ≤ 25. Submit calculations using the BEIT software or other GBI approved software(s), AND 2) Provision of Energy Management Control system where Air-conditioned space ≥ 4000m ²	1	1	
EE2	LIGHTING ZONING			
	Provide flexible lighting controls to optimise energy savings:		3	
	All individual or enclosed spaces to be individually switched; and the size of individually switched lighting zones shall not exceed 100m ² for 90% of the NLA; with switching clearly labelled and easily accessible by building occupants.	1		
	Provide auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylight areas, if any.	1		
	Provide motion sensors or equivalent to complement lighting zoning for at least 25% NLA.	1		
EE3	ELECTRICAL SUB-METERING & TENANT SUB-METERING			
	Monitor energy consumption of key building services as well as all tenancy areas: Provide sub-metering for all energy uses of ≥ 100kVA; with separate sub-metering for lighting and separately for power at each floor or tenancy, whichever is smaller.	1	1	
EE4	RENEWABLE ENERGY			
	Encourage use of renewable energy:		5	
	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 EE PERFORMANCE			
	Exceed Energy Efficiency (EE) performance better than the baseline minimum to reduce energy consumption in the building. Achieve Building Energy Intensity (BEI) ≤ 150 kWh/m ² yr as defined under GBI reference (using BEIT Software or other GBI approved software(s)), OR	2	15	
	BEI ≤ 140, OR	3		
	BEI ≤ 130, OR	5		
	BEI ≤ 120, OR	8		
	BEI ≤ 110, OR	10		
	BEI ≤ 100, OR	12		
	BEI ≤ 90	15		

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NRNC

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
COMMISSIONING				
EE6	ENHANCED COMMISSIONING OF BUILDING ENERGY SYSTEMS			
	<p>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:</p> <ol style="list-style-type: none"> 1. Conducting at least one commissioning design review during the detail design stage and back-check the review comments during the tender documentation stage. 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. 	3	3	
EE7	POST OCCUPANCY COMMISSIONING			
	<p>Carry out post occupancy commissioning for all tenancy areas after fit-out changes are completed:</p>		2	
	<p>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.</p>	1		
	<p>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.</p>	1		
VERIFICATION & MAINTENANCE				
EE8	EE VERIFICATION			
	<p>Verify predicted energy use of key building services:</p> <ol style="list-style-type: none"> 1) Use Energy Management System to monitor and analyse energy consumption including reading of sub-meters, <p>AND</p> <ol style="list-style-type: none"> 2) Fully commission EMS including Maximum Demand Limiting programme within 12 months of practical completion (or earlier if there is at least 50% occupancy). 	2	2	
EE9	SUSTAINABLE MAINTENANCE			
	<p>Ensure the building's energy related systems will continue to perform as intended beyond the 12 months Defects & Liability Period:</p>		3	
	<p>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.</p>	1		
	<p>2) Provide for a designated building maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage.</p> <p>3) Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).</p>	2		
ENERGY EFFICIENCY (EE) TOTAL			35	

2

INDOOR ENVIRONMENTAL QUALITY (EQ)

AIR QUALITY | THERMAL COMFORT | LIGHTING, VISUAL & ACOUSTIC COMFORT | VERIFICATION

21 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
AIR QUALITY				
EQ1	MINIMUM IAQ PERFORMANCE			
	Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in building, thus contributing to the comfort and well-being of the occupants: Meet the minimum requirements of ventilation rate in ASHRAE 62.1:2007 or the local building code whichever is the more stringent.	1	1	
EQ2	ENVIRONMENTAL TOBACCO SMOKE (ETS) CONTROL			
	Minimize exposure of building occupants, indoor surfaces, and ventilation air distribution systems to Environmental Tobacco Smoke (ETS): Prohibit smoking in the building, AND Locate any exterior designated smoking areas at least 10m away from entries, outdoor air intakes and operable windows	1	1	
EQ3	CARBON DIOXIDE MONITORING AND CONTROL			
	Provide response monitoring of carbon dioxide levels to ensure delivery of minimum outside air requirements: Install carbon dioxide (CO ₂) monitoring and control system with at least one (1) CO ₂ sensor at all main return points on each floor to facilitate continuous monitoring and adjustment of outside air ventilation rates to each floor, and ensure independent control of ventilation rates to maintain CO ₂ level ≤ 1,000ppm	1	1	
EQ4	INDOOR AIR POLLUTANTS			
	Reduce detrimental impact on occupant health from finishes that emit internal air pollutants: Use low VOC paint and coating throughout the building. Paints and Coatings to comply with requirements specified in international labelling schemes recognized by GBI, AND Use low VOC carpet or flooring throughout the building. Carpets to comply with requirements specified in international labelling schemes recognized by GBI. Other types of flooring to comply with requirements under FloorScore developed by Science Certification System or equivalent, AND Use low VOC adhesive and sealant or no adhesive or sealant used.	1	2	
	Use products with no added urea formaldehyde. These include: 1) Composite wood and agrifiber products defined as: particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores, AND 2) Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies, AND 3) Insulation foam, AND 4) Draperies	1		
EQ5	MOULD PREVENTION			
	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. Ensure that excessive moisture in building is controlled during the Design, Construction and Operation stages by the consideration and the control of the following: 1) Rainwater leakage through roof and walls 2) Infiltration of moist air 3) Diffusion of moisture through walls, roof and floors 4) Groundwater intrusion into basements and crawl spaces through walls and floors 5) Leaking or burst pipes 6) Indoor moisture sources 7) Construction moisture OR The building is fully naturally ventilated	1	1	

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NRNC

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
THERMAL COMFORT				
EQ6	THERMAL COMFORT: DESIGN & CONTROLLABILITY OF SYSTEMS			
	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 55 in conjunction with the relevant localised parameters as listed in MS1525:2007.	1		
	Provide individual comfort controls for $\geq 50\%$ 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. <i>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.</i>	1	2	
EQ7	AIR CHANGE EFFECTIVENESS			
	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	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 1.0m from finished floor level)			
LIGHTING, VISUAL & ACOUSTIC COMFORT				
EQ8	DAYLIGHTING			
	Provide good levels of daylighting for building occupants:			
	Demonstrate that $\geq 30\%$ of the NLA has a daylight factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level, OR	1	2	
	Demonstrate that $\geq 50\%$ of the NLA has a daylight factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level	2		
EQ9	DAYLIGHT GLARE CONTROL			
	Reduce discomfort of glare from natural light. Where blinds or screens are fitted on all glazing and atrium as a base building, incorporate provisions to meet the following criteria:			
	1) Eliminate glare from all direct sun penetration and keep horizontal workspace lux level below 2,000; 2) Eliminate glare from diffuse sky radiation for occupant workspace at viewing angles of 15° to 60° from the horizontal at eye level (typically 1.2m from floor level) 3) Control with an automatic monitoring system (for atrium and windows with incident direct sun light only - not applicable for fixed blinds/screens); AND 4) Equip with a manual override function accessible by occupants (not applicable for fixed blinds/screens)	1	1	
EQ10	ELECTRIC LIGHTING LEVELS			
	Baseline building office lighting not to be over designed:			
	Demonstrate that office lighting design maintains a luminance level of no more than specified in MS1525:2007 for 90% of NLA as measured at the working plane (800mm above the floor level).	1	1	
EQ11	HIGH FREQUENCY BALLASTS			
	Increase workplace amenity by avoiding low frequency flicker that may be associated with fluorescent lighting:			
	Install high frequency ballasts in fluorescent luminaires over a minimum of 90% of NLA.	1	1	
EQ12	EXTERNAL VIEWS			
	Reduce eyestrain for building occupants by allowing long distance views and provision of visual connection to the outdoor.			
	Demonstrate that $\geq 60\%$ of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.	1	2	
	Demonstrate that $\geq 75\%$ of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.	2		
EQ13	INTERNAL NOISE LEVELS			
	Maintain internal noise levels at an appropriate level. Demonstrate that 90% of the NLA do not exceed the following ambient internal noise levels:			
	Within the entire baseline building general office, space noise from the building services does not exceed 40dB(A)eq. OR Within the baseline building office space, the sound level does not exceed 45dB(A)eq for open plan and not exceed 40dB(A)eq for closed offices	1	1	

Continued on next page >>

GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NRNC

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
VERIFICATION				
EQ14	IAQ BEFORE & DURING OCCUPANCY			
	<p>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:</p> <p>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.</p>	1	2	
	<p>During Occupancy Stage:</p> <p>Where a permanent air flushing system of at least 10 airchanges/hour operation is installed for use during occupancy stage</p>	1		
EQ15	POST OCCUPANCY COMFORT SURVEY: VERIFICATION			
	<p>Provide for the assessment of comfort of the building occupants:</p> <p>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 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.</p> <p><i>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</i></p>	2	2	
INDOOR ENVIRONMENTAL QUALITY (EQ) TOTAL			21	

3

SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SITE PLANNING | CONSTRUCTION MANAGEMENT | TRANSPORTATION | DESIGN

16 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
SITE PLANNING				
SM1	SITE SELECTION			
	<p>Do not develop building, hardscape, road or parking area on a site or part of a site that meet any one of the following criteria:</p> <ol style="list-style-type: none"> 1. Prime farmland as defined by the Structure Plan of the area or the National Physical Plan. 2. Forest reserve or State Environmental Protection Zones that is specifically identified as habitat for any species found on the endangered lists. 3. Within 30m of any wetlands as defined by the Structure Plan of the area OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever is more stringent. 4. Previously undeveloped land that is within 30m of Mean High Water Spring (MHWS) sea level which supports or could support wildlife or recreational use, or statutory requirements whichever is the more stringent. 5. Previously undeveloped land that is within 20m of lake, river, stream and tributary which support or could support wildlife or recreational use. 6. Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is provided. 	1	1	
SM2	BROWNFIELD REDEVELOPMENT			
	<p>Reduce pressure on undeveloped land by rehabilitating damaged sites where development is complicated by environmental contamination, thereby reducing pressure on undeveloped land. This would typically involve old rubbish tips, former mining land, old factory sites, etc.</p>	1	1	

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NRNC

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
SM3	DEVELOPMENT DENSITY & COMMUNITY CONNECTIVITY			
	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 20,300m ² per hectare net (87,000 sqft per acre net)	1		
	B) COMMUNITY CONNECTIVITY Construct a new building or renovate an existing building on a previously developed site AND within 1km of a residential zone or neighbourhood with an average density of 25 units per hectare net (10 units per acre net) AND within 1km of at least 10 Basic Services AND with pedestrian access between the building and the services. <i>Basic Services include, but are not limited to:</i> 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. <i>Proximity is determined by drawing a 1km radius around the main building entrance on a site map and counting the services found within that radius.</i>	1	2	
SM4	ENVIRONMENT MANAGEMENT			
	A) Conserve existing natural area and restore damaged area to provide habitat and promote biodiversity & B) Maximize Open Space by providing a high ratio of open space to development footprint to promote biodiversity:			
	A) CONSERVATION On previously developed or graded site, restore or protect a minimum of 50% of the site area (excluding the building footprint) with native or adaptive vegetation. Native or adaptive plants are plants indigenous to a locality or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds. Applicable also to landscaping on rooftops and roof gardens so long as the plants meet the definition of native or adaptive vegetation. OR On greenfield sites, limit all site disturbance to within 12m beyond the building perimeter; 3m beyond surface walkway, patio, surface parking and utilities less than 300mm in diameter; 4.5m beyond primary roadway curb and main utility branch trench; and 7.5m beyond constructed area with permeable surface (such as pervious paving area, storm water detention facility and playing field) that require additional staging area in order to limit compaction in the constructed area.	1	2	
	B) OPEN SPACE: Reduce by 25%, the development footprint (defined as the total area of the building footprint, hardscape, access road and parking) and/or provide vegetated open space within the project boundary to exceed the local zoning's open space requirement for the site by 25%. OR For areas with no local zoning requirement (e.g. university campus, military bases), provide vegetated open space adjacent to the building whose area is equal to that of the building footprint. OR Where a zoning ordinance exists, but there is no requirement for open space (zero), provide vegetated open space equal to 20% of the project's site area.	1		
CONSTRUCTION MANAGEMENT				
SM5	EARTHWORKS - CONSTRUCTION ACTIVITY POLLUTION CONTROL			
	Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation. Create and implement an Erosion and Sedimentation Control (ESC) Plan for all construction activities associated with the project. The ESC Plan shall conform to the erosion and sedimentation requirements of the approved Earthworks Plans OR Local erosion and sedimentation control standards and codes, whichever is the more stringent. The plan shall describe the measures implemented to accomplish the following objectives: 1. Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse. 2. Prevent sedimentation of storm sewer or receiving stream. 3. Prevent polluting the air with dust and particulate matter.	1	1	
SM6	QLASSIC - QUALITY ASSESSMENT SYSTEM FOR BUILDING CONSTRUCTION WORK			
	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	1	
SM7	WORKERS' SITE AMENITIES			
	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: 1. Proper accommodation for construction workers at the site or at temporary rented accommodation nearby. 2. Prevent pollution of storm sewer or receiving stream by having proper septic tank. 3. Prevent polluting the surrounding area from open burning and proper disposal of domestic waste. 4. Provide adequate health and hygiene facilities for workers on site.	1	1	

Continued on next page >>

GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NRNC

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
TRANSPORTATION				
SM8	PUBLIC TRANSPORTATION ACCESS			
	Reduce pollution and land development impacts from automobile use: Locate project within 1km of an existing, or planned and funded, commuter rail, light rail or subway station. OR Locate project within 500m of at least one bus stop.	1	1	
SM9	GREEN VEHICLE PRIORITY - LOW EMITTING & FUEL EFFICIENT 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. <i>"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).</i>	1	1	
SM10	PARKING CAPACITY			
	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	1	
DESIGN				
SM11	STORMWATER DESIGN – QUANTITY & QUALITY CONTROL			
	Limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, and managing storm water runoff. Reduce or eliminate water pollution by reducing impervious cover, increasing onsite infiltration, eliminating sources of contaminants, and removing pollutants from storm water runoff: CONDITION 1: IF EXISTING IMPERVIOUSNESS IS ≤ 50%: Implement a storm water management plan that prevents the post development peak discharge rate and quantity from exceeding the pre-development peak discharge rate and quantity in conformance to the Storm Water Management Manual for Malaysia (MASMA). CONDITION 2: IF EXISTING IMPERVIOUSNESS IS > 50%: Implement a storm water management plan that results in a 25% decrease in the volume of storm water runoff required under MASMA. For either Condition, implement a storm water management plan that reduces impervious cover, promotes infiltration, and captures and treats the storm water runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs).	1	1	
SM12	GREENERY & ROOF			
	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 Provide any combination of the following strategies for 50% of the site hardscape (including sidewalks, courtyards, plazas and parking lots): 1) Shade (within 5 years of occupancy); 2) Paving materials with a Solar Reflectance Index (SRI) of at least 29; 3) Open grid pavement system;	1	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: <i>(Area of SRI Roof / 0.75) + (Area of vegetated roof / 0.5) ≥ Total Roof Area</i> <i>Roof Type Slope SRI</i> <i>Low-Sloped Roof < 2:12 78</i> <i>Steep-Sloped Roof > 2:12 29</i>	1		
SM13	BUILDING USER MANUAL			
	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	1	
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM) TOTAL			16	

4

MATERIALS & RESOURCES (MR)

REUSED AND RECYCLED MATERIALS | SUSTAINABLE RESOURCES | CONSTRUCTION MANAGEMENT | GREEN PRODUCTS

11 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
REUSED AND RECYCLED MATERIALS				
MR1	MATERIALS REUSE AND SELECTION			
	Reuse building materials and products to reduce demand for virgin materials and reduce creation of waste. This serves to reduce environmental impact associated with extraction and processing of virgin resources. Integrate building design and its buildability with selection of reused building materials, taking into account their embodied energy, durability, carbon content and life cycle costs:		2	
	Where reused products/materials constitutes $\geq 2\%$ of the project's total material cost value, OR	1		
	Where reused products/materials constitutes $\geq 5\%$ of the project's total material cost value	2		
MR2	RECYCLED CONTENT MATERIALS			
	Increase demand for building products that incorporate recycled content materials in their production: <i>(Recycled content shall be defined in accordance with the International Organization of Standards Document)</i>		2	
	Where use of materials with recycled content is such that the sum of post-consumer recycled plus one-half of the pre-consumer content constitutes $\geq 10\%$ (based on cost) of the total value of the materials in the project, OR	1		
	Where use of materials with recycled content is such that the sum of post-consumer recycled plus one-half of the pre-consumer content constitutes at least 30% (based on cost) of the total value of the materials in the project.	2		
SUSTAINABLE RESOURCES				
MR3	REGIONAL MATERIALS			
	Use building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation: Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500km of the project site for $\geq 20\%$ (based on cost) of the total material value. <i>Mechanical, electrical and plumbing components shall not be included. Only include materials permanently installed in the project.</i>	1	1	
MR4	SUSTAINABLE TIMBER			
	Encourage environmentally responsible forest management: Where $\geq 50\%$ of wood-based materials and products used are certified. <i>These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. To include wood materials permanently installed and also temporarily purchased for the project. Compliance with Forest Stewardship Council and Malaysian Timber Certification Council requirements.</i>	1	1	
WASTE MANAGEMENT				
MR5	STORAGE & COLLECTION OF RECYCLABLES			
	Facilitate reduction of waste generated during construction and during building occupancy that is hauled and disposed of 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	1	
MR6	CONSTRUCTION WASTE MANAGEMENT			
	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:		2	
	Recycle and/or salvage $\geq 50\%$ volume of non-hazardous construction debris, OR	1		
	Recycle and/or salvage $\geq 75\%$ volume of non-hazardous construction debris.	2		

Continued on next page >>

GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NRNC

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
GREEN PRODUCTS				
MR7	REFRIGERANTS & CLEAN AGENTS			
	Use environmentally-friendly Refrigerants and Clean Agents exceeding Malaysia's commitment to the Montreal & Kyoto protocols:		2	
	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		
MATERIALS & RESOURCES (MR) TOTAL			11	

5

WATER EFFICIENCY (WE)

WATER HARVESTING & RECYCLING | INCREASED EFFICIENCY

10 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
WATER HARVESTING & RECYCLING				
WE1	RAINWATER HARVESTING			
	Encourage rainwater harvesting that will lead to reduction in potable water consumption:		2	
	Rainwater harvesting that leads to $\geq 15\%$ reduction in potable water consumption, OR	1		
	Rainwater harvesting that leads to $\geq 30\%$ reduction in potable water consumption	2		
WE2	WATER RECYCLING			
	Encourage water recycling that will lead to reduction in potable water consumption:		2	
	Treat and recycle $\geq 10\%$ wastewater leading to reduction in potable water consumption, OR	1		
	Treat and recycle $\geq 30\%$ wastewater leading to reduction in potable water consumption	2		
INCREASED EFFICIENCY				
WE3	WATER EFFICIENT - IRRIGATION/LANDSCAPING			
	Encourage the design of system that does not require the use of potable water supply from the local water authority:		2	
	Reduce potable water consumption for landscape irrigation by $\geq 50\%$ (e.g. through use of native or adaptive plants to reduce or eliminate irrigation requirement, OR	1		
	Do not use potable water at all for landscape irrigation	2		
WE4	WATER EFFICIENT FITTINGS			
	Encourage reduction in potable water consumption through use of efficient devices:		2	
	Reduce annual potable water consumption by $\geq 30\%$, OR	1		
	Reduce annual potable water consumption by $\geq 50\%$	2		
WE5	METERING & LEAK DETECTION SYSTEM			
	Encourage the design of systems that monitors and manages water consumption:		2	
	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		
WATER EFFICIENCY (WE) TOTAL			10	

6

INNOVATION (IN)

INNOVATION INITIATIVES & GBI FACILITATOR

7 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
IN1	INNOVATION IN DESIGN & ENVIRONMENTAL DESIGN INITIATIVES			
	<p>Provide design team and project the opportunity to be awarded points for exceptional performance above the requirements set by GBI rating system:</p> <p>1 point for each approved innovation and environmental design initiative up to a maximum of 6 points, such as:</p> <ul style="list-style-type: none"> • Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling tower make-up water etc; • 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); • 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	6	
IN2	GREEN BUILDING INDEX FACILITATOR			
	<p>To support and encourage the design integration required for Green Building Index rated buildings and to streamline the application and certification process:</p> <p>At least one principal participant of the project team shall be a Green Building Index Facilitator who is engaged at the onset of the design process until completion of construction and Green Building Index certification is obtained.</p>	1	1	
INNOVATION (IN) TOTAL			7	



GBI ASSESSMENT CRITERIA
FOR
RESIDENTIAL NEW CONSTRUCTION (RNC)

VERSION 2.0 | MARCH 2011

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INTRODUCTION

WHAT IS THE GREEN BUILDING INDEX (GBI)?

The Green Building Index is an environmental rating system for buildings developed by PAM (Pertubuhan Arkitek Malaysia / Malaysian Institute of Architects) and ACEM (the Association of Consulting Engineers Malaysia). The Green Building Index is Malaysia's first comprehensive rating system for evaluating the environmental design and performance of Malaysian buildings based on the six (6) main criterias of Energy Efficiency, Indoor Environment Quality, Sustainable Site Planning & Management, Materials & Resources, Water Efficiency, and Innovation.

The Green Building Index is developed specifically for the Malaysian tropical weather, environmental and developmental context, cultural and social needs.

The GBI initiative aims to assist the building industry in its march towards sustainable development. The GBI environmental rating system is created to:

- **Define green buildings by establishing a common language and standard of measurement;**
- **Promote integrated, whole-building design;**
- **Recognise and reward environmental leadership;**
- **Transform the built environment to reduce it's environmental impact; and**
- **Ensure new buildings remain relevant in the future and existing buildings are refurbished and upgraded properly to remain relevant.**

WHO CAN USE THE GREEN BUILDING INDEX?

GSB encourages all members of Project Teams, Building owners, Developers and other interested parties (including Contractors, Government and Design & Build Contractors) to use the Green Building Index to validate environmental initiatives at the design phase of new construction or base building refurbishment; or construction and procurement phase of buildings. Use of the Green Building Index is encouraged on all such projects to assess and improve their environmental attributes.

Use of the Green Building Index tool without formal certification by an independent accredited GBI Certifier does not entitle the user or any other party to promote the Green Building Index rating achieved. No fee is payable to GSB for such use, however formal recognition of the Green Building Index rating - and the right to promote same - requires undertaking the formal certification process offered by Greenbuildingindex Sdn Bhd.

All Green Building Index rating tools are reviewed annually; please forward any feedback to info@greenbuildingindex.org

PROJECT INFORMATION

PROJECT NAME	
PROJECT ADDRESS	
POSTCODE	
STATE	

APPLICANT	
CONTACT PERSON	

ARCHITECT	
CIVIL ENGINEER	
STRUCTURAL ENGINEER	
MECHANICAL ENGINEER	
ELECTRICAL ENGINEER	
QUANTITY SURVEYOR	
LAND SURVEYOR	
LANDSCAPE CONSULTANT	
OTHER SPECIALIST CONSULTANT(S)	
MAIN CONTRACTOR	
LOCAL AUTHORITY	
TOTAL GROSS FLOOR AREA	
LAND AREA FOR LANDED PROPERTY	

BUILDING DESCRIPTION	

ASSESSMENT CRITERIA OVERALL POINTS SCORE

PART	ITEM	MAXIMUM POINTS	SCORE
1	Energy Efficiency	23	
2	Indoor Environmental Quality	12	
3	Sustainable Site Planning & Management	37	
4	Material & Resources	10	
5	Water Efficiency	12	
6	Innovation	6	
TOTAL SCORE		100	

GREEN BUILDING INDEX CLASSIFICATION

POINTS	GBI RATING
86+ points	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

ASSESSMENT CRITERIA SCORE SUMMARY

PART	CRITERIA	ITEM	POINTS	TOTAL	
1	EE	ENERGY EFFICIENCY			
	EE1	Minimum EE Performance	3	23	
	EE2	Renewable Energy	5		
	EE3	Advanced EE Performance based on OTTV & RTTV	10		
	EE4	Home Office & Connectivity	2		
	EE5	Sustainable Maintenance	3		
2	EQ	INDOOR ENVIRONMENTAL QUALITY			
	Air Quality, Lighting, Visual & Acoustic Comfort				
	EQ1	Minimum IAQ Performance	2	12	
	EQ2	Daylighting	2		
	EQ3	Sound Insulation	2		
	EQ4	Good Quality Construction	1		
	EQ5	Volatile Organic Compounds	2		
	EQ6	Formaldehyde Minimisation	1		
Verification					
EQ7	Post Occupancy Evaluation: Verification	2			
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT			
	Site Planning & Transport				
	SM1	Site Selection	1	37	
	SM2	Public Transportation Access	12		
	SM3	Community Services & Connectivity	8		
	SM4	Open Spaces, Landscaping & Heat Island Effect	4		
	Site & Construction Management				
	SM5	Construction System & Site Management	3		
	SM6	Stormwater Management	3		
	SM7	Re-development of Existing Sites & Brownfield Re-development	2		
	SM8	Avoiding Environmentally Sensitive Areas	2		
SM9	Building User Manual	2			
4	MR	MATERIALS & RESOURCES			
	Reused & Recycled Materials				
	MR1	Storage & Collection of recyclables	2	10	
	MR2	Materials Reuse and Selection	2		
	MR3	Construction Waste Management	2		
	Sustainable Resources				
	MR4	Recycled Content Materials	1		
MR5	Regional Materials	1			
MR6	Sustainable Timber	2			
5	WE	WATER EFFICIENCY			
	Water Harvesting & Recycling				
	WE1	Rainwater Harvesting	4	12	
	WE2	Water Recycling	2		
	Increased Efficiency				
WE3	Water Efficient Landscaping	2			
WE4	Water Efficient Fittings	4			
6	IN	INNOVATION			
	IN1	Innovation in Design & Environmental Design Initiatives	5	6	
	IN2	Green Building Index Facilitator (GBIF)	1		
TOTAL POINTS			100		

1

ENERGY EFFICIENCY (EE)

MINIMUM EE PERFORMANCE | RENEWABLE ENERGY | ADVANCED EE PERFORMANCE | HOME OFFICE & CONNECTIVITY

23 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
EE1	MINIMUM EE PERFORMANCE			
	Establish minimum Energy Efficiency (EE) performance to reduce energy consumption in buildings, thus reducing CO ₂ emission to the atmosphere. Apply OTTV and RTTV formulas of MS 1525 for residential buildings. OTTV ≤ 50 W/m ² , RTTV ≤ 25 W/m ² Roof U ≤ 0.4 W/m ² K (Lightweight) Roof U ≤ 0.6 W/m ² K (Heavyweight)	3	3	
EE2	RENEWABLE ENERGY			
	Encourage use of renewable energy.			
	A) Low-rise (3-Storeys and below ie. landed buildings, terrace, semi-detached & detached):			
	Where 1 kWp is generated by renewable energy, OR	1		
	Where 40% of building energy consumption or 2 kWp (whichever is the lower) is generated by renewable energy, OR	2		
	Where 60% of building energy consumption or 3 kWp (whichever is the lower), OR	3		
	Where 80% of building energy consumption or 4 kWp (whichever is the lower), OR	4		
	100% of building energy consumption or 5 kWp (whichever is the lower)	5		
	B) Hi-rise (Above 3-Storeys Building Energy Consumption here shall apply to Energy Consumption at common areas only and not to the Residential Units):			
	Where 0.5% of building energy consumption or 5 kWp (whichever is the higher) is generated by renewable energy, OR	1		
	Where 1.0% of building energy consumption or 10 kWp (whichever is the higher), OR	2		
	Where 1.5% of building energy consumption or 20 kWp (whichever is the higher), OR	3		
	Where 2.0% of building energy consumption or 30 kWp (whichever is the higher), OR	4		
	Where 2.5% of building energy consumption or 40 kWp (whichever is the higher)	5		
			5	
EE3	ADVANCED EE PERFORMANCE BASED ON OTTV & RTTV			
	Establish EE Performance to reduce dependence on Energy to keep indoor environment at satisfactory comfort level. Computed OTTV and RTTV to show lower dependence on Energy to maintain indoor thermal comfort.			
	A) OTTV			
	OTTV ≤ 46 W/m ²	1		
	OTTV ≤ 44 W/m ²	2		
	OTTV ≤ 42 W/m ²	3		
	OTTV ≤ 40 W/m ²	4		
	OTTV ≤ 38 W/m ²	5		
	B) RTTV			
	Lightweight Roof U-value ≤ 0.35 W/m ² K Heavyweight Roof U-value ≤ 0.5 W/m ² K	1		
	Lightweight Roof U-value ≤ 0.3-0 W/m ² K Heavyweight Roof U-value ≤ 0.4 W/m ² K	2		
	Lightweight Roof U-value ≤ 0.25 W/m ² K Heavyweight Roof U-value ≤ 0.3 W/m ² K	3		
	Lightweight Roof U-value ≤ 0.2 W/m ² K Heavyweight Roof U-value ≤ 0.2 W/m ² K	4		
	Lightweight Roof U-value ≤ 0.15 W/m ² K Heavyweight Roof U-value ≤ 0.15 W/m ² K	5		
			10	
EE4	HOME OFFICE & CONNECTIVITY			
	Encourage dual use spaces and working from Home thereby discourage avoidable commuting.			
	Multiple-use type developments, OR High speed internet access available at homes > 1MB/s	2		
			2	
EE5	SUSTAINABLE MAINTENANCE			
	Ensure that the building's energy related systems will continue to perform as intended beyond the 12 months Defects & Liability Period. Document Green Building Design features and strategies for user information and guide to sustain performance during occupancy.			
	Buildings With Common Management: 1. Provide a designated building maintenance office equipped with facilities (including tools and instrumentation) and inventory storage; 2. Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget; 3. Provide full set of all Building, Structural and M&E Plans and Maintenance manuals to maintenance team; OR	3		
	Buildings Without Common Management: 1. Provide a evidence of documented plan for at least 3-year preventive maintenance budget. 2. Provide full set of all Building, Structural and M&E Plans and Maintenance manuals to every building owner.	3		
			3	
ENERGY EFFICIENCY (EE) TOTAL			23	

2

INDOOR ENVIRONMENTAL QUALITY (EQ)

AIR QUALITY, LIGHTING, VISUAL & ACOUSTIC COMFORT | VERIFICATION

12 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
AIR QUALITY, LIGHTING, VISUAL & ACOUSTIC COMFORT				
EQ1	MINIMUM IAQ PERFORMANCE			
	Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in building, thus contributing to the comfort and well-being of the occupants.		2	
	Meet the minimum requirements of ventilation rate in the local building code	1		
	Provide cross ventilation for all public and circulation spaces	2		
EQ2	DAYLIGHTING			
	Encourage and recognise designs that provide good levels of daylighting for building occupants. Demonstrate that a nominated percentage of the Habitable Rooms as defined under UBBL has a daylight factor of minimum 1% as measured at floor level;		2	
	if > 50% of Habitable spaces, OR	1		
	if > 75% of Habitable spaces	2		
EQ3	SOUND INSULATION			
	Encourage and recognise building that is designed with adequate insulation between dwelling units. Ensure that the airborne sound penetration between spaces are controlled within the following criteria;		2	
	Sound Transmission Class (STC) between dwelling units ≥ 45	1		
	Intra dwelling sound insulation in the same dwelling unit should exceed the following STC values: Bedroom ≥ 40 Other areas ≥ 35	1		
EQ4	GOOD QUALITY CONSTRUCTION			
	Encourage and recognise good quality construction – first time right – that does not require re-work that wastes materials and labour.		1	
	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). Submit a PQP – Project Quality Plan to outline how to achieve the targets set. Must achieve a minimum score of 70%	1		
EQ5	VOLATILE ORGANIC COMPOUNDS			
	Encourage and recognise projects that reduce the detrimental impact on occupant health from finishes emitting internal air pollutants. Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants. Volatile Organic Compound (VOC) content to comply with requirements specified in international labelling schemes recognised by GBI. 0.5 point is awarded for each of the following up to a maximum of 1 point: 1. Low VOC paint and coating to walls (at least 90% of overall used) OR no paint and coating used. 2. Low VOC paint and coating to ceilings (at least 90% of overall used) OR no paint and coating used. 3. Low VOC carpet or interior flooring (at least 90% of overall used) OR no carpet or interior flooring used. 4. Low VOC adhesive and sealant (at least 90% of overall used) OR no adhesive and sealant used.	2	2	
EQ6	FORMALDEHYDE MINIMISATION			
	Reduce the exposure of occupants to formaldehyde and promote good indoor air quality in the living space. Products with no added urea formaldehyde are to be used. 0.5 point is awarded for each of the following up to a maximum of 1 point: 1. Composite wood and agrifiber products defined as: particleboard, medium density fiberboard (MDF), plywood, weather-board, strawboard, panel substrates and door cores OR none used; 2. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies OR none used; 3. Insulation foam OR none used; 4. Draperies OR none used	1	1	
VERIFICATION				
EQ7	POST OCCUPANCY EVALUATION: VERIFICATION			
	Provide for the assessment of quality and comfort of the building occupants over time.		2	
	Commit to implement a post-occupancy comfort survey of building occupants within a period of one month after issuance of CCC. This survey should collect anonymous responses about thermal comfort, visual comfort and acoustic comfort in a building. This should include measurement of overall thermal, daylight and acoustic performance and identification of thermal-related, visual-related and acoustic-related problems.	1		
	Develop a plan for corrective action if the survey results indicate that more than 20% of survey respondents are dissatisfied with the surveyed information on the building. This plan should include measurement of relevant environmental variables in problem areas.	1		
INDOOR ENVIRONMENTAL QUALITY (EQ) TOTAL			12	

3

SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SITE PLANNING & TRANSPORT | SITE & CONSTRUCTION MANAGEMENT

37 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE																				
SITE PLANNING & TRANSPORT																								
SM1	SITE SELECTION & PLANNING																							
	<p>Proposed development is appropriate for the site and complies with the Local Plan or Structure Plan for the area.</p> <p>The proposed building must comply with the following requirements:</p> <ol style="list-style-type: none"> The Structure Plan for the area AND/OR The Local Plan where available Infrastructure requirement is available for the area. 	1	1																					
SM2	PUBLIC TRANSPORTATION ACCESS																							
	<p>Encourage the selection of sites close to transport hubs and the planning of new housing areas to encourage the use of public transport. This is to reduce the current and future heavy dependence on private transport, which is the greatest contributor to Green House Gas (GHG) emission.</p> <p>Points are awarded according to proximity of the development to public transport hubs and quality of the access to the transport hub. For new housing areas, the provision of transport hubs for the housing concerned with proper shelter, amenities, shuttle facilities and parking facilities are encouraged. Points are awarded according to the subsection categories.</p> <p>NOTE: SELECT EITHER SM2A & SM2B OR SM2C & SM2D</p>		12																					
SM2A	<p>Distance from Mass Transport Station/Hub (Transport Station/Hub is where more than 1 transport route intersects and connects. Eg. Train Station, Monorail or Bus Transit Terminal) to building within 1km (50% of points if from Shuttle Bus Stop)</p> <table border="1"> <tr> <td>0 - 250m</td> <td>8</td> </tr> <tr> <td>251 - 500m</td> <td>6</td> </tr> <tr> <td>501 - 750m</td> <td>4</td> </tr> <tr> <td>751m - 1km</td> <td>2</td> </tr> </table>	0 - 250m	8	251 - 500m	6	501 - 750m	4	751m - 1km	2		8													
0 - 250m	8																							
251 - 500m	6																							
501 - 750m	4																							
751m - 1km	2																							
SM2B	<p>Walkway from building to Mass Transport Station/Hub if less than 750m from Mass Transport Station/Hub</p> <table border="1"> <tr> <td>Dedicated walkway – Public access path/ route</td> <td>2</td> </tr> <tr> <td>Dedicated Covered walkway – Dedicated walkway with man-made shadings or regular arrays of shaded trees covering at least 70% of route</td> <td>3</td> </tr> <tr> <td>Dedicated Covered walkway that incorporates provision for the handicapped</td> <td>4</td> </tr> <tr> <td>OR</td> <td></td> </tr> <tr> <td>Sheltered and secured waiting area for shuttle van or bus in the residential building if more than 750m from Mass Transport Station</td> <td>4</td> </tr> </table>	Dedicated walkway – Public access path/ route	2	Dedicated Covered walkway – Dedicated walkway with man-made shadings or regular arrays of shaded trees covering at least 70% of route	3	Dedicated Covered walkway that incorporates provision for the handicapped	4	OR		Sheltered and secured waiting area for shuttle van or bus in the residential building if more than 750m from Mass Transport Station	4		4											
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OR																								
Sheltered and secured waiting area for shuttle van or bus in the residential building if more than 750m from Mass Transport Station	4																							
SM2C	<p>Sheltered Transport Stops (Taxi OR Bus) within the Residential Area with covered seating and waiting area for a minimum of 10% of the total number of residential units</p> <p>Score is average of points of all residential units in the residential area as for SM2A</p>	8	8																					
SM2D	<p>Walkway from building to Transport Stops if less than 750m from Transport Stops:</p> <table border="1"> <tr> <td>Dedicated walkway – Public access path/ route</td> <td>2</td> </tr> <tr> <td>Dedicated Covered walkway – Dedicated walkway with man-made shadings or regular arrays of shaded trees covering at least 70% of route</td> <td>3</td> </tr> <tr> <td>Dedicated Covered walkway that incorporates provision for the handicapped</td> <td>4</td> </tr> <tr> <td>OR</td> <td></td> </tr> <tr> <td>Car park provision next to Transport Terminal:</td> <td></td> </tr> <tr> <td>Car park provision for at least 20% of total number of residential units not more than 250m from the Terminal</td> <td>4</td> </tr> <tr> <td>OR</td> <td></td> </tr> <tr> <td>Designated bicycle lane provision in at least 90% of the Residential area and a Secured bicycle parking area in the Transport Terminal for 10% of the total number of residential units:</td> <td></td> </tr> <tr> <td>Provision of Bicycle Lanes</td> <td>2</td> </tr> <tr> <td>AND Provision of Bicycle Parking Area</td> <td>2</td> </tr> </table>	Dedicated walkway – Public access path/ route	2	Dedicated Covered walkway – Dedicated walkway with man-made shadings or regular arrays of shaded trees covering at least 70% of route	3	Dedicated Covered walkway that incorporates provision for the handicapped	4	OR		Car park provision next to Transport Terminal:		Car park provision for at least 20% of total number of residential units not more than 250m from the Terminal	4	OR		Designated bicycle lane provision in at least 90% of the Residential area and a Secured bicycle parking area in the Transport Terminal for 10% of the total number of residential units:		Provision of Bicycle Lanes	2	AND Provision of Bicycle Parking Area	2		4	
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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR RNC

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
SM3	COMMUNITY SERVICES & CONNECTIVITY			
	Encourage the selection of sites close to basic community amenities and the planning of new residential areas to encourage the provision of local amenities. This is to reduce the current and future heavy use of private transport after working hours, which is the greatest contributor to GHG emission. Points are awarded according to proximity of the development to community amenities. Points are awarded according to the subsection categories.			
SM3A	Basic Amenities as listed below are provided or are available within 750m of the residential units (Less 1 point if more than 750m away): 1. Grocery Store or Mini-market 2. Restaurant or Coffee Shop 3. Religious Centre (eg. Surau, Mosque, Church, Temple) 4. Playground or Public Park	4	8	
SM3B	Other Amenities as listed below are provided or are available within 750m of the residential units (0.5 point per item or equivalent up to maximum of 2 points. Less 0.5 point if more than 750m away): 1. Clinic or Medical Center 2. Police Station or Police Pondok 3. School or Creche or Kindergarten 4. Bank, Post Office or ATM	2		
SM3C	Additional Amenities as listed below are provided or are available within 750m of the residential units (0.5 point per item or equivalent up to maximum of 2 points. Less 0.5 point if more than 750m away): 1. Library 2. Community Center or Hall 3. Wet Market or Supermarket 4. Barber Shop or Hair Salon 5. Laundry 6. Hardware Store 7. Bakery 8. Newsagent	2		
SM4	OPEN SPACES, LANDSCAPING AND HEAT ISLAND EFFECT			
	Development should have smaller footprints and more landscaping, thereby reducing the well known effects of heat islands around hard scaped areas.		4	
	Provision of landscaping with indigenous plants to 10% of total development area	1		
	Provision of additional similar landscaping of every extra 5%: 1 point up to a maximum of 3 points	3		
SITE & CONSTRUCTION MANAGEMENT				
SM5	CONSTRUCTION SYSTEM & SITE MANAGEMENT			
	Encourage IBS and reduce on-site construction. Reduce material wastage and construction wastage to landfill sites. Reduce the polluting effects of construction and from workers during construction.		3	
	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: 1. Proper accommodation for construction workers at the site or at temporary rented accommodation nearby. 2. Prevent pollution of storm sewer or receiving stream by having proper septic tank. 3. Prevent polluting the surrounding area from open burning and proper disposal of domestic waste. 4. Provide adequate health and hygiene facilities for workers on site.	1		
	CIDB IBS score ≥ 50%, OR	1		
	CIDB IBS score ≥ 70%	2		
SM6	STORM WATER MANAGEMENT			
	Manage surface water run off from developments. Reduce the pollution and storm water loading of the river systems from the development.		3	
	Reduce flood risk. Retain rainwater for recycling and appropriate use.			
	Complies with MASMA OR Local equivalent minimum requirements	1		
	Exceeds MASMA requirements by 30%: entitled to 2 additional points pro rated for lower values	2		
SM7	RE-DEVELOPMENT OF EXISTING SITES & BROWNFIELD SITES			
	Discourage development in environmentally sensitive areas. Encourage re-development of existing sites. Reward rehabilitation of Brownfield site and development in the rehabilitated sites.		2	
	Re-development, refurbishment OR extension of existing buildings OR sites OR	2		
	Rehabilitation of brownfield sites			
SM8	AVOIDING ENVIROMENTALLY SENSITIVE AREAS			
	Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site.		2	
	Do not develop buildings, hardscape, roads or parking areas on portions of sites that meet any one of the following criteria: <ul style="list-style-type: none"> • Prime agriculture land as defined by the Town and Country Planning Act • Land that is specifically identified as habitat for any species threatened or endangered lists • Within 30 meters of any wetlands as defined by the Structure Plan of the area. OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever is more stringent: <ul style="list-style-type: none"> • Previously undeveloped land that is within 15 meters of a water body, defined as seas, lakes, rivers, streams and tributaries which support or could support fish, recreation or industrial use. • Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public landowner. • Land which is classified as Class IV (steeper than 30 degrees) 	2		
SM9	BUILDING USER MANUAL			
	Document Green Building Design features & 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.	2	2	
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM) TOTAL			37	

4

MATERIALS & RESOURCES (MR)

REUSED AND RECYCLED MATERIALS | SUSTAINABLE RESOURCES

10 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
REUSED AND RECYCLED MATERIALS				
MR1	STORAGE & COLLECTION OF RECYCLABLES			
	Facilitate the reduction of waste generated by construction that is hauled and disposed off in landfills and recycling after occupancy.		2	
	During Construction, provide dedicated area(s) and storage for collection of non-hazardous materials for recycling.	1		
	During Building Occupancy, provide permanent recycle bins.	1		
MR2	MATERIALS REUSE AND SELECTION			
	Reuse building materials and products in order to reduce demand for virgin materials and to reduce waste, thereby reducing impacts associated with the extraction and processing of virgin resources. Integrate building design and its buildability, with careful selection of building materials in relation with embodied energy and durability of the materials to lower carbon content and better building life cycle.		2	
	Use salvaged, refurbished or used materials such that the sum of these materials constitutes at least 1% (based on cost) of the total materials for the project. The used, refurbished and new building materials concerned are to be assessed for eco preferred content, durability, the product manufacturer's environmental management system and whether the product is modular and/ or designed for disassembly. To include reusability and the number of cycles on the usage (minimum 15 cycles) of temporary materials; such as temporary formwork system, temporary framing or support system, etc. <i>0.5 point for 1.0% and additional 0.25 point for every additional 0.5% up to a maximum of 2 points.</i>	2		
MR3	CONSTRUCTION WASTE MANAGEMENT			
	Divert construction debris from disposal in landfill and incinerator. Redirect recyclable recovered resources back to manufacturing process. Redirect reusable materials to appropriate sites.		2	
	Recycle and/or salvage at least 50% of non-hazardous construction debris. Develop and implement a construction waste management plan that, at a minimum identifies the materials to be diverted from disposal and whether the materials will be sorted on site or co-mingled. Quantify by measuring total tonnage of waste or truck loads of waste disposal. <i>1 point for 50% and additional 0.25 point for every additional 5% up to a maximum of 2 points.</i> <i>If project uses high level of prefabrication with IBS score > 70, 1 point for every 10% increase in prefabrication up to a maximum of 2 points.</i>	2		
SUSTAINABLE RESOURCES				
MR4	RECYCLED CONTENT MATERIALS			
	Increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.		1	
	Use materials with recycled content such that the sum of post-consumer recycled plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of the total value of the materials in the project. Recycled content shall be defined in accordance with the International Organization of Standards Document. <i>0.5 point for 10% and 0.25 point for every additional 5% up to a maximum of 1 point.</i>	1		
MR5	REGIONAL MATERIALS			
	Increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation		1	
	Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500km of the project site for a minimum of 20% (based on cost) of the total material value. Mechanical, electrical and plumbing components shall not be included. Only include materials permanently installed in the project. <i>0.5 point for 20% and 0.25 point for every additional 5% up to a maximum of 1 point.</i>	1		
MR6	SUSTAINABLE TIMBER			
	Encourage environmentally responsible forest management: Where ≥ 50% of wood-based materials and products used are certified. <i>These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. To include wood materials permanently installed and also temporarily purchased for the project.</i> <i>Compliance with:</i> <i>1. Forest Stewardship Council (FSC) OR</i> <i>2. Malaysian Timber Certification Council (MTCC) AND Forest Stewardship Council (FSC) requirements.</i> <i>Where the project has no timber content, this credit may be transferred to MR5</i>	2	2	
MATERIALS & RESOURCES (MR) TOTAL			10	

5

WATER EFFICIENCY (WE)

WATER HARVESTING & RECYCLING | INCREASED EFFICIENCY

12 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
WATER HARVESTING & RECYCLING				
WE1	RAINWATER HARVESTING			
	Encourage rainwater harvesting that will lead to reduction in potable water consumption (For Hi-rise – above 3-storeys water consumption here shall apply to common area Water Consumption only and not to the Residential Units):			
	Rainwater harvesting that leads to $\geq 10\%$ reduction in potable water consumption, OR	1	4	
	Rainwater harvesting that leads to $> 30\%$ reduction in potable water consumption, OR	2		
	Rainwater harvesting that leads to $> 40\%$ reduction in potable water consumption, OR	3		
	Rainwater harvesting that leads to $> 50\%$ reduction in potable water consumption	4		
WE2	WATER RECYCLING			
	Encourage water recycling that will lead to reduction in potable water consumption:			
	Treat and recycle $\geq 5\%$ wastewater leading to reduction in potable water consumption, OR	0.5	2	
	Treat and recycle $\geq 10\%$ wastewater leading to reduction in potable water consumption, OR	1		
	Treat and recycle $\geq 20\%$ wastewater leading to reduction in potable water consumption, OR	1.5		
	Treat and recycle $\geq 30\%$ wastewater leading to reduction in potable water consumption	2		
INCREASED EFFICIENCY				
WE3	WATER EFFICIENT LANDSCAPING			
	Encourage the design of system that does not require the use of potable water supply from the local water authority:			
	Reduce potable water consumption for landscape irrigation by $\geq 50\%$ (e.g. through use of native or adaptive plants to reduce or eliminate irrigation requirement, OR	1	2	
	Do not use potable water at all for landscape irrigation	2		
WE4	WATER EFFICIENT FITTINGS			
	Encourage reduction in potable water consumption through use of efficient devices:			
	Reduce annual potable water consumption by $> 10\%$, OR	1	4	
	Reduce annual potable water consumption by $> 30\%$, OR	2		
	Reduce annual potable water consumption by $> 40\%$, OR	3		
	Reduce annual potable water consumption by $> 50\%$	4		
WATER EFFICIENCY (WE) TOTAL			12	

6

INNOVATION (IN)

INNOVATION INITIATIVES | MAINTENANCE PROGRAM & GREEN BUILDING INDEX FACILITATOR

6 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS	MAX POINTS	SCORE
IN1	INNOVATION IN DESIGN & ENVIRONMENTAL DESIGN INITIATIVES			
	Provide design team and project the opportunity to be awarded points for exceptional performance above the requirements set by GBI rating system: <i>1 point for each approved innovation and environmental design initiative up to a maximum of 5 points, such as:</i> <ul style="list-style-type: none"> • Innovative planning that displays “less is more” and “small is beautiful”; • Rehabilitation of existing buildings for re-use in innovative ways; • Innovative use of building features to passively cool the building • Heat recovery system (contributing to at least 10% of total required capacity); • Mixed mode / low energy ventilation system; • Waterless urinals (fitted to all male toilets); • Central waste conveyance system; • Central vacuum system 	5	5	
IN2	GREEN BUILDING INDEX FACILITATOR (GBIF)			
	Green Building Index Facilitator to support and encourage the design integration required for Green Building Index rated buildings and to streamline the application and certification process.		1	
	At least one principle participant of the project team shall be a Green Building Index Facilitator.	1		
INNOVATION (IN) TOTAL			6	



GBI ASSESSMENT CRITERIA
FOR
TOWNSHIP

VERSION 1.01 | SEPTEMBER 2011

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INTRODUCTION

WHAT IS THE GREEN BUILDING INDEX (GBI)?

The Green Building Index is an environmental rating system for buildings developed by PAM (Pertubuhan Arkitek Malaysia / Malaysian Institute of Architects) and ACEM (the Association of Consulting Engineers Malaysia). The Green Building Index is Malaysia's first comprehensive rating system for evaluating the environmental design and performance of Malaysian buildings based on the six (6) main criterias of Energy Efficiency, Indoor Environment Quality, Sustainable Site Planning & Management, Materials & Resources, Water Efficiency, and Innovation.

The Green Building Index is developed specifically for the Malaysian tropical weather, environmental and developmental context, cultural and social needs.

The GBI initiative aims to assist the building industry in its march towards sustainable development. The GBI environmental rating system is created to:

- **Define green buildings by establishing a common language and standard of measurement;**
- **Promote integrated, whole-building design;**
- **Recognise and reward environmental leadership;**
- **Transform the built environment to reduce its environmental impact; and**
- **Ensure new buildings remain relevant in the future and existing buildings are refurbished and upgraded properly to remain relevant.**

WHO CAN USE THE GREEN BUILDING INDEX?

GSB encourages all members of Project Teams, Building owners, Developers and other interested parties (including Contractors, Government and Design & Build Contractors) to use the Green Building Index to validate environmental initiatives at the design phase of new construction or base building refurbishment; or construction and procurement phase of buildings. Use of the Green Building Index is encouraged on all such projects to assess and improve their environmental attributes.

Use of the Green Building Index tool without formal certification by an independent accredited GBI Certifier does not entitle the user or any other party to promote the Green Building Index rating achieved. No fee is payable to GSB for such use, however formal recognition of the Green Building Index rating – and the right to promote same – requires undertaking the formal certification process offered by GSB.

All Green Building Index rating tools are reviewed annually; please forward any feedback to info@greenbuildingindex.org.

HOW TO USE THE GREEN BUILDING INDEX?

- Complete the Building Input worksheet as the building's type and location may affect the predicted rating.
- Complete the remaining worksheets by reviewing each credit in each category and entering the number of points you predict the building will achieve in the 'No. of Points Achieved' column. Calculators are provided for a number of the tool's credits.
- Enter any points that may be achieved but need to be confirmed in the 'Points to be Confirmed' column.
- Enter any comments required in the 'Comments' column.
- The predicted rating is shown in the Summary worksheet. More detail on point scores (both achieved and those to be confirmed) are shown in the Credit Summary and Graphical Summary worksheets at the end of the tool.

INTRODUCTION

WHAT IS A SUSTAINABLE TOWNSHIP?

A Township is a development of substantial size that contains a community or small neighbourhood. A sustainable townships are livable places that meet the diverse needs of the community, both now and in the future. They are places that are well planned and designed, safe and secure, and enhance the surrounding environment, thus providing a high quality of life for the residents.

The Basis on the concept of sustainable development is the balanced approached to addressing the environmental, social and economic issues.

SUSTAINABLE TOWNSHIP RATING TOOL

The preliminary stage of preparing a planning for the design of zoning and parcellation of a development, many issues that should be addressed at the site, community and environmental planning, infrastructure and transportation integration needs to be more effectively addressed.

The Township Rating Tool is created with the objective to:

- **Consider Sustainable Townships that are balanced in their ongoing production and consumption of energy and water**
- **Promote Protection of the Natural Environment**
- **Planned and designed for the benefit of the Community**
- **Optimising and lowering the impact on our Resources**
- **Recognise connectivity of the community within and externally**
- **Tailored to meet the contextual requirements and incorporating innovative solutions for now and the future**

Six core categories have been developed to address the delivery of a more sustainable township. The categories are Climate, Energy & Water, Ecology & Environment, Community Planning & Design, Transportation & Connectivity, Building & Resources and Business & Innovation.

The GBI Township Assessment process follows through four key stages. Stage 1 Application & Registration, Stage 2 Planning Assessment (PA), Stage 3 Final Planning Assessment (FPA) and Stage 4 Completion & Verification Assessment.

PROJECT INFORMATION

PROJECT NAME	
PROJECT ADDRESS	
POSTCODE	
STATE	

APPLICANT	
CONTACT PERSON	

TOWN PLANNER	
ARCHITECT	
LANDSCAPE ARCHITECTS	
CIVIL ENGINEER	
STRUCTURAL ENGINEER	
MECHANICAL ENGINEER	
ELECTRICAL ENGINEER	
EIA CONSULTANT	
BIODIVERSITY CONSULTANT	
TRANSPORT PLANNER	
QUANTITY SURVEYOR	
LAND SURVEYOR	
OTHER SPECIALIST CONSULTANT(S)	
LOCAL AUTHORITY	

DESCRIPTION OF PROPOSED DEVELOPMENT	ACREAGE	PERCENTAGE OF AREA ON OVERALL AREA
(A) GROSS TOTAL DEVELOPMENT AREA	acres	%
(B) RESIDENTIAL AREA	acres	%
(C) COMMERCIAL AREA	acres	%
(D) INDUSTRIAL AREA	acres	%
(E) AMENITIES & PUBLIC FACILITIES	acres	%
(F) OPEN SPACE (GREENSPACE & RECREATIONAL)	acres	%
(G) UTILITIES & INFRASTRUCTURE	acres	%

PROJECT DESCRIPTION	

DETAIL ASSESSMENT CRITERIA SUMMARY OF FINAL SCORE

PART		ITEM	MAXIMUM POINTS	SCORE
1	CEW	Climate, Energy & Water	20	
2	EEC	Environmental & Ecology	15	
3	CPD	Community Planning & Design	26	
4	TRC	Transportation & Connectivity	14	
5	BDR	Building & Resources	15	
6	BSI	Business & Innovation	10	
TOTAL SCORE			100	

GREEN BUILDING INDEX CLASSIFICATION

POINTS	GBI RATING
≥ 86 points	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

DETAIL ASSESSMENT CRITERIA SUMMARY OF CONTENTS

PART	CRITERIA	ITEM	POINTS	TOTAL
1	CEW	CLIMATE, ENERGY & WATER		
	CEW1	HEAT ISLAND DESIGN PRINCIPLES	4	20
	CEW2	EFFICIENT STREET AND PARK LIGHTING	2	
	CEW3	ON-SITE ENERGY GENERATION	2	
	CEW4	RENEWABLE ENERGY	4	
	CEW5	REDUCED WATER USE	4	
	CEW6	REDUCTION IN WATER USE BY WASTE WATER TREATMENT	4	
2	EEC	ENVIRONMENTAL & ECOLOGY		
	EEC1	BIODIVERSITY CONSERVATION	2	15
	EEC2	LAND REUSE	1	
	EEC3	ECOLOGY	3	
	EEC4	FLOOD MANAGEMENT AND AVOIDANCE	1	
	EEC5	WETLAND AND WATER BODY CONSERVATION	1	
	EEC6	AGRICULTURAL LAND PRESERVE	1	
	EEC7	HILL SLOPE DEVELOPMENT	1	
	EEC8	SUSTAINABLE STORMWATER DESIGN & MANAGEMENT	2	
	EEC9	PROXIMITY TO EXISTING INFRASTRUCTURE	1	
	EEC10	SERVICES INFRASTRUCTURE PROVISION	1	
EEC11	LIGHT POLLUTION	1		
3	CPD	COMMUNITY PLANNING & DESIGN		
	CPD1	GREENSPACES	3	26
	CPD2	COMPACT DEVELOPMENT	1	
	CPD3	AMENITIES FOR COMMUNITIES	3	
	CPD4	PROVISION FOR UNIVERSAL ACCESSIBILITY	3	
	CPD5	SECURE DESIGN	2	
	CPD6	HEALTH IN DESIGN	2	
	CPD7	RECYCLING FACILITIES	2	
	CPD8	COMMUNITY DIVERSITY	1	
	CPD9	AFFORDABLE HOUSING	1	
	CPD10	COMMUNITY THRUST	4	
CPD11	GOVERNANCE	4		
4	TRC	TRANSPORTATION & CONNECTIVITY		
	TRC1	GREEN TRANSPORT MASTERPLAN	8	14
	TRC2	AVAILABILITY AND FREQUENCY OF PUBLIC TRANSPORT	1	
	TRC3	FACILITIES FOR PUBLIC TRANSPORTATION	1	
	TRC4	PEDESTRIAN NETWORKS	1	
	TRC5	CYCLING NETWORKS	2	
TRC6	ALTERNATIVE TRANSPORT OPTIONS	1		
5	BDR	BUILDING & RESOURCES		
	BDR1	LOW IMPACT MATERIAL (INFRASTRUCTURE)	1	15
	BDR2	LOW IMPACT MATERIAL (BUILDINGS OR STRUCTURES)	1	
	BDR3	REGIONAL MATERIAL	1	
	BDR4	QUALITY IN CONSTRUCTION	2	
	BDR5	CONSTRUCTION WASTE MANAGEMENT	1	
	BDR6	SITE SEDIMENTATION AND POLLUTION CONTROL	1	
	BDR7	SUSTAINABLE CONSTRUCTION PRACTICE	2	
BDR8	GBI CERTIFIED BUILDING	6		
6	BSI	BUSINESS & INNOVATION		
	BSI1	BUSINESS	3	10
	BSI2	INNOVATION	6	
BSI3	GBI FACILITATOR	1		
			TOTAL POINTS	100

1 CLIMATE, ENERGY & WATER (CEW) – 20 POINTS
 To Minimise Impact on the Environment by Adopting Best Practice on Energy Efficiency, Water Efficiency and Sustainable Development.

CEW1	HEAT ISLAND DESIGN PRINCIPLES		4 POINTS
	INTENT	Reduce Heat Island effect and lower ambient temperatures to the surrounding environment.	

ASSESSMENT CRITERIA	POINTS	SCORE
A maximum of Four (4) points are awarded for compliance to the following criteria:		
A) Basic Compliance One (1) point for compliance to basic criteria. Provision of Open spaces including greenspaces shall be 15% of the total development area or 50% more than the local authority's requirements whichever greater.	1	
B) Advanced Compliance Maximum of three (3) points for advanced compliance. In addition to the basic compliance in (A) above, one point will be awarded for compliance to ANY TWO of the following criteria up to a maximum of three points: <ol style="list-style-type: none"> 50% of all public spaces (hardscape plaza's) and footpaths on the development are shaded. Provision of shaded green space or and tree cover to at least 20% of development foot print. At least 10% of public spaces to be provided with open water/or water features At least 50% of hardscape in public spaces and road within the development to use Solar Reflectance Index (SRI) value of 29 and above for the final surface finishes to mitigate heat absorption. Demonstrate provision of cross ventilation air-flow throughout development to mitigate stagnant / hotspots (use of computer simulation with building and landscape modelling) Any other measure which can be proven to promote, reduce or minimise heat island effect or lower ambient temperature 	3	
DESCRIPTION Open space describes land that is enclosed or open that is specified or reserved to be wholly or in part as a public botanical park, public park, public sports and recreation field, pedestrian walkway, dedicated cycleway or as a public plaza. The open space is a combination of hardscape and softscape. Greenspace is defined as open space that is having predominantly softscape landscaping in nature. The softscape can be defined as Greenspace and is referenced under CPD1. Tree preservation Order (TPO), Green Space Index and any other local statutory requirements should be referenced. The creation and erection of hard surfaces or structures within the built-environment promote the formation of 'heat islands' as these hardscapes create thermal mass that absorbs heat during the day and releases during the night to the surrounding areas. Mitigating 'heat island' effect at its basic level includes shading of public spaces, the provision of tree covers and shaded green, water bodies and features and use of materials of high SRI (Solar Reflective Index).		

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. Site Plan of the total development Area or Layout Plan indicating all Open Spaces both hardscape & softscape with the percentage breakdown of all components to the total area. (All drawings recommended scale 1:500 or 1:1000)	<input type="radio"/>	<input type="radio"/>
2. Summary Report on Strategies to ensure compliance with intent on all Open space strategies employed to reduce Heat Island.	<input type="radio"/>	<input type="radio"/>
3. All drawings calculations and reports to be endorsed by the planner or architect responsible.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. Approved landscape Masterplan layout indicating all compliance to criteria intent.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Summary Report describing compliance to measures (both Basic and Advanced) listed in the reports and highlight all criteria compliance.	<input type="radio"/>	<input type="radio"/>
2. As-Built drawings (colour coded) showing Open Spaces, pedestrian footpaths, shaded green spaces and free cover, open water features natural and man-made, buildings incorporating green roof if accessible to public.	<input type="radio"/>	<input type="radio"/>
3. For compliance to SRI values, submit materials listing within the summary report describing permeability and Solar Reflectance Index of materials used site-wide.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

1

CLIMATE, ENERGY & WATER (CEW) – 20 POINTS

To Minimise Impact on the Environment by Adopting Best Practice on Energy Efficiency, Water Efficiency and Sustainable Development.

CEW2	EFFICIENT STREET & PARK LIGHTING	2 POINTS
	INTENT	Reduce energy use by good lighting design practice for street and park lightings.

ASSESSMENT CRITERIA	POINTS	SCORE
A maximum of Two (2) points are awarded for compliance to the following criteria:		
A) One (1) point is awarded for compliance with the "lumen-caps per acre" listed in Table CEW2-1.	1	
B) Additional one (1) point is awarded for implementing energy saving lamps in over 90% of the development. Energy saving lamps (whether LED, discharge lamps, induction lamps, electronic simulated discharge lamps or whatever cutting edge technology) shall only qualify if lamps comply with the following criteria: 1. Lamp efficiencies is 120 lumens/W or better; 2. Certified low or zero mercury (< 3mg /100W) 3. Lamp life is 15,000 hours or more.	1	

DESCRIPTION

Sustainable Lighting Design

Sustainable lighting starts with the application of best practice in design of Luminance or Illuminance level and the selection of light fittings in the right context and for the relevant task application. Lighting for external application generally specify illuminance (candela/m²) rather than luminance (lumen/m² or lux). Issues to consider include:

1. Colour rendering index (CRI) or colour temperature depending on the task application (pedestrian or vehicular) and development area classification etc.
2. Uniformity and luminance and/or illuminance level (depending on whether application is vehicular or pedestrian or mixed traffic.
3. In facade and landscape lighting, the 'creative aspect' of lighting design is an important factor creating moods, or enhancing themes or features. In such application, "technical lighting" which is principally about uniformity, lighting level and colour may be overshadowed by 'creative' issues such as shadows, focus, 'surface washing', 'highlighting' etc. The use of 'colour' and 'colour rendering' will also be an important aspect of 'creative lighting'.
4. Generally, the 'technical aspect' of lighting are covered under the following Malaysian Standards:
 - i. MS 825 : Part 1 Code of Practice for the Design of Road Lighting; Part 1 Lighting of Roads and Public Amenity Areas.
 - ii. MS 825 : Part 2 Code of Practice for the Design of Road Lighting; Part 2 Lighting of Tunnels.

TABLE CEW2-1: LUMENS CAP PER ACRE

Lumens Caps (Initial Lamp Lumen Per Acre)	Lighting Zones				
	E4	E3	E2	E1	E1A
1. Commercial & Industrial Zone (1)					
Total (shielded + unshielded)	200,000	100,000	50,000	25,000	12,500
Unshielded only	10,000	10,000	4,000	2,000	1,000
2. Residential Zone (2)					
Total (shielded + unshielded)	20,000	10,000	10,000	10,000	5,000
Unshielded only	5,000	5,000	1,000	1,000	0

Notes for Table CEW2-1:

1. Commercial & Industrial Zone refers to all land use zoning classifications for high rise residential, commercial and industrial use.
2. Residential Zone refers to all low rise residential land use zoning including single family terraces, duplex, detached units etc.
3. Total (shielded + unshielded) refers to lamps certified semi-cut-off (examples define in EECII)
4. Unshielded means no-cut-off (examples as defined in EEC II)
5. Calculation of 'lumens cap' exclude signage lights, internally lit signs, internal building lights, neon lights, temporary lights, festive occasion lights and lights which provide 'sparkle'.
6. Seasonal variations (festive occasions etc) to the above are permitted.
7. Parcels of less than one acre are allowed lumens proportionate to one acre limitation (e.g. 0.8 acres, 0.8 x 20,000)
8. For definitions of Lighting Zones, refer to Table CEW2-2.

Continued on next page >>

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CLIMATE, ENERGY & WATER (CEW) – 20 POINTS

To Minimise Impact on the Environment by Adopting Best Practice on Energy Efficiency, Water Efficiency and Sustainable Development.

CEW2	EFFICIENT STREET & PARK LIGHTING (Continued)		2 POINTS
	INTENT	Reduce energy use by good lighting design practice for street and park lightings.	

TABLE CEW2-2: LIGHT ZONE CLASSIFICATION AND RELATED LAND USE

IDA Light Zones		Land Use Zones	
Zone	Description	Code	Description
E1	Intrinsic Dark Sky Zones Areas with intrinsically dark landscapes. These Zones include all areas within 50km of astronomical observatories and within 10km of local or national park boundaries, as well as the parks themselves. In these areas the preservation of a naturally-dark environment, both in the sky and in the viable landscape, is considered of paramount concern. These Zones may also include rural areas, including rural residential areas, that have identified preservation of natural darkness as a high priority or other areas where the preservation of a naturally dark landscape is of utmost priority.	T1 T2	Natural Zone Rural
E2	Low Ambient Lighting Zones These Zones generally include rural residential and agricultural areas but may also include small outlying neighbourhood commercial and industrial areas surrounded by rural residential areas.	T2 T3	Rural Sub Urban
E3	Medium Ambient Lighting Zones These Zones generally include urban areas with primary land uses for commercial, business and industrial activities including highway and downtown districts.	T3 T4 T5	Sub Urban General Urban Urban Centre
E4	High Ambient Lighting Zones These Zones generally include urban areas with primary land uses for commercial, business and industrial activities including highway and downtown districts.	T5 T6 SD	Urban Centre Urban Core Special District

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Layout Plan clearly indicating lighting zones and street lighting layout (Recommended 1:500 scale or 1:1000)	<input type="radio"/>	<input type="radio"/>
2. Summary Report on the lumens per acre calculation prepared by a professional engineer on the lighting strategies to be employed for the development.	<input type="radio"/>	<input type="radio"/>
3. Confirmation from Developer to comply with the proposed criteria.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Final approved Masterplan layout indicating lighting zones and street lighting layout	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Summary report confirming compliance to the original design intent. All reports, plans and sections to be endorsed by professional engineer.	<input type="radio"/>	<input type="radio"/>
2. Luminance or Illuminance measurements to be carried out on site to confirm compliance to design intent.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

1

CLIMATE, ENERGY & WATER (CEW) – 20 POINTS

To Minimise Impact on the Environment by Adopting Best Practice on Energy Efficiency, Water Efficiency and Sustainable Development.

CEW3	ON-SITE ENERGY GENERATION	2 POINTS
	INTENT	Reduce carbon emissions by on-site generation.

ASSESSMENT CRITERIA	POINTS	SCORE																								
On site energy generation (micro-generation or distributed generation) is the generation of energy via community run generation (e.g. district cooling plant, co-generation plant) OR in-building micro-generators such as BIPV, building solar-air conditioning etc). The intent of 'on-site' generation is to take advantage of reduction in transmission losses which therefore requires that on-site generation should be efficient, e.g. an inefficient district cooling plant may 'on-the-balance' be more "CO2 emissive" compared to direct grid-electrically run in-building chillers.																										
1 point : if the total source energy equivalent is reduced by at least 5%, OR	1																									
2 points : if the total source energy equivalent is reduced by at least 10%.	2																									
<p>TABLE CEW3-1: SITE-SOURCE RATIOS FOR ENERGY TYPES</p> <table border="1"> <thead> <tr> <th>Fuel Type</th> <th>Source-Site Ratio</th> </tr> </thead> <tbody> <tr> <td>1 Electricity (Grid-Connected)</td> <td></td> </tr> <tr> <td> a. Peninsular Malaysia</td> <td>3.20</td> </tr> <tr> <td> b. Sarawak</td> <td>3.10</td> </tr> <tr> <td> c. Sabah</td> <td>3.10</td> </tr> <tr> <td>2 Electricity (On-Site Solar, Wind etc.)</td> <td>1.00</td> </tr> <tr> <td>3 Fuel Oil (Diesel, LPG)</td> <td>1.05</td> </tr> <tr> <td>4 Fuel Oil (Natural Gas)</td> <td>1.05</td> </tr> <tr> <td>5 Chilled Water</td> <td>1.05</td> </tr> <tr> <td>6 Coal / Coke</td> <td>1.00</td> </tr> <tr> <td>7 Biomass (Renewables)</td> <td>1.00</td> </tr> <tr> <td>8 Others</td> <td>1.00</td> </tr> </tbody> </table> <p>Notes for Table CEW3-1:</p> <ul style="list-style-type: none"> Data is subject to update on availability of statistics. Conversion; 1,000 BTU_h = 293 kWe; 1 ton refrigeration = 3.517 kWe The actual source-site ratio of specific community run DCS, solar-generation etc. can be calculated if their primary fuel source, plant efficiency and average transmission losses are known. <p>SOURCE-SITE RATIO CALCULATORS CAN BE DOWNLOADED FROM THE GBI WEBSITE</p>			Fuel Type	Source-Site Ratio	1 Electricity (Grid-Connected)		a. Peninsular Malaysia	3.20	b. Sarawak	3.10	c. Sabah	3.10	2 Electricity (On-Site Solar, Wind etc.)	1.00	3 Fuel Oil (Diesel, LPG)	1.05	4 Fuel Oil (Natural Gas)	1.05	5 Chilled Water	1.05	6 Coal / Coke	1.00	7 Biomass (Renewables)	1.00	8 Others	1.00
Fuel Type	Source-Site Ratio																									
1 Electricity (Grid-Connected)																										
a. Peninsular Malaysia	3.20																									
b. Sarawak	3.10																									
c. Sabah	3.10																									
2 Electricity (On-Site Solar, Wind etc.)	1.00																									
3 Fuel Oil (Diesel, LPG)	1.05																									
4 Fuel Oil (Natural Gas)	1.05																									
5 Chilled Water	1.05																									
6 Coal / Coke	1.00																									
7 Biomass (Renewables)	1.00																									
8 Others	1.00																									

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

SUBMITTER GBI

- | | | |
|--|-----------------------|-----------------------|
| 1. Report describing on-site-generation strategy adopted. The following information shall be included: | <input type="radio"/> | <input type="radio"/> |
| a. Calculation of bare energy converted to source energy equivalent. | | |
| b. Calculation of energy converted to source energy equivalent after on site generation measures are adopted. | | |
| c. If community-wide energy plant (e.g. DCS) is adopted, a brief report of its commercial sustainability and its operating model should be included OR a letter from the District Cooling plant operator confirming supply of chilled water for the project and relevant information e.g. CoP. | | |
| d. Confirm provision of Energy for the development or Phase of development should the project be phased. | | |

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

SUBMITTER GBI

- | | | |
|---|-----------------------|-----------------------|
| 1. Location of Community - wide energy plant on Approved Masterplan. | <input type="radio"/> | <input type="radio"/> |
| 2. Summary Brief on the target on-site energy generation for the Approved Masterplan. | <input type="radio"/> | <input type="radio"/> |
| 3. Describe any deviation or addition to PA submission. | <input type="radio"/> | <input type="radio"/> |

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

SUBMITTER GBI

- | | | |
|---|-----------------------|-----------------------|
| 1. Final Report on the on-site energy generation strategy employed. | <input type="radio"/> | <input type="radio"/> |
| 2. Final calculations of energy converted to Source energy. | <input type="radio"/> | <input type="radio"/> |
| 3. Describe any deviation or addition to the FPA submission. | <input type="radio"/> | <input type="radio"/> |

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CLIMATE, ENERGY & WATER (CEW) – 20 POINTS

To Minimise Impact on the Environment by Adopting Best Practice on Energy Efficiency, Water Efficiency and Sustainable Development.

CEW4	RENEWABLE ENERGY	4 POINTS
	INTENT	Reduce carbon emissions by promoting Renewable Energy.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>The reduction of carbon emission by renewable energy generation can be implemented by ‘in-building’ or township-based effort.</p> <p>Renewable Energy includes wind, solar thermal, solar PV, biomass etc.</p> <p>Community run on-site generation or district energy plant (e.g. district cooling) can be eligible for RE point provided the amount of RE used in their generation can be ascertained and certified. The percentage of RE used in such township run energy plant will be used in ascertaining compliance. Energy calculated can be in kWh or BTU/h or KJoule equivalent.</p> <p>A maximum of four (4) points are awarded based on the target achieved:</p>		
1 point if total energy demand supplied by RE is at least 5%	1	
2 points if total energy demand supplied by RE is at least 10%	2	
3 points if total energy demand supplied by RE is at least 15%	3	
4 points if total energy demand supplied by RE is at least 20%.	4	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. For community / district energy plant (e.g. DCS), a brief report on its commercial sustainability OR a letter from the District plant operator confirming supply of energy for the project and relevant information e.g. % of RE used in generation.	<input type="radio"/>	<input type="radio"/>
2. Report showing total demand and demand fulfilled by RE.	<input type="radio"/>	<input type="radio"/>
3. For ‘within-building’ submit the following statement of compliance:	<input type="radio"/>	<input type="radio"/>
i. Site Plan with buildings and zones identified for in-building RE System(s).		

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. Area location of RE on Approved Development Plan.	<input type="radio"/>	<input type="radio"/>
2. Submit Summary Report showing total demand and demand fulfilled by RE.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. As-Built plans and photographs marking out installation location of Renewable Energy System(s).	<input type="radio"/>	<input type="radio"/>
2. As measured kWp or equivalent energy generated.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

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CLIMATE, ENERGY & WATER (CEW) – 20 POINTS

To Minimise Impact on the Environment by Adopting Best Practice on Energy Efficiency, Water Efficiency and Sustainable Development.

CEW5	REDUCED WATER USE		4 POINTS
	INTENT	Minimise water use for the whole development.	

ASSESSMENT CRITERIA	POINTS	SCORE
Achieve the following percentage in reduction of potable water consumption:		
1 point : For 5% or more reduction	1	
2 points : For 10% or more reduction	2	
3 points : For 15% or more reduction	3	
4 points : For 20% or more reduction	4	

Submit calculation demonstrating reduction in water consumption compared to the development base requirement for landscape irrigation of greenspaces.

Water reduction for irrigation must be reduced by at least 20%.

i. Use recycled water from stormwater retention for irrigation, parkland or other non-building use (including public facilities), **OR**

ii. If (i) above is NOT supported by the local authority, install landscape that does not require permanent irrigation system. Temporary irrigation for plant establishment will be allowed if removed within one (1) year from installation.

Water Requirement for Landscape Irrigation

The following table is a sample calculation to determine the water required for landscape irrigation.

The water requirement for each plant type are figures used in Putrajaya which were determined using the Food and Agriculture Organisation of the United Nations (FAO) calculation method based on soil type, soil available water, rooting depth, and the local/site evapotranspiration rate.

Example of Irrigation Requirements for Greenspace (or softscape):

TABLE CEW5-1: INITIAL PLANTING

Landscape Type	Qty	Units	Watering Requirement (L/unit/day)	IE		TPWA (L)	Remarks
Trees	200	Nos	24	Drip	0.9	5,333	Watering requirement during early establishment stage
Palms	150	Nos	7.1	Drip	0.9	1,183	Watering requirement during early establishment stage
Shrubs	3,000	m ²	6.3	Drip	0.9	21,000	
Ground Cover & Lawn	12,000	m ²	3.1	Sprinkler	0.625	59,520	
						87,036	

TABLE CEW5-2: ESTABLISHED LANDSCAPE

Landscape Type	Qty	Units	Watering Requirement (L/unit/day)	IE		TPWA (L)	Remarks
Trees	200	Nos	0	Drip	0.9	0	Assumed that no watering required upon reaching established stage after 3 years
Palms	150	Nos	0	Drip	0.9	0	Assumed that no watering required upon reaching established stage after 3 years
Shrubs	3,000	m ²	6.3	Drip	0.9	21,000	
Ground Cover & Lawn	12,000	m ²	3.1	Sprinkler	0.625	59,520	Watering demand may be reduced if browning during period of drought is acceptable
						80,520	

Eto = Evapotranspiration rate, IE = Irrigation Efficiency, TPWA = Total Plant Water Applied

Continued on next page >>

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CLIMATE, ENERGY & WATER (CEW) – 20 POINTS

To Minimise Impact on the Environment by Adopting Best Practice on Energy Efficiency, Water Efficiency and Sustainable Development.

CEW5	REDUCED WATER USE (Continued)		4 POINTS
	INTENT	Minimise water use for the whole development.	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. A calculation of the Base water consumption for irrigation to Greenspaces for development and / or each phase of development.	<input type="radio"/>	<input type="radio"/>
2. A technical report describing the retention or collection of rainwater storage capacity facility and distribution site wide. Location of retention or water collection should be indicated on the Landscape plan.	<input type="radio"/>	<input type="radio"/>
3. Confirmation by developer on the percentage of water harvesting or retention for irrigation purposes.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Approved Masterplan with updated location of rainwater harvesting storage for site wide.	<input type="radio"/>	<input type="radio"/>
2. Summary Report on Base Water consumption and water harvesting strategies to comply for this criteria.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Final Report on Base water consumption and water provision for irrigation for development and / or each phase of development.	<input type="radio"/>	<input type="radio"/>
2. Final as installed calculation of rainwater harvested, storage tank capacity and distribution system.	<input type="radio"/>	<input type="radio"/>
3. Furnish photographs of as installed system.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the FPA Submission.	<input type="radio"/>	<input type="radio"/>

1

CLIMATE, ENERGY & WATER (CEW) – 20 POINTS

To Minimise Impact on the Environment by Adopting Best Practice on Energy Efficiency, Water Efficiency and Sustainable Development.

CEW6	REDUCTION IN WATER USE BY WASTE WATER TREATMENT	4 POINTS
	INTENT	Minimise water use for the whole development.

ASSESSMENT CRITERIA	POINTS	SCORE
Encourage recycling of greywater and/or blackwater for entire township, thereby reducing the loading on the sewage treatment system. Points are awarded for percentage greywater and/or blackwater recycled:		
1 point : For achieving total potable water reduction by 10%	1	
2 points : For achieving total potable water reduction by 15%	2	
3 points : For achieving total potable water reduction by 30%	3	
4 points : For achieving total potable water reduction by 50% or more.	4	
DESCRIPTION		
Recycled waste water can be used for irrigation and street cleaning. Infrastructure and sustainable design to 'whole site' approach to recycling of grey water and / or black water is encouraged. Use of bio systems e.g. membrane bioreactor (MBR) technology to treat black water or any other systems is encouraged.		

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. A technical report describing the concept to waste water, recycling 'whole site' approach. Includes estimated calculations from parcels for site wide and facility provision to cater to the targeted volume.	<input type="radio"/>	<input type="radio"/>
2. Technical report shall include schematics showing outline strategy on plan for grey water and or black water recycling.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Final approved plan location of Facility on site.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Final as-installed calculation of grey water and/or black water recycling system and facility.	<input type="radio"/>	<input type="radio"/>
2. As-Built drawings for the above including photographs of installed system & facility.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the FPA Submission.	<input type="radio"/>	<input type="radio"/>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC1	BIODIVERSITY CONSERVATION	2 POINTS
	INTENT	Maintain areas important for biodiversity conservation and maintenance of ecosystem services.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>Two (2) points are awarded if the development does not build or infringe on ALL of the following:</p> <ol style="list-style-type: none"> 1. Forest Reserves, Wildlife Reserves, River Reserves or other forms of Protected Areas gazetted under various legislation; or Environmentally Sensitive Areas (ESA) identified in the National Physical Plan, State Structure Plan or District Local Plan; AND 2. Previously undeveloped land within 30 meters of a water body, defined as lakes, rivers, streams and wetlands which support or could support aquatic and terrestrial biodiversity (as a habitat or corridor) as well as provide ecosystem services such as water supply, flood mitigation, recreation or religious/spiritual use; AND 3. Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland OVER AND ABOVE what would be required by the local authority is included in the development master plan. 	2	
<p>DESCRIPTION</p> <p>Forest Reserve is as described under the National Land Code and includes forest ecosystem in the coastal zones. Water bodies includes rivers, streams, tributaries, reservoirs and ponds.</p>		

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. Survey plan of site indicating current land reserves with existing natural features such as lakes, rivers, streams, tributaries and beaches etc. on the development site. Recommended scale 1:500 or 1:1000	<input type="radio"/>	<input type="radio"/>
2. Report on the status of the original land and proposed conservation or protection plan.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. Final masterplan of site indicating the approved planning layout and any reserves.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the PA Submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. As-Built development plan indicating all the natural features.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC2	LAND REUSE	1 POINT
	INTENT	Reduce pressure on land use and conserve green field sites.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>One (1) point is awarded if ANY of the conditions are met:</p> <ol style="list-style-type: none"> 1. Site is classified as a BROWNFIELD site with the following measures taken: <ol style="list-style-type: none"> a. Hazmat survey of site; AND b. Rehabilitation and decontamination plan for Brownfield site. 2. Site is classified as an infill site. <ol style="list-style-type: none"> a. Complies with the zoning requirement of the infill site. 	1	
<p>DESCRIPTION</p> <p>Brownfield sites are existing or contaminated sites, where the site was contaminated at the time of purchase and full remedial steps will be taken to decontaminate the site prior to construction. This extends to former mining and rubbish tip.</p> <p>Analysis of the soil, ground water and surface water through testing for hazardous compounds ensures that appropriate measures of remediation are taken. Brownfield or infill redevelopment is recognised as a catalyst for community regeneration.</p>		

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. Submit a brief historical report on the usage of the land and prepare a report certified by approved testing laboratory determining the level of contamination.	<input type="radio"/>	<input type="radio"/>
2. Submit an EIA report containing assessment of the level of contamination and proposed remediation or decontamination to be taken and any other measures deemed appropriate.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. No submission required as the certification will be carried out at the Completion & Verification Assessment (CVA).	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Submit report and photographs of works carried out during the remediation of decontamination process.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC3	ECOLOGY	3 POINTS
	INTENT	To minimise the impact of development on existing ecological diversity and balance.

ASSESSMENT CRITERIA	POINTS	SCORE
A maximum of Three (3) points are awarded for compliance with ALL OR ANY of the following criteria:		
<p>A) Basic Compliance - Two (2) points for meeting the following:</p> <ol style="list-style-type: none"> 1. Conduct a biodiversity survey to identify habitats, species (including migratory species), ecosystem services of the site and adjacent area and indicators through literature and field surveys and consultation with local stakeholders as well as identifying existing threats to biodiversity and predicted impacts from the development; AND 2. Commission a Biodiversity Action Plan describing strategies to avoid negative impact on identified ecological features and mitigation measures where necessary to maintain or safeguard existing biodiversity and ecosystem services; AND 3. Commitment by developer to implement biodiversity action plan in (A2) above. 	2	
<p>B) Advanced Compliance - One (1) point</p> <p>In addition to the basic compliance in (A) above, advanced compliance requires that trees and shrubs specified contribute to the ecological value of the site as described below:</p> <ol style="list-style-type: none"> 1. That 75% of plants and shrubs specified for planting on site will be indigenous or native; AND 2. A site management plan will be (or is already in place) established to manage the maintenance of the specified flora. <p>The above percentage is based on any replanting areas within the development.</p>	1	
<p>DESCRIPTION</p> <p>Biodiversity Survey, Impact & Action Plan</p> <p>A) General Identify available knowledge and also gaps on species, habitats, protected areas and ecosystems that exist within, overlapping with or are adjacent to the site. Review existing national and local laws, policies, strategies and action plans relevant to the conservation of biodiversity at the site.</p> <p>B) Biodiversity Baseline Survey</p> <ol style="list-style-type: none"> 1. Field work to fill in gaps on information identified in the literature review. 2. Engage and consult with local stakeholders. 3. Identify priority species (including their population density and distribution) which include those which are <ul style="list-style-type: none"> • endangered and/or threatened, • protected by law, • of economic, social or cultural importance, OR • indicators of ecosystem health. 4. Identify ecosystem services, key ecological processes and ecosystem sensitivities. 5. Identify existing factors that impact on biodiversity negatively. <p>C) Biodiversity Impact Assessment</p> <ol style="list-style-type: none"> 1. Determine both direct and indirect predicted, pre-existing or observed impacts on biodiversity including socio-economic and cumulative impacts. 2. Assess the importance and significance of those impacts after expert review of data and in consultation with local stakeholders. 3. Identify appropriate targets, objectives or biodiversity standards in order to assess those impacts. 4. Prioritisation of significant impacts. 5. Develop criteria or indicators to monitor the effect of these impacts. <p>D) Action Plan</p> <ol style="list-style-type: none"> 1. Make recommendations for actions to reduce or eliminate identified impacts from the site activity. 2. Make recommendations for actions that will improve the biodiversity situation. 3. Develop and implement a plan for carrying out the recommended actions. 4. Develop and implement a long-term biodiversity monitoring programme. 5. Develop and implement a programme for dissemination of biodiversity information to local community and stakeholders. 6. Develop and implement a biodiversity reporting system accessible to local community and stakeholders. 		

Continued on next page >>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC3	ECOLOGY (Continued)	3 POINTS
	INTENT	To minimise the impact of development on existing ecological diversity and balance.

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Submit a Biodiversity Baseline Survey and Biodiversity Impact Assessment for the development site.	<input type="radio"/>	<input type="radio"/>
2. Confirmation on the Biodiversity Action Plan for the site.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Summary of Biodiversity Action Plan indicating any changes to the original intent.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit report on the measures taken during construction to mitigate Biodiversity Impact.	<input type="radio"/>	<input type="radio"/>
2. Provide Implementation programme for long term biodiversity monitoring.	<input type="radio"/>	<input type="radio"/>
3. Confirm and provide programme to disseminate Biodiversity to the local community.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC4	FLOOD MANAGEMENT AND AVOIDANCE		1 POINT
	INTENT	Conserve natural hydrological systems and protect life and property by assessing and mitigating flood risk.	

ASSESSMENT CRITERIA	POINTS	SCORE
One (1) point is awarded for compliance with the following criteria. The Development site is assessed as having flood risk based on 50 years flood data:		
A) For site classified a Flood Risk, the following measure must be employed, <ol style="list-style-type: none"> 1. Flood mitigating measures are adopted in accordance with JPS guidelines; AND 2. Flood risk response plan included in planning guide e.g. evacuation route etc. 	1	
B) Site is assessed as low or NO flood risk. No further action is necessary.		

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. Report on Flood Risk Assessment & Mitigation.	<input type="radio"/>	<input type="radio"/>
2. Plan showing flood risk safety zones identified in distinct colour codes.	<input type="radio"/>	<input type="radio"/>
3. Plan showing flood risk safety zones, escape routes, etc.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Final report flood risk mitigation measures undertaken on site.	<input type="radio"/>	<input type="radio"/>
2. As-Built drawings and photographs of the flood mitigation systems carried out within the development.	<input type="radio"/>	<input type="radio"/>
3. Plan showing Risk safety or evacuation points within the development.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC5	WETLAND AND WATER BODY CONSERVATION		1 POINT
	INTENT	Conserve natural hydrological systems and preserve biodiversity through conservation of wetlands or water bodies.	

ASSESSMENT CRITERIA	POINTS	SCORE
One (1) point is awarded for compliance with whichever is the more stringent criteria:		
1. Maintain a buffer zone of 30m to any wetlands or water bodies defined by the Structure Plan; OR 2. Development to be within setback distances from wetlands or water bodies prescribed in State or local regulations.	1	
DESCRIPTION Development within the Wetland buffer zone is limited to grading work, pedestrian or bicycle pathways (no wider than 4m) and single storey structures for the purpose of enhancing public access, recreation, environmental conservation and environmental education. Such developments should further be limited to 15% of the total buffer zone area for pathways and another 15% of the total buffer zone area for all other permitted structures.		

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Survey Plan of site indicating Wetland and water bodies clearly marked on the development site. Recommended scale a:500 or 1:1000 (drawing reference to EEC1 submission).	<input type="radio"/>	<input type="radio"/>
2. Development Plan of proposed site planning indicating setback or encroachment into the Wetland and water bodies.	<input type="radio"/>	<input type="radio"/>
3. Report on the development approach to the natural site.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built plans showing original Wetland and water bodies, indicate any built structure and pathways within the buffer zone.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC6	AGRICULTURAL LAND PRESERVE	1 POINT
	INTENT	Conserve agricultural land and promote the the local production of food.

ASSESSMENT CRITERIA	POINTS	SCORE
One (1) point is awarded for compliance with the following:		
1. Site is not located on prime agricultural preserve for food production as defined by the Structure Plan of the area or the National Physical Plan, AND 2. If prime agricultural land is converted for use in the development in question, the following mitigation measures are adopted in planning for the development: <ul style="list-style-type: none"> a. primary food production equal to 5 % or greater than the original agricultural preserve is included in the final development plan of the township; 	1	
DESCRIPTION Agricultural areas surrounding urban area and under threat. Minimising development impact on Prime Agricultural Land is encouraged. Prime Agricultural Land can be defined as: <ul style="list-style-type: none"> 1. Strategic Granary Area 2. Paddy land outside Granary area 3. Agricultural Land designated as 'Permanent Food Production Park (PFPP)' Which may include areas for crop production, animal husbandry, aquaculture and agriculture. 4. Agricultural areas without dry season and with short dry season. 5. Agriculture areas on Class 1, Class 2, Class 3 and peat/organic soils. 		

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Survey plan indicating the Prime Agricultural land (if any) and land status.	<input type="radio"/>	<input type="radio"/>
2. Confirmation that the land was not previously converted from prime agricultural preserve.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Submit Approved Masterplan demarcating the prime agricultural preserve.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit Final Masterplan with clear demarcation of prime agricultural preserve. With converted land, define area demarcated for primary food production.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation and addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC7	HILL SLOPE DEVELOPMENT		1 POINT
	INTENT	Reduce the potential impact arising from hill slope development.	

ASSESSMENT CRITERIA	POINTS	SCORE
One (1) point is awarded for compliance with ANY of the following:		
1. The development is NOT located within any OR include any hill slope categorised as Class I, II or III hill; OR 2. If the development is located within OR include sites with hill slope categorised as Class I; then proof is shown that the development will leave the said Class I hill slope undisturbed and/or preserved within the total masterplan of the development; OR 3. If the development is located within OR include sites with hill slope categorised as Class II or III; then proof is shown that the development comply with Guidelines on hill slope development for the relevant Class. Note: Class I gradient < 15°; Class II gradient > 15°, < 25°; Class III gradient > 35° Guidelines above shall refer to BOTH planning guidelines for hillslope and highland area issued by the Ministry of Housing and Local Government AND the "Highland Area Development Guidelines" issued by the Ministry of Natural Resources and Environment.	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Site plan and sections showing land current hill slopes with category descrification.	<input type="radio"/>	<input type="radio"/>
2. Submit preliminary report on in relation to hill slope and statement of compliance under hill slope guidelines.	<input type="radio"/>	<input type="radio"/>
3. Proposed new platform and infrastructure levels for site development.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Confirmation on Original design intent of PA maintained.	<input type="radio"/>	<input type="radio"/>
2. Submit final approved platform and infrastructure levels of development.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built Plans and section of hill slopes or cut slopes carried out on development site.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC8	SUSTAINABLE STORMWATER DESIGN & MANAGEMENT	2 POINTS
	INTENT	Limit disruption to natural hydrology by reducing water pollutants and source contaminants.

ASSESSMENT CRITERIA	POINTS	SCORE
Achieving the intent by reducing impervious cover, increase on-site infiltration, eliminating source pollutants and removing pollutants from storm water run-off.		
<p>A) One (1) point awarded for basic compliance to MSMA:</p> <p>1. If existing imperviousness of site is < 50% (infill site etc.):</p> <ul style="list-style-type: none"> Implement a stormwater management plan that prevents the post development peak discharge from exceeding the pre-development peak discharge rate and quantity in conformance to MSMA. <p>OR</p> <p>2. If existing imperviousness of site is > 50%:</p> <ul style="list-style-type: none"> Implement a storm water management plan that results in a 25% decrease in the volume of storm water runoff required under MSMA. <p>For either Condition, implement a storm water management plan that reduces impervious cover, promotes infiltration, and captures and treats the storm water runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs).</p>	1	
<p>B) Additional one (1) point awarded for eliminating and/or removing source pollutants from storm water run-off so as to attain a Water Quality Index of Class II(b) water discharge from development drainage systems.</p>	1	
<p>DESCRIPTION</p> <p>Demonstrate Sustainable Drainage system and Best Management Practice (BMP) stormwater drainage by attenuation locally. Encourage alternative method of traditional hard engineering based drainage system with application of swale, sub-surface or wading stream, drainage modules, dry ponds/wet pond or constructed wetland.</p>		

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. Submit preliminary study report complying with MSMA requirements.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. Submit confirmation on study report complying with MSMA requirements and on final stormwater design and management approach.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Report, complete with photographic evidence and site reports signed off by qualified person on final stormwater design and management.	<input type="radio"/>	<input type="radio"/>
2. Describe deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC9	PROXIMITY TO EXISTING INFRASTRUCTURE		1 POINT
	INTENT	Reduce the impact arising from the need to develop NEW water, sewage and electrical infrastructure to support the development.	

ASSESSMENT CRITERIA	POINTS	SCORE
<p>One (1) point is awarded for compliance with ANY of the following criteria:</p> <ol style="list-style-type: none"> Existing infrastructure for sewage treatment located off-site is sufficient without the necessity to “plant-up” NEW treatment plant at the site or off-site. Existing infrastructure for potable water supply is sufficient without the necessity to lay NEW mains water supply pipes and establishment of reservoirs off-site. Existing infrastructure for electrical supply is sufficient without the necessity to lay NEW mains 33kV cables and/or build NEW mains distribution station (defined as any electrical distribution stations 33kV and above) off-site. Existing infrastructure for telephone off-site is sufficient without the necessity to lay new telecom ducts. 	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Submit preliminary study report on utilities and services availability.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Confirmation of sufficiency of existing infrastructure facilities.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Report complete with photographic signed off by qualified person on existing infrastructure utilities and services to site.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC10	SERVICES INFRASTRUCTURE PROVISION	1 POINT
	INTENT	Reduce the impact and disruption arising from future reconstruction of infrastructure by provision of easy access.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>One (1) point is awarded for compliance with the following criteria:</p> <ol style="list-style-type: none"> 1. Basic Compliance Services reserve (or accessible services tunnels) are provided in public spaces for all services (water, telecoms, sewage, chilled water pipes, electric cables). Services reserves take full cognisance of pedestrian paths & networks, cycle ways, AND 2. In addition to basic compliance under (1) above, provision of a complete coordinated plan showing all above ground and below ground services including provision for future expansion or addition of services or where future services are expected to cross road ways or highway reserves. 	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Submit Development Plan indicating for all services mapped on the proposed Open Space (pedestrian paths and networks), cycle routes and roads submitted by qualified person.	<input type="radio"/>	<input type="radio"/>
2. Describe the Services Reserve strategy site wide.	<input type="radio"/>	<input type="radio"/>
3. Confirmation on intent to provide the services reserve as outlined in (1).	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Submit final approved plan layout of Services reserve in respect to the open space, including pedestrian paths or network, cycle routes and road, Coordinate information with drainage routes.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit As-Built drawings indicating the services reserve, both plans & sections signed off by qualified person.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the PFA submission.	<input type="radio"/>	<input type="radio"/>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC11	LIGHT POLLUTION	1 POINT
	INTENT	Maintain environmental quality by reducing light trespass, glare and night-time sky glow.

ASSESSMENT CRITERIA	POINTS	SCORE
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One (1) point is awarded for compliance with lamp shielding, light trespass, glare and sky-glow limitations:

TABLE EEC11-1: LAMP TYPE AND SHIELDING STANDARDS (IDA PATTERN CODE)

Class and Lamp Type	Lighting Zones				
	E4	E3	E2	E1	E1A
Class 1 Lighting (Colour Rendition)					
i. Output ≥ 2,000 lumens	F	F	F	F	F
ii. Output < 2,000 lumens	A	A	A	F	F
Class 2 Lighting (General Illumination)					
i. Output ≥ 2,000 lumens	F	F	X	X	X
ii. Output < 2,000 lumens	A	A	A	F	F
Class 3 Lighting (Decorative)					
i. Output ≥ 2,000 lumens	F	F	F	F	F
ii. Output < 2,000 lumens	A	A	A	A	F

1

Notes for TABLE EEC11-1:

1. **A** =all types of lighting fixtures allowed; shielding not required but highly recommended, except any spot or flood light must be aimed no higher than 45 degrees above straight down.

F =only fully shielded fixtures allowed.

X =not allowed.

2. Classes of lighting are as define by IDA (International Dark Sky Association) as follows:

Class 1 Lighting - All outdoor lighting used for, but not limited to, outdoor sales or eating areas, assembly or repair areas, advertising and other signs, recreational facilities and other similar applications where COLOR RENDITION IS IMPORTANT to preserve the effectiveness of the activity. Recognized Class 1 uses are outdoor eating and retail food or beverage service areas; outdoor maintenance areas; display lots; assembly areas such as concert or theater amphitheaters.

Class 2 Lighting - All outdoor lighting used for, but not limited to, illumination for walkways, roadways, equipment yards, parking lots and outdoor security where GENERAL ILLUMINATION for safety or security of the grounds is the primary concern.

Class 3 Lighting - Any outdoor lighting used for DECORATIVE effects including, but not limited to, architectural illumination, flag and monument lighting, and illumination of trees, bushes, etc.

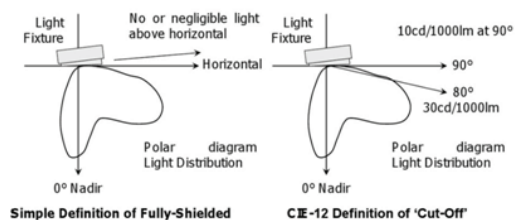
3. Classification of lighting zones are in Table WE2-2.

Definitions of lamp cut-off and shielding applicable for both Tables WE2-1 and EI9-1 are as follows:

TABLE EEC11-2 : DEFINITION OF CUT-OFF (CIE 12:1995)

Type of Luminaire	Direction of Max Intensity	Maximum Permissible Value at Intensity Emitted at		
		90°	80°	
1	Full Cut-Off	0 – 68°	*10cd/1,000lm	*30cd/1,000lm
2	Semi Cut-Off	0 – 75°	*500cd/1,000lm	*100cd/lm
3	No Cut-Off	-	*1,000cd	-

FIGURE EEC11-3 : DEFINITIONS SHIELDING AND CUT-OFF



Continued on next page >>

2

ENVIRONMENTAL & ECOLOGY (EEC) – 15 POINTS

To minimise impact on the environment by adopting best practice and preserving site ecology and biodiversity.

EEC11	LIGHT POLLUTION (Continued)		1 POINT
	INTENT	Maintain environmental quality by reducing light trespass, glare and night-time sky glow.	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA) SUBMITTER GBI

- | | | |
|--|-----------------------|-----------------------|
| 1. Summary report outlining strategies and procedures to be taken to meet credit requirements. | <input type="radio"/> | <input type="radio"/> |
| 2. Commitment to meet requirement of night sky light pollution reduction. | <input type="radio"/> | <input type="radio"/> |

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA) SUBMITTER GBI

- | | | |
|--|-----------------------|-----------------------|
| 1. Approved plan showing zone classification (coloured). | <input type="radio"/> | <input type="radio"/> |
| 2. Commitment to meet requirements of night sky light pollution reduction. | <input type="radio"/> | <input type="radio"/> |
| 3. Describe any deviation or addition to the PA submission. | <input type="radio"/> | <input type="radio"/> |

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA) SUBMITTER GBI

- | | | |
|--|-----------------------|-----------------------|
| 1. As-Built drawing and specification demonstrating that the lighting system and fixture selected has been constructed according to the zone classification. | <input type="radio"/> | <input type="radio"/> |
| 2. Describe any deviation or addition to FPA submission. | <input type="radio"/> | <input type="radio"/> |

3

COMMUNITY PLANNING & DESIGN (CPD) – 26 POINTS

To minimise impact on the environment and promote community connectivity and participation by adopting good practice on site selection and space planning.

CPD1	GREENSPACES	3 POINTS
	INTENT	Environmental quality by moderating the impact of micro climate on surrounding public space.

ASSESSMENT CRITERIA	POINTS	SCORE
A maximum of Three (3) points are awarded for compliance with ALL OR ANY of the following criteria:		
A) Basic Compliance - One (1) point The provision of green spaces which are over and above mandatory requirement specified by the local authority by at least 25%.	1	
B) Advanced Compliance - Two (2) points for provision of green spaces which can be classified as recreational space accessible to residents. One point up to a maximum of two points for provision of any of the following 'recreational green space' which are within 800m from any residential lot within the development: <ol style="list-style-type: none"> Public park Playground Community run herb garden Recreational lakes 	2	
DESCRIPTION Greenspaces are categorised as follows : Parks & Gardens, Natural & semi natural landscape, green corridors, outdoor green recreational fields, allotments & community gardens, amenity Greenspaces & cemeteries. Category of Park will reference to Planning standards local or national in terms of Playlots, Play field, Neighbourhood Park, Local Park, Urban Park, Regional Park or National Park. For water bodies within parks, calculation will be subject to local authority standards acceptance.		

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Development and Landscape plan indicating greenspace area and summary data.	<input type="radio"/>	<input type="radio"/>
2. Submit commitment on greenspace provision.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit final as-built landscape plan indicating greenspaces area and detail data.	<input type="radio"/>	<input type="radio"/>
2. Described any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

3

COMMUNITY PLANNING & DESIGN (CPD) – 26 POINTS

To minimise impact on the environment and promote community connectivity and participation by adopting good practice on site selection and space planning.

CPD2	COMPACT DEVELOPMENT	1 POINT
	INTENT	Environmental quality by moderating the impact of micro climate on surrounding public space.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>One (1) point awarded if the development meets the minimum CPD1 requirement and the average gross density of the development complies with the local development intensity guideline OR meets the following:</p> <ol style="list-style-type: none"> For Low Density (Detached House) 10.0% higher than the local development intensity guideline. For Medium Density (Semi-detached/ Terrace / Townhouse / Cluster House) 7.5% higher than the local development intensity guideline For High Density (Apartment / Condominium) 5.0% higher than the local development intensity guideline 	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. Submit Gross Floor Area and Density Calculation for Residential components of the Development Plan.	<input type="radio"/>	<input type="radio"/>
2. Submit Site Plan with legend colours to differentiate the type of development.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. Submit Final Gross Floor Area and Density Calculation.	<input type="radio"/>	<input type="radio"/>
2. Submit Site Plan with legend colours to differentiate the final type of development.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Submit As-Built density calculation.	<input type="radio"/>	<input type="radio"/>
2. Submit Site Plan with legend colours to differentiate the As-Built type of development.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

3

COMMUNITY PLANNING & DESIGN (CPD) – 26 POINTS

To minimise impact on the environment and promote community connectivity and participation by adopting good practice on site selection and space planning.

CPD3	AMENITIES FOR COMMUNITIES		3 POINTS
	INTENT	To reduce the need for travel by car to essential facilities by physically locating said facilities within a reasonable walking distance.	

ASSESSMENT CRITERIA	POINTS	SCORE
<p>Up to three (3) points are awarded for location of planned essential facilities within 500m of each residential unit on the development AND location of facilities (where applicable) are linked by walkable pedestrian network which are also coordinated with public transport nodes for easy access:</p> <p>One (1) point is awarded for the presence of any TWO of the following essential services up to a maximum of three (3) points for at least six amenities:</p> <ul style="list-style-type: none"> a. Bank (Commercial) b. Place of Worship c. Convenience/Grocery (Commercial) d. Day Care (Commercial) e. Police Station f. Fire Station g. Beauty (Commercial) h. Hardware (Commercial) i. Laundry (Commercial) j. Library k. Medical/Dental (Commercial) l. Senior Care Facility m. Pharmacy n. Post Office (Commercial) o. Restaurant (Commercial) p. School q. Supermarket (Commercial) r. Theatre s. Community Centre t. Fitness Centre (Commercial) 	3	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Submit plan identifying location of Commercial and Institutional areas with planned essential services within 500m of any residential.	<input type="radio"/>	<input type="radio"/>
2. Commitment by developer to position the selected essential facilities within the development plan.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Submit Final Approved Plan Layout of all selected essential facilities mapped in relation to the residential areas of the development .	<input type="radio"/>	<input type="radio"/>
2. Provide legend to differentiate the types of services	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit Final Location Plan of all essential facilities mapped in relation to the residential areas of the development.	<input type="radio"/>	<input type="radio"/>
2. Indicate Pedestrian network access to the essential facilities.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the PFA submission.	<input type="radio"/>	<input type="radio"/>

3

COMMUNITY PLANNING & DESIGN (CPD) – 26 POINTS

To minimise impact on the environment and promote community connectivity and participation by adopting good practice on site selection and space planning.

CPD4	PROVISION FOR UNIVERSAL ACCESSIBILITY	3 POINTS
	INTENT	To promote an all-inclusive society by providing infrastructure that is 'handicapped-friendly'.

ASSESSMENT CRITERIA	POINTS	SCORE
1 point : If at least 25% of the pedestrian network, linkages, transit points & open spaces is of Universal Design, OR	1	
2 points : If at least 50% of the pedestrian network, linkages, transit points & open spaces is of Universal Design, OR	2	
3 points : If 75% or more of the pedestrian network, linkages, transit points & open spaces is of Universal Design.	3	
<p>DESCRIPTION</p> <p>Universal Design is the term used internationally for OKU (Orang Kurang Upaya) or design friendly to cater to both abled and disabled persons. Environment accessible to people with disabilities often benefits others and includes sidewalk curb cuts, designed to make sidewalks and streets accessible to those using wheelchairs, benefitting kids on skateboards, parents with baby strollers, and delivery staff with rolling trolleys.</p>		

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA) SUBMITTER GBI

- | | | |
|--|-----------------------|-----------------------|
| 1. Summary report identifying the key features and site wide applications of Universal Design that will be adopted in the design including target percentage coverage. | <input type="radio"/> | <input type="radio"/> |
| 2. Commitment by Developer to undertake the Universal Design strategies. | <input type="radio"/> | <input type="radio"/> |

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA) SUBMITTER GBI

- | | | |
|---|-----------------------|-----------------------|
| 1. Confirmation from the principal submitting person and developer for Universal Design strategies. | <input type="radio"/> | <input type="radio"/> |
| 2. Describe any deviation or addition to the PA submission. | <input type="radio"/> | <input type="radio"/> |

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA) SUBMITTER GBI

- | | | |
|---|-----------------------|-----------------------|
| 1. Layout Plan of Universal Design features linked to the pedestrian route and public realm. | <input type="radio"/> | <input type="radio"/> |
| 2. As-Built plans & Photographic evidence on Universal Design accessibility features within the public realm. | <input type="radio"/> | <input type="radio"/> |
| 3. Summary Report identifying the key features and site-wide applications of Universal Design. | <input type="radio"/> | <input type="radio"/> |
| 4. Describe any deviation or addition to the FPA submission. | <input type="radio"/> | <input type="radio"/> |

3

COMMUNITY PLANNING & DESIGN (CPD) – 26 POINTS

To minimise impact on the environment and promote community connectivity and participation by adopting good practice on site selection and space planning.

CPD5	SECURE DESIGN	2 POINTS
	INTENT	Enhancing the built-environment by providing security in design.

ASSESSMENT CRITERIA	POINTS	SCORE
Maximum of Two (2) points are awarded if the whole development is designed to comply with guidelines for 'security-in-planning'. Security for town planning include the following measures for compliance:		
1. Compliance to CPTED (Crime Prevention Through Environmental Design) principles in site wide application within the community.	1	
2. Lighting in compliance with ISO 8995-3 and CIE S016 "Lighting of work places - Part 3: Lighting Requirements for Safety and Security of Outdoor Work Places".	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Submit summary report on adopted CPTED principles for the development site wide.	<input type="radio"/>	<input type="radio"/>
2. Confirmation letter from the developer that the development will be designed and constructed to CPTED principles.	<input type="radio"/>	<input type="radio"/>
3. Confirmation letter from the developer that the development will be designed and constructed to ISO 8995-3 and CIRE SD016.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Planning layout indicating key CPTED features adopted in the development.	<input type="radio"/>	<input type="radio"/>
2. Final report on designed and constructed features to CPTED principles (including the external safety lighting features).	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

3

COMMUNITY PLANNING & DESIGN (CPD) – 26 POINTS

To minimise impact on the environment and promote community connectivity and participation by adopting good practice on site selection and space planning.

CPD6	HEALTH IN DESIGN	2 POINTS
	INTENT	Enhancing the built-environment by including public health through environmental planning.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>One (1) point is awarded for compliance with to ALL of the following:</p> <ol style="list-style-type: none"> 1. Zoning to ensure polluting industries (including industrial facilities, markets and motor workshops) are located on sites that have adequate wastewater collection & treatment facility. 2. Ensure that all drainage system and water features will not be a source for water-borne disease and vectors. 3. Where waste are hazardous and listed in DoE schedule, a plan for disposal through licensed waste disposal OR on-site treatment to DoE requirement shall be included. 	1	
<p>Additional One (1) point awarded for eliminating and/or removing source pollutants from storm water run-off, in compliance with ALL of the following:</p> <ol style="list-style-type: none"> 1. Provision of appropriate sillage collection treatment systems. Oil and grease traps must be installed in all wet markets, school canteens, food courts and shopping complexes. 2. In all cases where restaurant discharge kitchen waste and workshops discharge industrial grease or waste (not under (1) above), proper grease traps or waste treatment plan shall be included in the planning, design and construction of such facilities. 3. At least 50% of source pollutants are removed. 	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Layout plan indicating zoning or parcelling within the development, indicating industries, petrol station & wet markets.	<input type="radio"/>	<input type="radio"/>
2. EIA or Environmental Impact Assessment Engineer report on the strategy for mitigating and controlling hazardous waste & pollutants from within site of development.	<input type="radio"/>	<input type="radio"/>
3. Confirmation Letter from developer to undertake measures to meet target credits.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Summary report and evidence of Governance programmes adopted.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

3

COMMUNITY PLANNING & DESIGN (CPD) – 26 POINTS

To minimise impact on the environment and promote community connectivity and participation by adopting good practice on site selection and space planning.

CPD7	RECYCLING FACILITIES	2 POINTS
	INTENT	To promote separation of waste at source.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>A) One (1) point for provision of facilities for recycling within the development. Amenities to be provided include the following:</p> <ol style="list-style-type: none"> Community recycling centre with bins located at centralised location with truck access; AND Support from the local waste disposal company appointed by the local authority supporting local recycling initiatives. 	1	
<p>B) Additional One (1) point for the provision of the following:</p> <ol style="list-style-type: none"> Compactor station for paper and plastics if capacity can be shown to make such facility feasible; AND Support from a private waste disposal company supporting community based recycling OR any other active measures undertaken by the community. 	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Summary Report on strategies to be adopted for addressing Recycling.	<input type="radio"/>	<input type="radio"/>
2. Investigation report on local waste disposal companies to service the development and existing or infrastructure facilities to support recycling.	<input type="radio"/>	<input type="radio"/>
3. Confirmed letter of commitment by the developer to implement the selected recycling strategy.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings and photographs of Recycling strategies adopted site wide for the development.	<input type="radio"/>	<input type="radio"/>
2. Final report on the amount of recycling capacity collection and disposal and location for community recycling centre.	<input type="radio"/>	<input type="radio"/>
3. Describe any community based programme for Recycling initiated for the development by the Resident Association.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

3

COMMUNITY PLANNING & DESIGN (CPD) – 26 POINTS

To minimise impact on the environment and promote community connectivity and participation by adopting good practice on site selection and space planning.

CPD8	COMMUNITY DIVERSITY	1 POINT
	INTENT	To promote a socially equitable and diverse community by diversity in housing and mixed-use neighbourhood.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>Encouraging the reasonable percentage of diversity in housing, diversity being measured as follows:</p> <p>2 Types of Housing Diversity for sites between 20 acres to 40 acres, OR 3 Types of Housing Diversity for sites between 41 acres to 100 acres, OR 4 Types of Housing Diversity for sites between 101 acres to 150 acres, OR 5 Types of Housing Diversity for sites between 151 acres to 250 acres, OR 6 Types of Housing Diversity for sites between 251 acres to 350 acres, OR 7 Types of Housing Diversity for sites above 351 acres.</p> <p>Diversity Types can be as follows:</p> <p>a. Detached House b. Semi-detached House c. Terrace House d. Townhouse e. Cluster (e.g. Quart) House f. Low-rise Apartment / Condominium (< 4 storey) g. High-rise Apartment / Condominium (> 4 storey) h. Others</p> <p>Note: Affordable Housing is excluded in this assessment.</p>	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. Submit Diversity Percentage Calculation.	<input type="radio"/>	<input type="radio"/>
2. Submit Site Plan with legend colours to differentiate the type of Diversity.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. Submit Final Diversity Percentage Calculation.	<input type="radio"/>	<input type="radio"/>
2. Submit Site Plan with legend colours to differentiate the final type of Diversity.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Submit As-Built Diversity Percentage Calculation.	<input type="radio"/>	<input type="radio"/>
2. Submit Site Plan with legend colours to differentiate the As-Built type of Diversity.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

3

COMMUNITY PLANNING & DESIGN (CPD) – 26 POINTS

To minimise impact on the environment and promote community connectivity and participation by adopting good practice on site selection and space planning.

CPD9	AFFORDABLE HOUSING	1 POINT
	INTENT	To promote socially equitable and diverse community by diversity in housing for wide range of economic levels.

ASSESSMENT CRITERIA	POINTS	SCORE
Encouraging the diversity of affordable housing to comply with the local authority guideline. Affordable Housing Types can be described as follows: a. Low Cost Flat / House (Selling Price < RM42K) b. Medium Low Cost Apartment / House (RM42K < Selling Price < RM100K) c. Medium Cost Apartment / House (Selling Price > RM100K)	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. Submit Affordable Housing Percentage Calculation.	<input type="radio"/>	<input type="radio"/>
2. Submit Site Plan with legend colours to differentiate the type of Affordable Housing.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. Submit Final Affordable Housing Percentage Calculation.	<input type="radio"/>	<input type="radio"/>
2. Submit Site Plan with legend colours to differentiate the final type of Affordable Housing.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Submit As-Built Affordable Housing Percentage Calculation.	<input type="radio"/>	<input type="radio"/>
2. Submit Site Plan with legend colours to differentiate the As-Built type of Affordable Housing.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

3

COMMUNITY PLANNING & DESIGN (CPD) – 26 POINTS

To minimise impact on the environment and promote community connectivity and participation by adopting good practice on site selection and space planning.

CPD10	COMMUNITY THRUST	4 POINTS
	INTENT	Encourage Community participation and maintenance of sustainable practice.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>A) The first point is awarded for compliance with the basic requirements:</p> <ol style="list-style-type: none"> 1. Developer to establish active dialogue with existing community within the vicinity of the development. Developer must show that active measures to address issues of existing community will be taken into account in the new development, OR 2. Developer to provide evidence that active dialogue with purchasers on features on sustainable practice of proposed development is maintained in the duration of the development and construction period leading to handing over. 	1	
<p>B) The second point is awarded for the provision of the following:</p> <ol style="list-style-type: none"> 1. A community centre of sufficient size to cater for the community, OR 2. A Sports center/club with sufficient sporting facilities to cater for the community. 	1	
<p>C) The third point is awarded when:</p> <ol style="list-style-type: none"> 1. Evidence is provided that an active Resident Association is being established or is already established. 	1	
<p>D) The fourth point is awarded for compliance with ANY THREE of the activities listed below will be implemented by the Resident Association (or included in the charter of the Resident Association):</p> <ol style="list-style-type: none"> 1. Community based recycling programme with at least separation at source of paper, glass, metal, plastic and toxic material. 2. Community based waste management system. 3. Community based food gardening initiative. 4. Community based car pool system. 5. Any other community based activities which will promote sustainability. 	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Summary Report on Existing Community Feedback and proposed actions.	<input type="radio"/>	<input type="radio"/>
2. Submit proposed community facilities or provisions for the development and commitment.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Description, As-Built Drawings and photographs of Community Facilities.	<input type="radio"/>	<input type="radio"/>
2. Evidence of active Resident Association/s.	<input type="radio"/>	<input type="radio"/>
3. Describe the sustainable programs implemented by the Resident Association/s.	<input type="radio"/>	<input type="radio"/>

3

COMMUNITY PLANNING & DESIGN (CPD) – 26 POINTS

To minimise impact on the environment and promote community connectivity and participation by adopting good practice on site selection and space planning.

CPD11	GOVERNANCE	4 POINTS
	INTENT	Encourage Community participation and maintenance of sustainable practice.

ASSESSMENT CRITERIA	POINTS	SCORE
A total of four (4) points are awarded if the local government concerned has in place the following measures or practices:		
A) Basic requirement; to have in place the following measures: <ol style="list-style-type: none"> e-Submission for planning and refurbishment of buildings An active OSC (One Stop Centre) procedure in accordance with Ministry of Housing and Local Government Guidelines. 	1	
B) Additional one (1) point for compliance to ANY TWO of the following measures up to a maximum of three (3) points for compliance of up to six programmes. <ol style="list-style-type: none"> An active complaints bureau which addresses local issues. Adopt guidelines on CPTED in development. An active crime prevention programme implemented in cooperation with the police and resident association. An active procedure which engages the community for public review and consultation for development projects. Implementing a recycling programme with separation of waste at source at the local level. An active programme of having regular dialogue sessions with local resident associations. An active Local Agenda 21 programme with participation from at least 50% of the resident associations. Other GBI approved programmes on sustainability initiated by the local authority. 	3	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Confirmation on availability on e-Submission and active OSC procedures.	<input type="radio"/>	<input type="radio"/>
2. Brief summary on proposed adoption of Governance programmes within development.	<input type="radio"/>	<input type="radio"/>
3. Confirmation letter by developer to undertake programmes identified under (B).	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Summary report and evidence of Governance programmes adopted.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the FPA.	<input type="radio"/>	<input type="radio"/>

4

TRANSPORTATION & CONNECTIVITY (TRC) – 14 POINTS

To reduce impact from Transportation by providing affordable and sustainable Transportation network both within the development and linkages outside the development.

TRC1	GREEN TRANSPORT MASTERPLAN	8 POINTS
	INTENT	Provide an assessment and action plan for transportation linkages both within the development and linkages to outside centers.

ASSESSMENT CRITERIA	POINTS	SCORE
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A Green Transport Masterplan which shall be adopted, designed and constructed in the development with these primary considerations.

Reducing travel by car by promoting efficient linkages, shorter travel distances to essential services and sustainable patterns of development (such as pedestrian walkways, bicycle lanes, mixed-use development and alternative forms of sustainable transportation system).

Promoting the use of public transportation system by integrating or upgrading of existing public transportation system or the creation of new public transportation system.

Accessibility of the location including accessibility by non car mode by providing or integrating or upgrading to existing public transportation system and vehicular access networks.

DESCRIPTION

Green Transport Masterplan is a traffic planning that promotes transit oriented development integrated with pedestrian and cycling network and the linkages of the development. Trip generation is a sequential process of transportation modelling which establishes the relationship between land use, socioeconomic and demographic data also described as Trip Production and Trip Attraction. The enclosed calculation for Trip Production and Trip Attraction has been included to determine the generated movement within the development site.

Model demand is aggregated into zones. Trips originate and terminate at zone centroids. A trip has two ends, Trip Production and Trip Attraction. A trip also has an origin and a destination. This will depend on trip purpose. For example, because we generate work trips in two parts (the production end and the attraction end), assign the production end to the home zone. Departure from Work for a destination is captured as Trip Production.

Points are awarded for compliance to the following:

1 point : for overall assessment score of 5	1	
2 points : for overall assessment score of 10	2	
3 points : for overall assessment score of 20	3	
4 points : for overall assessment score of 25	4	
5 points : for overall assessment score of 30	5	
6 points : for overall assessment score of 35	6	
7 points : for overall assessment score of 40	7	
8 points : for overall assessment score of 50	8	

TRIP PRODUCTIONS : MAXIMUM POINT SCORE 33
TABLE TRC1-1: DEVELOPMENT TYPE - RESIDENTIAL

Travel Mode	Travel Purpose		
	Work	School, Educational Centre	Shopping, Amenities, Recreation
Walk	1 job/household within 500m walking distance 5 points	2 student places / household within 500m walking distance 5 points	Full range of everyday amenities within 500m walking distance 5 points
	1 job/ 2 households within 500m walking distance 2 points	1 student place/household within 500m walking distance 2 points	Specialist amenities within 500m walking distance 2 points
Cycle	1 job/ household within 5km cycling distance 2 points	1 student place/household within 3km cycling distance 2 points	-
Public Transport	2 jobs/household within 20 minutes journey time by existing or committed public transport system (includes walk times at trip ends) 5 points	2 student places within 15 minutes journey time by existing or committed public transport system (includes walk times at trip ends) 5 points	Full range of amenities within 15 minutes journey time by existing or committed public transport system (includes walk times at trip ends) 4 points

Continued on next page >>

4 TRANSPORTATION & CONNECTIVITY (TRC) – 14 POINTS
 To reduce impact from Transportation by providing affordable and sustainable Transportation network both within the development and linkages outside the development.

TRC1	GREEN TRANSPORT MASTERPLAN (Continued)		8 POINTS
	INTENT	Provide an assessment and action plan for transportation linkages both within the development and linkages to outside centers.	

TRIP ATTRACTIONS : MAXIMUM POINT SCORE 32
TABLE TRC1-2 : DEVELOPMENT TYPE - FACTORY, OFFICE, WORKPLACE, EDUCATIONAL CENTRE, RETAIL, PUBLIC FACILITY, ETC.

Travel Mode	Travel Purpose		
	Work	School, Educational Centre	Shopping, Amenities, Recreation
Walk	1 household/job within 500m walking distance 4 points	1 household/student place within 500m walking distance 5 points	1 household/500 sq.ft. of retail GFA, 1 household/15 venue places within 500m walking distance 5 points
	1 household/2 jobs within 500m walking distance 2 points	1 household/2 student places within 500m walking distance 2 points	1 household/1,000 sq.ft. of retail GFA, 1 household/15 venue places within 500m walking distance 2 points
Cycle	1 household/job within 5km cycling distance 2 points	1 household/student place within 3km cycling distance 2 points	1 household/1,000 sq.ft. of retail GFA, 1 household/15 venue places within 3km cycling distance 2 points
Public Transport	2 households/jobs within 20 minutes journey time by existing or committed public transport system (includes walk times at trip ends) 5 points	1 household/2 student places within 15 minutes journey time by existing or committed public transport system (includes walk times at trip ends) 5 points	4 households/1,000 sq.ft. of retail GFA, 1 household/15 venue places within 20 minutes journey time by existing or committed public transport system (including walk times at trip ends) 2 points

Notes:
 The points values allocated in the tables are specific to the transport assessment to achieve a differential effect between alternatives. To fit the overall environmental standards assessment, scheme points achieved in the transport assessment should be set against the total points available and scaled down pro rata to the points allocated to transport in the overall assessment. E.g. if a development proposal scores 48 points out of a possible 65 in the transport assessment the overall environmental transport assessment transport shall be 7 points.

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. Summary Report on Green Transport Masterplan (includes TIA) covering proposed development framework, surrounding catarments, surveys, existing conditions.	<input type="radio"/>	<input type="radio"/>
2. Forecast of future traffic shall be at against the Trip Production & Trip Attraction TRC-1 Matrix as part of the strategic Green Transport Plan.	<input type="radio"/>	<input type="radio"/>
3. All linkages both pedestrian and vehicular from surrounding developments shall be included.	<input type="radio"/>	<input type="radio"/>
4. Confirmation from the developer to adopt Green transport strategies to meet development requirements.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. Summary update on Green Transport Masterplan to confirm compliance to criteria.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Submit final Green Transport Report indicating all road upgrades, new roads, pedestrian networks, transit points or hubs completed by qualified Engineer for the development.	<input type="radio"/>	<input type="radio"/>
2. As-Built Site Plan indicating all road upgrades, roads, pedestrian networks, public amenities and facilities, transit points as an Integrated Green Masterplan with photographs of key element.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

4 TRANSPORTATION & CONNECTIVITY (TRC) – 14 POINTS
 To reduce impact from Transportation by providing affordable and sustainable Transportation network both within the development and linkages outside the development.

TRC2	AVAILABILITY AND FREQUENCY OF PUBLIC TRANSPORT		1 POINT
	INTENT	Reduce car use by increasing the availability of public transport both within the community and linkage to external hubs.	

ASSESSMENT CRITERIA	POINTS	SCORE
<p>One (1) point is awarded for compliance to the following (compliance statement submitted in conjunction with the traffic assessment impact report submitted under TRC2):</p> <ol style="list-style-type: none"> Inter community accessibility via public transportation catering for more than 30% of its estimated traffic generation to external hubs (Note 1), AND Intra-community travel via car is decreased by at least 40% via internal public transportation network OR it can be shown that an integrated pedestrian walkway and/or bicycle network systems are viable alternatives (Note 2). <p>DEFINITION</p> <p>Note 1: Traffic generators within development including restaurant, schools, retail outlets, supermarkets, commercial centres and office etc shall be included within the calculation. External traffic generators include “hubs” such as city central business district, large retail outlets etc.</p> <p>Note 2: Intra-community travel can be identified by travel generated between different usage zones within a development. In a ‘small neighbourhood development’, intra-community travel may be mitigated by network of pedestrian and bicycle routes. Larger development may require an integrated public or alternative transportation network such as trams, mini-bus routes, park-and-ride etc.</p>	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. Summary Report on the Intra and later community targets and strategies for the reduction of travel in the planning of the development.	<input type="radio"/>	<input type="radio"/>
2. Confirmation on the target Intra and Inter community travel for the development.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Summary report confirming the achieved Inter and Intra community travel for the completed project by qualified person. Include same data to meet criteria and completion studies qualification to meet the design intent.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

4

TRANSPORTATION & CONNECTIVITY (TRC) – 14 POINTS

To reduce impact from Transportation by providing affordable and sustainable Transportation network both within the development and linkages outside the development.

TRC3	FACILITIES FOR PUBLIC TRANSPORTATION	1 POINT
	INTENT	Promote sustainable public transportation network by the provision of facilities.

ASSESSMENT CRITERIA	POINTS	SCORE
One (1) point is awarded for compliance with the following: 1. Provision of covered or sheltered bus stops and/or any light or mass rapid transit station within 500m of every housing unit or non-residential unit, AND 2. Provision of covered or shaded walkway linking to sheltered bus stops and/or stations (under (1) above) to the nearest residential or commercial centres.	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA) SUBMITTER GBI

- | | | |
|--|-----------------------|-----------------------|
| 1. Location of all covered or sheltered bus or transit points in relation to the furthest residential within the masterplan. Label the different types of bus stops. | <input type="radio"/> | <input type="radio"/> |
| 2. Confirmation from developer for the provision of covered or sheltered bus or other transit stops. | <input type="radio"/> | <input type="radio"/> |

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA) SUBMITTER GBI

- | | | |
|---|-----------------------|-----------------------|
| 1. Describe any deviation or addition to the PA submission. | <input type="radio"/> | <input type="radio"/> |
|---|-----------------------|-----------------------|

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA) SUBMITTER GBI

- | | | |
|--|-----------------------|-----------------------|
| 1. As-Built Site plan indicating all transport facilities accessible within 500m radii of every housing unit or non-residential unit, AND | <input type="radio"/> | <input type="radio"/> |
| 2. Submit report and photographs of the transport facilities and covered or shaded pedestrian linkages. | <input type="radio"/> | <input type="radio"/> |
| 3. Describe any deviation or addition to the FPA submission. | <input type="radio"/> | <input type="radio"/> |

4

TRANSPORTATION & CONNECTIVITY (TRC) – 14 POINTS

To reduce impact from Transportation by providing affordable and sustainable Transportation network both within the development and linkages outside the development.

TRC4	PEDESTRIAN NETWORKS	1 POINT
	INTENT	To reduce travel by car by promoting walkable streets.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>One (1) point is awarded for the provision of pedestrian network (existing or planned) serving the development AND evidence that the said pedestrian network comply with the following basic requirements:</p> <ol style="list-style-type: none"> 1. The pedestrian network is planned as a link from hubs within neighbourhood zones (residential zones, commercial zones etc) to all other units within said zones including key public amenities within the zone. 2. The pedestrian network links to transitory hubs (cycling, public network, bus routes etc) within a walkability zone. 3. At least 75% of the pedestrian routes are covered or shaded. 4. Proper signages are provided for the safe and proper usage of pedestrian network by the residents. 	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Submit site plan, if different to TRC1, indicating the pedestrian networks in and around the site.	<input type="radio"/>	<input type="radio"/>
2. Submit proposal for the pedestrian links, to land parcels, open spaces and significant features and the adopted special features site wide.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit As-Built Site Plan drawings and sections on the pedestrian networks, types adopted into the final development.	<input type="radio"/>	<input type="radio"/>
2. Submit photographs and report on the pedestrian network.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

4

TRANSPORTATION & CONNECTIVITY (TRC) – 14 POINTS

To reduce impact from Transportation by providing affordable and sustainable Transportation network both within the development and linkages outside the development.

TRC5	CYCLING NETWORKS	2 POINTS
	INTENT	To reduce travel by car by promoting cycling as an alternative transportation mode.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>A) The first point for EITHER an existing cycle network OR a new planned cycle network serving the development AND evidence that the said cycle network complies with the following basic requirements:</p> <ol style="list-style-type: none"> 1. The cycling network is planned to link to ALL amenities provided (if relevant) under CPD3 (Local Amenities), CPD11 (Amenities for Community Thrust), CPD1 (Recreational Green Spaces) and any other key public facilities relevant. 2. The cycling network provide an easy accessible linkage from ALL residential units to commercial zones and other zones. 3. Cycling networks are dedicated lanes. 4. Proper signages are provided for the safe and proper usage of cycling network by the residents. 	1	
<p>B) The second point is awarded ONLY AFTER COMPLIANCE with the first point above AND if at least ANY TWO of the following amenities are provided to promote a cycling network:</p> <ol style="list-style-type: none"> 1. Provision of bicycle storage space at focal points of development (focal point is defined as key public facilities which are possible focus of human traffic (e.g. markets, schools, restaurants etc.). The capacity of storage space shall be based on an estimate of population traffic projections. 2. Provision of tree-line shaded cycle lanes for at least 75% of the cycling network. 3. Provision of “rest-stop” facilities at every 750m intervals of cycle lanes, said rest-stops shall be shaded with suitable amenities (bicycle parking yard, refreshment booth and others to be proposed etc). 	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Submit Brief summary on the cycling network and facilities strategy site wide for the development.	<input type="radio"/>	<input type="radio"/>
2. Confirmation from developer to provide the cycling networks and facilities for the site.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit As-Built cycling route plans and sections for the development. Locate all facilities provided for cyclists.	<input type="radio"/>	<input type="radio"/>
2. Submit report and photographs of all facilities.	<input type="radio"/>	<input type="radio"/>
3. Describe and deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

4

TRANSPORTATION & CONNECTIVITY (TRC) – 14 POINTS

To reduce impact from Transportation by providing affordable and sustainable Transportation network both within the development and linkages outside the development.

TRC6	ALTERNATIVE TRANSPORT OPTIONS		1 POINT
	INTENT	Promotion of alternative mode of sustainable transportation.	

ASSESSMENT CRITERIA	POINTS	SCORE
One (1) point awarded for compliance with ANY of the following “Green Initiatives”: <ul style="list-style-type: none"> a. Provision of charging station for electric cars at ALL strategic locations such as hubs for essential public amenities or commercial centres or neighbourhood focal point. b. Park and Ride depot with parking facilities and public transport for commercial centres; c. Management of car pool system for residents. d. Community Bicycle Rental managed by the local authority or resident association or community centre. e. “Green Public Vehicle” for transportation within neighbourhood hubs (“green vehicle” to include vehicles operating on electric or biofuel). f. Central Travel Information Centre created by for the development for the community. g. “Other Sustainable Transportation Mode” approved by GBI. 	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Submit a brief on the Green Initiatives that will be adopted for the development site.	<input type="radio"/>	<input type="radio"/>
2. Confirmation from the developer that these initiatives will be implemented during final development stage.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit report and photographs of the Green Initiatives completed for the development.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

5

BUILDING & RESOURCES (BDR) – 15 POINTS

To reduce impact consumption of primary resources and the practice of sustainable construction.

BDR1	LOW IMPACT MATERIAL (INFRASTRUCTURE)		1 POINT
	INTENT	To reduce the impact of material use by promoting the use of recycled and reclaimed materials for infrastructure works	

ASSESSMENT CRITERIA	POINTS	SCORE
<p>The use of materials for new infrastructure such that the sum of post consumer and/or pre-consumer recycled content can be established by cost; or by weight converted to cost.</p> <p>1. One (1) point given where use of materials with recycled content is such that the sum of post consumer recycled plus one-half of pre-consumer content constitutes more than 10% (based on cost) of total value of materials in the project.</p> <p>Infrastructure items include roadways, base and sub base materials, drains, curbs, water and sewage infrastructure, electrical and telephone infrastructure and street furniture.</p>	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Identify on-site materials (e.g. earth or rocks) or off site recycled material for construction of the infrastructure.	<input type="radio"/>	<input type="radio"/>
2. Confirmation on commitment for recycled content in construction of infrastructure.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Documentation during construction stage including photographs of installed reused materials.	<input type="radio"/>	<input type="radio"/>
2. Calculation of recycled content value of each material must be provided.	<input type="radio"/>	<input type="radio"/>
3. Information on the sources/suppliers of the materials with recycled content must be provided.	<input type="radio"/>	<input type="radio"/>
4. Calculate the total percentage (based on cost) value of the materials with recycled content against the actual total value of the materials for the project. The percentage of the post consumer and/or pre-consumer recycled content must be established by cost. Submission to be verified by qualified quantity surveyor.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

5

BUILDING & RESOURCES (BDR) – 15 POINTS

To reduce impact consumption of primary resources and the practice of sustainable construction.

BDR2	LOW IMPACT MATERIAL (BUILDINGS AND STRUCTURES)	1 POINT
	INTENT	To reduce the impact of material use by promoting the use of recycled and reclaimed materials for building works.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>The use of materials for new buildings and structures such that the sum of post consumer and/or pre-consumer recycled content can be established by cost; or by weight converted to cost.</p> <p>1. One (1) point given where use of materials with recycled content is such that the sum of post consumer recycled plus one-half of pre-consumer content constitutes more than 10% (based on cost) of total value of materials in the project.</p> <p>Building & Structures items include bridges, structures in the Open Space and any other buildings fall within the site wide development.</p>	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Identify on-site materials (e.g. earth or rocks) or off site recycled material for construction of the buildings & structures.	<input type="radio"/>	<input type="radio"/>
2. Confirmation on commitment for recycled content in construction for the buildings & structures.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Documentation during construction stage including photographs of installed reused materials.	<input type="radio"/>	<input type="radio"/>
2. Calculation of recycled content value of each material must be provided.	<input type="radio"/>	<input type="radio"/>
3. Information on the sources/suppliers of the materials with recycled content must be provided.	<input type="radio"/>	<input type="radio"/>
4. Calculate the total percentage (based on cost) value of the materials with recycled content against the actual total value of the materials for the project. The percentage of the post consumer and /or pre-consumer recycled content must be established by cost.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

5

BUILDING & RESOURCES (BDR) – 15 POINTS

To reduce impact consumption of primary resources and the practice of sustainable construction.

BDR3	REGIONAL MATERIAL	1 POINT
	INTENT	To reduce the impact of carbon emissions from transportation of regional materials.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>Use building/construction materials that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation:</p> <p>1. Use building/construction materials that have been extracted, harvested or recovered, as well as manufactured, within 500km of the project site for ≥ 70% (based on cost) of the total material value.</p> <p>Mechanical, electrical and plumbing components shall not be included. Only include materials permanently installed in the project.</p>	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. Confirmation by developer to extract/harvest/recover/or manufacture within 500km of project site.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. List of products that were extracted/harvested/recovered and manufactured within 500km of the project site after completion for the 70% of the total material value.	<input type="radio"/>	<input type="radio"/>
2. Provide Name & manufacturer, product cost, AND the distance between the project site and manufacturer.	<input type="radio"/>	<input type="radio"/>
3. Determine the Actual Material cost.	<input type="radio"/>	<input type="radio"/>
4. Calculate the percentage of Regional materials used + Total Cost of Regional Materials/Total Material Cost.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

5

BUILDING & RESOURCES (BDR) – 15 POINTS

To reduce impact consumption of primary resources and the practice of sustainable construction.

BDR4	QUALITY IN CONSTRUCTION	2 POINTS
	INTENT	Promote efficiency and quality in construction thereby conserving resources.

ASSESSMENT CRITERIA	POINTS	SCORE
One (1) point is awarded for compliance with ANY of the following:		
1. QLASSIC score of at least 70% for infrastructure works.	1	
2. QLASSIC score of at least 70% for building works as follows: <ul style="list-style-type: none"> achieved by at least 50% of built structures Note: Achievement for building based on GFA achieving QLASSIC score.	1	
DESCRIPTION External works cover the general external work elements in building construction such as the link-ways/shelters, drains, roadworks, car parks footpaths, turfings, playgrounds, gates and fences, swimming pools, hardscapes and electrical substations.		

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Submit preliminary Project Quality Plan, QLASSIC is to be understood by all consultants and owner early in the design stage captured in the tender works: OR	<input type="radio"/>	<input type="radio"/>
2. Confirmation by developer to adopt QLASSIC for the construction phase of the development.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Certification from CIDB of score achieved.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

5

BUILDING & RESOURCES (BDR) – 15 POINTS

To reduce impact consumption of primary resources and the practice of sustainable construction.

BDR5	CONSTRUCTION WASTE MANAGEMENT		1 POINT
	INTENT	To reduce the environmental impact from construction activities by construction waste management and recycling.	

ASSESSMENT CRITERIA	POINTS	SCORE
Evidence that a comprehensive construction waste management and recycling scheme is implemented for the whole site (building and infrastructure): <ol style="list-style-type: none"> 1. CWM plan for whole site; AND 2. Recycling plan; AND 3. Proper disposal off site; AND 4. Provision for recycling bins and recycling centre. AND 5. Measures for monitoring and training of site staff and sub contractors on CWM plan. 	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

SUBMITTER GBI

- | | | |
|---|-----------------------|-----------------------|
| 1. Submit Preliminary report on construction waste management plan for development; OR | <input type="radio"/> | <input type="radio"/> |
| 2. Confirm commitment to provide a construction waste management plan for the Development. | <input type="radio"/> | <input type="radio"/> |

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

SUBMITTER GBI

- | | | |
|---|-----------------------|-----------------------|
| 1. Describe any deviation or addition to the PA submission. | <input type="radio"/> | <input type="radio"/> |
|---|-----------------------|-----------------------|

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

SUBMITTER GBI

- | | | |
|---|-----------------------|-----------------------|
| 1. Submit final construction waste management monthly report for the entire construction period, complete with photographic evidence and site reports verified by qualified person. | <input type="radio"/> | <input type="radio"/> |
| 2. Describe any deviation or addition to the FPA submission. | <input type="radio"/> | <input type="radio"/> |

5

BUILDING & RESOURCES (BDR) – 15 POINTS

To reduce impact consumption of primary resources and the practice of sustainable construction.

BDR6	SITE SEDIMENTATION AND POLLUTION CONTROL	1 POINT
	INTENT	To reduce the environmental impact from construction activities by implementation site sedimentation and pollution control.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>Provide evidence that a comprehensive Erosion and Sedimentation Control Plan (ESC) is implemented for the whole site (for building, structures, and for infrastructure works). The plan should include the following elements:</p> <ol style="list-style-type: none"> 1. Drainage of site 2. Sedimentation Control Plan. 3. Prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting top soil by stockpiling for reuse; AND 4. Prevent sedimentation of storm sewer or receiving stream; AND 5. Prevent polluting the air with dust and particulate matter 6. Monitoring compliance to CSPP during construction 7. Ensuring compliance to CSPP during construction 	1	
<p>DESCRIPTION</p> <p>Site construction activities have a large impact on the local environment. A direct result of construction activities is a disturbance of the natural terrain and earth formation which results in sedimentation to existing drainage and hydrological system. Construction activities also introduce pollution to the local environment. In Malaysia, site sedimentation and pollution control of construction site is mandatory under the control of local authorities. This criteria aims to reinforce the mandatory requirement of site sedimentation and pollution control by introducing a clearer and (in some case, a higher standard) of practice for site sedimentation and pollution control. A Construction (Site) Sedimentation & Pollution Control Plan (CSPP) forms the basis for reporting on measures for construction activities.</p>		

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)	SUBMITTER	GBI
1. A proper CSPP Plan should be adopted and understood by all consultants and the developer early during design stage and captured in the tender specifications. Submit Preliminary CSPP Report Plan for the construction works.	<input type="radio"/>	<input type="radio"/>
2. Confirmation to proceed and comply with CSPP for the whole site during construction.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)	SUBMITTER	GBI
1. Submit CSPP Report to confirm compliance with the intent of this criteria.	<input type="radio"/>	<input type="radio"/>
2. Submit plan showing CSPP measures for construction.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Submit final CSPP report, complete with photographic evidence and site reports verified by qualified person confirming that CSPP plan has been complied with during constructions.	<input type="radio"/>	<input type="radio"/>
2. Sample report and QC checklist of CSPP plan to be included in report.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

5

BUILDING & RESOURCES (BDR) – 15 POINTS

To reduce impact consumption of primary resources and the practice of sustainable construction.

BDR7	SUSTAINABLE CONSTRUCTION PRACTICE	2 POINTS
	INTENT	Encourage practice of sustainable construction.

ASSESSMENT CRITERIA	POINTS	SCORE
Minimum 2 measures for one (1) point are awarded up to a maximum of two (2) points. <ol style="list-style-type: none"> 1. Implement rainwater harvesting for site use. 2. Install workers amenities over and above statutory requirement (e.g. provision of rest and recreation facilities). 3. Preserve existing greenery. 4. IBS system is implemented up to a minimum score of 30%. 5. Any other sustainable 'green-construction measures approved by the GBIAF. 	2	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Submit selected criteria or list any other GBI approved sustainable green construction measures to be adopted for the Development.	<input type="radio"/>	<input type="radio"/>
2. Provide summary report on strategies describing the adoption and future implementation.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Submit Summary report on sustainable construction strategies to be adopted for the development by Qualified person.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built drawings and photographs demonstrating the selected sustainable construction measures undertaken during construction.	<input type="radio"/>	<input type="radio"/>
2. Submit final report on sustainable construction measures complied with during construction.	<input type="radio"/>	<input type="radio"/>
3. Sample report and QC checklist of sustainable construction practices on site.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviation or addition to the FPA submission	<input type="radio"/>	<input type="radio"/>

5

BUILDING & RESOURCES (BDR) – 15 POINTS

To reduce impact consumption of primary resources and the practice of sustainable construction.

BDR8	GBI CERTIFIED BUILDING	6 POINTS
	INTENT	Adopt best practice for energy and water efficiency and sustainable development for each individual building by achieving GBI Certification.

ASSESSMENT CRITERIA	POINTS	SCORE
1 point: Minimum 50 % of the total development GFA to achieve GBI certification.	1	
2 points: 55% of the total development GFA to achieve GBI certification.	2	
3 points: 60% of the total development GFA to achieve GBI certification.	3	
4 points: 65% of the total development GFA to achieve GBI certification.	4	
5 points: 70% of the total development GFA to achieve GBI certification.	5	
6 points: 75% of the total development GFA to achieve GBI certification.	6	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Determine the total Development plan GFA and indicate the GFA of building parcels that will be built to achieve GBI Certification	<input type="radio"/>	<input type="radio"/>
2. Confirmation from developer for the building parcels achieving GBI certification for each Phase of the development.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Submit parcels or buildings selected for GBI certification and total development GFA for these selected projects.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Confirm the total development GFA for buildings built achieving GBI certification.	<input type="radio"/>	<input type="radio"/>
2. Submit evidence of buildings and GFA achieving GBI certification.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

6

BUSINESS & INNOVATION (BSI) – 10 POINTS

To reduce impact consumption of primary resources and the practice of sustainable construction.

BSI1	BUSINESS	3 POINTS
	INTENT	

ASSESSMENT CRITERIA	POINTS	SCORE
<p>A) First point is awarded for the following: Identify Business and Services opportunities for the development based on Feasibility Study of the context and surrounding developments.</p>	1	
<p>B) The second point is awarded for the following:</p> <ol style="list-style-type: none"> 1. An assessment of proposed commercial or industrial development and type of residential to support such businesses within the development, and vice versa. 2. An assessment of services, business types and sectors likely generated from the proposed development. 3. Recommendations on commercial units required to fulfil the needs of the resident within this development based on this report. 4. Show that the development mixed is in accordance with the commercial/industrial-to-residential ratio recommended in the report. If the commercial development is higher in ratio, identify key locations of employment catchment. 	1	
<p>C) The third point is awarded when:</p> <ol style="list-style-type: none"> 1. With at least one priority or focused business or educational sector will be included in the plan; AND 2. Recommendations on commercial units and infrastructure required to fulfil the needs of (1). 	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Feasibility study addressing the following:	<input type="radio"/>	<input type="radio"/>
a. Local context opportunities and considerations		
b. Identify Residential & Business opportunities		
c. Considerations for Services and facilities required for to support the development		
d. Location of commercial centers		
2. Submit summary of feasibility report.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Review on completed Masterplan on the feasibility study described in at the FPA submission.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation and addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

6

BUSINESS & INNOVATION (BSI) – 10 POINTS

To reduce impact consumption of primary resources and the practice of sustainable construction.

BSI2	INNOVATION	6 POINTS
	INTENT	Promote innovative solutions which are sustainable and reduce carbon emissions.

ASSESSMENT CRITERIA	POINTS	SCORE
<p>Up to Six (6) points are awarded for implementing any of the listed innovations (one point per innovation up to a maximum of 6 points):</p> <ol style="list-style-type: none"> 1. Active Design strategies <ol style="list-style-type: none"> a. Innovative on-site generation (solar cooling, biomass, biodigester, etc) b. Innovative green energy supplied by certified “green-energy” supplier c. Community grey water recycling d. Community black water recycling scheme e. Community food production f. Community food garden g. Community recycling scheme h. Central ‘micro’ chiller plant i. Biomass generation plant (chilled water, electricity generation). j. Automatic leak detection system is incorporated for the water reticulation system (implemented by the local utility company). 2. Unique Community Planning, Ecological or Environmental features that contribute to better Neighbourhoods 3. REGIONALITY - To encourage strategies that address local specific environmental, social and cultural needs this includes responding to Conservation issues. Developments next to ecological sites, heritage sites, rivers, islands will need to respond to the context with best practice solutions. 4. Other Innovative solution approved by GBI. 	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Summary report on each innovation, sustainable features and benefits or in the case of (2) and (3) cultural, social or economic benefit to the community.	<input type="radio"/>	<input type="radio"/>
2. Commitment by developer to adopt these innovations for the development site.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. Describe any deviation or addition to the PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Full documentation, drawings and/or photographs describing each innovation. Documentation should describe the unique features.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviation or addition to the FPA submission.	<input type="radio"/>	<input type="radio"/>

6

BUSINESS & INNOVATION (BSI) – 10 POINTS

To reduce impact consumption of primary resources and the practice of sustainable construction.

BSI3	GBI FACILITATOR	1 POINT
	INTENT	Promote best practice in sustainability in design by appointment of GBI Facilitator and specialist sustainability consultants.

ASSESSMENT CRITERIA	POINTS	SCORE
One (1) point to be awarded on appointment of a GBI Facilitator.	1	

REQUIRED SUBMISSION FOR PLANNING ASSESSMENT (PA)

	SUBMITTER	GBI
1. Proof of appointment of the named GBI Facilitator.	<input type="radio"/>	<input type="radio"/>
2. GBI Facilitator to submit PA submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR FINAL PLANNING ASSESSMENT (FPA)

	SUBMITTER	GBI
1. GBI Facilitator to submit FPA Submission.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. GBI Facilitator to present CVA submission to GBI Certifier (if required).	<input type="radio"/>	<input type="radio"/>