



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

**DESIGN REFERENCE GUIDE
& SUBMISSION FORMAT**

VERSION 1.01 | MAY 2019

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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 are further divided into corresponding sub-sections containing 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 cases, 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 Green Building Index Rating Tools.

To attain Green Building Index certification, 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 then be assigned for the duration of the project.

The schedule of 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 (i.e. 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 certification.

GBI verifies the project's certification within 12 months of CPC (or CCC/OC/OP whichever is the later); or earlier, if occupancy is not less than 50%. 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

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

VALIDITY OF CERTIFICATION

The validity of the certification is limited to 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 accreditation 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 training and examinations conducted by GSB.

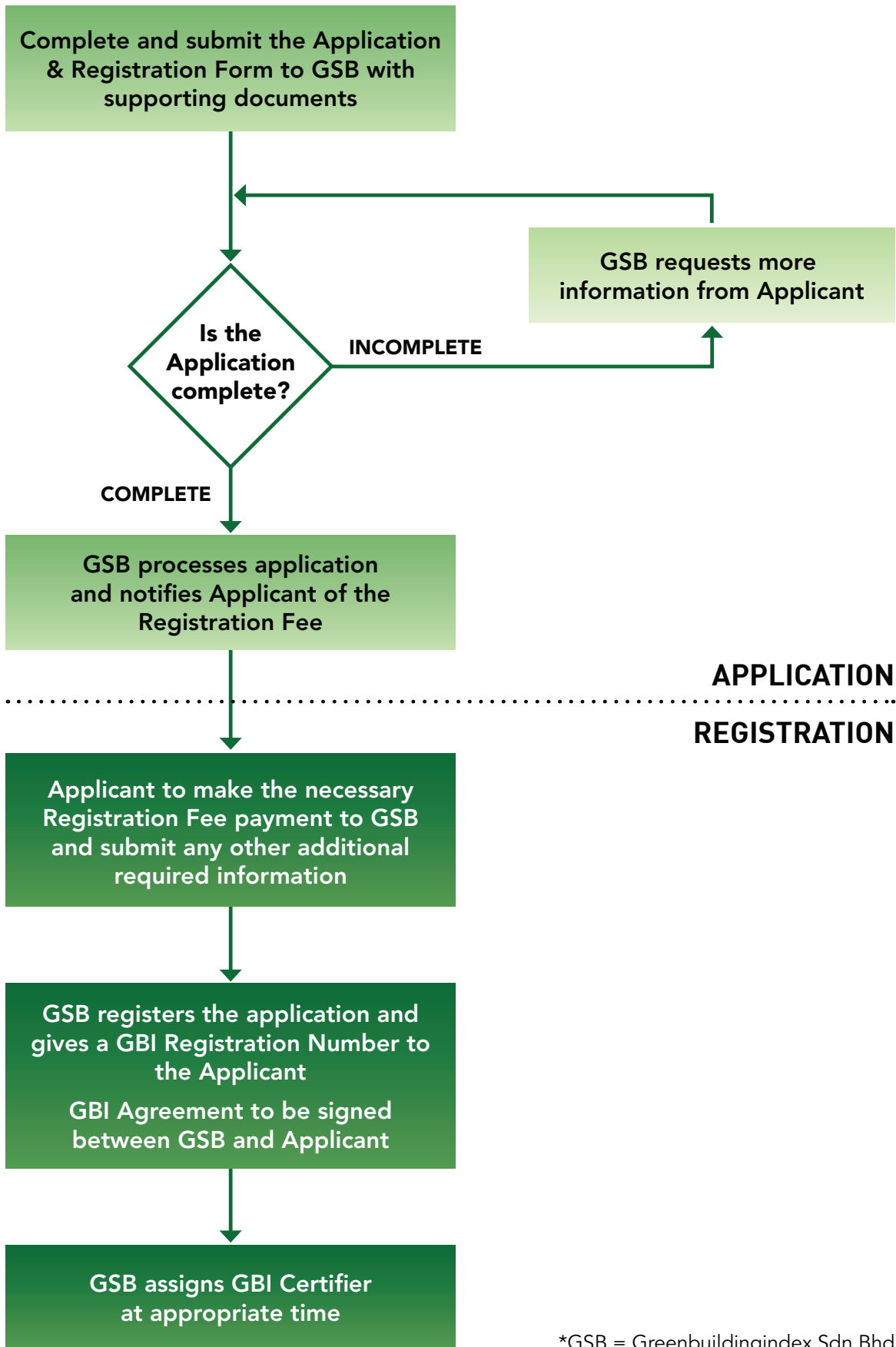
GBI TERMS & CONDITIONS

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



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

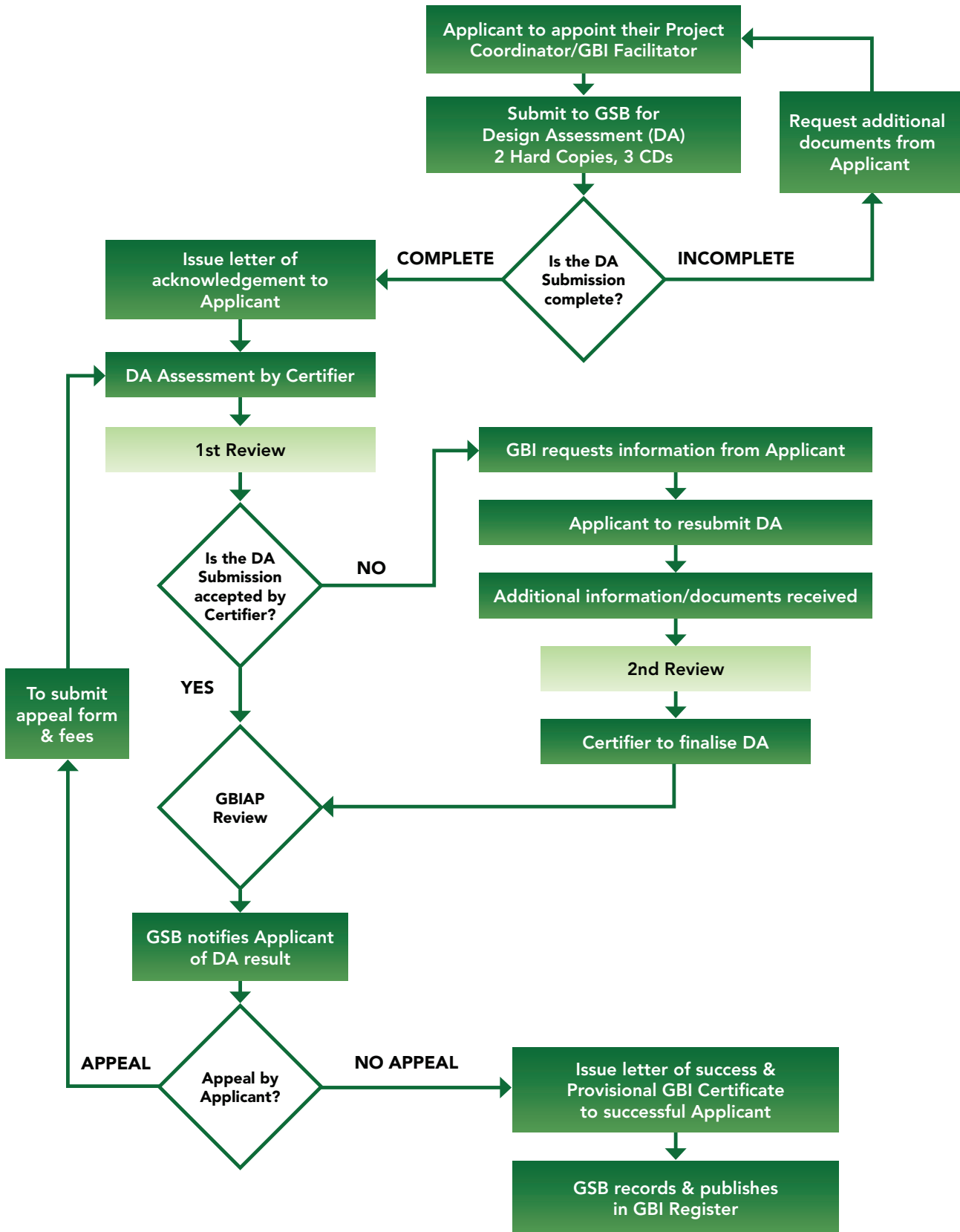
STAGE 1 APPLICATION & REGISTRATION



**APPLICATION
REGISTRATION**

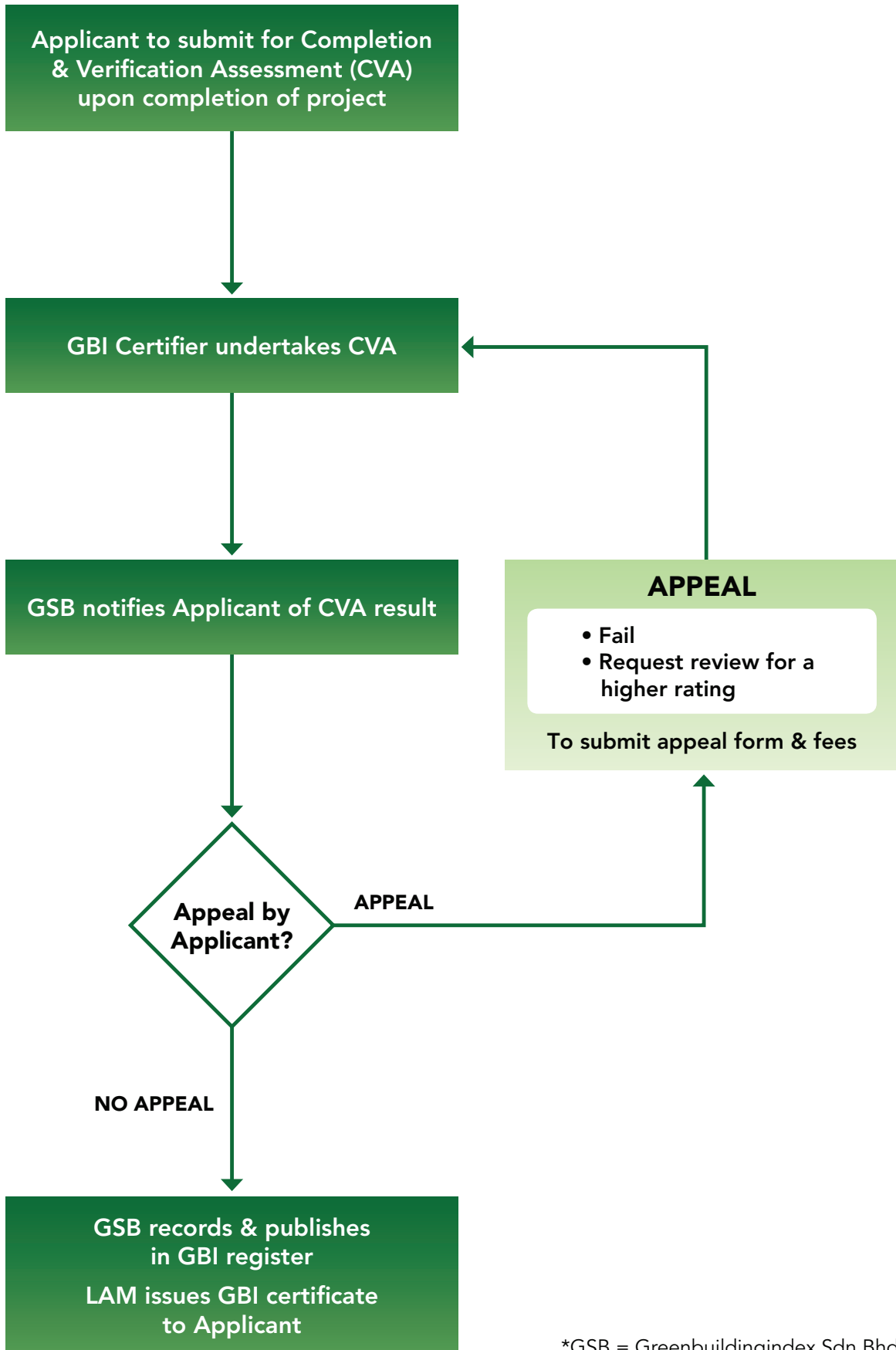
*GSB = Greenbuildingindex Sdn Bhd

STAGE 2 DESIGN ASSESSMENT (DA)



*GSB = Greenbuildingindex Sdn Bhd

STAGE 3 COMPLETION & VERIFICATION ASSESSMENT (CVA)



*GSB = Greenbuildingindex Sdn Bhd



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

NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING PROJECT INFORMATION

PROJECT NAME	
PROJECT ADDRESS	
POSTCODE	
STATE	

APPLICANT	
CONTACT PERSON	

INTERIOR DESIGNER	
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	

PROJECT DESCRIPTION	
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ASSESSMENT CRITERIA OVERALL POINTS SCORE

PART	ITEM	MAXIMUM POINTS
1	Energy Efficiency (EE)	24
2	Indoor Environmental Quality (EQ)	16
3	Sustainable Conservation & Management (SC)	15
4	Material & Resources (MR)	20
5	Water Efficiency (WE)	11
6	Innovation (IN)	14
TOTAL SCORE		100

GREEN BUILDING INDEX CLASSIFICATION

POINTS	GBI RATING
86 to 100 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	SUBMITTER	GBI
1	EE	ENERGY EFFICIENCY			
	Design & Performance				
	EE1	Minimum EE Performance	2		
	EE2	Lighting Zoning & Control	1		
	EE3	Automated Lighting Control	2		
	EE4	Renewable Energy	5		
	EE5	Advanced EE Performance - BEI	8		
	Commissioning				
	EE6	Enhanced or Re-Commissioning	2		
	EE7	On-going Post Occupancy Commissioning	1		
	Monitoring, Improvement & Maintenance				
	EE8	EE Monitoring & Improvement	1		
EE9	Sustainable Maintenance	2			
2	EQ	INDOOR ENVIRONMENTAL QUALITY			
	Air Quality				
	EQ1	Minimum IAQ Performance	1		
	EQ2	Environmental Tobacco Smoke (ETS) Control	1		
	EQ3	Indoor Air Pollutants	2		
	EQ4	Mould Prevention	1		
	Thermal Comfort				
	EQ5	Thermal Comfort: Controllability of Systems	1		
	Lighting, Visual & Acoustic Comfort				
	EQ6	Daylighting	2		
	EQ7	Daylight Glare Control	1		
	EQ8	Electric Lighting Levels	1		
	EQ9	Visual Comfort	2		
	EQ10	Acoustic Comfort	1		
	Verification				
EQ11	IAQ Before/During Occupancy	2			
EQ12	Occupancy Comfort Survey: Verification	1			
3	SC	SUSTAINABLE CONSERVATION & MANAGEMENT			
	Facility Management & Provision				
	SC1	GBI Rated Design & Construction	1		
	SC2	Building Exterior Management	1		
	SC3	Integrated Pest Management, Erosion Control & Landscape Management	1		
	SC4	Universal Access & Design Facilities	1		
	SC5	Historic Building Conservation Practices & Management	6		
	Reduce Heat Island Effect				
	SC6	Hardscape and Greenery Application	2		
	SC7	Roof Application	2		
	Manual & Documentation				
SC8	Building User Manual	1			

DETAIL ASSESSMENT CRITERIA

SUMMARY OF CONTENTS (CONTINUED)

PART	CRITERIA	ITEM	POINTS	SUBMITTER	GBI	
4	MR	MATERIALS & RESOURCES				
		Reused & Recycled Materials				
		MR1	Historic Material Reuse and Selection	11		
		MR2	Recycled Content Materials	2		
		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	2		
	WE5	Metering & Leak Detection System	2			
6	IN	INNOVATION				
		IN1	Innovation & Environmental Initiatives	13		
		IN2	Green Building Index Facilitator	1		
			TOTAL POINTS	100		

CRITERIA SIGNATORIES

The Historic Building Reference Guide is formatted parallel to the Historic Building Tool. This reference guide is envisaged as a live document that from time to time will be updated for the benefit of the end users.

The Historic Building Reference Guide has been formatted to form part of the basic criteria checklist for all documentation submissions for both the GBI Design Assessment (DA) and Completion & Verification Assessment (CVA). The cover sheet for each individual criteria shall be attached with the required documentation drawings, project narratives and technical submissions. All cover sheets shall be signed by the respective Lead Professional.

The table below lists 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 & Control	SP and C
	EE3	Automated Lighting Control	SP and C
	EE4	Renewable Energy	SP/S and C
	EE5	Advanced 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	Indoor Air Pollutants	PSP and C
	EQ4	Mould Prevention	PSP/SP and C
	EQ5	Thermal Comfort: Controllability of Systems	SP and C
	EQ6	Daylighting	PSP and C
	EQ7	Daylight Glare Control	PSP and C
	EQ8	Electrical Lighting Levels	SP and C
	EQ9	Visual Comfort	PSP/SP/S and C
	EQ10	Acoustic Comfort	PSP/SP/S and C
	EQ11	IAQ Before/During Occupancy	SP/S and C
EQ12	Occupancy Comfort Survey: Verification	S and C	
3	SC	SUSTAINABLE CONSERVATION & MANAGEMENT	
	SC1	GBI Rated Design & Construction	PSP/SP/S and C
	SC2	Building Exterior Management	PSP/SP/S and C
	SC3	Integrated Pest Management, Erosion Control & Landscape Management	PSP/SP/S and C
	SC4	Universal Access & Design Facilities	PSP and C
	SC5	Historic Building Conservation Practices & Management	PSP/SP/S and C
	SC6	Hardscape and Greenery Application	PSP/SP and C
	SC7	Roof Application	PSP/SP and C
SC8	Building User Manual	S and C	

GREEN BUILDING INDEX DESIGN REFERENCE GUIDE & SUBMISSION FORMAT

PART	CRITERIA	ITEM	REQUIRED SIGNATORIES
4	MR	MATERIALS & RESOURCES	
	MR1	Historic Material Reuse and Selection	PSP/SP and C
	MR2	Recycle Content Materials	PSP/SP and C
	MR3	Sustainable Timber	PSP/SP and C
	MR4	Sustainable Purchasing Policy	PSP/S and C
	MR5	Storage, Collection & Disposal of Recyclables	PSP/SP/S 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/SP and C
6	IN	INNOVATION	
	IN1	Innovation & Environmental Initiatives	PSP/SP/S and C
	IN2	Green Building Index Facilitator	S and C

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

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

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

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

SUBMISSION FORMAT

All required submission information shall be attached to the respective cover sheet along with relevant signatures for each criteria. The criteria checklist is to be marked by the submitter for all project documentation as described under "Required Submission for Design Assessment (DA)" or "Required Submission for Completion & Verification Assessment (CVA)". Please leave the GBI column blank 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) and Completion & Verification Assessment (CVA) submissions:

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 in pdf format. Two (2) hard copies and three (3) copies of CDROM are to be submitted to GSB.



NON-RESIDENTIAL EXISTING BUILDING (NREB):
HISTORIC BUILDING
ASSESSMENT CRITERIA

**NON-RESIDENTIAL EXISTING BUILDING (NREB):
HISTORIC BUILDING TOOL**

**ENERGY EFFICIENCY
(EE)**

NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL 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.

Note that compliance with this criterion is mandatory

DESCRIPTION

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

REQUIREMENTS

1 Point: Awarded for Overall Thermal Transfer Value (OTTV) ≤ 50 W/m², Roof U-Value ≤ 0.4 (Lightweight) & ≤ 0.6 (Heavyweight) and where applicable, Roof Thermal Transfer Value (RTTV) ≤ 25 W/m². Submit calculations for OTTV and RTTV. Use of the BEIT 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. Appointment letters of qualified professionals.	<input type="radio"/>	<input type="radio"/>
2. OTTV calculations for each facing wall and roof.	<input type="radio"/>	<input type="radio"/>
3. Description of specified wall & aperture materials.	<input type="radio"/>	<input type="radio"/>
4. Calculations of U-values for roof and wall assemblies.	<input type="radio"/>	<input type="radio"/>
5. Proposed glazing specifications including 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 ≥ 4000 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 including 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): HISTORIC BUILDING TOOL ENERGY EFFICIENCY (EE)

EE2	LIGHTING ZONING & CONTROL	1 POINT
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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 that are individually switched; and the maximum number of light fittings per circuit shall not exceed 10; with switching clearly labelled and easily accessible by building occupants.

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.

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.	<input type="radio"/>	<input type="radio"/>
3. Report to include the areas of all switched zones and confirmation that the proposed area comply with credit 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 and the area controlled by the switch.	<input type="radio"/>	<input type="radio"/>
3. Report to include the exact areas of all switched zones and confirmation that their total area meets the credit 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

NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL ENERGY EFFICIENCY (EE)

EE3	AUTOMATED LIGHTING CONTROL	2 POINTS
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INTENT

To provide automated lighting controls in conjunction with daylighting strategies and occupancy so as to optimise energy savings.

DESCRIPTION

Automated lighting control provides lighting only to those areas that are occupied or require lighting.

REQUIREMENTS

1 Point: Awarded for provision of auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylight areas.

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

APPROACH & IMPLEMENTATION

Automated lighting control helps to reduce energy consumption and costs by only lighting up those areas or zones that are occupied or required.

POTENTIAL TECHNOLOGIES & STRATEGIES

Lighting zones by means of individual automated sensing devices.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)	SUBMITTER	GBI
1. Drawings of floor plans clearly showing every proposed auto controlled lighting zone and its coverage area.	<input type="radio"/>	<input type="radio"/>
2. Electrical schematic drawings showing the locations and extent of switching area by the automated control sensing system.	<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 auto controlled 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 area by the automated control sensing system.	<input type="radio"/>	<input type="radio"/>
3. Report to include the exact areas of all switched zones and confirmation that the total areas meet 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

NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL ENERGY EFFICIENCY (EE)

EE4

RENEWABLE ENERGY

5 POINTS

INTENT

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

DESCRIPTION

The use of renewable energy systems helps defer the need for power plants and promotes and promote green energy use. Calculate the project performance by expressing the energy produced by renewable energy systems as a percentage of the building's annual energy use. In the context of Malaysia's built environment, the most likely form of renewable energy is derived from Solar PV. 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. Solar Photo Voltaic (PV) is recommended to generate renewable electricity for buildings in the Malaysian climate. PV systems can be grid connected or stand-alone with or without battery packs to store excess energy production.

POTENTIAL TECHNOLOGIES & STRATEGIES

Assess the project's potential for non-polluting and renewable energy generation 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 documentation of total kWp or equivalent to be installed.	<input type="radio"/>	<input type="radio"/>
3. Demonstrate 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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NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL ENERGY EFFICIENCY (EE)

EE5
ADVANCED EE PERFORMANCE - BEI
8 POINTS

INTENT

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

REQUIREMENTS

Up to 8 points are awarded by demonstrating 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 $BEI \leq 150$ kWh/m²/year
- 3 points** where $BEI \leq 140$ kWh/m²/year
- 4 points** where $BEI \leq 130$ kWh/m²/year
- 5 points** where $BEI \leq 120$ kWh/m²/year
- 6 Points** where $BEI \leq 110$ kWh/m²/year
- 7 points** where $BEI \leq 100$ kWh/m²/year
- 8 points** where $BEI \leq 90$ kWh/m²/year

Notes: BEI values listed above are applicable to Office Buildings only. Refer to GBI for BEI values for other categories of Non-Residential Buildings.

APPROACH & IMPLEMENTATION

Cutting edge technologies and materials should be fully explored to improve EE performance. 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.

CONTINUED ON NEXT PAGE

NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL ENERGY EFFICIENCY (EE)

EE5	ADVANCED EE PERFORMANCE - BEI	8 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. (GBI Certified or Silver ratings, may submit static energy calculations using manual method or software programs such as BEIT or other GBI approved software programs; GBI Gold or Platinum ratings, must use dynamic energy simulation using GBI approved software programs with accompanying report.)	<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): HISTORIC BUILDING TOOL ENERGY EFFICIENCY (EE)

EE6	ENHANCED OR RE-COMMISSIONING	2 POINTS
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INTENT

To ensure the building’s energy related systems are properly commissioned so as to realise their full potential and intent. This will help eliminate the bad practice of not fully commissioning 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 enhance EE performance.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Confirmation letter from the CxS of their 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): HISTORIC BUILDING TOOL
ENERGY EFFICIENCY (EE)**

EE7	ON-GOING POST OCCUPANCY COMMISSIONING	1 POINT
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INTENT

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

REQUIREMENTS

Professional Engineer shall review all tenancy fit-out plans to ensure original design intent is not compromised and sign off the completed works, **AND**

Carry out re-commissioning of the building’s energy related to systems for the affected tenancy areas.

APPROACH & IMPLEMENTATION

Professional engineers must check all fit-out designs and 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-outs.	<input type="radio"/>	<input type="radio"/>
2. 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): HISTORIC BUILDING TOOL ENERGY EFFICIENCY (EE)

EE8	EE MONITORING & IMPROVEMENT	1 POINT
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INTENT

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

REQUIREMENTS

Use Energy Management System (where mandated) to monitor and trend log building system performance especially for HVAC system efficiency including parameters for plant sequencing, etc., **OR**

If EMS is not mandated, set up an Energy Management team to manually monitor and improve building system performance.

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 commissioning the maximum demand limiting programme, (if applicable) and utilise EMS to monitor energy consumption, **OR**

If EMS is not mandated, manually 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, (if applicable) or if EMS is not mandated, provide comprehensive manual readings.	<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): HISTORIC BUILDING TOOL ENERGY EFFICIENCY (EE)

EE9	SUSTAINABLE MAINTENANCE	2 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 50% of the permanent building maintenance team participate in the commissioning of all building energy services, **AND**

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, understands the design intent and provides 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 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 50% 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):
HISTORIC BUILDING TOOL
**INDOOR ENVIRONMENTAL
QUALITY (EQ)**

NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL 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 the 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 the 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 Procedure can be used to determine the minimum required ventilation rates for various applications. The 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): HISTORIC BUILDING TOOL 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.

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
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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"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
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1. As-Built drawings identifying location of exterior 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 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): HISTORIC BUILDING TOOL INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ3	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 no 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 only 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): HISTORIC BUILDING TOOL INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ4	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 air-conditioning and mechanical ventilation systems 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 is controlled and monitored during construction and operation stages by control of the following:

- i. Rainwater leakage through roof and walls
- ii. Infiltration of moist air
- iii. Diffusion of moisture through walls, roof and floors
- iv. Groundwater intrusion into basements and crawl spaces through walls and floors
- v. Leaking or burst pipes
- vi. Indoor moisture sources
- vii. Construction moisture

OR

The 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): HISTORIC BUILDING TOOL
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ5	THERMAL COMFORT: DESIGN & CONTROLLABILITY OF SYSTEMS	1 POINT
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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 ≥ 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.

A totally non air-conditioned building will be deemed to comply with this criterion.

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): HISTORIC BUILDING TOOL INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ6	DAYLIGHTING	2 POINTS
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INTENT

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

DESCRIPTION

Design and implement good levels 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 point: 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 systems for buildings include windows, 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 as measured at the working plane. 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 daylight design strategies that will be undertaken to meet the credit requirements include all provisions for glare control.	<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): HISTORIC BUILDING TOOL INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ7	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 drawings 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): HISTORIC BUILDING TOOL INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ8	ELECTRIC LIGHTING LEVELS	1 POINT
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INTENT

To ensure lighting levels are not over-designed.

DESCRIPTION

Ensure lighting levels are 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 levels 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): HISTORIC BUILDING TOOL INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ9	VISUAL COMFORT	2 POINTS
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INTENT

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

DESCRIPTION

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

REQUIREMENTS

1 point: Demonstrating that $\geq 60\%$ 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 $\geq 75\%$ 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 views for spaces located near the core is the primary design objective.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

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

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-Built plans including interior layouts confirming there are direct lines 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 layouts 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): HISTORIC BUILDING TOOL INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ10	ACOUSTIC COMFORT	1 POINT
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INTENT

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

DESCRIPTION

Maintain internal noise levels at an acceptable and tolerable level.

REQUIREMENTS

Demonstrate that 90% of the NLA does not exceed the following ambient internal noise levels.

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

Note: Refer to GBI for non-office applications.

APPROACH & IMPLEMENTATION

Excessive noise can reduce productivity and cause discomfort to occupants. Some strategies to ensure acceptable noise levels are maintained include:

- i. Specify internal acoustics lining up to 5-10m of the AHU discharge duct
- ii. Specify use of duct silencers or sound attenuators
- iii. Specify acoustical ceiling
- iv. Specify furniture with sound absorbing surfaces on both sides
- v. Locate photocopiers, fax machines away from the main office areas in a separate area
- vi. Insulate partition cavities
- vii. 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 levels are 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): HISTORIC BUILDING TOOL INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ11	IAQ BEFORE & DURING OCCUPANCY	2 POINTS
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INTENT

To maintain good Indoor Air Quality conditions both before 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 at least 1 ACH continuously during the initial 14 days occupancy of the completed building, **OR**

Option 2: If low VOC materials and low formaldehyde composite wood products 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 levels 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 whether or not credit requirements have been met. 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): HISTORIC BUILDING TOOL INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ12	OCCUPANCY COMFORT SURVEY: VERIFICATION	1 POINT
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INTENT

To assess the comfort of building occupants.

DESCRIPTION

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

REQUIREMENTS

Conduct an occupancy comfort survey of building occupants. This survey should collect anonymous responses about thermal, visual and acoustic comfort in the building. It should include an assessment of overall satisfaction with thermal, visual and acoustic performance and identification of thermal, visual 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 concentrations.

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 if problem areas are 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 to be undertaken to meet credit requirements.	<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):
HISTORIC BUILDING TOOL
**SUSTAINABLE CONSERVATION
& MANAGEMENT (SC)**

NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL SUSTAINABLE CONSERVATION & MANAGEMENT (SC)

SC1	GBI RATED DESIGN & CONSTRUCTION	1 POINT
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INTENT

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

DESCRIPTION

Encourage buildings to subscribe to continuous improvements and maintenance of their green rating and energy efficiency efforts.

REQUIREMENTS

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

APPROACH & IMPLEMENTATION

Maintain green rating of the building throughout its life span through sustainable practices and compliance with GBI requirements. Continuously monitor the energy efficiency performance 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): HISTORIC BUILDING TOOL SUSTAINABLE CONSERVATION & MANAGEMENT (SC)

SC2	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; and conscious use of traditional materials, technologies and art forms when carrying out building management works. Use environmentally non-polluting methods and chemicals for cleaning of building exterior including maintenance equipment, chemicals, paint and sealants, **OR**

Employ materials sensitive to the historic nature of the built fabric. Use traditional materials and technologies, locally sourced where possible, for cleaning of building exterior including maintenance equipment, paints and sealants. Where contemporary materials need to be used, ensure compatibility with historic materials.

APPROACH & IMPLEMENTATION

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

Develop a building management plan that is sensitive to the historic nature of the built fabric.

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): HISTORIC BUILDING TOOL SUSTAINABLE CONSERVATION & MANAGEMENT (SC)

SC3	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): HISTORIC BUILDING TOOL SUSTAINABLE CONSERVATION & MANAGEMENT (SC)

SC4	UNIVERSAL DESIGN & ACCESS FACILITIES	1 POINT
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INTENT

Promote the accessibility of Historic buildings which are often also tourist attractions to all, especially people with disabilities.

DESCRIPTION

To encourage universal accessibility for people with disabilities, the elderly and the very young. This should not only include wheel chair access but also toilet and related facilities.

REQUIREMENTS

The building shall be designed to meet the following Malaysian Standards

1. MS1184: Code of Practice on access for disabled persons to public buildings
2. MS1183: Specifications for fire precautions in the design and construction of buildings. Part 8 Code of practice for means of escape for disabled persons
3. MS1331: Code of practice for access of disabled persons outside buildings

OR

Demonstrate full compliance to by-law 34A : Building requirement for disabled persons

APPROACH & IMPLEMENTATION

Submit plans for the building and the approved planning and building plan approvals where available.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit approved planning and building plans where available	<input type="radio"/>	<input type="radio"/>
2. Submit relevant details of the universal design strategies and facilities for the proposed building	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit as-built building plans and photographs of the building's universal design strategies and facilities	<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): HISTORIC BUILDING TOOL SUSTAINABLE CONSERVATION & MANAGEMENT (SC)

SC5	HISTORIC BUILDING CONSERVATION PRACTICE & DOCUMENTATION	6 POINTS
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INTENT

Encourage best practices in conservation to promote regeneration of historic buildings and sites, as a focus for environmental sustainability.

DESCRIPTION

Encourage conservation of historical buildings rather than demolish and re-build as a means to more sustainable development. Support the conservation of historic and heritage buildings in conservation zones through conservation according to recognised best practices and through proper and complete documentation.

REQUIREMENTS

Points shall be awarded according to the following criteria:

- 1 point:** Where the historic building is located in a "Conservation Zone".
- 2 points:** Where the conservation of the historic building is in accordance to recognised best practices
- 2 points:** Where the conservation of the historic building is documented.
- 1 point:** Where the conservation of the historic building has been recognised or awarded

APPROACH & IMPLEMENTATION

Submit the necessary zone plans for the building concerned and the approved planning and building plan approvals. Develop a building conservation plan that is in accordance with best recognised conservation practices and document the entire works conservation process.

AND

Where the building has been designated as a Heritage building, submit the necessary supporting documents.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)	SUBMITTER	GBI
1. Submit zoning plans, approved planning and building plans where available	<input type="radio"/>	<input type="radio"/>
2. Submit a method statement for the proposed conservation works to be carried out	<input type="radio"/>	<input type="radio"/>
3. Submit the supporting documents for Heritage designation for the building and site where relevant	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. Submit as-built building plans	<input type="radio"/>	<input type="radio"/>
2. Submit full construction records of the conservation works carried out	<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): HISTORIC BUILDING TOOL SUSTAINABLE CONSERVATION & MANAGEMENT (SC)

SC6	HARDSCAPE & GREENERY APPLICATION	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 adjacent habitats.

REQUIREMENTS

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;

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 site areas. Plants used should be of either native or adaptive types.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit Site plan showing the extent of proposed hardscape and greenery (softscape) (To scale).	<input type="radio"/>	<input type="radio"/>
2. 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 of completed hardscape and greenery	<input type="radio"/>	<input type="radio"/>
2. Submit photographs of hardscape & greenery	<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): HISTORIC BUILDING TOOL SUSTAINABLE CONSERVATION & MANAGEMENT (SC)

SC7	ROOF APPLICATION	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

1. Minimize impact on microclimate and adjacent habitats.
2. Roof application includes roofs over individual parking lots and roofs over parking structures.
3. 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: Roof Application

1. Use roofing material with a Solar Reflectance Index (SRI) equal to or greater than the value in the table below for a minimum of 75% of the roof surface, **OR**
2. Install a vegetated roof for at least 50% of the roof area, **OR**
3. Install high albedo and vegetated roof surfaces that, in combination, meet the following criteria:
(Area of SRI Roof / 0.75) + (Area of vegetated roof / 0.5) > Total Roof Area

Roof Type	Slope	SRI 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 Roof Plan showing the extent of proposed roof materials 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): HISTORIC BUILDING TOOL SUSTAINABLE CONSERVATION & MANAGEMENT (SC)

SC8	BUILDING USER MANUAL	1 POINT
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INTENT

To document green building design features and strategies for user information and guidance 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 highlights 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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NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

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

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

MR1

HISTORIC MATERIAL REUSE AND SELECTION

11 POINTS

INTENT

To encourage designers to specify the reuse of historic building materials when retrofitting historic buildings.

DESCRIPTION

Reuse historic building materials and products, not to only reduce demand for virgin materials and reduce creation of waste, but also to preserve the cultural social and historical values associated with them. This serves to reduce the environmental impact associated with extraction and processing of virgin resources.

The employment of traditional craft skills and craft persons in the maintenance, restoration and upkeep of the historic built fabric serves to keep alive traditional trades and practices and protect intangible heritage. 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. The restoration and reuse of the original built fabric, which have high inherent embodied energy keeps alive both the values associated with the traditional technologies, the craftsmen practising these skills and the knowledge systems they represent.

REQUIREMENTS

2 points: Where reused products/materials constitute more than 5% of the project's total retrofit material cost value, **OR**

3 points: Where reused products/materials constitute more than 10% of the project's total retrofit material cost value.

1 point: Where traditional local craftsmen and knowledge systems are employed, **OR**

Where training programs and capacity building are provided to train new tradesmen in traditional materials, skills, technologies and knowledge systems

2 points: Where reused materials/products constitute more than 10% of the total reuse materials sourced within 500km locally, **OR**

3 points: Where reused materials/products constitute more than 20% of the total reuse materials sourced within 500km locally.

Encourage the reuse of historic objects, their preservation and safe guarding, as an important component of Heritage & Conservation. Where new interventions are necessary, especially in the case of adaptive reuse; then, increase demand for building products that incorporate recycled content materials in their production. (Recycled content shall be as defined in the ISO 14021)

2 points: Where the percentage (%) of conserved and reused (inclusive of objects salvaged from other sites) materials and objects in the heritage building (such as old photographs/ plans/ furniture/ etc.) exceeds 20%, **OR**

3 points: Where the percentage (%) of conserved and reused (inclusive of objects salvaged from other sites) materials and objects in the heritage building (such as old photographs/ plans/ furniture/ etc.) exceeds 30%

1 point: Where conservation/ restoration process includes training and capacity building programs for the locals or site managers, to enable them to maintain the interior materials and objects.

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 conservation and refurbishment of historic 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.

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

MR1	HISTORIC MATERIAL REUSE AND SELECTION	11 POINTS
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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). Where traditional local craftsmen and knowledge systems are employed :: Employ local crafts person for restoration and refurbishment or train local people and communities in the traditional building crafts through the creation of a training or apprenticeship program.

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. Indicate the 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"/>
5. Traditional Local Craftsmen used, through the employment of local community for restoration and refurbishment. Local community will constitute people residing within the same city/ town as the built premises.	<input type="radio"/>	<input type="radio"/>
6. Capacity Building Programs: Where technology and crafts persons who are not local are employed , to train the local community. For example: If timber door restoration requires the importing of skilled crafts persons from China, the creation of a local apprenticeship program where local wood workers can learn the maintenance and upkeep of these components.	<input type="radio"/>	<input type="radio"/>
7. An inventory of heritage objects within the Historic Building Fabric including their retention and use.	<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"/>
6. List of local crafts persons employed along with their contact information and expertise.	<input type="radio"/>	<input type="radio"/>
7. Photographic and video documentation of the apprenticeship program and the people registered in the program.	<input type="radio"/>	<input type="radio"/>
8. Detailed inventory of objects within the Historic Building Fabric before and after restoration.	<input type="radio"/>	<input type="radio"/>

Note: The National Heritage Department of Malaysia provides references for undertaking a HABS I, II and III and will be the benchmark for Historic Building and Object Documentation.

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

MR2

RECYCLED CONTENT MATERIALS

2 POINTS

INTENT

To encourage designers to specify the usage of recycled content materials when conserving & 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, **OR**

2 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 $\geq 30\%$ (based on cost) of project's total retrofit material cost value.

APPROACH & IMPLEMENTATION

The goal of using materials with recycled content should be established during the design phase. The project team must identify materials with recycled content and their 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)

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.

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

MR2	RECYCLED CONTENT MATERIALS	2 POINTS
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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 to 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): HISTORIC BUILDING TOOL MATERIALS AND RESOURCES (MR)

MR3	SUSTAINABLE TIMBER	1 POINT
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INTENT

To promote responsible forest management.

DESCRIPTION

Encourage the use of environmentally responsible timber products.

REQUIREMENTS

Where $\geq 75\%$ 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 in the project. Compliance with Forest Stewardship Council or 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 or 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 or 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 or 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 or 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): HISTORIC BUILDING TOOL MATERIALS AND RESOURCES (MR)

MR4	SUSTAINABLE PURCHASING POLICY	1 POINT
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INTENT

To promote the use of sustainable consumer products for 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 tenants.

REQUIREMENTS

Develop a sustainable purchasing policy that covers product purchases within the building 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 the 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): HISTORIC BUILDING TOOL 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 waste for recycling during construction (consumables - glass, paper, metal, equipment, addition & alteration construction wastes) and during occupancy.

1 point: Promote and encourage waste minimization and recycling among occupants, tenants and visitors through appropriate strategies.

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's occupants/operations.

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's entrance and vehicular access points.	<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 and/or vehicular access point.	<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): HISTORIC BUILDING TOOL 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 exceed 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):
HISTORIC BUILDING TOOL**

**WATER EFFICIENCY
(WE)**

NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL 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 usage and/or irrigation.

REQUIREMENTS

Rainwater harvesting that achieves the following percentage in reduction of potable water consumption:

- 1 point:** For $\geq 5\%$ or more reduction, **OR**
- 2 points:** For $\geq 15\%$ or more reduction, **OR**
- 3 points:** For $\geq 30\%$ or more reduction.

Submit calculation demonstrating reduction in water consumption compared to the existing building's water usage, including 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 are encouraged to avoid additional energy use for pumping. Use rainwater for non- potable applications such as toilet and urinal flushing, landscape irrigation, general cleaning, 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"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL 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 $\geq 10\%$ or more wastewater being treated and recycled, **OR**

2 points: For $\geq 30\%$ 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 system.

Options for on-site wastewater treatment including 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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NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL WATER EFFICIENCY (WE)

WE3	WATER EFFICIENT IRRIGATION / LANDSCAPING	2 POINTS
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INTENT

To encourage and recognise the design of landscaping systems that minimise or do 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 used for landscape irrigation. This may be achieved by harvesting rainwater for irrigation use as well as 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"/>

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NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL WATER EFFICIENCY (WE)

WE4	WATER EFFICIENT FITTINGS	2 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 $\geq 50\%$ 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 $\geq 50\%$ 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 condition.

APPROACH & IMPLEMENTATION

The use of water efficient water closets, taps, shower heads or other systems which have 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 waterless urinals.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. A brief description of the systems used and how they meet the requirement for the credit requirements.	<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 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

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL WATER EFFICIENCY (WE)

WE5	METERING & LEAK DETECTION SYSTEM	2 POINTS
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INTENT

To encourage the design of systems that allow 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.

If EMS is not mandated, set up an Energy Management team to manually monitor and detect water leakage on a daily basis.

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 reduce 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
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**NON-RESIDENTIAL EXISTING BUILDING (NREB):
HISTORIC BUILDING TOOL**

**INNOVATION
(IN)**

NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL INNOVATION (IN)

IN1

INNOVATION

13 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 building design and performance:

1 point for each approved innovation and environmental design initiative up to a maximum of 13 points, for innovative ideas such as, but not limited to:

1. Demonstrate significant vernacular environmental features
2. Demonstrate high level of Architectural significance of the era
3. Show significant Engineering advancement of the era
4. Seamless integration of new into old building
5. Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling tower make-up water etc;
6. Recycling of fire sprinkler system water during regular testing;
7. Light pipes accounting for at least 1% of NLA ;
8. Central vacuum system (serving at least 50% of NLA);
9. QLASSIC compliance
10. Electric sub-meters for major energy uses to facilitate energy efficiency management Carbon Dioxide (CO₂) monitoring and control system
11. Carbon Dioxide(CO₂) monitoring and control system"
12. Herbs Garden
13. IBS compliance
14. On-site Composting
15. External Shading
16. Vertical Greenery
17. LED Façade lighting
18. Educational Green Display
19. Bicycle Facilities
20. Maximum Demand Limiting (MDL) programing

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): HISTORIC BUILDING TOOL INNOVATION (IN)

IN1	INNOVATION	13 POINTS
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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 consumption 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): HISTORIC BUILDING TOOL 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
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CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE

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GSB would like to thank all contributors for efforts in preparing the Non-Residential Existing Building (NREB): Historical Building Design Reference Guide Version 1.0. The following are the main contributors to the formation of this document:

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