



**RESIDENTIAL NEW
CONSTRUCTION
(RNC)**

**DESIGN REFERENCE GUIDE
& SUBMISSION FORMAT**

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INTRODUCTION

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

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

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

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

A summary of the stages is described below:

STAGE 1 | APPLICATION & REGISTRATION

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

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

GBI Terms & Conditions

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

STAGE 2 | DESIGN ASSESSMENT (DA)

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

STAGE 3 | COMPLETION & VERIFICATION ASSESSMENT (CVA)

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

Facilitators verify before submission of CPC (or CCC/OC/OP whichever is the later); on the project classification. The verification process involves verifying the actual measured energy and water use, sustainable site measures, indoor comfort survey results and action plan, Building Manual and Sustainable Maintenance program. CVA submission can be done upon CPC submission. A full Certification is given at this stage. A summary Completion & Verification Assessment (CVA) checklist is provided to determine target scoring.

APPEAL PROCEDURES

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

VALIDITY OF CERTIFICATION

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

CERTIFIERS & FACILITATORS

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

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

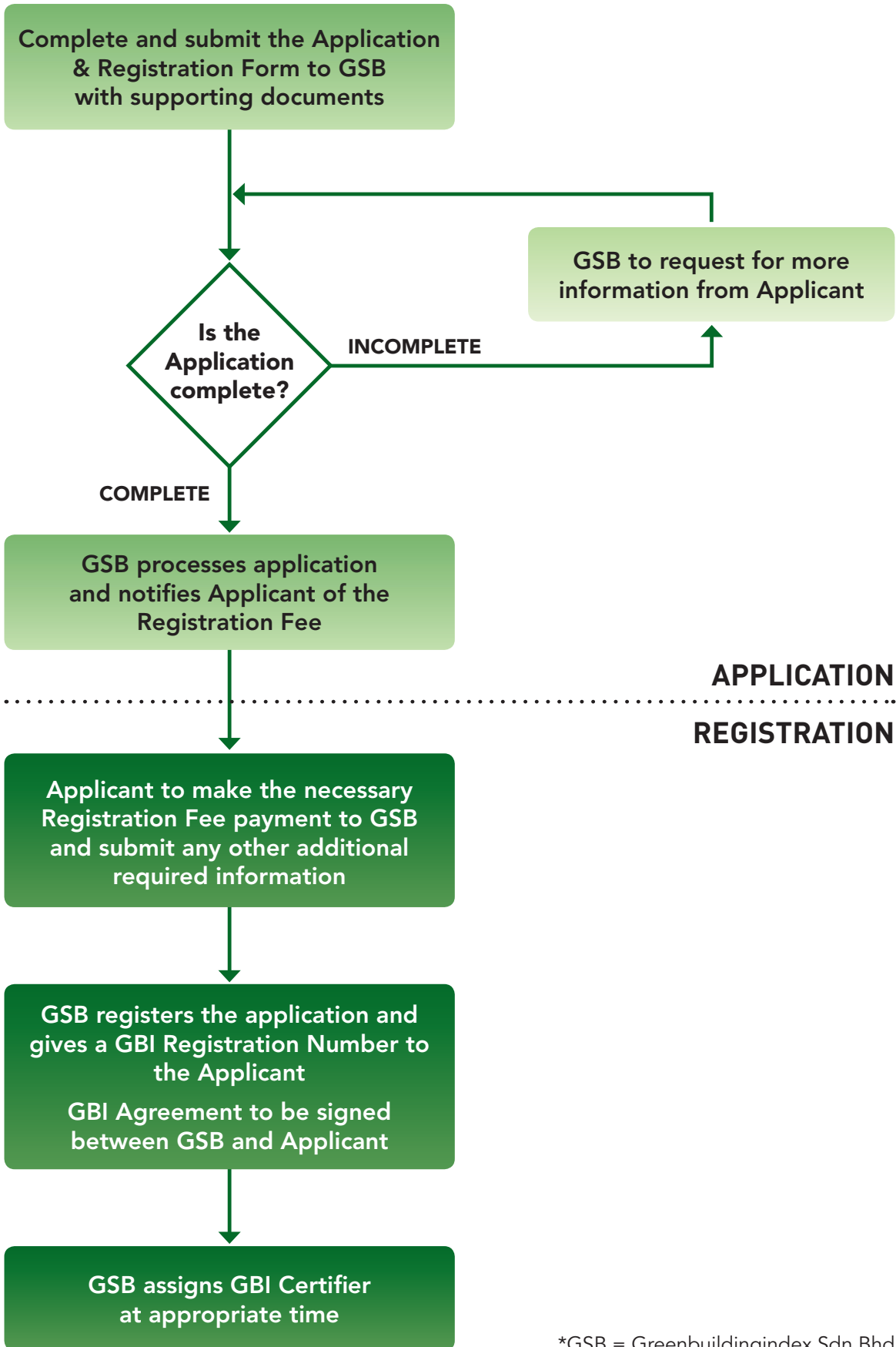
GBI TERMS & CONDITIONS

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



**RESIDENTIAL NEW
CONSTRUCTION (RNC)
PROCEDURES**

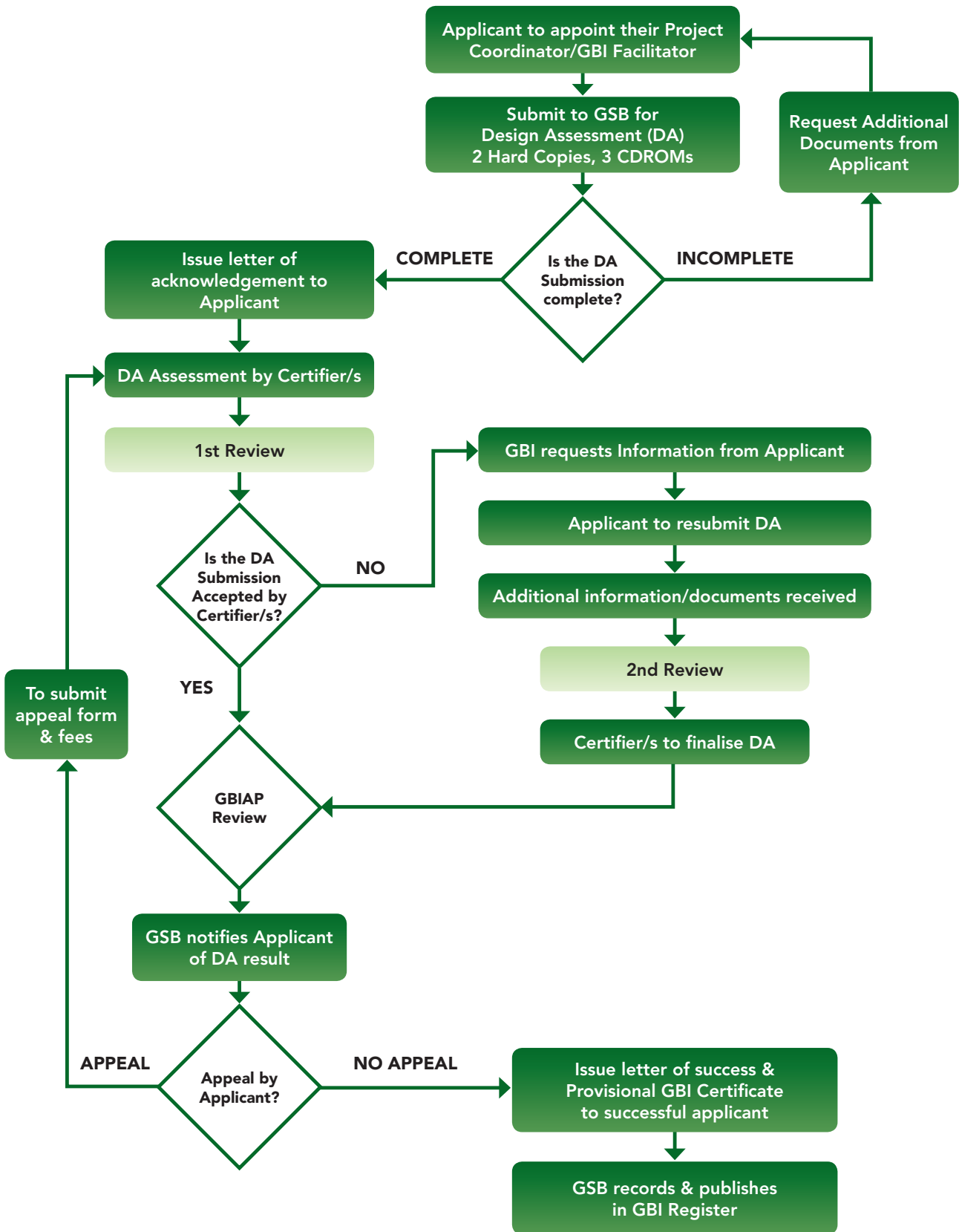
STAGE 1 APPLICATION & REGISTRATION



**APPLICATION
REGISTRATION**

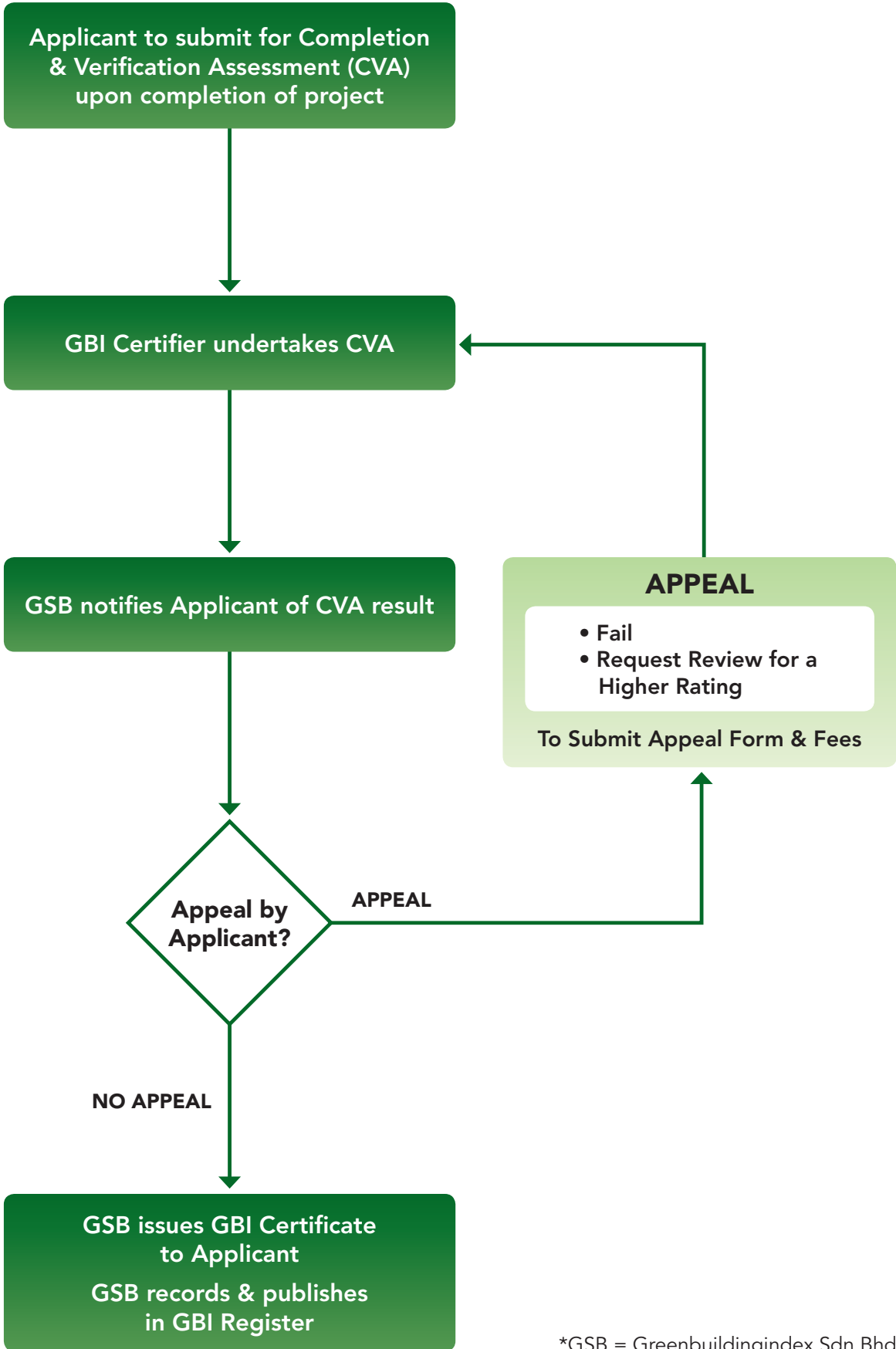
*GSB = Greenbuildingindex Sdn Bhd

STAGE 2 DESIGN ASSESSMENT (DA)



*GSB = Greenbuildingindex Sdn Bhd

STAGE 3 COMPLETION & VERIFICATION ASSESSMENT (CVA)



*GSB = Greenbuildingindex Sdn Bhd



**RESIDENTIAL NEW
CONSTRUCTION (RNC)
CRITERIA CHECKLIST
& SUBMISSION FORMAT**

RESIDENTIAL NEW CONSTRUCTION (RNC) PROJECT INFORMATION

PROJECT NAME	
PROJECT ADDRESS	
POSTCODE	
STATE	

APPLICANT	
CONTACT PERSON	

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

BUILDING DESCRIPTION	

RESIDENTIAL NEW CONSTRUCTION (RNC)

ASSESSMENT CRITERIA OVERALL POINTS SCORE

PART	ITEM	MAXIMUM POINTS
1	Energy Efficiency	23
2	Indoor Environmental Quality	11
3	Sustainable Site Planning & Management	39
4	Material & Resources	9
5	Water Efficiency	12
6	Innovation	6
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

RESIDENTIAL NEW CONSTRUCTION (RNC) ASSESSMENT CRITERIA SCORE SUMMARY

PART	CRITERIA	ITEM	POINTS	SUBMITTER	GBI
1	EE	ENERGY EFFICIENCY			
	EE1	Minimum EE Performance	3		
	EE2	Renewable Energy	5		
	EE3	Advanced EE Performance based on OTTV & RTTV	10		
	EE4	Home Office & Connectivity	2		
	EE5	Sustainable Maintenance	3		
2	EQ	INDOOR ENVIRONMENTAL QUALITY			
	Air Quality, Lighting, Visual & Acoustic Comfort				
	EQ1	Minimum IAQ Performance	2		
	EQ2	Daylighting	2		
	EQ3	Sound Insulation	2		
	EQ4	Good Quality Construction	1		
	EQ5	Volatile Organic Compounds	1		
	EQ6	Formaldehyde Minimisation	1		
Verification					
EQ7	Post Occupancy Evaluation: Verification	2			
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT			
	Site Planning & Transport				
	SM1	Site Selection	1		
	SM2	Public Transportation Access	12		
	SM3	Community Services & Connectivity	8		
	SM4	Open Spaces, Landscaping & Heat Island Effect	4		
	Site & Construction Management				
	SM5	Construction System & Site Management	3		
	SM6	Stormwater Management	3		
	SM7	Re-development of Existing Sites & Brownfield Sites	4		
SM8	Avoiding Environmentally Sensitive Areas	2			
SM9	Building User Manual	2			
4	MR	MATERIALS & RESOURCES			
	Reused & Recycled Materials				
	MR1	Storage & Collection of recyclables	2		
	MR2	Materials Reuse and Selection	2		
	MR3	Construction Waste Management	2		
	Sustainable Resources				
	MR4	Recycled Content Materials	1		
MR5	Regional Materials	1			
MR6	Sustainable Timber	1			
5	WE	WATER EFFICIENCY			
	Water Harvesting & Recycling				
	WE1	Rainwater Harvesting	4		
	WE2	Water Recycling	2		
	Increased Efficiency				
WE3	Water Efficient Landscaping	2			
WE4	Water Efficient Fittings	4			
6	IN	INNOVATION			
	IN1	Innovation in Design & Environmental Design Initiatives	5		
	IN2	Green Building Index Facilitator (GBIF)	1		

RESIDENTIAL NEW CONSTRUCTION (RNC)

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

The Reference guide has been formatted to form part of the basic criteria checklist for all documentation submissions for both the Design Assessment (DA) and Completion & Verification Assessment (CVA). The front cover sheet of the the individual criteria will be attached with the documentation drawings, project narratives and technical submissions. The criteria checklist will be signed by the Principal Submitting Person (in short "PSP"), Submitting Person (in short "SP") or Specialist (in short "S") together with the client's (in short "C").

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

PART	CRITERIA	ITEM	REQUIRED SIGNATORIES
1	EE	ENERGY EFFICIENCY	
	EE1	Minimum EE Performance	PSP and C
	EE2	Renewable Energy	SP/S and C
	EE3	Advanced EE Performance based on OTTV & RTTV	SP/S and C
	EE4	Home Office & Connectivity	SP/S and C
	EE5	Sustainable Maintenance	SP/S and C
2	EQ	INDOOR ENVIRONMENTAL QUALITY	
	EQ1	Minimum IAQ Performance	PCP and C
	EQ2	Daylighting	PSP and C
	EQ3	Sound Insulation	PSP/SP and C
	EQ4	Good Quality Construction	SP and C
	EQ5	Volatile Organic Compounds	PSP/SP and C
	EQ6	Formaldehyde Minimisation	PSP/SP and C
EQ7	Post Occupancy Comfort Survey: Verification	S and C	
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT	
	SM1	Site Selection	PSP and C
	SM2	Public Transportation Access	PSP/SP and C
	SM3	Community Services & Connectivity	SP and C
	SM4	Open Spaces, Landscaping & Heat Island Effect	PSP/SP and C
	SM5	Construction System & Site Management	PSP/SP and C
	SM6	Stormwater Management	SP and C
	SM7	Re-development of Existing Sites & Brownfield Sites	PSP and C
	SM8	Avoiding Environmentally Sensitive Areas	PSP and C
SM9	Building User Manual	S and C	

CONTINUED ON NEXT PAGE

RESIDENTIAL NEW CONSTRUCTION (RNC)

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

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

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

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

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

SUBMISSION FORMAT & SIGNATURES

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

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

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

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



**RESIDENTIAL NEW
CONSTRUCTION (RNC)
ASSESSMENT CRITERIA**

RESIDENTIAL NEW CONSTRUCTION (RNC)
ENERGY EFFICIENCY
(EE)

RESIDENTIAL NEW CONSTRUCTION (RNC) ENERGY EFFICIENCY (EE)

EE1

MINIMUM EE PERFORMANCE

3 POINTS

INTENT

To create EE awareness, promote the use of MS 1525 and to provide a thermally comfortable environment to reduce the use of air-conditioning in residential building, thereby reducing CO₂ emission.

DESCRIPTION

Establish minimum energy efficiency (EE) performance to reduce energy consumption in buildings, thus reducing CO₂ emission to the atmosphere. Meet the following minimum EE requirements as stipulated in MS 1525:2007.

REQUIREMENTS

OTTV ≤ 50, RTTV ≤ 25. Submit calculations using the BEIT software or other GBI approved software/s, **AND**

Roof U-value ≤ 0.4 W/m²K (Lightweight),

U-value ≤ 0.6 W/m²K (Heavyweight).

APPROACH & IMPLEMENTATION

Wall insulation can be made using autoclaved lightweight concretes, composite insulated walls, double brickwall and many other option. Glazing should be optimally sized and the use of 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.

Solar shading devices that block out direct sunlight through glazing have a critical effect on the OTTV value of a buildings and their sizing and selection using the solar shading coefficients from the graphs derived from Tables 5,6 and 7 of MS 1525 will greatly assist in bringing down the OTTV. Insulation in roofs is a basic requirement in order to comply with MS 1525 as the greatest amount of heat entering low rise housing is through the roof.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Plan and elevations marking out wall & apertures used for the calculation coloured blue and walls & apertures not used for calculation coloured red. Recommended scale 1: 200.	<input type="radio"/>	<input type="radio"/>
2. Calculations for each facing wall.	<input type="radio"/>	<input type="radio"/>
3. Description and section of wall/roof & aperture materials specified	<input type="radio"/>	<input type="radio"/>
4. Calculations of U-values for roof and walls.	<input type="radio"/>	<input type="radio"/>
5. Proposed Glazing specifications on Shading Coefficient, U-value and visible light transmission.	<input type="radio"/>	<input type="radio"/>
6. For repetitive housing, OTTV of each building type of different orientations to be submitted separately.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As Built plan and elevations marking out wall & apertures used for the calculation coloured blue and walls & apertures not used for calculation coloured red. Recommended scale 1: 200.	<input type="radio"/>	<input type="radio"/>
2. Calculations for each facing wall.	<input type="radio"/>	<input type="radio"/>
3. Description of built wall & aperture materials with U-value calculation.	<input type="radio"/>	<input type="radio"/>
4. Manufacturer issued glazing specification on shading coefficient, U-values and Visible Light Transmission.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

RESIDENTIAL NEW CONSTRUCTION (RNC) ENERGY EFFICIENCY (EE)

EE2
RENEWABLE ENERGY
5 POINTS

INTENT

To promote the use of renewable energy in residential buildings for self-supply in order to reduce environmental impact due to emission of CO₂.

DESCRIPTION

The use of renewable energy systems is to offset energy cost and promote green energy use. Calculate the project performance by expressing the energy produced by the renewable systems as a percentage of the building annual energy use. The table below display the number of points achievable.

REQUIREMENTS

To provide renewable energy at these conditions:

(a) Low rise (3 storeys and below)

1 point : Awarded where 20% (of the total electricity consumption is generated by renewable energy) or 1 kWp (of BIPV) whichever is the lower, **OR**

2 points : Awarded where 40% or 2 kWp whichever is the lower, **OR**

3 points : Awarded where 60% or 3 kWp whichever is the lower, **OR**

4 points : Awarded where 80% or 4 kWp whichever is the lower, **OR**

5 points : Awarded where 100% or 5 kWp whichever is the lower.

(b) High rise (Above 3 storeys)

1 point : Awarded where 0.5% (of the total electricity consumption is generated by renewable energy) or 5 kWp (of BIPV) whichever is the greater, **OR**

2 points : Awarded where 1.0% or 10 kWp whichever is the greater, **OR**

3 points : Awarded where 1.5% or 15 kWp whichever is the greater, **OR**

4 points : Awarded where 2.0% or 20 kWp whichever is the greater, **OR**

5 points : Awarded where 2.5% or 25 kWp whichever is the greater.

APPROACH & IMPLEMENTATION

Assess the project for renewable energy potential including solar, wind, geothermal, low-impact hydro, biomass and other similar technologies. Building Integrated PhotoVoltaic (BIPV) is highly recommended be used to generate renewable electricity in residential building in Malaysia climate. The BIPV system can be grid integrated or stand-alone system with battery pack to store excess energy production. Solar hot water system may also be used to generate hot water for residential homes, the electrical energy offset by the solar hot water system will be considered as renewable energy.

CONTINUED ON NEXT PAGE

**RESIDENTIAL NEW CONSTRUCTION (RNC)
ENERGY EFFICIENCY (EE)**

EE2	RENEWABLE ENERGY	5 POINTS
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REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Plan and elevations marking out areas used by renewable energy equipment. Recommended scale 1: 200.	<input type="radio"/>	<input type="radio"/>
2. Technology to be used. Total areas of renewable energy equipment, total kWp and predicted annual generation in kWh.	<input type="radio"/>	<input type="radio"/>
3. Predicted total electricity consumption by the building.	<input type="radio"/>	<input type="radio"/>
4. Percentage of renewable energy over total electricity consumption.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As Built plan and elevations marking out area used by the renewable energy equipment. Recommended scale 1: 200.	<input type="radio"/>	<input type="radio"/>
2. Photograph of completed installation.	<input type="radio"/>	<input type="radio"/>
3. Manufacturer issued specification on the renewable energy equipment.	<input type="radio"/>	<input type="radio"/>
4. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

**RESIDENTIAL NEW CONSTRUCTION (RNC)
ENERGY EFFICIENCY (EE)**

EE3	ADVANCED EE PERFORMANCE BASED ON OTTV & RTTV	10 POINTS
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INTENT

To encourage enhancement to building to provide a thermally comfortable environment to reduce the use of air-conditioning in residential building, thereby reducing CO₂ emission.

REQUIREMENTS

Design the residential building to meet these conditions to obtain credits.

- | | |
|---|---|
| <p>2 points OTTV ≤ 46 W/m²
Lightweight Roof U-value ≤ 0.35 W/m²K
Heavyweight Roof U-value ≤ 0.5 W/m²K</p> | <p>8 points OTTV ≤ 40 W/m²
Lightweight Roof U-value ≤ 0.2 W/m²K
Heavyweight Roof U-value ≤ 0.2 W/m²K</p> |
| <p>4 points OTTV ≤ 44 W/m²
Lightweight Roof U-value ≤ 0.30 W/m²K
Heavyweight Roof U-value ≤ 0.4 W/m²K</p> | <p>10 points OTTV ≤ 38 W/m²
Lightweight Roof U-value ≤ 0.15 W/m²K
Heavyweight Roof U-value ≤ 0.15 W/m²K</p> |
| <p>6 points OTTV ≤ 42 W/m²
Lightweight Roof U-value ≤ 0.25 W/m²K
Heavyweight Roof U-value ≤ 0.3 W/m²K</p> | |

APPROACH & IMPLEMENTATION

Wall insulation can be made using autoclaved lightweight concretes, composite insulated walls, double brickwall and many other option. Glazing should be optimally sized and the use of 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.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Plan and elevations marking out wall & apertures used for the calculation coloured blue and walls & apertures not used for calculation coloured red. Recommended scale 1: 200.	<input type="radio"/>	<input type="radio"/>
2. Calculations for each facing wall.	<input type="radio"/>	<input type="radio"/>
3. Description and section of wall/roof & aperture materials specified.	<input type="radio"/>	<input type="radio"/>
4. Calculations of U-values for roof and walls.	<input type="radio"/>	<input type="radio"/>
5. Proposed Glazing specifications on Shading Coefficient, U-value and visible light transmission.	<input type="radio"/>	<input type="radio"/>
6. For repetitive housing, OTTV of each building type of different orientations to be submitted separately.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As Built plan and elevations marking out wall & apertures used for the calculation coloured blue and walls & apertures not used for calculation coloured red. Recommended scale 1: 200.	<input type="radio"/>	<input type="radio"/>
2. Calculations for each facing wall.	<input type="radio"/>	<input type="radio"/>
3. Description of built wall & aperture materials with U-value calculation.	<input type="radio"/>	<input type="radio"/>
4. Manufacturer issued glazing specification on shading coefficient, U-values and Visible Light Transmission.	<input type="radio"/>	<input type="radio"/>
5. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

**RESIDENTIAL NEW CONSTRUCTION (RNC)
ENERGY EFFICIENCY (EE)**

EE4	HOME OFFICE & CONNECTIVITY	2 POINTS
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INTENT

To encourage dual use spaces and working from home, thereby discouraging commuting and reducing CO₂ emission.

REQUIREMENTS

Multiple use type developments, **OR**
High Speed Internet access available at homes > 1MB/s.

APPROACH & IMPLEMENTATION

Design residential homes with spaces for home-office. Or provide high speed internet connection to homes.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Provide plan layout marking out spaces for home-office use. Recommended scale 1: 200, OR	<input type="radio"/>	<input type="radio"/>
2. Provide letter of support from Internet Service Provider.	<input type="radio"/>	<input type="radio"/>
3. Provide wiring plan for the internet service from outside manhole to building where the service is not wireless	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As built Plan marking out spaces for home-office use. Recommended scale 1:200, OR	<input type="radio"/>	<input type="radio"/>
2. Official documentation from Internet Service Provider providing a minimum of 1 MB/s connection to the buildings.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

PROJECT NAME				DATE
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RESIDENTIAL NEW CONSTRUCTION (RNC)
ENERGY EFFICIENCY (EE)

EE5	SUSTAINABLE MAINTENANCE	3 POINTS
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INTENT

Ensure the building’s energy related systems will continue to perform as intended beyond the 12 months Defects & Liability Period.

REQUIREMENTS

Two types of Building Management is provided under this criteria.

(a) Buildings With Common Management

3 points awarded with the following requirements:

- Provide a designated building maintenance office equipped with facilities (including tools and instrumentation) and inventory storage;
- Provide evidence of documented plan for at least 3 year facility maintenance and preventative maintenance budget

(b) Buildings Without Common Management

3 points awarded with the following requirements:

- Provide evidence of documented plan for at least 3 year facility maintenance and preventative maintenance budget

APPROACH & IMPLEMENTATION

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Identify building maintenance room and facilities in the design floor plans.	<input type="radio"/>	<input type="radio"/>
2. Commitment to engage at least 50% of permanent building maintenance team before practical completion with proposed 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 of engagement of 50% of the maintenance team one to three months before practical completion who are then 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 including photographic evidence.	<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 deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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RESIDENTIAL NEW CONSTRUCTION (RNC)
**INDOOR ENVIRONMENTAL
QUALITY (EQ)**

RESIDENTIAL NEW CONSTRUCTION (RNC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ1	MINIMUM IAQ PERFORMANCE	2 POINTS
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INTENT

To establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in building, thus contributing to the comfort and well-being of the occupants.

DESCRIPTION

Ensure that adequate fresh air is supplied to occupied spaces to maintain good air quality in building.

REQUIREMENTS

1 point : Provide the minimum requirements of ventilation rate as per local building code (1 point).

2 points : Provide natural cross-ventilation or stack ventilation for all public and circulation spaces (2 points).

APPROACH & IMPLEMENTATION

Provide adequate openings as required by the local building code. Cross ventilation is obtainable by having opening in both sides of the room. Stack ventilation is obtainable by having low opening and high openings for the same space.

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 to show calculations that meet the local building 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 has complied to local code including information regarding the cross or stack ventilation design and any special conditions that affected the project ventilation design.	<input type="radio"/>	<input type="radio"/>
3. Calculations to show that the openings provided meets the local code.	<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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RESIDENTIAL NEW CONSTRUCTION (RNC) INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ2	DAYLIGHTING	2 POINTS
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INTENT

To encourage provision of daylighting in buildings.

DESCRIPTION

Design and implement good level of daylight in buildings.

REQUIREMENTS

1 point : Demonstrate that $\geq 50\%$ of the habitable rooms has a daylight factor in the range of 1.0 – 3.5% as measured at floor level, **OR**

2 points : Demonstrate that $\geq 75\%$ of the habitable rooms has a daylight factor in the range of 1.0 – 3.5% as measured at floor level.

APPROACH & IMPLEMENTATION

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Site plan with height of surrounding buildings indicated.	<input type="radio"/>	<input type="radio"/>
2. Plan and section indicating the daylight factor range achieved in habitable rooms.	<input type="radio"/>	<input type="radio"/>
3. Summary of daylight factor targets.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As Built drawings and specifications to demonstrate that the daylighting has been constructed according to design drawings/specifications.	<input type="radio"/>	<input type="radio"/>
2. Typical floor plans with daylight factor simulation/calculation/measured results.	<input type="radio"/>	<input type="radio"/>
3. Site plan with height of existing buildings or planned buildings surrounding the building to be indicated.	<input type="radio"/>	<input type="radio"/>
4. Summary of daylight factor results.	<input type="radio"/>	<input type="radio"/>
5. Manufacturer Information on the daylighting system used (if applicable).	<input type="radio"/>	<input type="radio"/>
6. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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RESIDENTIAL NEW CONSTRUCTION (RNC) INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ3

SOUND INSULATION

2 POINTS

INTENT

To reduce noise pollution between spaces.

DESCRIPTION

Ensure that the building walls and floors system is designed with adequate noise absorption properties to maintain good acoustical quality for the neighbourhood.

REQUIREMENTS

Ensure that the air borne sound penetration between spaces are controlled within the following criteria:

1 point : Awarded where Inter dwelling sound penetration between dwelling units does not exceed <45 dBAeq.

1 point : Awarded where Intra dwelling air borne sound penetration between walls in the same dwelling unit should not exceed the following values:

- Bedroom < 40 dBAeq
- Other areas < 30 dBAeq

APPROACH & IMPLEMENTATION

Provide party walls with heavy mass or sound insulation materials to reduce transmission of noise between walls. Consider floor underlayments for floors above, to separate the floor's surface above from the ceiling down below. The separation point will serve to disconnect the rooms, decoupling the foot noise and other impact sounds that would otherwise work to vibrate energy through. A 120mm thick brick wall with cement render on both sides to weight of 245 kg/m² will be deemed to have air borne sound reduction value of 45 dBAeq.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. A summary report describing acoustical features to be provided in the building design.	<input type="radio"/>	<input type="radio"/>
2. Typical layout with walls and floors with noise attenuation properties clearly marked. Provide legends to show level of sound attenuation level and computation of sound attenuation level.	<input type="radio"/>	<input type="radio"/>
3. Summary table of sound attenuation targets.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As built drawings and specifications to demonstrate that the acoustical features has been constructed according to design drawings/specifications.	<input type="radio"/>	<input type="radio"/>
2. As built acoustic test results.	<input type="radio"/>	<input type="radio"/>
3. Typical layout with walls and floors with noise attenuation properties clearly marked. Provide legends to show level of sound attenuation level and computation of sound attenuation level.	<input type="radio"/>	<input type="radio"/>
4. Manufacturer Information on the acoustical system used.	<input type="radio"/>	<input type="radio"/>
5. Summary table of sound attenuation results	<input type="radio"/>	<input type="radio"/>
6. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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RESIDENTIAL NEW CONSTRUCTION (RNC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ4	GOOD QUALITY CONSTRUCTION	1 POINT
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INTENT

To encourage and recognise good quality constructions.

DESCRIPTION

Promote good quality constructions to reduce repetitive re-work that waste materials and renovation.

REQUIREMENTS

Subscribe to independent method to assess and evaluate quality of workmanship of building based on CIDB’s CIS7:Quality Assessment System for Building Construction Work (QLASSIC). The construction of the building must achieve a minimum score of 70%.

APPROACH & IMPLEMENTATION

Refer to QLASSIC documents for details.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Letter of confirmation from building owner to confirm participation in QLASSIC.	<input type="radio"/>	<input type="radio"/>
2. Letter of support from Architect to confirm standards listed in QLASSIC will be applied to tender and contract specifications OR Project Quality Plan for the building construction.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. QLASSIC certification with score ≥ 70%.	<input type="radio"/>	<input type="radio"/>

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RESIDENTIAL NEW CONSTRUCTION (RNC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ5	VOLATILE ORGANIC COMPOUNDS	1 POINT
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INTENT

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

DESCRIPTION

Encourage the use and specification of healthy materials and finishes which contain low volatile organic compounds and formaldehyde to ensure the well-being of occupants. This criteria recognises projects that reduce the detrimental impact on occupant health from finishes emitting internal air pollutants. Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well being of installers and occupants. Volatile Organic Compound (VOC) contents to comply with requirements specified in international labelling schemes recognised by GBI.

REQUIREMENTS

0.5 point is awarded for each of the following up to a maximum of 1 point:

- Use low VOC paint and coating throughout the building, **OR**
- Use low VOC carpet or flooring throughout the building.
- Use low VOC adhesive and sealant or no adhesive or sealant used.

APPROACH & IMPLEMENTATION

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary, plans and report outlining the specified location and areas of low VOC materials.	<input type="radio"/>	<input type="radio"/>
2. Table of low VOC materials used for each of the surfaces of each space in the building. Schedule of finishes clearly listing low VOC materials for each room/space is acceptable.	<input type="radio"/>	<input type="radio"/>
3. Manufacturer's information and green building certificate for the specified materials.	<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 constructed using low VOC materials in accordance with the design stage drawings/specifications.	<input type="radio"/>	<input type="radio"/>
2. List of products installed that meet the credit requirements.	<input type="radio"/>	<input type="radio"/>
3. Manufacturer information including data sheets, certificates, test reports etc to demonstrate credit compliance.	<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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RESIDENTIAL NEW CONSTRUCTION (RNC)

INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ6

FORMALDEHYDE MINIMISATION

1 POINT

INTENT

To reduce the exposure of occupants to formaldehyde and promote good indoor air quality in the living space.

DESCRIPTION

Products with no added urea formaldehyde are to be used.

REQUIREMENTS

0.5 point is awarded for each of the following up to a maximum of 1 point:

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

APPROACH & IMPLEMENTATION

Ensure that that credit requirements are clearly stated in contract tender documents. Submittal of the compliance documentation should be a pre-requisite for product approval.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Summary report outlining the location and strategies to be taken to meet the credit requirements.	<input type="radio"/>	<input type="radio"/>
2. A copy of the specified non-added urea formaldehyde alternative to be used.	<input type="radio"/>	<input type="radio"/>
3. Manufacturer's information and green labelling certificate (if applicable) for the specified materials).	<input type="radio"/>	<input type="radio"/>
4. Table of non-formaldehyde materials used for each of the surfaces of each space in the building. Schedule of finishes clearly listing non-formaldehyde materials for each room/ space is acceptable.	<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 constructed using the alternative materials in accordance with the design stage drawings/ specifications.	<input type="radio"/>	<input type="radio"/>
2. Report to outline the measures undertaken to ensure that credit is met.	<input type="radio"/>	<input type="radio"/>
3. Manufacturer's information to verify credit compliance (if applicable).	<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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RESIDENTIAL NEW CONSTRUCTION (RNC)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ7	POST OCCUPANCY EVALUATION: VERIFICATION	2 POINTS
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INTENT

To provide verification of the comfort of the occupants in the building.

DESCRIPTION

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

REQUIREMENTS

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

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

Should a corrective action not be required, the full **2 points** will be awarded.

APPROACH & IMPLEMENTATION

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. A Summary report on the post occupancy comfort survey that will be undertaken to meet the credit compliance, listing all areas of assessment.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Survey questionnaire to be used to collect responses from the occupants.	<input type="radio"/>	<input type="radio"/>
2. Objective measurement plan illustrating the areas and measurements to be 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 deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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RESIDENTIAL NEW CONSTRUCTION (RNC)
**SUSTAINABLE SITE PLANNING
& MANAGEMENT (SM)**

RESIDENTIAL NEW CONSTRUCTION (RNC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM1	SITE SELECTION & PLANNING	1 POINT
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INTENT

To avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site. Proposed development is appropriate for the site, complies with the Local Plan or Structure Plan for the area and does not overburden the available infrastructure.

DESCRIPTION

Minimize inappropriate developments that do not comply with the Local Plan and/or Structure Plan for the area or exceed the available or planned infrastructure.

REQUIREMENTS

- Approved Layout plan that shows compliance with the Local Plan and/or Structure Plan of the area.
- Support letters from all Infrastructure Providers.

APPROACH & IMPLEMENTATION

- Ensure the Layout plans for the project comply with the existing Structure Plan and/or Local Plan for the area where available.
- Ensure Planned Development is supported by available or planned infrastructure including but not limited to Roads, Drains, Water supply, Sewerage Systems, Electricity Supply and Telecommunications systems.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit approved Layout Plan and Planning approval letter with list of conditions where available.	<input type="radio"/>	<input type="radio"/>
2. If planning approval has not been obtained, Layout Plan and Structure Plan / Local Plan of the area must be submitted showing compliance.	<input type="radio"/>	<input type="radio"/>
3. Show through support letters or available infrastructure plans of adequate Roads, Drains, Water supply, Sewerage Systems, Electricity Supply and Telecommunications systems.	<input type="radio"/>	<input type="radio"/>
4. Recommended scale 1:500	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit compliance to Planning approval portion of CCC submission to Local Authorities or supporting letter from Planning Department for the CCC.	<input type="radio"/>	<input type="radio"/>
2. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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RESIDENTIAL NEW CONSTRUCTION (RNC) SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM2

PUBLIC TRANSPORTATION ACCESS

12 POINTS

INTENT

Promote the use of Public Transport for new housing projects. This is to reduce the current and future heavy dependence on private transport, the greatest contributor of Green House Gases (GHG).

DESCRIPTION

Reduce pollution and land development impacts from automobile use.

REQUIREMENTS

- Points are awarded according to proximity of the development to public transport hubs and quality of the access to the transport hub. For new housing areas, the provision of transport hubs for the housing concerned with proper shelter, amenities, shuttle facilities and parking facilities are encouraged. Points are awarded according to the subsection categories.
- Housing projects can be divided into two main categories .First category are for Housing projects located in Urban sites and the second category are for Sub-Urban and individual residential projects. GBI Public Transport Access will work differently for both these main categories.
- Urban Housing projects would normally select SM2A & SM2B
- Sub-Urban Housing projects would normally select SM2C & SM2D.
- Provision allows for Single Residential projects(< 4 units) to transfer the 12 point score under Site Planning & Management into INNOVATION (IN)
- For Housing Projects within Agricultural communities and Estate housing where there is NO daily commuting, this credit may be transferred to the section into INNOVATION (IN)

APPROACH & IMPLEMENTATION

During concept design stage, plan the building in a manner whereby easy access is available for building users to commute using public transport. Provisions for dedicated walkways and bicycle lanes are encouraged in the approach to the planning of the project and connections to transport hubs or stops.

In larger residential areas transport terminals or dedicated bus shuttle connections to community centres or shopping precincts are also encouraged.

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RESIDENTIAL NEW CONSTRUCTION (RNC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM2	PUBLIC TRANSPORTATION ACCESS	12 POINTS
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REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)	SUBMITTER	GBI
1. Photograph of each of the transport facilities clearly demarcated to the site plans to be submitted. Seating capacity of each of the transport facilities e.g bus stop, to be indicated.	<input type="radio"/>	<input type="radio"/>
2. Urban Housing can select SM2A & SM2B : Mass Transport Station / Hub distance to building within 1 km (50% of points if from Shuttle Bus Stop)	<input type="radio"/>	<input type="radio"/>
3. SM2B encourages dedicated walkways or sheltered walkways with a maximum of 4 points.	<input type="radio"/>	<input type="radio"/>
4. Sub- Urban Housing can select SM2C & SM2D : Dedicated Transport Terminal within the Residential Area with covered seating and waiting area for a minimum of 10% of the total number of residential units of the designated residential area OR consideration will also be given for Housing projects that provide dedicated Bus shuttle services from housing enclave to community centre or shopping precincts.	<input type="radio"/>	<input type="radio"/>
5. SM2C : The full 8 point allocation is provided for projects with dedicated transport terminus with 10 % waiting provision. The points decreases when the distances increases .	<input type="radio"/>	<input type="radio"/>
6. Single residence developed < 4 units at any one time or Agricultural communities and Estate housing where there is NO daily commuting, the 12 points may be transferred to the section on INNOVATION. Additional reward points can be earned for exemplary innovation and initiatives. Innovation Criteria is a single scoring system. Each Innovation can only get a single point.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. As built site plan with marked up transport hub or terminus, dedicated walkways, bicycle lanes or dedicated Car parking should be shown. Alternatively a plan showing the dedicated shuttle bus system and stops plus report on system routing and frequency can be submitted.	<input type="radio"/>	<input type="radio"/>
2. Site plan with clear linkage to photographs of the transport facilities to be submitted.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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RESIDENTIAL NEW CONSTRUCTION (RNC) SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM3
**COMMUNITY SERVICES &
CONNECTIVITY**
8 POINTS

INTENT

To encourage close proximity of Amenities to reduce automobile use.

DESCRIPTION

Community Facilities are for the convenience of house owners. Community facilities in close proximity or within the vicinity of new housing areas reduces impact from automobile use. Encourage the selection of sites close to the basic community amenities and the planning of new residential area to encourage the provisions of local amenities. This is to reduce the current and future heavy use of private transport after working hours, which is the greatest contributor to GHG emission.

REQUIREMENTS

Points are awarded according to proximity of the development to community amenities. For new housing areas, the provision of basic/essential amenities and enhancements is encouraged. Points are scored according to the sub-section categories.

The community services and amenities are grouped in terms of priority into three categories; SM3A, SM3B and SM3C. Scoring for each category is independent from one another. A total maximum score of 8 points can be obtained for this section. The project team is to select the most appropriate category. All amenities described under each category must fall within the specified distance to qualify for the points.

4 points : SM3A - BASIC AMENITIES

Basic Amenities as listed below are provided or are available within 750m of the residential units (1 point per item or equivalent up to maximum of 4 points. Less 1 point if more than 750m away):

1. Grocery Store or Mini-market
2. Restaurant or Coffee Shop
3. Surau or Mosque
4. Playground or Public Park

2 points : SM3B - OTHER AMENITIES

Other Amenities as listed below are provided or are available within 750m of the residential units (0.5 point per item or equivalent up to maximum of 2 points. Less 0.5 point if more than 750m away):

1. Clinic or Medical Centre
2. Police Station or Police Pondok
3. School or Crèche
4. Bank, Post Office or ATM

2 points : SM3C - ADDITIONAL AMENITIES

Additional Amenities as listed below are provided or are available within 750m of the residential units (0.5 point per item or equivalent up to maximum of 2 points. Less 0.5 point if more than 750m away):

1. Library
2. Community Centre or Hall
3. Wet Market or Supermarket
4. Barber Shop
5. Laundry

APPROACH & IMPLEMENTATION

This credit encourages the provision beyond the Basic amenities or services for the benefit of homeowners. Describe any other steps taken to enhance the infrastructure and amenities.

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RESIDENTIAL NEW CONSTRUCTION (RNC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM3	COMMUNITY SERVICES & CONNECTIVITY	8 POINTS
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REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)	SUBMITTER	GBI
1. Site Plan showing housing or individual residential location in connection to the above Basic Services, Other or Additional Amenities. Indicate distances and legend of covered walkways, pedestrian access and other connections like link bridges and underground links. Provide legend for the Amenities to achieve the design credit.	<input type="radio"/>	<input type="radio"/>
2. Proximity is determined by drawing a 750 meter radius around the main development entrance on a site map and counting the services found within that radius. Another radii at 250 meter intervals can be shown on the map for amenities that fall beyond the 750 meter radius.	<input type="radio"/>	<input type="radio"/>
3. Site plan with clear linkage to photographs of the amenities to be submitted.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)	SUBMITTER	GBI
1. As-built Site plan showing locations of all existing services, covered walkways, pedestrian access and other connections like link bridges, underground links.	<input type="radio"/>	<input type="radio"/>
2. Provide legend symbols or colours to differentiate the types of amenities.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**RESIDENTIAL NEW CONSTRUCTION (RNC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM4	OPEN SPACES, LANDSCAPING & HEAT ISLAND EFFECT	4 POINTS
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INTENT

To conserve existing natural area or create larger soft landscaping area to provide habitat, promote biodiversity and reduce Heat Island Effect.

DESCRIPTION

Encourage protection or restoration of the habitat and maximise the ecological diversity by introducing native or adaptive vegetation. Maximise potential for open spaces on grade or on rooftops.

REQUIREMENTS

Maximize Open Space by providing a high ratio of open space to development footprint to promote biodiversity & reduce Heat Island Effect:

- 1 point** : Provision of landscaping with indigenous plants is up to 10% of total development area
- 1 point** : Landscaping with indigenous plants is up to 15% of total development area
- 1 point** : Landscaping with indigenous plants is up to 20 % of total development area
- 1 point** : Landscaping with indigenous plants is up to 25% or more of total development area

APPROACH & IMPLEMENTATION

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Site plan showing setback dimensions, outlines of building plinth, hardscape areas.	<input type="radio"/>	<input type="radio"/>
2. Landscape plan (softscape) showing the percentage area covered by native or adaptive vegetation. (Preferred scale for drawup minimum 1:500)	<input type="radio"/>	<input type="radio"/>
3. Name list of plants and characteristics.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As-built coloured Site Plan with marked outline of building plinth, hardscape and softscape areas. Indicate percentage area covered by hardscape and separately for softscape.	<input type="radio"/>	<input type="radio"/>
2. Landscape as-built plans showing the percentage area covered by native and adaptive vegetation.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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RESIDENTIAL NEW CONSTRUCTION (RNC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM5	CONSTRUCTION SYSTEM & SITE MANAGEMENT	3 POINTS
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INTENT

Construction sites are usually responsible for significant environmental pollution. Adoption of Industrialized Building System can reduce the amount of construction work on site.

DESCRIPTION

Encourage IBS and reduce on-site construction. Reduce material wastage and construction wastage to landfill sites. Reduce the polluting effects of construction and from workers during construction.

REQUIREMENTS

1 point: Reduce pollution from construction activities by controlling pollution from waste and rubbish from workers. Create and implement a Site Amenities Plan for all construction workers associated with the project.

The plan shall describe the measures implemented to accomplish the following objectives:

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

1 point : Construction with a CIDB IBS score >50%, **OR**

2 points : Construction with a CIDB IBS score >70%

APPROACH & IMPLEMENTATION

Ensure that a proper IBS Plan is adopted and understood by all consultants and owner early during design stage and captured in the tender for the works.

Ensure strict implementation of the IBS Plan during construction.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit Proposed IBS Plan.	<input type="radio"/>	<input type="radio"/>
2. Submit the CIDB IBS report and description of adopted IBS system	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Submit IBS report, complete with photographic evidence and site reports verified by qualified person.	<input type="radio"/>	<input type="radio"/>
2. Submit CIDB IBS Certification and scoring summary sheet.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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RESIDENTIAL NEW CONSTRUCTION (RNC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM6	STORM WATER MANAGEMENT	3 POINTS
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INTENT

Limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, eliminating sources of contaminants and managing storm water runoff.

DESCRIPTION

Manage surface water run off from developments. Reduce the pollution and storm water loading of the river systems from the development. Encourage rainwater for recycling.

REQUIREMENTS

- 1 point :** Demonstrate the development complies to MASMA's minimum requirements.
- 2 points :** Developments that demonstrate exceeding MASMA requirements by 30%. These points are pro rated for lower value.

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

APPROACH & IMPLEMENTATION

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

Implement a stormwater management strategy in conformance with and satisfy the objectives of MASMA.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit preliminary study report complying with MASMA requirements and the development target.	<input type="radio"/>	<input type="radio"/>
2. Submit report on proposed systems or method of stormwater management for the site.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Report, complete with photographic evidence and site reports signed off by qualified person on final stormwater design and management.	<input type="radio"/>	<input type="radio"/>
2. As-Built Site Plan of completed project to scale.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**RESIDENTIAL NEW CONSTRUCTION (RNC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM7	RE-DEVELOPMENT OF EXISTING SITE & BROWNFIELD SITES	4 POINTS
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INTENT

To encourage development on Existing or Brownfield sites, reducing opening up of new Greenfield sites. This includes to redevelop and rehabilitate existing environmentally contaminated or used site.

DESCRIPTION

Greenfield sites are those that are not previously developed or graded and remain in a natural state. Existing developed sites are those that previously contained building, roadway, parking lot, or were graded or altered by direct human activity. Brownfield sites are used sites abandoned or contaminated, example Mining Pool land or Service station sites.

REQUIREMENTS

Reward rehabilitation of Brownfield site and development in existing sites.

2 points : Re-development of existing sites or refurbishment of existing building.

2 points : Rehabilitation of brownfield sites.

APPROACH & IMPLEMENTATION

Greenfield sites are those that are not previously developed or graded and remain in a natural state. Previously developed sites are those that previously contained building, roadway, parking lot, or were graded or altered by direct human activity. Brownfield sites are used sites abandoned or contaminated, example Mining Pool land or service station sites.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Existing site photographs, showing existing condition of building or site. Provide copy of environmental report (EIA) of site if available.	<input type="radio"/>	<input type="radio"/>
2. Site plan to scale with proposal and summary report on refurbishment or proposed rehabilitation of site.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Complete site photographs, showing rehabilitation or refurbishment.	<input type="radio"/>	<input type="radio"/>
2. As-Built site plan to scale with completed project and summary report on refurbishment or proposed rehabilitation of site.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**RESIDENTIAL NEW CONSTRUCTION (RNC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM8	AVOID ENVIRONMENTALLY SENSITIVE AREAS	2 POINTS
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INTENT

To avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site.

REQUIREMENTS

Do not develop buildings, hardscape, roads or parking areas on portions of sites that meet any one of the following criteria:

- Prime agricultural land as defined by the Town and Country Planning Act
- Land that is specifically identified as habitat for any species threatened or endangered lists
- Within 30 meters of any wetlands as defined by the Structure Plan of the area.

OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever is more stringent

- Previously undeveloped land that is within 15 meters of a water body, defined as seas, lakes, rivers, streams and tributaries which support or could support fish, recreation or industrial use.
- Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public landowner.
- Land which is classified as Class IV (steeper than 30 deg.)

APPROACH & IMPLEMENTATION

- During site selection process, give preference to sites that have low ecological value or are not environmentally sensitive.
- If unavoidable, locate the building in a suitable location and with a minimal footprint so as to minimize disruption of environmentally sensitive areas.
- Select sites that are stable and not prone to destructive natural events like flooding, erosion or landslides.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

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

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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

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**RESIDENTIAL NEW CONSTRUCTION (RNC)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)**

SM9	BUILDING USER MANUAL	2 POINTS
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INTENT

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

DESCRIPTION

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

REQUIREMENTS

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

APPROACH & IMPLEMENTATION

The preparation of the Building User Manual should commence during design concept stage and continue to be developed during all subsequent stages up to and including construction. 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 deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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RESIDENTIAL NEW CONSTRUCTION (RNC)
MATERIALS AND RESOURCES
(MR)

RESIDENTIAL NEW CONSTRUCTION (RNC) MATERIALS AND RESOURCES (MR)

MR1	STORAGE & COLLECTION OF RECYCLABLES	2 POINTS
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INTENT

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

DESCRIPTION

Facilitate the reduction of waste generated by construction that is hauled and disposed off in landfills and recycling after occupancy.

REQUIREMENTS

1 point : During Construction, provide dedicated area/s and storage for collection of non-hazardous materials for recycling.

1 point : During Building Occupancy, provide permanent recycling bins. The waste that should be collected at a minimum should include aluminum, paper, plastics, glass, corrugated cardboard and batteries.

APPROACH & IMPLEMENTATION

During construction, designate a dedicated area where on-site sorted waste materials can be stored in separate skips for collection to recycling facilities. This is tied in with credit MR3: Construction Waste Management.

Designate areas in the building for recycling bins to be located which is accessible and convenient for occupants to recycle their waste. It could be located in one main area or each floor as long it can be demonstrated that the recycling facilities provided is sufficient to cater to the waste volume generated by the occupants.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. A copy of site plan indicating the designated area of storage and collection of construction waste to be recycled.	<input type="radio"/>	<input type="radio"/>
2. A copy of floor plan showing the planned location of the storage area for recyclables and its proximity to the building entrance and vehicular access point/s.	<input type="radio"/>	<input type="radio"/>
3. Ensure that the space provided for recyclables is in addition to the storage allocated for general waste.	<input type="radio"/>	<input type="radio"/>
4. The drawings should ensure that the vehicular access provides adequate space for maneuvering and sufficient size for loading bays for vehicles collecting the recyclables.	<input type="radio"/>	<input type="radio"/>
5. A description of the labelling of recyclables should be also provided.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. A copy of marked as-built drawing plan/s showing the location/s of the storage area for recyclables. The plan should indicate the proximity of the storage from the building entrance and mark where vehicular access is.	<input type="radio"/>	<input type="radio"/>
2. The drawings should ensure that the vehicular access provides adequate space for maneuvering and sufficient size for loading bays for vehicles collecting the recyclables.	<input type="radio"/>	<input type="radio"/>
3. Photographs showing the location, size, the storage provision and labelling of dedicated facilities.	<input type="radio"/>	<input type="radio"/>
4. Description of how the recyclables are to be handled.	<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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RESIDENTIAL NEW CONSTRUCTION (RNC) MATERIALS AND RESOURCES (MR)

MR2	MATERIALS RE-USE AND SELECTION	2 POINTS
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INTENT

Encourage owners to specify the usage of reused building materials in new buildings.

DESCRIPTION

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

REQUIREMENTS

0.5 point : Where reused products/materials constitutes 1% of the project's total material cost value.

Additional 0.25 point : For every 0.5% of the project's total increase material cost value up to maximum of 2 points.

APPROACH & IMPLEMENTATION

The following approach can achieve this credit by using:

Reused Materials found on site

- Fixed components such as doors, cabinetry, posts etc. that no longer serve their original function are refurbished, reconditioned and installed for a different use or in a different location.
- Finish materials such as door, windows and cabinet associated hardware that are refurbished and used to its original function.

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 and are to be assessed for eco preferred content, durability, product manufacturer's environmental system.

Temporary structures

- Temporary formwork, framing and structures etc that can be reused many times before disposal (minimum 15 cycles of usage) can also be included. If the temporary structures are not new procurement to this project and have been used previously in other projects, state the number of uses that are remaining

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. List of reused or salvaged materials used in the project.	<input type="radio"/>	<input type="radio"/>
2. 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"/>
3. Establish the estimated Total Cost of the materials in the project.	<input type="radio"/>	<input type="radio"/>
4. Submit a waste management plan for the project during construction indicating clearly how construction waste is to be managed in order to achieve this point.	<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 constructed in accordance with the design stage drawings/specifications.	<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 deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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**RESIDENTIAL NEW CONSTRUCTION (RNC)
MATERIALS AND RESOURCES (MR)**

MR3	CONSTRUCTION WASTE MANAGEMENT	2 POINTS
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INTENT

Reduce and recycle construction waste materials and divert from disposal to landfills and incinerator.

DESCRIPTION

Develop and implement a construction waste management plan that, as a minimum identifies the materials to be diverted from disposal regardless of whether the materials will be sorted on site or co-mingled. Quantify by measuring total truck loads of waste sent for disposal.

REQUIREMENTS

Recycle and/or salvage at least 50% volume of non-hazardous construction debris.

Develop and implement a construction waste management plan that, at a minimum identifies the materials to be diverted from disposal and whether the materials will be sorted on site or co-mingled. Quantify by measuring total tonnage of waste or truck loads of waste disposal.

1 point : Recycle and/or salvage of non-hazardous construction debris.

Additional 0.25 point : For every additional 5% up from the minimum 50% recycle and/or salvaged non-hazardous construction debris.

If project uses high level of prefabrication with IBS score >70

1 point : Every 10% increase in prefabrication up to a maximum of 2 points.

APPROACH & IMPLEMENTATION

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

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

Use of pre-cast reduces waste produced on site.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. To calculate the percentage, convert all waste materials to either weight (tons) or volume (cubic meter).	<input type="radio"/>	<input type="radio"/>
2. For comingled recycled wastes, summaries of diversion rates is required from the recyclers.	<input type="radio"/>	<input type="radio"/>
3. Provide a table with a list of diverted/recycled/landfill waste and the quantity of the diverted/recycled/landfill waste.	<input type="radio"/>	<input type="radio"/>
4. A copy of the specification clause that requires the main/principal contractor to produce the required waste management plan and waste audit.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. To calculate the percentage, convert all waste materials to either weight or volume.	<input type="radio"/>	<input type="radio"/>
2. For comingled recycled wastes, summaries of diversion rates is required from the recyclers.	<input type="radio"/>	<input type="radio"/>
3. A copy of the construction waste management plan from the main/principal contractor and a table with a list of diverted/recycled waste/landfill waste, diverted/recycled/landfill waste destination or location and the quantity of the diverted/recycled/landfill waste.	<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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RESIDENTIAL NEW CONSTRUCTION (RNC) MATERIALS AND RESOURCES (MR)

MR4

RECYCLED CONTENT MATERIALS

1 POINT

INTENT

Encourage designers to specify the usage of recycled content materials in new buildings.

DESCRIPTION

Increase demand for building products that incorporate recycled content materials in their production:- (Recycled content shall be defined in accordance with the International Organization of Standards Document).

REQUIREMENTS

0.5 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 > 10% (based on cost) of the total value of the materials in the project. Recycled content shall be defined in accordance with the International Organisation of Standards Document.

Additional 0.25 point : For every additional 5% increase up to a maximum of 1 point.

APPROACH & IMPLEMENTATION

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. List all recycled content materials and products and their costs.	<input type="radio"/>	<input type="radio"/>
2. The percentage of post-consumer and/or pre-consumer recycled content must be established by weight.	<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. Calculation on the recycled content value of each material must be provided.	<input type="radio"/>	<input type="radio"/>
5. Calculate the total percentage (based on cost) value of the materials with recycled content of the estimated total value of the materials in the project.	<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 constructed in accordance with the design stage drawings/specifications.	<input type="radio"/>	<input type="radio"/>
2. List all recycled content materials and products and their costs used in the project after completion.	<input type="radio"/>	<input type="radio"/>
3. The percentage of post-consumer and/or pre-consumer recycled content must be established by weight.	<input type="radio"/>	<input type="radio"/>
4. Information on the sources/suppliers on the materials with recycled content must be provided.	<input type="radio"/>	<input type="radio"/>
5. Calculation on the recycled content value of each material must be provided.	<input type="radio"/>	<input type="radio"/>
6. Calculate the total percentage (based on cost) value of the materials with recycled content of the actual total value of the materials in the project.	<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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RESIDENTIAL NEW CONSTRUCTION (RNC) MATERIALS AND RESOURCES (MR)

MR5	REGIONAL MATERIALS	1 POINT
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INTENT

Encourage sourcing of regional materials to reduce environmental impacts due to transportation.

DESCRIPTION

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

REQUIREMENTS

0.5 point : Using building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500km (radius) of the project site for a minimum 20% (based on cost) of the total material value. Mechanical, electrical and plumbing components shall not be included. Only include materials permanently installed in the project.

Additional 0.25 point : For every additional 5% up to a maximum of 1 point.

APPROACH & IMPLEMENTATION

This credit must be evaluated early in the design process as materials and products that can be sourced locally can be established. The general contractor must work with subcontractors and suppliers to verify the availability of materials which are extracted/harvested/recovered and manufactured locally. This will ensure that the project team is aware on the availability of such materials and give focus on the materials that will contribute the most to this credit.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. List of products that are extracted/harvested/recovered and manufactured within 500 km. of the project site.	<input type="radio"/>	<input type="radio"/>
2. Provide the following: <ul style="list-style-type: none"> • Name of the manufacturer • Product cost • The distance between the project site and the manufacturer • The distance between the project site and the extraction site for each raw material contained within each product 	<input type="radio"/>	<input type="radio"/>
3. Determine the Total Material Cost	<input type="radio"/>	<input type="radio"/>
4. Calculate the percent local materials = Total Cost of Local Materials (RM)/Total Material Cost (RM)	<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 constructed in accordance with the design stage drawings/specifications.	<input type="radio"/>	<input type="radio"/>
2. List of products that are extracted/harvested/recovered and manufactured within 500 km. of the project site after completion.	<input type="radio"/>	<input type="radio"/>
3. Provide the following: <ul style="list-style-type: none"> • Name of the manufacturer • Product cost • The distance between the project site and the manufacturer • The distance between the project site and the extraction site for each raw material contained within each product. 	<input type="radio"/>	<input type="radio"/>
4. Determine the Actual Total Material Cost.	<input type="radio"/>	<input type="radio"/>
5. Calculation on the recycled content value of each material must be provided.	<input type="radio"/>	<input type="radio"/>
6. Calculate the percent local materials = Total Cost of Local Materials (RM)/Actual Total Material Cost (RM).	<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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RESIDENTIAL NEW CONSTRUCTION (RNC) MATERIALS AND RESOURCES (MR)

MR6	SUSTAINABLE TIMBER	1 POINT
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INTENT

Promote responsible forest management taking the interest of indigeneous people into account.

DESCRIPTION

Encourage environmentally responsible forest management.

REQUIREMENTS

1 point : Where $\geq 50\%$ of wood-based materials and products used are certified. These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. To include wood materials permanently installed and also temporarily purchased for the project. Compliance with Forest Stewardship Council (FSC) and Malaysian Timber Certification Council (MTCC) required.

Where the project has no timber, this credit may be transferred to MR5.

APPROACH & IMPLEMENTATION

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

Provide a list of certified vendors, suppliers and manufacturers to the contract bidders that they will establish availability of the wood products specified in the project.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. List all new wood products specified in the project and identify which components are at least FSC and MTCC certified timber source.	<input type="radio"/>	<input type="radio"/>
2. Provide a list of vendors/suppliers capable of providing FSC and MTCC certified wood products or equivalent for the project.	<input type="radio"/>	<input type="radio"/>
3. The FSC and MTCC certified wood must be identified as "Pure", "Mixed" or "Mixed (NN)%".	<input type="radio"/>	<input type="radio"/>
4. The volume of each wood products must be shown.	<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 constructed in accordance with the design stage drawings/specifications.	<input type="radio"/>	<input type="radio"/>
2. List all new wood products specified in the project and identify which components are at least FSC and MTCC certified.	<input type="radio"/>	<input type="radio"/>
3. The FSC and MTCC certified wood must be identified as "Pure", "Mixed" or "Mixed (NN)%".	<input type="radio"/>	<input type="radio"/>
4. The volume of each wood products must be shown.	<input type="radio"/>	<input type="radio"/>
5. The vendor's chain-of-custody (COC) number must be shown in the invoice that includes FSC and MTCC products.	<input type="radio"/>	<input type="radio"/>
6. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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CLIENT	NAME	DESIGNATION	COMPANY	SIGNATURE

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

RESIDENTIAL NEW CONSTRUCTION (RNC)
WATER EFFICIENCY
(WE)

RESIDENTIAL NEW CONSTRUCTION (RNC) WATER EFFICIENCY (WE)

WE1	RAINWATER HARVESTING	4 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 residential consumption and/or irrigation.

REQUIREMENTS

To achieve the following percentage in reduction of potable water consumption.

- 1 point** : Rainwater harvesting that leads to $\geq 10\%$ reduction in potable water consumption, **OR**
- 2 points** : Rainwater harvesting that leads to $> 30\%$ reduction in potable water consumption, **OR**
- 3 points** : Rainwater harvesting that leads to $> 40\%$ reduction in potable water consumption, **OR**
- 4 points** : Rainwater harvesting that leads to $> 50\%$ reduction in potable water consumption.

For high rise stratified properties higher than 3 stories, this requirement would apply for all common property usage of water only. For landed properties and repetitive housing 3 stories and below, calculations shall be submitted for each individual dwelling unit.

APPROACH & IMPLEMENTATION

Two main approaches to rainwater harvesting namely collection of runoff rainwater from surrounding site or roof top rainwater harvesting. Both systems requires separate water storage tanks and additional pressure boosting equipment may be required. Gravity feed system is encouraged to avoid additional energy use. Water purifying systems may be necessary depending on the application and methodology of harvesting the rainwater.

Use of rainwater for non-potable applications such as toilets and urinal flushing, landscape irrigation, washing clothes is encouraged.

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.

Reference to GoM's National Urbanization Policy guide on rainwater harvesting for factories, schools & bungalows.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit calculation to demonstrate the reduction in water consumption compared to the building base condition.	<input type="radio"/>	<input type="radio"/>
2. Submit method and application of systems for rainwater harvesting in report and diagrams.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As Built calculations of rainwater harvesting, storage tank capacity and building usage distribution system.	<input type="radio"/>	<input type="radio"/>
2. Final drawings for rainwater harvesting system and storage tank location (Recommended scale 1:200).	<input type="radio"/>	<input type="radio"/>
3. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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RESIDENTIAL NEW CONSTRUCTION (RNC)
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

1. To encourage recycling of greywater or blackwater for residential and irrigation use to reduce discharge to external sewer, thereby reducing the overall building potable water consumption.
2. To encourage and recognise residential design that reduces water flows to sewerage treatment plants.

REQUIREMENTS

0.5 point : To treat and recycle \geq 5% wastewater leading to reduction in potable water, **OR**

1 point : To treat and recycle \geq 10% wastewater leading to reduction in potable water, **OR**

1.5 points : To treat and recycle \geq 20% wastewater leading to reduction in potable water, **OR**

2 points : To treat and recycle \geq 30% wastewater leading to reduction in potable water.

APPROACH & IMPLEMENTATION

Water treatment systems and re-use technology options are used in 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.

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Submit calculation to demonstrate the percentage of wastewater treated and recycled.	<input type="radio"/>	<input type="radio"/>
2. Listing of each type of greywater-generating fixture and frequency of use to determine the amount of discharge generated.	<input type="radio"/>	<input type="radio"/>
3. A technical report describing the concept and details of treatment plant, conveyance system storage facility and distribution system.	<input type="radio"/>	<input type="radio"/>
4. The technical report shall include detail schematics showing how the wastewater is collected, channelled, stored and utilised.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As Built calculations of wastewater collection, storage tank capacity and building usage distribution system.	<input type="radio"/>	<input type="radio"/>
2. Final drawings for wastewater treatment system and storage tank location (Recommended scale 1:200).	<input type="radio"/>	<input type="radio"/>
3. Describe any deviations or additions to the DA submission.	<input type="radio"/>	<input type="radio"/>

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RESIDENTIAL NEW CONSTRUCTION (RNC) WATER EFFICIENCY (WE)

WE3	WATER EFFICIENT LANDSCAPING	2 POINTS
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INTENT

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

DESCRIPTION

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

REQUIREMENTS

Up to 2 points are awarded as follows:

- 1 point** : Reducing potable water consumption for landscape irrigation by $\geq 50\%$, **AND/OR**
- 1 point** : Not using potable water at all for landscape irrigation.

APPROACH & IMPLEMENTATION

Perform a 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 reference(s) to the guidelines used, calculations, and an explanation of how the system meets the requirement for the credit.	<input type="radio"/>	<input type="radio"/>
2. A short report by a landscape architect detailing the water efficient irrigation system and demonstrating that it will meet all the requirements of the criteria.	<input type="radio"/>	<input type="radio"/>
3. A report of native or adaptive plants in the design.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. As built plan of the entire site showing the use of each area and clearly indication the location (or lack of) any landscaped area. Recommended 1:200.	<input type="radio"/>	<input type="radio"/>
2. As built plan showing the location and design of the recycled water / rainwater system.	<input type="radio"/>	<input type="radio"/>
3. Calculation for the proportion of wastewater being re-use and clearly documented. (recommended 1:200 scale)	<input type="radio"/>	<input type="radio"/>
4. A report noting nature or adaptive plants adopted in design.	<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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RESIDENTIAL NEW CONSTRUCTION (RNC) WATER EFFICIENCY (WE)

WE4	WATER EFFICIENT FITTINGS	4 POINTS
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INTENT

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

REQUIREMENT

- 1 point** : To reduce annual potable water consumption by > 10%, **OR**
- 2 points** : To reduce annual potable water consumption by > 30%, **OR**
- 3 points** : To reduce annual potable water consumption by > 40%, **OR**
- 4 points** : To reduce annual potable water consumption by > 50%.

APPROACH & IMPLEMENTATION

The use of water efficient water closets, wash hand basins or shower heads or systems which has the potential to reduce potable water consumption in the residential area. Specify the use of automatic self-closing faucets, electronic or otherwise, to eliminate wastage through faucets carelessly left running.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Listing of each type of consuming fixture, flows and frequency of use to determine the amount of potable water usage for base condition.	<input type="radio"/>	<input type="radio"/>
2. Listing similar to the above but based on water efficient fittings selected and demonstrate the water saving through calculations.	<input type="radio"/>	<input type="radio"/>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

	SUBMITTER	GBI
1. Inventory of all water efficient fittings incorporated in final building.	<input type="radio"/>	<input type="radio"/>
2. Submit final water consumption calculator of selected water efficient fixtures.	<input type="radio"/>	<input type="radio"/>
3. Describe any deviations or additions to the DA submission.		

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RESIDENTIAL NEW CONSTRUCTION (RNC)
INNOVATION
(IN)

RESIDENTIAL NEW CONSTRUCTION (RNC) INNOVATION (IN)

IN1	INNOVATION IN DESIGN & ENVIRONMENTAL DESIGN INITIATIVES	5 POINTS
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INTENT

Provide design team and project the opportunity to be awarded points for exceptional performance above the requirements set by GBI rating system.

DESCRIPTION

Reward innovation and initiatives.

REQUIREMENTS

Encourage design team and project the opportunity to be score points for exceptional performance above the requirements set by GBI rating system:

1 point : For each approved innovation and environmental design initiative up to a maximum of 5 points, for innovative ideas such as, but not limited to :

- Innovative planning that displays “less is more” and “small is beautiful”;
- Rehabilitation of existing buildings for re-use in innovative ways;
- Innovative use of building features to passively cool the building
- Heat recovery system (contributing to at least 10% of total required capacity);
- Mixed mode / low energy ventilation system;
- Waterless urinals (fitted to all male toilets);
- Central waste conveyance system;
- Central vacuum system

Project team may submit any innovation not listed above to GBI for consideration and approval of credit.

APPROACH & IMPLEMENTATION

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

	SUBMITTER	GBI
1. Report on each innovation, how it is derived, and how it would assist in reducing energy and improving sustainable design. Indicate on drawing for any innovative architectural passive features introduced to building.	<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"/>

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**RESIDENTIAL NEW CONSTRUCTION (RNC)
INNOVATION (IN)**

IN2	GREEN BUILDING INDEX FACILITATOR (GBIF)	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, where:

1 point : 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 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 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"/>

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ACKNOWLEDGEMENTS

GSB would like to thank all contributors for efforts in preparing the Residential New Construction (RNC) Design Reference Guide Version 1.0. The following are the main contributors to the formation of this document:

RESIDENTIAL NEW CONSTRUCTION (RNC)

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