The Green Building Index (GBI) is developed by Greenbuildingindex Sdn Bhd (in short “GSB”) for the purposes as mentioned herein and may be subject to updating and/or modification in future.

While every care has been taken by in the development of the GBI to establish and acknowledge copyright of the information and materials used, and contact the copyright owners known to GSB. GSB tender their apologies for any accidental omissions.

Green Building Index and GBI is a copyright of Greenbuildingindex Sdn Bhd (in short “GSB”) in which GSB reserves all rights. GSB is the custodian of all rights for GBI. No part of the GBI may be used, modified, reproduced, stored in a retrieval system or transmitted in any form, or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of GSB.

DISCLAIMERS

GSB shall not be held liable for any improper or incorrect use of the GBI (inclusive of the materials and/or information contained therein) and assume no responsibility for any user’s use of it. In no event shall GSB be liable for any damages whatsoever, whether direct, indirect, incidental, special, exemplary or consequential (including, but not limited to business interruption or loss of use, data or profits) regardless of cause, and on any basis of liability, whether in contract, strict liability or tort (including negligence, misrepresentation or otherwise) arising in any way out of the use of the GBI or the information and materials contained therein.

The information and materials in the GBI are provided “as is” and without warranties of any kind expressed or implied. GSB do not warrant or make representations as to the accuracy and completeness of any information and/or materials contained therein. While every effort has been made to check the accuracy and completeness of the information and materials given, the users should always make their own relevant checks. Accordingly, GSB do not accept responsibility and liability for misstatements made in it or misunderstanding from it.

The GBI is no substitute for professional advice. Users are advised to consult with appropriate and accredited professional advisors for advice concerning specific matters pertaining to the GBI before adopting or using it. GSB disclaim any responsibility for positions taken by users in their individual cases or for any misunderstandings and losses, direct or indirectly, on the part of the users.

GSB do not endorse or otherwise acknowledge the GBI rating achieved by the use of the GBI. GSB offer a formal certification process for ratings; which service provides for independent third party review of points claimed to ensure that all credits can be demonstrated to be achieved by the provision of the necessary documentary evidence. Use of the GBI without formal certification by GSB does not entitle the user or any other party to promote the achieved GBI rating.

INDEMNIFICATION

To the extent permitted by applicable law, by using GSB’s GBI, the user agrees to defend, indemnify, and hold harmless, GSB, their officers, employees, members, representatives and agents from and against all claims and expenses of whatsoever kind and amount, arising out of the user’s use of the GBI or materials and information contained therein and not to pursue any cause of action whatsoever against GSB under any conceivable circumstances.
CONTENTS

INDUSTRIAL EXISTING BUILDING (IEB)

2 COPYRIGHT

4 INTRODUCTION

6 PROCEDURES

10 CRITERIA CHECKLIST & SUBMISSION FORMAT

17 ASSESSMENT CRITERIA
18 ENERGY EFFICIENCY (EE)
29 INDOOR ENVIRONMENTAL QUALITY (EQ)
46 SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)
54 MATERIALS & RESOURCES (MR)
61 WATER EFFICIENCY (WE)
67 INNOVATION (IN)

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

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

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

**STAGE 2 | DESIGN ASSESSMENT (DA)**
Appraisal conducted upon the submission by the Project Design team / Client (Architect/Engineer/Building Owner or Developer directly or through a GBI Facilitator) of comprehensive design and other necessary documents for Green Building Index Assessment. After acceptance of registration from GBI, the Project Design team & client should proceed to collect information for each of the six criteria completing the submittal requirements described under each detailed sub-section. It is recommended that the information submitted is based on preconstruction information (ie tender documentation stage) when all parameters of the design have been finalised. A Provisional Design Assessment certificate is given at this stage. A summary Design Assessment (DA) checklist is provided to determine target scoring.
STAGE 3 | COMPLETION & VERIFICATION ASSESSMENT (CVA)
Appraisal conducted upon CPC of the project when all necessary documents are re-submitted according to as-built information and calculations by the Project Design Team / Client (Architect/Engineer/Building Owner or Developer directly or through a GBI Facilitator). The Completion & Verification Assessment confirms that the targeted criteria have been properly implemented and achieved, or otherwise, for the intended classification.

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

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

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

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

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

GBI TERMS & CONDITIONS
An agreement setting out the terms and conditions between the Project owner and Greenbuildingindex Sdn Bhd.
INDUSTRIAL EXISTING BUILDING (IEB) PROCEDURES
STAGE 1
APPLICATION & REGISTRATION

Is the Application complete?

COMPLETE

GSB processes application and notifies Applicant of the Registration Fee

INCOMPLETE

GSB to request for more information from Applicant

APPLICATION
REGISTRATION

Complete and submit the Application & Registration Form to GSB with supporting documents

Applicant to make the necessary Registration Fee payment to GSB and submit any other additional required information

GSB registers the application and gives a GBI Registration Number to the Applicant

GBI Agreement to be signed between GSB and Applicant

GSB assigns GBI Certifier at appropriate time

*GSB = Greenbuildingindex Sdn Bhd
**STAGE 2**
**DESIGN ASSESSMENT (DA)**

- Applicant to appoint their Project Coordinator/GBI Facilitator
- Submit to GSB for Design Assessment (DA)
  - 2 Hard Copies, 3 CDs
- Request Additional Documents from Applicant

**Is the DA Submission complete?**

**COMPLETE**
- Issue letter of acknowledgement to Applicant
- DA Assessment by Certifier
- 1st Review
  - Is the DA Submission Accepted by Certifier?
    - NO
      - GBI requests Information from Applicant
        - Applicant to resubmit DA
        - Additional information/documents received
        - 2nd Review
          - Certifier to finalise DA
    - YES
      - GBIAP Review
        - GSB notifies Applicant of DA result
        - Appeal by Applicant?
          - APPEAL
            - Issue letter of success & Provisional GBI Certificate to successful applicant
          - NO APPEAL
            - GSB records & publishes in GBI Register

**INCOMPLETE**
- To submit appeal form & fees
- GBIAP Review
- GSB notifies Applicant of DA result
- Appeal by Applicant?
  - APPEAL
    - Issue letter of success & Provisional GBI Certificate to successful applicant
  - NO APPEAL
    - GSB records & publishes in GBI Register

*GSB = Greenbuildingindex Sdn Bhd*
STAGE 3
COMPLETION & VERIFICATION ASSESSMENT (CVA)

Applicant to submit for Completion & Verification Assessment (CVA) upon completion of project

GBI Certifier undertakes CVA

GSB notifies Applicant of CVA result

Appeal by Applicant?

APPEAL

• Fail
• Request Review for a Higher Rating

To Submit Appeal Form & Fees

NO APPEAL

GSB records & publishes in GBI register
LAM issues GBI certificate to Applicant

*GSB = Greenbuildingindex Sdn Bhd
INDUSTRIAL EXISTING BUILDING (IEB) CRITERIA CHECKLIST & SUBMISSION FORMAT
## INDUSTRIAL EXISTING BUILDING (IEB) PROJECT INFORMATION

<table>
<thead>
<tr>
<th>NAME OF BUILDING</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ADDRESS OF BUILDING</td>
<td></td>
</tr>
<tr>
<td>POSTCODE</td>
<td></td>
</tr>
<tr>
<td>STATE</td>
<td></td>
</tr>
</tbody>
</table>

| 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 |  |

<table>
<thead>
<tr>
<th>BUILDING AND INDUSTRIAL PROCESS DESCRIPTION</th>
<th></th>
</tr>
</thead>
</table>
INDUSTRIAL EXISTING BUILDING (IEB)

ASSESSMENT CRITERIA
OVERALL POINTS SCORE

<table>
<thead>
<tr>
<th>PART</th>
<th>ITEM</th>
<th>MAXIMUM POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Energy Efficiency (EE)</td>
<td>38</td>
</tr>
<tr>
<td>2</td>
<td>Indoor Environmental Quality (EQ)</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>Sustainable Site Planning &amp; Management (SM)</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Material &amp; Resources (MR)</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>Water Efficiency (WE)</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>Innovation (IN)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>TOTAL SCORE</td>
<td>100</td>
</tr>
</tbody>
</table>

GREEN BUILDING INDEX CLASSIFICATION

<table>
<thead>
<tr>
<th>POINTS</th>
<th>GBI RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>86 to 100 points</td>
<td>Platinum</td>
</tr>
<tr>
<td>76 to 85 points</td>
<td>Gold</td>
</tr>
<tr>
<td>66 to 75 points</td>
<td>Silver</td>
</tr>
<tr>
<td>50 to 65 points</td>
<td>Certified</td>
</tr>
</tbody>
</table>
# INDUSTRIAL EXISTING BUILDING (IEB) ASSESSMENT CRITERIA

## SCORE SUMMARY

<table>
<thead>
<tr>
<th>PART</th>
<th>CRITERIA</th>
<th>ITEM</th>
<th>POINTS</th>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EE</strong></td>
<td>ENERGY EFFICIENCY</td>
<td><strong>Design &amp; Performance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EE1</td>
<td>Minimum EE Performance</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE2</td>
<td>Lighting Zoning</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE3</td>
<td>Electrical Sub-metering</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE4</td>
<td>Renewable Energy &amp; Onsite Energy Capture/Recovery</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE5</td>
<td>Advanced or Improved EE Performance - BEI and/or EUI</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Commissioning</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE6</td>
<td>Enhanced or Re-Commissioning or Retro Commissioning</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE7</td>
<td>On-going Post Occupancy Commissioning</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Monitoring, Improvement &amp; Maintenance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE8</td>
<td>EE Monitoring &amp; Improvement</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE9</td>
<td>Sustainable Maintenance</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EQ</strong></td>
<td>INDOOR ENVIRONMENTAL QUALITY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>EQ1</td>
<td>Minimum IAQ Performance</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ2</td>
<td>Environmental Tobacco Smoke (ETS) Control</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ3</td>
<td>Carbon Dioxide Monitoring and Control</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ4</td>
<td>Indoor Air Pollutants &amp; Industrial Chemical Exposure</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ5</td>
<td>Mould Prevention</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Occupant Comfort</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ6</td>
<td>Thermal Comfort: Controllability of Systems</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ7</td>
<td>Air-Change Effectiveness</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ8</td>
<td>Breakout Spaces</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Lighting, Visual &amp; Acoustic Comfort</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ9</td>
<td>Daylighting</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ10</td>
<td>Daylight Glare Control</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ11</td>
<td>Electric Lighting Levels</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ12</td>
<td>High Frequency Ballasts</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ13</td>
<td>External Views</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ14</td>
<td>Internal Noise Levels</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Verification</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ15</td>
<td>IAQ Before &amp; During Occupancy</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ16</td>
<td>Post Occupancy Comfort Survey: Verification</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Sustainable Site Planning & Management

<table>
<thead>
<tr>
<th>Part</th>
<th>Criteria</th>
<th>Item</th>
<th>Points</th>
<th>Submitter</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM</td>
<td>Facility Management</td>
<td>SM1 GBI Rated Design &amp; Construction</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SM2 Building Exterior Management</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SM3 Integrated Pest Management, Erosion Control &amp; Landscape Management</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transportation</td>
<td>SM4 Green Vehicle Priority</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SM5 Parking Capacity</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduce Heat Island Effect</td>
<td>SM6 Greenery &amp; Roof</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SM7 Building User Manual</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Materials & Resources

<table>
<thead>
<tr>
<th>Part</th>
<th>Criteria</th>
<th>Item</th>
<th>Points</th>
<th>Submitter</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR</td>
<td>Reused &amp; Recycled Materials</td>
<td>MR1 Materials Reuse and Selection</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MR2 Recycled Content Materials</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sustainable Materials &amp; Resources and Policy</td>
<td>MR3 Sustainable Timber</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MR4 Sustainable Purchasing Policy</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Waste Management</td>
<td>MR5 Storage, Collection &amp; Disposal of Recyclables</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Green Products</td>
<td>MR6 Refrigerants &amp; Clean Agents</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Water Efficiency

<table>
<thead>
<tr>
<th>Part</th>
<th>Criteria</th>
<th>Item</th>
<th>Points</th>
<th>Submitter</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>WE</td>
<td>Water Harvesting &amp; Recycling</td>
<td>WE1 Rainwater Harvesting</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>WE2 Water Recycling</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increased Efficiency</td>
<td>WE3 Water Efficient Irrigation/Landscaping</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>WE4 Water Reduction</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>WE5 Metering &amp; Leak Detection System</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Innovation

<table>
<thead>
<tr>
<th>Part</th>
<th>Criteria</th>
<th>Item</th>
<th>Points</th>
<th>Submitter</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>IN1 Innovation &amp; Environmental Design Initiatives</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IN2 Green Building Index Facilitator</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Points: 100**
The Industrial Existing Building (IEB) Reference Guide is formatted in reference to the Industrial Existing Building Tool. It is envisaged that this reference guide is a live document that from time to time will be updated for the benefit of the end users.

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

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

<table>
<thead>
<tr>
<th>PART</th>
<th>CRITERIA</th>
<th>ITEM</th>
<th>REQUIRED SIGNATORIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EE</td>
<td>ENERGY EFFICIENCY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE1</td>
<td>Minimum EE Performance</td>
<td>PSP and C</td>
</tr>
<tr>
<td></td>
<td>EE2</td>
<td>Lighting Zoning</td>
<td>SP and C</td>
</tr>
<tr>
<td></td>
<td>EE3</td>
<td>Electrical Sub-metering</td>
<td>SP and C</td>
</tr>
<tr>
<td></td>
<td>EE4</td>
<td>Renewable Energy &amp; Onsite Energy Capture/Recovery</td>
<td>SP/S and C</td>
</tr>
<tr>
<td></td>
<td>EE5</td>
<td>Advanced or Improved EE Performance – BEI and/or EUI</td>
<td>SP/S and C</td>
</tr>
<tr>
<td></td>
<td>EE6</td>
<td>Enhanced or Re-Commissioning or Retro Commissioning</td>
<td>SP/S and C</td>
</tr>
<tr>
<td></td>
<td>EE7</td>
<td>On-going Post Occupancy Commissioning</td>
<td>SP/S and C</td>
</tr>
<tr>
<td></td>
<td>EE8</td>
<td>EE Monitoring &amp; Improvement</td>
<td>SP/S and C</td>
</tr>
<tr>
<td></td>
<td>EE9</td>
<td>Sustainable Maintenance</td>
<td>SP/S and C</td>
</tr>
<tr>
<td>2</td>
<td>EQ</td>
<td>INDOOR ENVIRONMENTAL QUALITY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQ1</td>
<td>Minimum IAQ Performance</td>
<td>SP and C</td>
</tr>
<tr>
<td></td>
<td>EQ2</td>
<td>Environmental Tobacco Smoke (ETS) Control</td>
<td>PSP and C</td>
</tr>
<tr>
<td></td>
<td>EQ3</td>
<td>Carbon Dioxide Monitoring and Control</td>
<td>SP and C</td>
</tr>
<tr>
<td></td>
<td>EQ4</td>
<td>Indoor Air Pollutants &amp; Industrial Chemical Exposure</td>
<td>PSP and C</td>
</tr>
<tr>
<td></td>
<td>EQ5</td>
<td>Mould Prevention</td>
<td>PSP/SP and C</td>
</tr>
<tr>
<td></td>
<td>EQ6</td>
<td>Thermal Comfort: Design &amp; Controllability of Systems</td>
<td>SP and C</td>
</tr>
<tr>
<td></td>
<td>EQ7</td>
<td>Air-Change Effectiveness</td>
<td>SP and C</td>
</tr>
<tr>
<td></td>
<td>EQ8</td>
<td>Breakout Spaces</td>
<td>PSP and C</td>
</tr>
<tr>
<td></td>
<td>EQ9</td>
<td>Daylighting</td>
<td>PSP and C</td>
</tr>
<tr>
<td></td>
<td>EQ10</td>
<td>Daylight Glare Control</td>
<td>PSP and C</td>
</tr>
<tr>
<td></td>
<td>EQ11</td>
<td>Electric Lighting Levels</td>
<td>SP and C</td>
</tr>
<tr>
<td></td>
<td>EQ12</td>
<td>High Frequency Ballasts</td>
<td>SP and C</td>
</tr>
<tr>
<td></td>
<td>EQ13</td>
<td>External Views</td>
<td>PSP and C</td>
</tr>
<tr>
<td></td>
<td>EQ14</td>
<td>Internal Noise Levels</td>
<td>PSP/SP/S and C</td>
</tr>
<tr>
<td></td>
<td>EQ15</td>
<td>IAQ Before &amp; During Occupancy</td>
<td>SP/S and C</td>
</tr>
<tr>
<td></td>
<td>EQ16</td>
<td>Post Occupancy Comfort Survey: Verification</td>
<td>S and C</td>
</tr>
<tr>
<td>3</td>
<td>SM</td>
<td>SUSTAINABLE SITE PLANNING &amp; MANAGEMENT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SM1</td>
<td>GBI Rated Design &amp; Construction</td>
<td>PSP/SP/S and C</td>
</tr>
<tr>
<td></td>
<td>SM2</td>
<td>Building Exterior Management</td>
<td>PSP/SP/S and C</td>
</tr>
<tr>
<td></td>
<td>SM3</td>
<td>Integrated Pest Management, Erosion Control &amp; Landscape Management</td>
<td>PSP/SP/S and C</td>
</tr>
<tr>
<td></td>
<td>SM4</td>
<td>Green Vehicle Priority</td>
<td>PSP and C</td>
</tr>
<tr>
<td></td>
<td>SM5</td>
<td>Parking Capacity</td>
<td>PSP and C</td>
</tr>
<tr>
<td></td>
<td>SM6</td>
<td>Greenery &amp; Roof</td>
<td>PSP/SP/S and C</td>
</tr>
<tr>
<td></td>
<td>SM7</td>
<td>Building User Manual</td>
<td>S and C</td>
</tr>
</tbody>
</table>
GREEN BUILDING INDEX DESIGN REFERENCE GUIDE & SUBMISSION FORMAT

PSP is defined as Architect or Engineer (similar to the definition in Certificate of Completion & Compliance, CCC)
SP is defined as Engineer, Landscape Architect, Planner and Quantity Surveyor (QS).
S is defined as Specialist which includes Facilitator, Project Manager, Facilities Manager, Energy or Sustainable Consultant and Commissioning Specialist.
C is defined as Client or client's assigned representative.

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

SUBMISSION FORMAT & SIGNATURES

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

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

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

<table>
<thead>
<tr>
<th>PART</th>
<th>CRITERIA</th>
<th>ITEM</th>
<th>REQUIRED SIGNATORIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR</td>
<td>MATERIALS &amp; RESOURCES</td>
<td>MR1 Materials Reuse and Selection</td>
<td>PSP/QS and C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MR2 Recycled Content Materials</td>
<td>PSP/QS and C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MR3 Sustainable Timber</td>
<td>PSP/QS and C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MR4 Sustainable Purchasing Policy</td>
<td>PSP/QS and C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MR5 Storage, Collection &amp; Disposal of Recyclables</td>
<td>PSP/S/QS AND C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MR6 Refrigerants &amp; Clean Agents</td>
<td>SP and C</td>
</tr>
<tr>
<td>WE</td>
<td>WATER EFFICIENCY</td>
<td>WE1 Rainwater Harvesting</td>
<td>PSP/SP/S and C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WE2 Water Recycling</td>
<td>SP/S and C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WE3 Water Efficient Irrigation/Landscaping</td>
<td>SP and C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WE4 Water Reduction</td>
<td>PSP/SP/S and C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WE5 Metering &amp; Leak Detection System</td>
<td>SP and C</td>
</tr>
<tr>
<td>IN</td>
<td>INNOVATION</td>
<td>IN1 Innovation &amp; Environmental Design Initiatives</td>
<td>PSP/SP/S and C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN2 Green Building Index Facilitator</td>
<td>S and C</td>
</tr>
</tbody>
</table>
INDUSTRIAL EXISTING BUILDING (IEB)
ENERGY EFFICIENCY
(EE)
INDUSTRIAL EXISTING BUILDING (IEB)
ENERGY EFFICIENCY (EE)

**EE1 **MINIMUM EE PERFORMANCE 2 POINTS

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

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

**REQUIREMENTS**
Submit calculations for Overall Thermal Transfer Value (OTTV) ≤ 50 and Roof Thermal Transfer Value (RTTV) ≤ 25. Use of the BEIT software or other GBI approved software is acceptable, AND Provision of Energy Management System where Air Conditioned space ≥ 4,000m²

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

**POTENTIAL TECHNOLOGIES & STRATEGIES**
Design the building envelope, HVAC, lighting and other systems to maximise energy performance.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Plans and elevations marking out walls &amp; apertures used for the calculation coloured blue; and walls &amp; apertures not used for calculation coloured red. Recommended scale 1: 200</td>
<td>ø</td>
</tr>
<tr>
<td>2. OTTV calculations for each facing wall and RTTV calculation for roof.</td>
<td>ø</td>
</tr>
<tr>
<td>3. Description of wall, roof &amp; aperture materials specified.</td>
<td>ø</td>
</tr>
<tr>
<td>4. Calculations of U-values for roof and walls.</td>
<td>ø</td>
</tr>
<tr>
<td>5. Proposed Glazing specifications on Shading Coefficient, U-values and Visible Light Transmission.</td>
<td>ø</td>
</tr>
<tr>
<td>6. Confirm provision of Energy Management System where Air Conditioned space ≥ 4,000m².</td>
<td>ø</td>
</tr>
</tbody>
</table>

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

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

**NOTE** ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
## INTENT
To provide flexible lighting controls so as to optimise energy savings.

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

## REQUIREMENTS

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

1 point: Awarded for provision of auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylit areas and/or provide task lighting for at least 25% (separate from motion sensor provision) of industrial plant area.

1 point: Awarded for provision of motion sensors or equivalent to complement lighting zoning for at least 25% NLA of building OR provide task lighting for at least 25% (separate from auto-sensor provision) of industrial plant area.

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

## POTENTIAL TECHNOLOGIES & STRATEGIES
Design lighting zones by increasing switching flexibility with controls by individual switches and/or automated sensing devices.

### REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

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

### REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>SUBMITTER</th>
<th>GOBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>As-Built Drawings of floor plans clearly showing each individually switched lighting zone and its coverage area.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>As-Built Electrical schematic drawings showing the locations and extent of switching, the area controlled by the switch and automated control sensing system detailed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Report to include the exact areas of all switched zones and confirmation that the total area meets the percentage NLA requirements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Describe any deviation or addition to the DA submission.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
INTENT
To monitor energy consumption of key building services as well as all tenancy and industrial plant areas.

DESCRIPTION
Encourage and recognise the provision of energy sub-metering to facilitate energy monitoring of base building services and industrial plant process by tenant or end users.

REQUIREMENTS
1 point: Provide separate sub-metering for all energy use ≥ 100kVA; with separate sub-metering for
1) Lighting, AND
2) Power, AND
3) Industrial processes

APPROACH & IMPLEMENTATION
For building with existing tenancies, separate metering shall be provided for car parks; chillers; AHUs; lifts; common area lighting and power and any additional item including plant equipment or process which carries an energy use ≥ 100kVA.

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. An extract from the specification detailing the installation requirements for electrical sub-meters that meets the credit criteria.
2. Clearly marked electrical schematic drawings showing the proposed locations of meters and the usage served by those meters.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. As-Built Electrical schematic drawings showing the exact locations of meters and the building usage served by those meters.
2. Describe any deviation or addition to the DA submission.

PROJECT NAME
DATE

SUBMITTING PROFESSIONAL
NAME
DESIGNATION
COMPANY
SIGNATURE

CLIENT
NAME
DESIGNATION
COMPANY
SIGNATURE

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To promote use of all forms of renewable energy and/or onsite energy capture/recovery to reduce environmental impact and emission of CO₂.

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

REQUIREMENTS
1 point: Awarded where 0.25% or 2 kWp whichever is the greater, of the equivalent total electricity consumption is generated by Renewable Energy (RE) and/or onsite energy capture/recovery, OR
2 points: Awarded where 0.50% or 5 kWp whichever is the greater, OR
3 points: Awarded where 0.75% or 7.5 kWp whichever is the greater, OR
4 points: Awarded where 1.00% or 10 kWp whichever is the greater, OR
5 points: Awarded where 1.25% or 15 kWp whichever is the greater, OR
6 points: Awarded where 1.50% or 20 kWp whichever is the greater, OR
7 points: Awarded where 2.00% or 40 kWp whichever is the greater, OR
8 points: Awarded where 2.50% or 60 kWp whichever is the greater.

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Plans and elevations marking out areas allocated to house renewable energy equipment.
2. Describe proposed technology to be used, including documenting total kWp or equivalent to be installed.
3. Predict reduced total electricity consumption by the building and percentage of renewable energy to be generated.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. As-Built plans and elevations marking out installation and location of renewable energy equipment.
2. Manufacturer's technical specification of the renewable energy equipment.
3. As-Measured kWp or equivalent renewable energy generated.
4. Describe any deviation or addition to the DA submission.

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To encourage enhancement of building and industrial plant process EE performance thereby reduce CO₂ emission.

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

- 1 point where BEI ≤ 180 kWh/m²/year or EUI improvement ≥ 10%
- 3 points where BEI ≤ 150 kWh/m²/year or EUI improvement ≥ 25%
- 4 points where BEI ≤ 140 kWh/m²/year or EUI improvement ≥ 30%
- 5 points where BEI ≤ 130 kWh/m²/year or EUI improvement ≥ 35%
- 6 points where BEI ≤ 120 kWh/m²/year or EUI improvement ≥ 40%
- 7 points where BEI ≤ 110 kWh/m²/year or EUI improvement ≥ 45%
- 8 points where BEI ≤ 100 kWh/m²/year or EUI improvement ≥ 50%
- 10 points where BEI ≤ 90 kWh/m²/year or EUI improvement ≥ 55%

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

- 1 point where BEI > 15% with resultant BEI ≤ 200 kWh/m²/year or EUI improvement > 10%
- 2 points where BEI > 20% with resultant BEI ≤ 190 kWh/m²/year or EUI improvement > 25%
- 3 points where BEI > 25% with resultant BEI ≤ 180 kWh/m²/year or EUI improvement > 30%
- 5 points where BEI > 30% with resultant BEI ≤ 150 kWh/m²/year or EUI improvement > 35%
- 6 points where BEI > 40% with resultant BEI ≤ 140 kWh/m²/year or EUI improvement > 40%
- 7 points where BEI > 50% with resultant BEI ≤ 130 kWh/m²/year or EUI improvement > 45%
- 8 points where BEI > 60% with resultant BEI ≤ 120 kWh/m²/year or EUI improvement > 50%
- 10 points where BEI > 70% with resultant BEI ≤ 110 kWh/m²/year or EUI improvement > 55%

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

POTENTIAL TECHNOLOGIES & STRATEGIES
Design the building envelope and systems to maximise energy performance. Adopt the most energy efficient design concepts and strategies for both the building and plant process. For plant process, explore opportunities for energy recovery and/or reuse. Quantify BEI and/or EUI performance as compared to a baseline building/plant or the existing building/plant with the aid of appropriate simulation software tools as appropriate.

CONTINUED ON NEXT PAGE
## ADVANCED EE PERFORMANCE – BEI AND/OR EUI

**10 POINTS**

**CONTINUED FROM PREVIOUS PAGE**

### REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. All documentation provided for EE1 (cross referenced)
2. Submit predicted BEI and/or EUI calculations. (For GBI Certified or Silver rating, may use static energy calculation using manual method or software programs such as BEIT or other GBI approved software programs; for GBI Gold or Platinum, must use dynamic energy calculation using GBI approved software programs)

### REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Actual verified BEI and/or EUI achieved for completed building/plant.
2. Actual EMS printouts.
3. Describe any deviation or addition to the DA submission.

---

**NOTE** ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To ensure building and industrial plant process energy related systems are installed to achieve proper commissioning so as to realise their full potential and intent. This will serve to eliminate the bad practice of not fully commissioning the installed systems.

REQUIREMENTS
Appoint a GBI recognised Commissioning Specialist (CxS) to perform the commissioning for all the facility’s energy related systems in accordance with ASHRAE Commissioning Guideline or other GBI approved equivalent standard by:

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Confirmation letter from the CxS of his appointment and scope of works in accordance with the GBI CxS requirements.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
## INTENT
To ensure up-to-date on-going post occupancy/post plant operation commissioning are carried out for all tenancy fit-out and plant modification changes are completed.

## REQUIREMENTS

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

### 1 point
Awarded where the CxS carries out a full post/re-commissioning of the energy related systems to verify that their performance is sustained in conjunction with the completed tenancy fit-outs/plant modifications.

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

### REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Declaration that post occupancy/modification commissioning will be undertaken.</td>
<td>☐</td>
</tr>
</tbody>
</table>

### REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Document what has been approved and constructed for post-occupancy fit-out/plant modifications.</td>
<td>☐</td>
</tr>
<tr>
<td>2. CxS to verify re-commissioning works, if applicable.</td>
<td>☐</td>
</tr>
<tr>
<td>3. Describe any deviation or addition to the DA submission.</td>
<td>☐</td>
</tr>
</tbody>
</table>
INTENT
To provide for ongoing accountability of the building/plant energy consumption over time.

REQUIREMENTS
1 point: Awarded for the use of Energy Management System to monitor and trend log energy consumption for building and plant process, AND
Monitor sub-metering of building system and plant process to track energy consumption of major uses and other end use applications e.g. by categorising into building/plant systems or floors etc.

1 point: Fully commission EMS and activate Maximum Demand Limiting programme. AND
Compile, summarise and submit BEI/EUI, Fuel and Water Consumption of building/plant to GSB on an annual basis during the 3-years validity period or earlier whenever requested by GSB. Submission shall include monthly energy and water bills.

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

<table>
<thead>
<tr>
<th>REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)</th>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Declaration of commitment to carry out EE verification upon completion.</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

<table>
<thead>
<tr>
<th>REQUIRED SUBMISSION FOR COMPLETION &amp; VERIFICATION ASSESSMENT (CVA)</th>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Where EMS is installed, comprehensive printouts of EMS results including Maximum Demand Limiting program setting.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Describe any deviation or addition to the DA submission.</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To ensure the energy related systems will continue to perform as intended with proper and sustainable maintenance.

REQUIREMENTS
1 point: Awarded where at least 75% of permanent maintenance team to participate in the commissioning of all energy services.
1 point: Set up a permanent Energy Monitoring Committee (EMC) to ensure that building/plant energy performance is continuously monitored and improved.
1 point: Awarded for providing a designated facility maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage, AND
1 point: Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts) for building and plant process.

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)
1. Identify building maintenance room and facilities in the design floor plan.
2. Commitment to deploy at least 75% of permanent building maintenance team to participate in commissioning of all building energy services with organisation chart and staff positions identified.
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).

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. Documentary evidence that 75% of the maintenance team were involved in the full testing & commissioning of the building/plant process energy related systems.
2. Comprehensive list of maintenance tools and instrumentation, and inventory storage items.
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).
4. Describe any deviation or addition to the DA submission.
INDUSTRIAL EXISTING BUILDING (IEB)

INDOOR ENVIRONMENTAL QUALITY (EQ)
INDUSTRIAL EXISTING BUILDING (IEB)
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ1  MINIMUM IAQ PERFORMANCE  1 POINT

INTENT
To provide for minimum IAQ performance to enhance indoor air quality in building (and industrial plant area where applicable), thus contributing to comfort and well-being of occupants.

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Description of the ventilation design.
2. Schematic to illustrate the ventilation system design.
3. Summary table with calculations to illustrate how the delivered minimum outdoor airflow to each zone and the outdoor air intake for the system meet the requirements of ASHRAE and/or local code.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To minimise exposure of building and plant occupants to Environmental Tobacco Smoke.

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

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

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

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To provide response monitoring of carbon dioxide levels to ensure delivery of optimal outside air requirements.

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

REQUIREMENTS
Install carbon dioxide (CO\(_2\)) monitoring and control system with at least one (1) CO\(_2\) sensor at main return air points on each air-conditioned floor/zone to facilitate continuous monitoring and adjustment of outside air ventilation rates to each floor/zone, and ensure independent control of ventilation rates to maintain CO\(_2\) level ≤ 1,000 ppm.

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Submission of ventilation and control schematics together with description of how CO\(_2\) monitoring and controls are integrated into the ventilation design.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. As-Built drawings showing the installed sensors and controls.
2. Summary report on the ventilation design and CO\(_2\) monitoring and control system including information regarding the location, quantity of installed sensors, the operational parameters and set points.
3. Manufacturer’s information confirming the specifications of the CO\(_2\) sensors.
4. Photographic evidence of typical installations.
5. Describe any deviation or addition to the DA submission.
**INDUSTRIAL EXISTING BUILDING (IEB)**

**INDOOR ENVIRONMENTAL QUALITY (EQ)**

<table>
<thead>
<tr>
<th>EQ4</th>
<th>INDOOR AIR POLLUTANTS &amp; INDUSTRIAL CHEMICAL EXPOSURE</th>
<th>3 POINTS</th>
</tr>
</thead>
</table>

**INTENT**
To minimise detrimental impact on occupants’ health from finishes that emit internal air pollutants and exposure to industrial chemicals.

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

**REQUIREMENTS**

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

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

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

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

1. Composite wood and agrifiber products defined as: particleboard, medium density fibreboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores, AND

2. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies, AND

3. Insulation foam, AND


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

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

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Summary report identifying areas where the low VOC materials will be installed and how the credit compliance is to be met.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-Built drawings showing where low VOC materials or products are used.

2. List of products installed that meet the credit requirements, and their specifications.

3. Manufacturer’s information including data sheets, certificates, test reports etc to demonstrate credit compliance.

4. Photographic evidence of each typical low VOC installation.

5. Describe any deviation or addition to the DA submission.

---

**NOTE** ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To prevent microbial contamination in the building and plant area to ensure the health and well-being of occupants.

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

REQUIREMENTS
Demonstrate that the air-conditioning and mechanical ventilation system will maintain a positive indoor air pressure relative to the exterior, and can actively control indoor air humidity to be no more than 70% RH without the use of active control that will consume additional energy.

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

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Summary report outlining the strategies adopted to meet the credit requirements.
2. A copy of specifications for the strategies to be carried out.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. As-Built drawings or As-Built specifications confirming that the industrial building has been constructed in accordance with the strategies adopted.
2. Manufacturer’s information on all relevant materials specified for mould prevention and/or resistance, to verify credit compliance.
3. Documentation evidence during construction of the precautions taken for mould prevention, e.g. photographs of material storage and protection for items that are susceptible to mould growth as identified in the DA submission stage.
4. Provide 24-hour record (during full occupancy) of Temperature-Relative Humidity measurements for at least two (2) areas acceptable to the GBI Certifier.
5. Describe any deviation or addition to the DA submission.
INTENT
To provide a thermal environment that is comfortable and supports the productivity and well-being of building and plant occupants.

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

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

1 point: Provide individual comfort control for ≥ 50% of the occupants to enable adjustments to suit individual task needs and preferences, AND
Provide comfort system control for all shared multi-occupant spaces to enable adjustments to suit group needs and preferences, AND

Conditions for thermal comfort include the primary factors of air temperature, radiant temperature, air speed and humidity. Comfort system control for this purpose is defined as the provision of control over at least one of these primary factors in the occupants’ local environment.

APPROACH & IMPLEMENTATION
Conditions for thermal comfort include the primary factors of air temperature, radiant temperature, air speed and humidity. Comfort system control for this purpose is defined as the provision of control over at least one of these primary factors in the occupants’ local environment.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Describe how the project will fulfil the requirements on provision of individual control for at least 50% of occupants and also provision of controls for shared multi-occupant spaces.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. Summary report that includes information on the methods used to establish thermal conditions for the project and how the system design addresses the design criteria.
2. Provide 72-hour record (during full occupancy) of temperature measurement for at least two (2) areas acceptable to the GBI Certifier, to verify the specified close thermal comfort condition.
3. Summary report on the individual types of control and the controls for multi-occupant spaces that are provided to achieve the credit compliance.
4. Photographic evidence of each typical type of sensor and control installed.
5. Describe any deviation or addition to the DA submission.
**INTENT**
To provide effective delivery of clean air through reduced mixing with indoor pollutants in order to promote a healthy indoor environment.

**DESCRIPTION**
Prevent or minimise short-circuiting of outdoor ventilation air through recirculation of supply and return air.

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

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

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

### REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Summary report detailing the design criteria that has been adopted for each type of space in the development.</td>
<td></td>
</tr>
<tr>
<td>2. Describe how the ventilation system meets the credit compliance.</td>
<td></td>
</tr>
</tbody>
</table>

### REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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

---

**NOTE** ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To reduce worker’s fatigue.

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Plans and elevations marking out areas for breakout spaces.
2. Description of strategies to be employed in the building to achieve this credit (by means of management policy or signage proposal).

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. As-Built drawings identifying location of breakout spaces.
2. Summary report describing strategies undertaken.
4. Describe any deviation or addition to the DA submission.
INTENT
To ensure provision of good levels of daylighting for building and plant occupants.

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

REQUIREMENTS
1 point: Demonstrate that ≥ 30% of the NLA has a Daylight Factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level, OR
2 points: Demonstrate that ≥ 50% of the NLA has a Daylight Factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level.

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Summary report with diagrams, of the design daylight strategies including for glare control that will be undertaken to meet the credit requirements.

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

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
**INTENT**
To reduce discomfort of glare from natural light.

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

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

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

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

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**
1. Typical floor plans and sections showing variable position of glare control system.
2. Brief description of proposed control mechanism to be provided.
3. Summary report to describe how view and daylight is assured when glare control system is engaged.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**
1. As-Built drawings and specifications to confirm that building is constructed according to design drawing and specifications.
2. Typical As-Built floor plans and sections showing position of glare control system.
3. Description of control mechanism installed.
4. Manufacturer’s Information on the blind and control systems provided.
5. Summary report to describe how view and daylight is assured when glare control system is engaged.
6. Furnish photographs of each type of typical glared control system installed.
7. Describe any deviation or addition to the DA submission.
INTENT
To ensure lighting level is not over-designed.

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Summary report of lighting design brief to illustrate how the credit will be met.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. As-Built drawings showing the lighting layout plans.
2. Photometric measurements to illustrate that the lighting level fulfils the credit requirement.
3. Furnish photographs of typical floor lighting installation.
4. Describe any deviation or addition to the DA submission.
INTENT
To provide for comfortable visual working environment for occupants.

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Description of design strategy to achieve installation of high frequency ballasts for minimum 90% of NLA.</td>
<td>○</td>
</tr>
</tbody>
</table>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. As-Built lighting plans to identify location of the 90% NLA of fluorescent luminaries installed with high frequency ballasts.</td>
<td>○</td>
</tr>
<tr>
<td>2. Manufacturer’s information confirming the specifications of high frequency ballasts installed.</td>
<td>○</td>
</tr>
<tr>
<td>3. Describe any deviation or addition to the DA submission.</td>
<td>○</td>
</tr>
</tbody>
</table>
**INTENT**
To reduce eyestrain for building occupants by providing long distance views and provision of visual connection to the outdoor.

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

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

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

*Note:* This requirement is applicable to the office building component of the industrial plant only.

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

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Typical floor plans to identify how external view for the spaces is maintained.
2. Design strategy of the interior layout that will be designed or recommended to maintain view to the outside.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

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

**PROJECT NAME**

**DATE**

**SUBMITTING PROFESSIONAL**

**NAME** | **DESIGNATION** | **COMPANY** | **SIGNATURE**

**CLIENT**

**NAME** | **DESIGNATION** | **COMPANY** | **SIGNATURE**

*NOTE:* ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTERNAL NOISE LEVELS

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

**DESCRIPTION**
Maintain internal noise level at an appropriate level.

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

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

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

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

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Design report on strategies to ensure internal noise level is maintained at the prescribed levels.</td>
<td>○ ○</td>
</tr>
<tr>
<td>2. Floor plans showing location of Core, M&amp;E, and equipment rooms.</td>
<td>○ ○</td>
</tr>
</tbody>
</table>

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Report describing the measured internal and external noise sources and features installed to achieve required noise level.</td>
<td>○ ○</td>
</tr>
<tr>
<td>2. As-Built drawings showing noise control features.</td>
<td>○ ○</td>
</tr>
<tr>
<td>3. Manufacturer’s data sheets of the acoustic materials used in building.</td>
<td>○ ○</td>
</tr>
<tr>
<td>4. Describe any deviation or addition to the DA submission.</td>
<td>○ ○</td>
</tr>
</tbody>
</table>
INTENT
To maintain good Indoor Air Quality condition both before building/plant occupancy and during occupancy.

DESCRIPTION
Reduce indoor air quality problems resulting from the construction process (or inherent conditions) in order to improve and sustain the comfort and well-being of occupants.

REQUIREMENTS

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

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

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

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

1 Point: Permanent Air Purging System – Where a permanent air flushing system of at least 10 air changes/hour operation is installed for use during occupancy stage.

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Summary report outlining the strategies and procedures to be taken to meet the credit requirements.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Report on flush-out procedure including the actual dates of the flush-out.
2. If IAQ testing is carried out, a report to outline the procedures undertaken and the results of the testing to verify if the credit requirements are met or not. If not, corrective measures must be taken.
3. Describe any deviation or addition to the DA submission.
INTENT
To provide for assessment of comfort of the building occupants/plant workers.

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

REQUIREMENTS
1) Conduct an occupancy comfort survey of building occupants/workers annually. This survey should collect anonymous responses about thermal comfort, visual comfort and acoustic comfort in a building/plant. It should include an assessment of overall satisfaction with thermal, visual and acoustic performance and identification of thermal-related, visual-related and acoustic-related problems, AND
2) Develop a plan for corrective action if the survey results indicate that more than 20% of occupants/workers are dissatisfied with the overall comfort in the building/plant. This plan should include measurement of relevant environmental variables in problem areas. The relevant environmental variables include 1) temperature, relative humidity, air speed and mean radiant temperature, 2) lighting level and glare problem, 3) background noise level, 4) odour problem, CO₂ level, VOCs, and particulate concentration.

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Summary report of the strategies that will be undertaken to meet the credit compliance.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INDUSTRIAL EXISTING BUILDING (IEB)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)
INDUSTRIAL EXISTING BUILDING (IEB)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

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

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Furnish past GBI certificate or other GBI approved Green Building Certificate OR valid Energy Efficiency Audit report (not more than 12 months old).

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Furnish past GBI certificate or other GBI approved Green Building Certificate OR valid Energy Efficiency Audit report (not more than 12 months old).

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INDUSTRIAL EXISTING BUILDING (IEB)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM2  BUILDING EXTERIOR MANAGEMENT  1 POINT

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

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Submit building/plant exterior management plan and intended list of non-polluting cleaning agents / products.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To preserve the natural environment of the building/plant exterior through adopting environmentally sensitive management measures.

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

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Submit Pest Management Plan.</td>
<td>O</td>
</tr>
<tr>
<td>2. Submit Erosion &amp; Sedimentation Control Plan.</td>
<td>O</td>
</tr>
<tr>
<td>3. Submit Landscape Management Plan.</td>
<td>O</td>
</tr>
</tbody>
</table>

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Submit as implemented Pest Management Plan and photographic evidence of activity in compliance.</td>
<td>O</td>
</tr>
<tr>
<td>2. Submit as implemented Erosion &amp; Sedimentation Control Plan and photographic evidence of activity in compliance.</td>
<td>O</td>
</tr>
<tr>
<td>3. Submit as implemented Landscape Management Plan and photographic evidence of activity in compliance.</td>
<td>O</td>
</tr>
<tr>
<td>4. Describe any deviation or addition to the DA submission.</td>
<td>O</td>
</tr>
</tbody>
</table>

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INDUSTRIAL EXISTING BUILDING (IEB)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

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

INTENT
To reduce pollution and land development impacts from automobile use.

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

REQUIREMENTS
Encourage use of green vehicles:
- Provide preferred parking for low-emitting and fuel-efficient vehicles comprising 5% of total parking bays. “Preferred Parking” refers to the parking spots that are closest to the main entrance of the building/plant (exclusive of spaces designated for handicapped or parking passes provided at a discounted price).

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Submit calculations for provision of 5% required car park bays for green vehicles. ☐ ☐
2. Plans showing the locations and numbers of car park bays reserved for green vehicles. ☐ ☐

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Submit As-Built plans showing locations and the allocated 5% car park bays for green vehicles. ☐ ☐
2. Describe any deviation or addition to the DA submission. ☐ ☐

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
**INTENT**
To reduce pollution and land development impacts from single occupancy vehicle use.

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

**REQUIREMENTS**
Discourage over-provision of car parking capacity:

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

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

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Submit detailed calculation showing the minimum number of car park bays required by the local authorities, and the number of bays provided.</td>
<td></td>
</tr>
<tr>
<td>2. Submit plans showing location for preferred parking for carpools or vanpools.</td>
<td></td>
</tr>
</tbody>
</table>

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Submit final car park calculations verified by qualified persons.</td>
<td></td>
</tr>
<tr>
<td>2. Submit As-Built drawings indicating the preferred parking for carpools or vanpools.</td>
<td></td>
</tr>
<tr>
<td>3. Describe any deviation or addition to the DA submission.</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**
Attach all submittals with this cover page.
INTENT
To reduce heat island effect (thermal gradient difference between developed and undeveloped areas) so as to minimise impact on microclimate and human and wildlife habitat.

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

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

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

<table>
<thead>
<tr>
<th>Roof Type</th>
<th>Slope</th>
<th>SRI Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-Sloped</td>
<td>&lt; 2:12</td>
<td>78</td>
</tr>
<tr>
<td>Steep-Sloped</td>
<td>&gt; 2:12</td>
<td>29</td>
</tr>
</tbody>
</table>

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Submit Site plan and Roof Plan showing the extent of proposed hardscape and greenery (softscape) (To scale).
2. Section drawing of the rooftop showing details of built-up roof greenery (To scale).
3. List of names of native or adaptive vegetation and their characteristics.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. As-Built plans and sections of roof (To scale). Submit list of materials used and their SRI values.
2. Submit photographs of roof and materials.
3. Describe any deviation or addition to the DA submission.

NOTE: Attach all submittals with this cover page

SUBMITTER GBI
INDUSTRIAL EXISTING BUILDING (IEB)
SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

SM7 BUILDING USER MANUAL 1 POINT

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
2. Describe any deviation or addition to the DA submission.

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INDUSTRIAL EXISTING BUILDING (IEB)

MATERIALS & RESOURCES (MR)
INDUSTRIAL EXISTING BUILDING (IEB)
MATERIALS & RESOURCES (MR)

MR1 MATERIALS REUSE AND SELECTION 1 POINT

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

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

REQUIREMENTS
1 point: Where reused products/materials constitute ≥ 20% of the project’s total retrofit material cost value.

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

The following approach can achieve this credit by using:

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

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

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

PROJECT NAME
DATE

SUBMITTING PROFESSIONAL
NAME
DESIGNATION
COMPANY
SIGNATURE

CLIENT
NAME
DESIGNATION
COMPANY
SIGNATURE

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

GREEN BUILDING INDEX DESIGN REFERENCE GUIDE & SUBMISSION FORMAT

GREENBUILDING INDEX SDN BHD (845666-V)

VERSION 1.0 | SEPTEMBER 2011 55
**INTENT**
To encourage designers to specify the usage of recycled content materials when retrofitting buildings.

**DESCRIPTION**
Increase demand for building products that incorporate recycled content materials in their production. (Recycled content shall be defined in accordance with the ISO14021 document).

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

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

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

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

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

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

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

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

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

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

**NOTE** ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To promote responsible forest management.

DESCRIPTION
To encourage environmentally responsible forest management.

REQUIREMENTS
Where ≥ 75% of wood-based materials and products used in the retrofit are certified. These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. To include wood materials permanently installed and also temporarily purchased for the project. Compliance with Forest Stewardship Council and Malaysian Timber Certification Council requirements.

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. List all new wood products specified in the project and identify which components are FSC and MTCC certified.
2. Indicate the estimated volume of each wood product.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INDUSTRIAL EXISTING BUILDING (IEB)
MATERIALS & RESOURCES (MR)

MR4 SUSTAINABLE PURCHASING POLICY 1 POINT

INTENT
To promote the use of sustainable consumer products apart from building/plant maintenance and operational needs, through the adoption of a sustainable purchasing policy.

DESCRIPTION
It is essential to extend environmental protection to cover the day to day operation of a building/plant through the implementation of a sustainable purchasing policy by the owners and tenancies.

REQUIREMENTS
Develop a Sustainable Purchasing Policy that must cover product purchases within the building/plant and management’s control.

APPROACH & IMPLEMENTATION
Sustainable purchasing policy involves commitment to the environment, economic and social aspects of the society. Procurement of products should consider the sustainability of their raw materials used, production energy consumed, environmental impact, reusable or recyclable contents, biodegradability and so forth.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Submit an outline of the Sustainable Purchasing Policy with its objective, scope and responsibilities, best practices and procurement strategies, etc.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Submit a comprehensive Sustainable Procurement Policy outlining in details its objectives, scope and responsibilities, best practices and procurement strategies, procedures and staffing.

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To provide dedicated areas and storage bins for non-hazardous materials for recycling during BOTH retrofit construction and building/plant occupancy.

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

REQUIREMENTS
1 point: Provide recycling facilities/infrastructure for sorting and separate collection of recyclable waste for recycling (consumables - glass, paper, metal, equipment, addition & alteration construction wastes).
1 point: Promote and encourage waste minimization and recycling among occupants, tenants and visitors through various avenues.
1 point: Promote waste sorting, collecting, quantifying, monitoring and recycling of a large range of waste generated in-house.

APPROACH & IMPLEMENTATION
During retrofit construction, designate a dedicated area where on-site sorting of waste materials can be stored in separate skips for collection to recycling facilities.
During Building Occupancy, designate storage areas for recyclable materials that are clearly labelled for recycling, placed within accessible reach of the building occupants and in a location with easy vehicular access to facilitate collection.
The size of the storage space allocated should be adequate to store the recyclable waste volume generated by the building/plant occupants/operation.
Identify and include a list of recycling facilities that are able to handle and treat the recyclable waste diverted from landfills by the building/plant occupants/operation.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Floor plans showing the proposed locations of the storage areas for recyclables and their proximity to the building entrance and vehicular access point/s.
2. Ensure that the space provided for recyclables is in addition to the storage space allocated for general waste.
3. Describe proposed promotional activities to encourage recycling within the building/plant.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. As-Built plans showing the locations of the storage area for recyclables. The plans should indicate the proximity of the storage from the building entrance.
2. Photographs showing the location, size, storage provision and labelling of dedicated facilities during retrofit construction.
3. Write up of promotional activities to encourage recycling within the building/plant including evidence of such promotional activities carried out.
4. A waste recycling strategy and plan that identifies types of recyclable materials diverted from landfills as well as recycling facilities that have been signed up to handle the recyclable waste
5. Describe any deviation or addition to the DA submission.

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To demonstrate leadership in accelerating phase-out of all Ozone Depleting Substances. Recognise and promote use of low Global Warming Substances.

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

REQUIREMENTS
1 point: Use zero Ozone Depleting Potential (ODP) products: non-CFC and non-HCFC Refrigerants AND Clean Agents.

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)  SUBMITTER OBI
1. Submit proposed types of refrigerants and clean agents to be used and/or if no refrigerants or clean agents will be used.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)  SUBMITTER OBI
1. Submit list of as-installed refrigerants and clean agents.
2. Describe any deviation or addition to the DA submission.
INDUSTRIAL EXISTING BUILDING (IEB)
WATER EFFICIENCY (WE)
INTENT
To encourage rainwater harvesting that will lead to reduction in potable water consumption.

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

REQUIREMENTS
1 point: Rainwater harvesting that leads to ≥ 5% reduction in potable water consumption, OR
2 points: Rainwater harvesting that leads to ≥ 15% reduction in potable water consumption, OR
3 points: Rainwater harvesting that leads to ≥ 30% reduction in potable water consumption.

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

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

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

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

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. Final as-installed calculation of rainwater harvested, storage tank capacity and building usage distribution system.
2. As-Built drawings for rainwater harvesting system and storage tank location (Recommended scale 1:200).
3. Furnish photographs of as installed main equipment and components.
4. Describe any deviation or addition to the DA submission.
INTENT
To encourage water recycling that will lead to reduction in potable water consumption.

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

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

REQUIREMENTS
Treat and recycle the following percentage of wastewater leading to reduction in potable water consumption:
- **1 point:** For $\geq 10\%$ or more wastewater being treated and recycled, OR
- **2 points:** For $\geq 30\%$ or more wastewater being treated and recycled, OR
- **3 points:** For $\geq 50\%$ or more wastewater being treated and recycled

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

POTENTIAL TECHNOLOGIES & STRATEGIES
Consider channelling greywater from sinks, showers and other sources to wastewater treatment plant. Options for on-site wastewater treatment include packaged biological nutrient removal systems and high efficiency filtration systems can be considered.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

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

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Final as-installed calculation of the recycled and treated wastewater, storage tank capacity and distribution system.
2. As-Built drawings for wastewater recycling and treatment system, and storage tank location (to scale).
3. Describe any deviation or addition to the DA submission.

PROJECT NAME

SUBMITTING PROFESSIONAL

CLIENT

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To encourage and recognise the design of landscaping system that minimises or does not require the use of potable
water supply from the local water authority.

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

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

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

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

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. A brief description of the system with references to Guidelines used, calculations, and an
   explanation of how the system meets the requirement for the credit.
2. A brief report by a landscape architect detailing the selection of native adaptive vegetation and the water efficient irrigation system and demonstrating that it will meet all the requirements for the credit.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. As-Built plans showing the detail location of the planted native adaptive vegetation and installed water efficient irrigation system (to scale).
2. Calculation of the reduction of potable water for landscape irrigation.
3. Furnish photographs of the vegetation installed.
4. Describe any deviation or addition to the DA submission.
INTENT
To encourage reduction in potable water consumption through use of efficient devices/industrial process.

REQUIREMENTS
1 point: Reduce annual potable water consumption by ≥ 30%, OR
2 points: 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 building.

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

Specify the use of modified waterless urinals.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. A brief description of the system and an explanation of how the system meets the requirement for the credit.
2. Submit proposed makes of the intended fittings and industrial process.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Actual verified water consumption for the building.
2. Tabulation of all as-installed water efficient fittings and calculations to verify percentage of water saved to meet the requirement for the credit.
3. Submit manufacturer’s details of the installed fittings.
4. Furnish photographs of each type of water efficient fittings as-installed.
5. Describe any deviation or addition to the DA submission.
**INTENT**
To encourage the design of systems that allows monitoring and management of water consumption.

**REQUIREMENTS**
1 point: Use of sub-meters to monitor and manage major water usage for cooling towers, irrigation, kitchens, tenancy use, and industrial process use.
1 point: Link all water sub-meters to EMS to facilitate early detection of water leakage.

**APPROACH & IMPLEMENTATION**
Specify the provisions of sub-meters for major water consuming system/equipment.
Incorporate EMS monitoring system of sub-meters.

**POTENTIAL TECHNOLOGIES & STRATEGIES**
To incorporate provisions of analogue or digital flow water sub-meters.
Incorporation of EMS monitoring will enable early detection of water leakage and contain water wastage.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**
1. Describe proposed provision of sub-meters of all major water consuming system/equipment and interface with EMS.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**
1. Submit tabulated inventory of as-installed sub-meters.
2. As-Built plans of the building showing the location of sub-meters.
3. Furnish photographs of typical sub-meter installed.
4. Sample of actual EMS report recording consumption and simulated leakage.
5. Describe any deviation or addition to the DA submission.

---

**NOTE**
Attach all submittals with this cover page.
INDUSTRIAL EXISTING BUILDING (IEB)

INNOVATION

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

DESCRIPTION
Reward innovation and initiatives.

REQUIREMENTS
Encourage project team to score points for exceptional performance above the requirements set by GBI rating system:

1 point for each approved innovation and environmental design initiative up to a maximum of 9 points, for innovative ideas such as, but not limited to:

• Use of Industrialised Building System (IBS) for the retrofit component (minimum CIDB IBS score of 30);
• Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling water make-up water etc;
• Co-generation / Tri-generation system;
• Thermal / PCM / Thermal Mass storage system (accounting for at least 25% of total required capacity);
• Solar thermal technology / Solar Air conditioners (generating at least 10% of total required capacity);
• Heat recovery system (contributing to at least 10% of total required capacity);
• Heat pipe technology (contributing to at least 50% of the relevant applications);
• Light pipes (generating at least 1% of total lighting capacity);
• Auto-condenser tube cleaning system (fitted to plant equipment serving at least 50% of total capacity);
• Non-chemical water treatment system for condenser or chilled water circuit (serving at least 50% of total capacity);
• Air and dirt separator system for chilled water piping system;
• Vacuum degasser cleaning system for chilled water piping system;
• Dynamic balancing control valve system (for entire chilled water system)
• Mixed mode / low energy ventilation system;
• Advanced air filtration technology (serving at least 50% of GFA);
• Waterless urinals (fitted to at least 75% male toilets);
• Central vacuum system (serving at least 50% of NLA);
• Central Pneumatic Waste Collection system (serving at least 50% of NLA);
• Self-cleaning façade (for at least 10% of façade);
• Electrochromic glazed façade (for at least 10% of façade);
• Refrigerant leakage detection and recycling facilities (for at least 90% of HVAC plant);
• Car park mechanical ventilation fans provided with VSD and controlled by CO2/CO sensors;
• Use non-synthetic (natural) Refrigerants AND Clean Agents with zero ODP and negligible Global Warming Potential;
• ISO 14000 series certification;
• Recycling of all fire systems water during regular testing;

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

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.

CONTINUED ON NEXT PAGE
REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Report on each innovation, how it is derived, and how it would assist in reducing energy and/or improving sustainable design.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Full documentation and photographic evidence of each innovation, and the process from commencement to commissioning, complete with drawings, manuals and maintenance write-up.
2. Describe any deviation or addition to the DA submission.
INDUSTRIAL EXISTING BUILDING (IEB)
INNOVATION (IN)

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

**DESCRIPTION**
Encourage and promote green technology service providers.

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

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

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

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

<table>
<thead>
<tr>
<th></th>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Proof of appointment of the named GBI Facilitator.</td>
<td>〇</td>
</tr>
<tr>
<td>2.</td>
<td>GBI Facilitator to present DA submission to GBI Certifier.</td>
<td>〇</td>
</tr>
</tbody>
</table>

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

<table>
<thead>
<tr>
<th></th>
<th>SUBMITTER</th>
<th>GBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>GBI Facilitator to present CVA submission to GBI Certifier.</td>
<td>〇</td>
</tr>
</tbody>
</table>

---

**PROJECT NAME**

<table>
<thead>
<tr>
<th>NAME</th>
<th>DESIGNATION</th>
<th>COMPANY</th>
<th>SIGNATURE</th>
</tr>
</thead>
</table>

**SUBMITTING PROFESSIONAL**

<table>
<thead>
<tr>
<th>NAME</th>
<th>DESIGNATION</th>
<th>COMPANY</th>
<th>SIGNATURE</th>
</tr>
</thead>
</table>

**CLIENT**

<table>
<thead>
<tr>
<th>NAME</th>
<th>DESIGNATION</th>
<th>COMPANY</th>
<th>SIGNATURE</th>
</tr>
</thead>
</table>

**NOTE** ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
GSB would like to thank all contributors for efforts in preparing the INDUSTRIAL EXISTING BUILDING Design Reference Guide Version 1.0. The following are the main contributors to the formation of this document:

**GBI INDUSTRIAL EXISTING BUILDING (IEB)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chen Thiam Leong</td>
<td>Association of Consulting Engineers Malaysia (ACEM)</td>
</tr>
<tr>
<td>Dr Nurul Muiz Murad</td>
<td>Malaysian Green Building Confederation (MGBC)</td>
</tr>
<tr>
<td>Ahmad Ridha</td>
<td>Malaysian Green Building Confederation (MGBC)</td>
</tr>
<tr>
<td>Au Chong Hun</td>
<td>Association of Consulting Engineers Malaysia (ACEM)</td>
</tr>
<tr>
<td>Ahmad Izdihar</td>
<td>Association of Consulting Engineers Malaysia (ACEM)</td>
</tr>
<tr>
<td>Wong Kian Lon</td>
<td>Association of Consulting Engineers Malaysia (ACEM)</td>
</tr>
<tr>
<td>Dr Kribanandan GN</td>
<td>Association of Consulting Engineers Malaysia (ACEM)</td>
</tr>
<tr>
<td>Leong Siew Meng</td>
<td>American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. – Malaysia Chapter (MASHRAE)</td>
</tr>
<tr>
<td>Ng Yong Kong</td>
<td>American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. – Malaysia Chapter (MASHRAE)</td>
</tr>
<tr>
<td>Lam Kim Seong</td>
<td>American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. – Malaysia Chapter (MASHRAE)</td>
</tr>
<tr>
<td>Looi Hip Peu</td>
<td>Malaysian Green Building Confederation (MGBC)</td>
</tr>
<tr>
<td>Thirukumaran Jallendran</td>
<td>Malaysian Green Building Confederation (MGBC)</td>
</tr>
<tr>
<td>Von Kok Leong</td>
<td>Pertubuhan Arkitek Malaysia (PAM)</td>
</tr>
<tr>
<td>Faizul Ideris</td>
<td>Federation of Manufacturers Malaysia (FMM)</td>
</tr>
<tr>
<td>Wong Siew Sheng</td>
<td>Malaysia Air-Conditioning &amp; Refrigeration Assocation (MACRA)</td>
</tr>
</tbody>
</table>