BCA Green Mark for Infrastructure
Version 1.0

BCA GREEN MARK FOR INFRASTRUCTURE - VERSION 1

Summary of Assessment Criteria

Ref.	Category	Points
1	Landscape, ecology and land efficiency	20
2a	Energy	20
2b	Renewable energy	10
3	Water	15
4	Project Management	20
5	Waste management and Environmental Protection	15
6	Innovation	30
	Total	130

Rating Scale for BCA Green Mark Infrastructure

Green Mark Points	Green Mark Rating Level
90 and above	Platinum
80 to < 90	Gold^{Plus}
70 to < 80	Gold
50 to < 70	Certified

Note: The weightage of the criteria will be fine-tuned for different types of infrastructure projects to suit the nature of the project. However, the total points shall remain 130 points.

Revision Log

S/No.	Description	Date Effective
R0	Launch for Implementation	27 Apr 2009
R1	Minor Amendment to Criteria 1.5	10 Jan 2017

Landscape, ecology and land efficiency		
1.1	<u>Avoid use of land with high ecological, agricultural value</u> The identification of high ecological and biodiversity valuable areas could be done through ecological and biodiversity studies or in consultation with Nature Society/Universities to determine if there are any areas that should be conserved. The findings and feedback should be considered in the planning and design in the project footprint. No significant impact on the ecological value of site - 2 points Some minor impact but mitigation measures adopted – 1 point	2 pt
1.2	<u>Loss and mitigation of greenery area</u> Minimise the impact of the project on greenery and enhance the greenery area where possible. Greenery area to be calculated on plan before and after project implementation. Greenery Provision before and after project construction : No change in GnP – 1 point 5% improvement in GnP – 2 points 10% improvement in GnP – 3 points	3 pt
1.3	<u>Conservation of matured trees and protected species</u> Encourage conservation of matured trees and protected species Evidence to show that efforts were made in the design and construction to conserve mature trees and protected species. Transplanting of the trees shall be considered where applicable.	2 pt
1.4	<u>Habitat creation and connectivity</u> No impact on wildlife habitat or where it is not possible to conserve existing wildlife habitat areas, re-instatement of existing habitat should be carried out (1 point) Interconnectivity of the green areas not disturbed. (1 point)	2 pt
1.5	<u>Use of brownfield sites and clean-up of contaminated land</u> Area of site which is previously built-on: 100% - 2 points 50% - 1 point 0% - 0 points If building on a contaminated site, proper remediation measures are carried out to restore the land for use. (1 point)	3 pt
1.6	<u>Minimise the use of land through exploring alternative design layout</u> Demonstrate that the planning and design process has explored various alternative proposals to optimize the use of land while achieving the intended performance of the infrastructure project.	4 pt

Landscape, ecology and land efficiency		
1.7	<u>Provision of Amenities for Public Usage and Ease of Accessibility</u> Provide recreation facilities the public e.g.children playground, cycling track, exercise corner for elderly (2 point) Universal design features (barrier-free accessibility) to improve the accessibility for the physically-challenged (2 points)	4 pts

<table>
<tr><td colspan="2">2a - Energy</td><td></td></tr>
<tr><td>2a.1</td><td><u>Energy efficiency</u>
Demonstrate the energy saving of the project compared to a code compliance facility or industry norm. The energy consumption calculation per year should include all equipment and systems such as lightings, air-conditioning, escalator and lift, pumps, etc

<table><tr><th>Functional Requirement of the Infrastructure</th><th>Other Ancillary Services</th></tr><tr><td>Percentage saving compared to code compliance/Industry norm
10% - 2 point
20% - 4 point
30% - 6 points
40% - 8 points
50% - 10 points</td><td>Percentage saving compared to code compliance/Industry norm
10% - 0.5 point
20% - 1 point
30% - 1.5 points
40% - 2 points
50% - 3 points</td></tr></table></td><td>13 pts</td></tr>
<tr><td>2a.2</td><td><u>Sub-metering and Energy Monitoring System</u>
Provision of sub-meters for major energy uses which includes cooling, pumps, fans (1 point).
Linking all sub-meters to the Building Management System (BMS) (1 point).</td><td>2 pts</td></tr>
<tr><td>2a.3</td><td><u>On-site Energy Generation</u>

Use of cogeneration / tri-generation system or biofuel power generation for the project energy needs</td><td>5 pts</td></tr>
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<tr><td colspan="2">2b -Renewable Energy</td><td></td></tr>
<tr><td>2b.1</td><td>Use of renewable energy such as solar, wind, biogas, tidal, geothermal.

1 point for the equivalent of renewable energy generated for the power consumption of two typical 4-room HDB flat. Assuming each 4-room flat consumes 400kWh/month of electricity, 4800 kWh/m2/year.</td><td>Up to 10 pts</td></tr>
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Water		
3.1	Rainwater harvesting and Grey water recycling Collection and use of rainwater or grey water recycling for non-potable use such as irrigation, flushing of toilets. Points will be pro-rated based on the extensiveness of use. 100% of irrigation using non-potable water – 4 points 75% of irrigation using non-potable water – 3 points 50% of irrigation using non-potable water – 2 points 30% of irrigation using non-potable water – 1 points	4pt
3.2	Water usage during construction stage Implement non-chemical waste water/rainwater collection and treatment system to recycle the water for construction usage e.g. casting of concrete, washing, curing concrete etc.	3 pts
3.3	Adopt Active, Beautiful, Clean (ABC) Waters Design ABC Waters Design allows the integration of urban planning and development, with the protection, management and conservation of the water cycle as a whole. ABC Waters Design features mimic natural system that can mitigate the impact of urban stormwater run-off on the environment and they form aesthetically pleasing features and enhance urban biodiversity. The basic ABC Waters Design features include the following: • Rain Gardens (bioretention basins) • Bioretention Swales • Constructed Wetlands • Cleansing Biotopes • Green Roofs • Vegetated Swales • Bioengineering • Infiltration systems	3 pts
3.4	Water Efficient Fixtures Use of Water Efficient Label Scheme (WELS) fittings to reduce the consumption of water. All water fittings having: • Good Rating – 1 point • Very Good Rating – 2 points • Excellent Rating – 3 points	3 pt
3.5	Water monitoring and sub-metering Provision of sub meters to monitor water usage during operation (1 point) Linking of sub-meters to a monitoring system for detection system (1 point)	2 pt

Project Management		
4.1	Environmental Risk Analysis (aspect/impact identification) The purpose of the environmental risk assessment is to ensure that planners and designers consider environmental impacts associated with the project, to determine environmental aspects and impacts of products/activities/services at an early stage. The risk analysis should include relevant impacts such as, but not limited to, soil contamination, air pollution, noise health effects, and ecology impacts, including endangered species, geological hazards, and water pollution.	3 pts
4.2	Environmental management system (EMS) An effective environmental management system should be implemented to include: • establishing an environmental policy, • planning environmental objectives and measurable targets, • implementation and operation of programs to meet objectives and targets, • checking and corrective action, and • management review.	3 pts
4.3	Green and Gracious Builders Scheme Certification Scoring for will be based on the Green and Gracious Builders Scheme criteria in Annex A. Green and Gracious Builders Scheme Merit Rating (3 point) Green and Gracious Builders Scheme Excellent Rating (6 point)	6 pts
4.4	Consultation with relevant agencies and other organization (Design Phase) The following groups should be consulted where applicable: • Local community and Resident's Committee • NGOs such as Nature Society • Government agencies • Professional bodies and associations The feedback and inputs from the consultation should be used to improve the design and construction process. If any negative impacts are unavoidable, mitigation measures should be implemented to reduce these impacts as far as possible. These shall be communicated to the community and interest groups in a timely manner.	4 pts
4.5	Follow up consultations during construction phase Further follow up sessions should be conducted when necessary, such as when there are changes to the original design of the project or change in the construction method which could have negative impacts on the environment and community.	4 pts

Waste Management and Environmental Protection		
5.1	<u>Buildability</u> To encourage efforts made in the design to increase the buildability of the design hence reducing wet trades on site and construction waste generation. 2 point for use of pre-fabricated elements 2 point for buildable design features such as standardization of grids, flat slab/plate.	4 pts
5.2	<u>Minimise Cut and Fill</u> To encourage reduction in the quantity of excavated materials taken off or into the site by optimising the use of cut and fill material in the construction process.	3 pts
5.3	<u>Use of recycled material / Environment-friendly material</u> Us of environmental friendly products that are certified under The Singapore Green Labelling Scheme (SGLS) or recycled materials (with at least 30% recycled content). 1 points for products used extensively (more than 50% of built up area) 0.5 point of product used in small area (less than 50% of built up area)	6 pts
5.4	<u>Public awareness on environmental sustainability</u> Dedicated outreach programme to increase public awareness on environmental sustainability and green features of the infrastructure. User guide brochures and facilities such as visitor centres, exhibits should be provided where appropriate to facilitate public awareness.	2 pts

INNOVATION POINTS

Innovation		
6.1	Points will be given for other environment-friendly features not mentioned in the assessment criteria. These could vary widely for different types of infrastructure projects and the project team has to quantify and justify the positive environmental impacts and how it contributes to wider environmental impact. The following are examples that could be considered: • Enhance adjacent land valuations • Tourism – the project could become eco-destination to attract both locals and tourist • Integration of innovative technologies e.g. waste heat from district cooling system recovered for generating hot water • Life cycle analysis for the development with an effort to reduce the carbon footprint of the project construction and operation • Any other features that contribute to sustainable development	Up to 30 pts