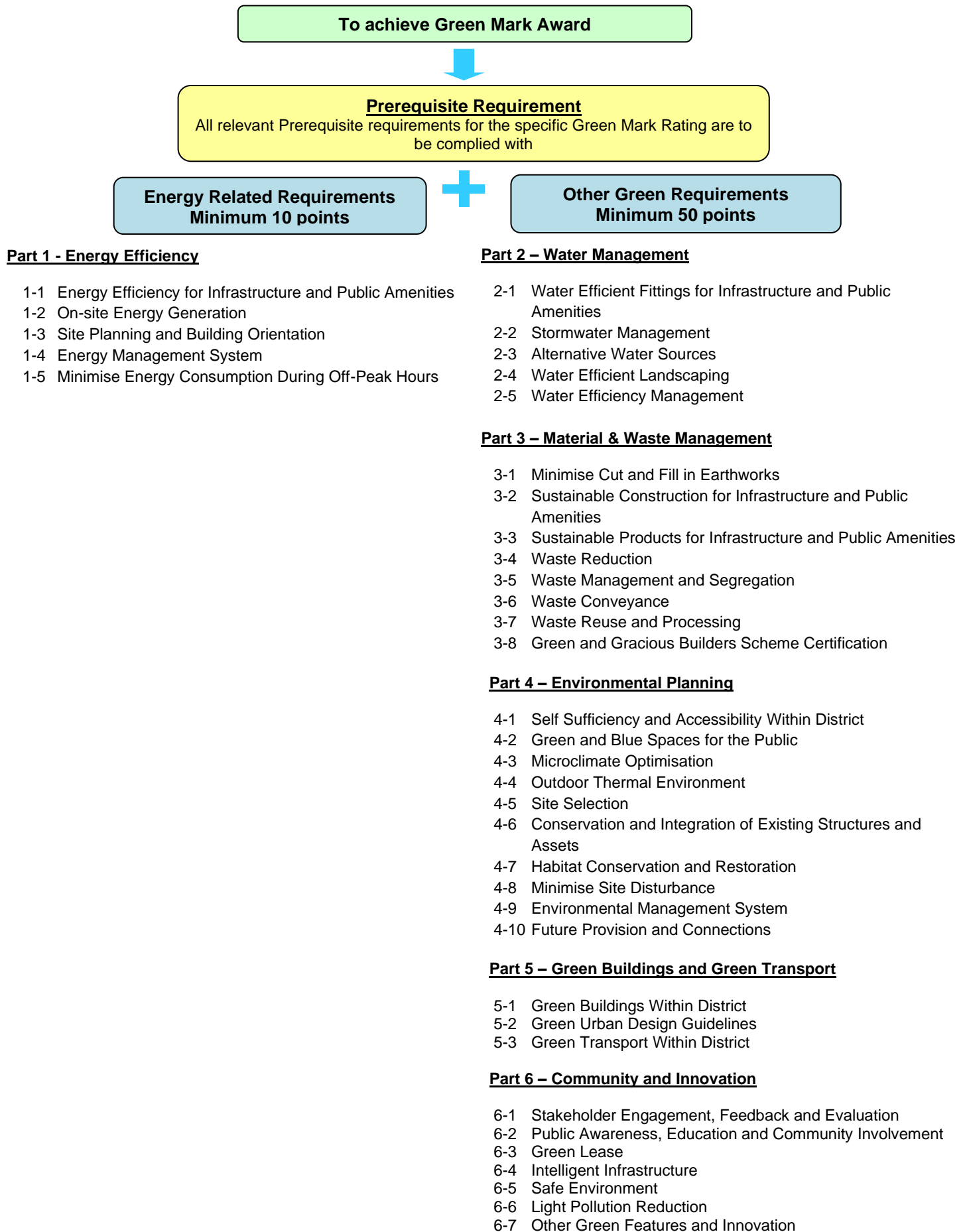




BCA Green Mark for Districts (Version 2.2)

Framework – BCA Green Mark for Districts (Version 2.2)



Points Allocations – BCA Green Mark for Districts (Version 2.2)

Category		Point Allocations		
		Residential Districts	Industrial / Business Parks Districts	Commercial Districts
(I) Energy Related Requirements				
Minimum 10 points	Part 1 : Energy Efficiency			
	GMD 1-1 Energy Efficiency for Infrastructure and Public Amenities		10	
	GMD 1-2 On-site Energy Generation		6	
	GMD 1-3 Site Planning and Building Orientation		10	
	GMD 1-4 Energy Management System		5	
	GMD 1-5 Minimise Energy Consumption During Off-Peak Hours		1	
	Category Score for Part 1 – Energy Efficiency		32	
(II) Other Green Requirements				
Minimum 50 points (Parts 2 to 6)	Part 2 : Water Management			
	GMD 2-1 Water Efficient Fittings for Infrastructure and Public Amenities		4	
	GMD 2-2 Stormwater Management		8	
	GMD 2-3 Alternative Water Sources		4	
	GMD 2-4 Water Efficient Landscaping		2	
	GMD 2-5 Water Efficiency Management		3	
	Category Score for Part 2 – Water Management		21	
	Part 3 : Material and Waste Management			
	GMD 3-1 Minimise Cut and Fill in Earthworks		3	
	GMD 3-2 Sustainable Construction for Infrastructure and Public Amenities		7	
	GMD 3-3 Sustainable Products for Infrastructure and Public Amenities		5	
	GMD 3-4 Waste Reduction		2	
	GMD 3-5 Waste Management and Segregation		4	
	GMD 3-6 Waste Conveyance		2	
	GMD 3-7 Waste Reuse and Processing		4	
	GMD 3-8 Green and Gracious Builders Scheme Certification		2	
	Category Score for Part 3 – Material and Waste Management		29	
	Part 4 : Environmental Planning			
	GMD 4-1 Self Sufficiency and Accessibility Within District		5	
	GMD 4-2 Green and Blue Spaces for the Public		3	
	GMD 4-3 Microclimate Optimisation		4	
	GMD 4-4 Outdoor Thermal Environment		8	
	GMD 4-5 Site Selection		5	
	GMD 4-6 Conservation and Integration of Existing Structures and Assets		1	
	GMD 4-7 Habitat Conservation and Restoration		7	
	GMD 4-8 Minimise Site Disturbance		2	
	GMD 4-9 Environmental Management System		5	
GMD 4-10 Future Provision and Connections		2		
Category Score for Part 4 – Environmental Planning		42		
(Parts 5 & 6 on next page)				

Category		Point Allocations			
		Residential Districts	Industrial / Business Parks Districts	Commercial Districts	
Minimum 50 points (Parts 2 to 6)	Part 5 : Green Buildings and Green Transport				
	GMD 5-1 Green Buildings Within District		20		
	GMD 5-2 Green Urban Design Guidelines		4		
	GMD 5-3 Green Transport Within District		11		
	Category Score for Part 5 – Green Buildings and Green Transport		35		
	Part 6 : Community and Innovation				
	GMD 6-1 Stakeholder Engagement, Feedback and Evaluation		8	6	6
	GMD 6-2 Public Awareness, Education and Community Involvement		7		
	GMD 6-3 Green Lease		2		
	GMD 6-4 Intelligent Infrastructure		2	3	3
	GMD 6-5 Safe Environment		1		
	GMD 6-6 Light Pollution Reduction		1	2	2
	GMD 6-7 Other Green Features and Innovation		5		
	Category Score for Part 6 – Community and Innovation		26		
Green Mark Score:		185 (Max)			

Notes:

- 1) The framework for the BCA Green Mark for Districts criteria has incorporated elements from other Singapore agencies. These include PUB's ABC Waters Design Guidelines and NParks' Singapore Index for cities biodiversity.
- 2) The BCA Green Mark for Districts criteria is formulated based on Singapore's Codes of Practices, practices, local climate and weather patterns (i.e. tropical climate). For international projects which have a different climatic conditions and weather pattern, the local planning guidelines/ Codes of Practices/ regulatory frameworks/ practices shall take precedence.
- 3) For items not applicable for the district under assessment, points can be considered for pro-ratio to other items within the same category with evidence(s) provided.

Green Mark Award Ratings and Prerequisite Requirements

Green Mark Score	Green Mark Rating
100 and above	Green Mark Platinum
90 to < 100	Green Mark Gold ^{Plus}
75 to < 90	Green Mark Gold
60 to < 75	Green Mark Certified

Prerequisite Requirements for Green Mark for Districts Criteria

1. Green Building within District

At least one building (GFA > 5,000 m²) at Phase 1 to achieve the corresponding Green Mark rating assessed under the prevailing Green Mark schemes for buildings.

Green Mark for District Award Rating	Minimum one Green Mark rated building (GFA > 5,000 m ²) at Phase 1
Green Mark Certified	NIL
Green Mark Gold	Green Mark Gold
Green Mark Gold ^{PLUS}	Green Mark Gold ^{Plus}
Green Mark Platinum	Green Mark Platinum

2. Minimum System Efficiency and Energy Monitoring (if using District Cooling System)

- i) Where District Cooling System (DCS) is being utilised in the district, the Design System Efficiency (DSE) of the DCS plant must achieve a minimum of 0.65 kW/RT for Green Mark Gold, Gold^{PLUS} and Platinum awards.
- ii) Developments with District Cooling Systems (DCS) that report to NEA's Minimum Energy Efficiency Standards (MEES) must provide documentary evidence of their requirement to comply with NEA's MEES. This documentation serves as an alternative to comply with these prerequisites.
 - (a) The DCS plant efficiency refers to the annual electricity consumption of a DCS plant (kWh) over the annual cooling consumption (RTh) of the DCS plant. The operation hours are assumed to be 24 hours operation per day x 365 days. The relevant equipment for the computation of the DCS plant efficiency includes those within the DCS Plant boundary.
 - (b) Other auxiliary services for the DCS plant room (electricity consumption from lighting, mechanical ventilation, air-conditioning systems, receptacle loads etc.) can be excluded from the plant efficiency computation. The energy generated by the photovoltaic system at the plant can also be used to offset the total energy consumed by the DCS plant. The energy efficiency of the DCS plant shall be measured over 8,760 hours in a year.
- iii) Permanent Instrumentation for the Measurement and Verification of DCS plant efficiency shall be provided. The installed instrumentation shall have the capability to calculate resultant system efficiency (i.e. kW/RT) within 5% of its true value and in accordance with ASHRAE Guideline 22 and AHRI Standard 550/590. Each measurements system shall include the sensor, any signal conditioning, the data acquisition system and wiring connecting them. The following are to be complied with where applicable:
 - (a) Location and installation of the measuring devices to meet the manufacturer's recommendation.
 - (b) All data logging with capability to trend at 1 minute sampling time interval and recorded to the 3rd decimal digit.

Prerequisite Requirements for Green Mark for Districts Criteria (continued)

- (c) Full-bore magnetic in-line flow meters with 1% uncertainty and capable of electronic in-situ verification to within $\pm 2\%$ of its original factory calibration, shall be provided for chilled water and condenser water loop. Where circumstances do not all the installation of magnetic in-line flow meters, ultrasonic flow meters may be used.
 - (d) Temperature sensors are to be provided for chilled water and condenser water loop and shall have an end-to-end measurement uncertainty not exceeding $\pm 0.05^\circ\text{C}$ over the entire measurement or calibration range. Thermo-wells shall be installed in a manner that enables the sensors to be in direct contact with the fluid flow. Each temperature measurement location shall have 2 spare thermo-wells located at both sides of the sensor for verification of measurement accuracy.
 - (e) Dedicated power meters (of IEC Class 1 or equivalent) and associated current transformers (class 0.5 or equivalent) shall be provided for monitoring of the power consumption of each of the following groups of equipment within the boundary of DCS plant where applicable: chillers, chilled water pumps, condenser water pumps, and cooling towers, network pumps, thermal storage and heat exchangers.
- iv) Submission of building annual energy consumption data and operating system efficiency of the DCS plant efficiency to BCA. This submission is required to demonstrate compliance with efficiency and the heat balance requirements using the Energy Audit Report for Building Cooling System.

3. Sustainable Construction

Minimum score under GMD 3-2: Sustainable Construction for Infrastructure and Public Amenities

Green Mark Gold^{PLUS} ≥ 3 points
Green Mark Platinum ≥ 4 points

4. Sustainable Products

Minimum score under GMD 3-3: Sustainable Products for Infrastructure and Public Amenities

Green Mark Gold^{PLUS} ≥ 2 points
Green Mark Platinum ≥ 3 points

5. Environmental Planning

Minimum score under Part 4: Environmental Planning.

Green Mark Gold^{Plus} ≥ 15 points
Green Mark Platinum ≥ 21 points

Green Mark District Requirements

Part 1 – Energy Efficiency	Green Mark Points
<p><u>GMD 1-1 Energy Efficiency for Infrastructure and Public Amenities</u></p> <p>Site wide energy modelling or calculation to include energy demand and operating carbon emissions of project baseline (as defined below) and proposed.</p> <p><u>Baseline:</u> Minimum efficiency requirement of mechanical and electrical systems as stated in SS530, SS553, IESNA design guide, or equivalent local standards, or based on conventional systems, etc.</p> <p>Baseline building energy efficiency index (EEI) based on survey data of the year 2005 (for Singapore only).</p> <p>The mechanical and electrical systems to be included in the calculation shall include (but not limited to) the following:</p> <ul style="list-style-type: none"> (a) Street lighting / landscape lighting / carpark lighting / electric signages (b) Water pumps (c) Mechanical fans (d) Lifts / escalators <p><u>Prerequisite Requirements:</u></p> <p><i>Minimum System Efficiency and Energy Monitoring (if using District Cooling System)</i></p> <p><i>Where District Cooling System is being utilised in the district, the total system (chilled water plant) efficiency must achieve a minimum of 0.65 kW/RT for Green Mark Gold, Gold^{Plus} and Platinum awards.</i></p> <p><u>Energy Efficiency of DCS plant:</u></p> <ul style="list-style-type: none"> i) District Cooling System (DCS) is being utilised in the district, the Design System Efficiency (DSE) of the DCS plant must achieve a minimum of 0.65 kW/RT for Green Mark Gold, Gold^{PLUS} and Platinum awards. ii) Developments with District Cooling Systems (DCS) that report to NEA's Minimum Energy Efficiency Standards (MEES) must provide documentary evidence of their requirement to comply with NEA's MEES. This documentation serves as an alternative to comply with these prerequisites. <ul style="list-style-type: none"> (a) The DCS plant efficiency refers to the annual electricity consumption of a DCS plant (kWh) over the annual cooling consumption (RTh) of the DCS plant. The operation hours are assumed to be 24 hours operation per day x 365 days. The relevant equipment for the computation of 	<p>2 points for carbon calculation</p> <p>0.15 points for every percentage of saving over the total energy consumption for infrastructure and public amenities (Excludes energy consumption for those under Green Mark for Buildings)</p> <p>Points awarded = $0.15 \times (\% \text{ improvement})$</p> <p>(Up to 8 points)</p> <p>[Total 10 points]</p>

the DCS plant efficiency includes those within the DCS Plant boundary.

- (b) Other auxiliary services for the DCS plant room (electricity consumption from lighting, mechanical ventilation, air-conditioning systems, receptacle loads etc.) can be excluded from the plant efficiency computation. The energy generated by the photovoltaic system at the plant can also be used to offset the total energy consumed by the DCS plant. The energy efficiency of the DCS plant shall be measured over 8,760 hours in a year.
- iii) Permanent measuring instruments for monitoring of DCS plant efficiency shall be provided. The installed instrumentation shall have the capability to calculate resultant system efficiency (i.e. kW/RT) within 5% of its true value and in accordance with ASHRAE Guideline 22 and AHRI Standard 550/590. Each measurements system shall include the sensor, any signal conditioning, the data acquisition system and wiring connecting them. The following are to be complied with where applicable:
 - (a) Location and installation of the measuring devices to meet the manufacturer's recommendation.
 - (b) All data logging with capability to trend at 1 minute sampling time interval and recorded to the 3rd decimal digit.
 - (c) Full-bore magnetic in-line flow meters with 1% uncertainty and capable of electronic in-situ verification to within $\pm 2\%$ of its original factory calibration, shall be provided for chilled water and condenser water loop. Where circumstances do not all the installation of magnetic in-line flow meters, ultrasonic flow meters may be used.
 - (d) Temperature sensors are to be provided for chilled water and condenser water loop and shall have an end-to-end measurement uncertainty not exceeding $\pm 0.05^\circ\text{C}$ over the entire measurement or calibration range. Thermo-wells shall be installed in a manner that enables the sensors to be in direct contact with the fluid flow. Each temperature measurement location shall have 2 spare thermo-wells located at both sides of the sensor for verification of measurement accuracy.
 - (e) Dedicated power meters (of IEC Class 1 or equivalent) and associated current

<p>transformers (class 0.5 or equivalent) shall be provided for monitoring of the power consumption of each of the following groups of equipment within the boundary of DCS plant where applicable: chillers, chilled water pumps, condenser water pumps, and cooling towers, network pumps, thermal storage and heat exchangers.</p> <p>iv) Submission of building annual energy consumption data and operating system efficiency of the DCS plant efficiency to BCA. This submission is required to demonstrate compliance with efficiency and the heat balance requirements using the Energy Audit Report for Building Cooling System.</p>	
<p><u>GMD 1-2 On-site Energy Generation</u></p> <p>Encourage the on-site generation of energy for self-supply in the common areas of the district (e.g. street lighting, landscape lighting, etc).</p> <p>(a) Energy generation by efficient combined system such as co-generation, tri-generation, etc</p> <p>(b) Generation of renewable energy</p> <p>(c) Energy recovery or regeneration</p>	<p>Points scored for every percentage replacement of electricity (based on total annual district energy consumption) by systems:</p> <p>10% – 2 points 15% – 4 points >20% – 6 points</p> <p>[Total 6 points]</p>
<p><u>GMD 1-3 Site Planning and Building Orientation</u></p> <p>Minimise the heat gain / loss by use of passive solar strategies to reduce the energy demand</p> <p>(a) 50% or more of the plot have one axis within plus minus 22.5 degree of geographical north / south, and north / south length is at least as long or longer than the east / west length</p> <p style="text-align: center;">OR</p> <p>(b) 50% or more of the project building GFA have one axis of each building is at least 1.5 times longer than the other, and the longer axis is within 22.5 degrees of geographical north / south axis</p> <p>(c) Reduction of the area of the west facing elevation of buildings, or application of inter-block shading strategies to west / east facing facades</p> <p>(d) Planning of buildings layout and massing to avoid blocking prevailing wind</p>	<p><u>(a) Plot coverage</u> 0.1 point for every percentage improvement in the plot coverage Points awarded = 0.1 x (% improvement)</p> <p style="text-align: center;">OR</p> <p><u>(b) GFA coverage</u> 0.15 point for every percentage improvement in the GFA coverage Points awarded = 0.15 x (% improvement)</p> <p style="text-align: center;">(Up to 4 points)</p> <p style="text-align: center;">2 points</p> <p style="text-align: center;">2 points</p>

(e) Natural ventilation and daylighting for public spaces	<p>2 points</p> <p>[Total 10 points]</p>
<p><u>GMD 1-4 Energy Management System</u></p> <p>Design and incorporate energy monitoring and/or control system to facilitate energy consumption monitoring and management for public facilities</p> <p>(a) Provide with sub-metering with remote metering capability for subsystems > 15 kW or with electric loads > 100 kVA</p> <p>(b) Provide with district level energy monitoring and automatic control systems for applicable energy consuming systems</p> <p>(c) Provide with energy management plan at design stage such as setting targets, developing measures and strategies</p>	<p>2 points</p> <p>0.5 points for each control system (minimum of 90% coverage of the system capacity) to public facilities, such as motion or photo sensors for lighting control, etc. (Up to 2 points)</p> <p>1 point</p> <p>[Total 5 points]</p>
<p><u>GMD 1-5 Minimise Energy Consumption During Off-Peak Hours</u></p> <p>Design and incorporate energy optimisation plan (e.g. for night operation and weekends where there is little occupancy) to ensure only the essential energy consuming devices are running e.g. the system configuration optimised for night loads</p>	<p>1 point</p>
<p>PART 1 – ENERGY EFFICIENCY</p> <p>CATEGORY SCORE :</p>	<p>Sum of Green Mark Points obtained from GMD 1-1 to 1-4:</p> <p>32 Points Maximum</p> <p>[Minimum 10 points]</p>

Part 2 – Water Management	Green Mark Points		
<u>GMD 2-1 Water Efficient Fittings for Infrastructure and Public Amenities</u> Encourage the use of water efficient fittings covered under PUB’s Water Efficiency Labelling Scheme (WELS) or equivalent water labelling schemes (a) Basin taps and mixers (b) Flushing cisterns (c) Shower taps, mixers or showerheads (d) Sink/ bib taps and mixers (e) Urinals and urinal flush valves	Rating based on Water Efficiency Labelling Scheme (WELS)		Points awarded based on the number and water efficiency rating of the fitting type used OR Based on the water saving compared to baseline model (Good/ One tick rated WELS fitting) [Total 4 points]
	Very Good (2 ticks)	Excellent (3 ticks)	
	2	4	
<u>GMD 2-2 Stormwater Management</u> Encourage the treatment of stormwater run-off before discharge to public drains (a) Provisions of the following infiltration features or design features as recommended in PUB’s Active, Beautiful and Clean (ABC) Waters Design Guidelines: ▪ Bioretention swales / other bioretention systems ▪ Rain gardens ▪ Constructed wetlands ▪ Cleansing biotopes ▪ Retention ponds (b) Achieve ABC Waters Certification from PUB.	(a) Can score under option A or B only Points scored based on the % of runoff from impervious areas within the site that can be treated or retained by ABC Waters design features OPTION A – Applicable only for the whole district including public realm, infrastructure and <u>individual land parcels</u> . 10-35% = 2 points 35-50% = 5 points >50% = 7 points OR OPTION B – Applicable for the whole district <u>excluding</u> individual land parcels. 25-50% = 2 points 50-70% = 5 points >70% = 7 points (b) 1 Point [Total 8 points]		
<u>GMD 2-3 Alternative Water Sources</u> Collection and use of alternative water sources for non potable use such as irrigation, washing, water features, and cooling tower make-up water to reduce use of potable water. Water sources can include rainwater, greywater, NEWater and recycled water from approved sources	100% of replacement using non-potable water – 4 points 75% of replacement using non-potable water – 3 points		

Points will be pro-rated based on the effectiveness of use	50% of replacement using non-potable water – 2 points 30% of replacement using non-potable water – 1 points [Total 4 points]
<u>GMD 2-4 Water Efficient Landscaping</u> Reduce the water demand by selecting drought resistant plants in landscaping design	2 points [Total 2 points]
<u>GMD 2-5 Water Efficiency Management</u> Design and incorporate water efficiency management plans to reduce the demand of water by public facilities and in common areas (a) Provide the use of private water meters and leak detection system to monitor the major water usage e.g. irrigation, water features and swimming pools, etc (b) Targets to improve public area water performance should be set. To show intent, measures and implementation strategies of water efficiency improvement plans over the next three years	1 point for provision of individual sub meters; 2 points for sub-meters linked to district management system 1 point [Total 3 points]
PART 2 – WATER EFFICIENCY CATEGORY SCORE :	Sum of Green Mark points obtained from GMD 2-1 to 2-5 : 21 points Maximum

Part 3 – Material and Waste Management	Green Mark Points										
<p><u>GMD 3-1 Minimise Cut and Fill in Earthworks</u></p> <p>Encourage reduction in the quantity of excavated materials removed or transported into the district by optimising the use of cut and fill material removed during earthworks/ land preparation works for the district</p> <p>(a) Reusing of at least 50% of the topsoil</p> <p>(b) Reusing of at least 50% cut and fill material</p>	<p>1 point</p> <p>2 points</p> <p>[Total 3 points]</p>										
<p><u>GMD 3-2 Sustainable Construction for Infrastructure and Public Amenities</u></p> <p>Encourage recycling and the adoption of designs, practices and materials that are environmentally friendly and sustainable in the construction of infrastructure and public amenities</p> <p>(a) Use of sustainable and recycled materials</p> <p>(i) Green Cements with approved industrial by-product (such as Ground Granulated Blastfurnace Slag (GGBS), silica fume, fly ash) to replace ordinary Portland Cement (OPC) by at least 10% by mass for superstructural works.</p> <p>(ii) Recycled Concrete Aggregates (RCA) and Washed Copper Slag (WCS) from approved sources to replace coarse and fine aggregates for concrete production of main building elements</p> <p>Note: For structural building elements, the use of RCA and WCS shall be limited to maximum 10% replacement by mass of coarse/ fine aggregates respectively or as approved by the relevant authorities.</p> <p>(b) Recycle or salvage at least 50% of non-hazardous construction waste by weight, or conserve at least 50% of existing structural elements or building envelope by area</p> <p><u>Prerequisite Requirement:</u></p> <p><i>Minimum score under this criterion:</i> <i>Green Mark Gold^{PLUS} ≥ 3 points</i> <i>Green Mark Platinum ≥ 4 points</i></p>	<p>2 points</p> <p>Extent of Coverage: The total quantity used (in tonnage) for replacement of coarse or fine aggregates must not be less than the minimum usage requirement that is [0.03 x Gross Floor Area (GFA in m²)]</p> <table border="1" data-bbox="841 1318 1502 1570"> <thead> <tr> <th>Quantity of RCA / WCS</th><th>Points Allocation</th></tr> </thead> <tbody> <tr> <td>≥ 0.5 times (0.5X) minimum usage requirement</td><td>1 point</td></tr> <tr> <td>≥ 1 X minimum usage requirement</td><td>2 points</td></tr> <tr> <td>≥ 1.5 X minimum usage requirement</td><td>3 points</td></tr> <tr> <td>≥ 2 X minimum usage requirement</td><td>4 points</td></tr> </tbody> </table> <p>(Up to 4 points for GMD 3-2(a)(i) and (a)(ii))</p> <p>0.1 point for every percentage improvement (Up to 3 points)</p> <p>[Total 7 Points]</p>	Quantity of RCA / WCS	Points Allocation	≥ 0.5 times (0.5X) minimum usage requirement	1 point	≥ 1 X minimum usage requirement	2 points	≥ 1.5 X minimum usage requirement	3 points	≥ 2 X minimum usage requirement	4 points
Quantity of RCA / WCS	Points Allocation										
≥ 0.5 times (0.5X) minimum usage requirement	1 point										
≥ 1 X minimum usage requirement	2 points										
≥ 1.5 X minimum usage requirement	3 points										
≥ 2 X minimum usage requirement	4 points										

<p><u>GMD 3-3 Sustainable Products for Infrastructure and Public Amenities</u></p> <p>Promote use of environmentally friendly products that are certified under by approved local certification body and are applicable to infrastructure works and public amenities (including street furniture)</p> <p>*For overseas projects where low environmental impact <u>certified</u> building materials are impossible to source, points will be awarded for local products sourced within a 400 km radius from the site.</p> <p><u>Prerequisite Requirement:</u></p> <p><i>Minimum score under this criterion:</i> <i>Green Mark Gold^{PLUS} ≥ 2 points</i> <i>Green Mark Platinum ≥ 3 points</i></p>	<table> <tr> <th colspan="3">Weightage based on the extent of environmental friendliness of products</th></tr> <tr> <th>Good</th><th>Very Good</th><th>Excellent</th></tr> <tr> <td>1</td><td>1.5</td><td>2</td></tr> </table>	Weightage based on the extent of environmental friendliness of products			Good	Very Good	Excellent	1	1.5	2	<p>Points scored based on the weightage and the extent of coverage and impact</p> <p>1 point for high impact item 0.5 point for low impact item</p> <p>[Total 5 points]</p>
Weightage based on the extent of environmental friendliness of products											
Good	Very Good	Excellent									
1	1.5	2									
<p><u>GMD 3-4 Waste Reduction</u></p> <p>Minimise waste generation in a sustainable manner, covering all kinds of waste including domestic household waste (e.g. food waste), commercial waste (e.g. paper waste), construction waste, etc</p>	<p>1 point for each item monitored and reduced (Up to 2 points)</p> <p>[Total 2 points]</p>										
<p><u>GMD 3-5 Waste Management and Segregation</u></p> <p>Encourage waste recycling within district to reduce waste going to landfill. Promote proper disposal of waste and provide waste management infrastructures</p> <ul style="list-style-type: none"> (a) Provision of at least one recycling station at the district level dedicated to the separation, collection and storage of recyclable materials such as paper, glass, plastics and metals (b) Provision of at least one drop-off point for potentially hazardous waste such as paints, solvents, batteries (c) Provision of litter receptacles with integrated recycle containers at public areas (including at public amenities) (d) Develop a community waste strategy and education programme e.g. promotional materials such as posters, circulars and provision of recycling bags to promote waste sorting, collecting and recycling of waste 	<p>1 point for every item of requirement that is met</p> <p>[Total 4 Points]</p>										

<p><u>GMD 3-6 Waste Conveyance</u></p> <p>Reduce the negative impact on environment during waste conveyance, such as use of odourless pneumatic conveyance system, specific waste transport design to minimise the disturbance</p>	<p>1 point for low impact applications 2 points for high impact applications</p> <p>[Total 2 Points]</p>
<p><u>GMD 3-7 Waste Reuse and Processing</u></p> <p>Encourage use of environmentally friendly waste processing system</p> <p>(a) Provision of local composting (kitchen and garden wastes) /chipping facilities within the boundary of the development and / or at strategic locations. Compost should be made available to local users (building occupiers, owners, residents, maintenance firms)</p> <p>(b) Use of organic waste for energy generation e.g. through bio-methanisation</p>	<p>Up to 2 points*</p> <p>Up to 2 points*</p> <p>*2 points for high impact applications, 1 point for low impact applications</p> <p>[Total 4 Points]</p>
<p><u>GMD 3-8 Green and Gracious Builders Scheme Certification</u></p> <p>Main builder that has good track records in the adoption of sustainable, environmentally friendly and considerate practices during construction such as the Green and Gracious Builder Scheme</p> <p>http://www.bca.gov.sg/Awards/GGBA/others/GGB_book.pdf</p>	<p>Green and Gracious Builders Scheme Excellent Rating (1 point)</p> <p>Green and Gracious Builders Scheme Star Rating (2 points)</p> <p>[Total 2 Points]</p>
<p>PART 3 – WASTE EFFICIENCY CATEGORY SCORE :</p>	<p>Sum of Green Mark Points obtained from GMD 3-1 to 3-5:</p> <p>29 Points Maximum</p>

Part 4 – Environmental Planning	Green Mark Points
<p><u>GMD 4-1 Self-Sufficiency and Accessibility Within District</u></p> <p>Ensure that a diverse range of facilities needed to meet daily needs are suitably incorporated in the masterplan and can be accessed suitably to minimise vehicle trips or distance travelled. Increase the accessibility to key facilities by ensuring that they are sited in accordance to the local planning guidelines</p> <p><i>[In the absence of local planning guidelines, the following standards/ catchment radius shall apply:</i></p> <ul style="list-style-type: none"> (i) <i>Basic Retail (e.g. Hawker centres, local shops, markets) 400m</i> (ii) <i>Community & Leisure Facilities (e.g. 3G exercise facilities, hardcourts, swimming pools, children's playground) 400m</i> (iii) <i>Health Facilities (Pharmacy / GP / Polyclinic, Dentist) 400m</i> (iv) <i>Educational facilities (e.g. Primary Schools, Secondary Schools excluding tertiary institutions) 800m</i> (v) <i>Communal facilities (e.g. Child care centres/ pre-schools/ kindergartens, elder care centres, community centre, Resident's committee centre, public squares) 800m</i> (vi) <i>Employment Centres (e.g. mixed rental Offices / Light industry) 800m</i> (vii) <i>Residential areas (e.g. mixed income housing)</i> (viii) <i>Other supporting amenities (Post office, ATM, Postal box) 800m</i> (ix) <i>Place of worship 1000m]</i> (x) <i>Hotels (only for commercial districts)</i> 	<p><u>GM Points for Residential Districts:</u></p> <p>2 points if (i), (ii) and (iii) are within the distances stipulated in the local planning guidelines <u>and</u> are easily accessible by public modes of transport</p> <p>1 point – for each additional item</p> <p>(Up to 5 points)</p> <p><u>GM Points for Industrial / Business Parks:</u></p> <p>3 points if (i) and (viii) are within the distances stipulated in the local planning guidelines <u>and</u> are easily accessible by public modes of transport</p> <p>1 point – for each additional item</p> <p>(vi) is not applicable</p> <p>(Up to 5 points)</p> <p><u>GM Points for Commercial Districts:</u></p> <p>1 point if commercial district includes (i), (iii) and (viii) and at least one major transport node (e.g. rail station, bus interchange, etc) is located within the district</p> <p>Additional 1 point each if (ii), (v), (vii) and (x) are provided within the distances stipulated in the local planning guidelines</p> <p>(i), (iii), (vi) and (viii) are not applicable</p> <p>(Up to 5 points)</p> <p>[Total 5 Points]</p>
<p><u>GMD 4-2 Green and Blue Spaces for the Public</u></p> <p>Provide sufficient green and blue spaces for residents and occupants</p> <ul style="list-style-type: none"> (a) Parks, green spaces or water body at least 800 sqm within 400 m walking distance (b) Interconnectivity of green / blue spaces for public and biodiversity (c) Adopt native plant strategies in landscape design - must demonstrate that >60 % of the trees and shrubs are native 	<p>1 point for every item of requirement that is met</p> <p>[Total 3 Points]</p>

<p><u>GMD 4-3 Microclimate Optimisation</u></p> <p>Promote design optimisation, including site planning and building massing, for better micro-climate, such as use of natural planting and water body to optimise microclimate, through modelling and simulation, verifying by field measurements of major climate data before and after the development:</p> <ul style="list-style-type: none"> (a) Solar analysis (sun path OR solar insolation simulation) (b) Ambient temperature simulation 	<p>1 point each for design optimisation</p> <p>1 point each for field measurement</p> <p>[Total 4 Points]</p>
<p><u>GMD 4-4 Outdoor Thermal Environment</u></p> <p>Encourage to use any combination of following strategies to improve the outdoor thermal comfort and reduce heat island effect</p> <ul style="list-style-type: none"> (a) Design and simulate to enable air flow through the development (CFD analysis or wind tunnel testing) (b) Use of building vegetation, vegetated walls and green roofs (minimum 20% of the plot area) (c) Street sidewalks/ pedestrian walkways shaded over 40% (d) Provide shade for open structures such as covered walkways, vine pergolas > 50% (e) Use of permeable paving materials with Solar Reflectance Index (SRI) > 29 (Gravel and wood chippings also encouraged to hardscape areas) (f) Open grid pavement system (at least 50% pervious) for pedestrian paths at green spaces > 40% (g) Provide shading for open air carparks > 50% (h) Avoid building heat exhaust to pedestrian walkways - Exhausts if fronting the public realm must be >5m above pedestrian walkways (i) Any other suitable strategy 	<p>2 points for (a)</p> <p>1 point each for (b) to (i) (up to 6 points)</p> <p>[Total 8 Points]</p>

<p><u>GMD 4-5 Site selection</u></p> <p>(a) Avoid use of land with high agricultural or ecological value</p> <p>(b) Use of brownfield sites to reduce the use of greenfield sites</p> <p>(c) Proper remediation measures carried out on contaminated land to restore the land for use</p> <p>(d) Flood risk assessment – demonstrate that the buildings are located in an area of low probability of flooding OR the development is appropriately flood resilient and resistant including safe access and escape routes</p> <p><u>Notes:</u></p> <p>1) <i>There must be no vulnerable building uses in the flood plain area such as emergency dispersal depots (police, fire, ambulance), or installations holding, using or containing hazardous substances.</i></p> <p>2) <i>Infrastructure and services planning for overall platform levels, roads, drainage and sewerage must be demonstrated.</i></p>	<p>1 point for (a)</p> <p>For (b) Area of site which is previously built-on: 100% - 1 point 50% - 0.5 point</p> <p>1 point for (c)</p> <p>2 points if 100% of buildings are in an area of low probability of flooding / non-flood plain, OR demonstrates flood mitigation and escape routes 1 points for 75% of buildings 0.5 point for 50% of buildings</p> <p>[Total 5 Points]</p>
<p><u>GMD 4-6 Conservation an Integration of Existing Structures and Assets</u></p> <p>Conservation, preservation or restoration of historic remains, or buildings, or natural spaces or views that characterise and have local or community importance</p> <p><u>Note:</u> <i>Gazetted buildings will not be included as these are already a mandatory requirement</i></p>	<p>1 point</p> <p>[Total 1 Point]</p>

<p><u>GMD 4-7 Habitat Conservation & Restoration</u></p> <p>Determine the ecological value of the habitats in and around the site in order to conserve and enhance the biodiversity and prevent deforestation</p> <ul style="list-style-type: none"> (a) Conduct an Environmental Impact Assessment or Biodiversity Impact Assessment to identify habitats, migration routes and potential damage from the development, including justification of developmental benefits versus the potential ecological losses and mitigation measures (b) Species protection plan or plans to increase the local species diversity (c) Prevent the loss of greenery in the district: Greenery area to be calculated on plan before and after project construction. (d) Use of the Singapore Index for Cities Biodiversity for Districts 	<p>2 points</p> <p>1 point</p> <p>No change – 1 point 5% GnP improvement 2 points 10% GnP improvement 3 points</p> <p>1 Point</p> <p>[Total 7 Points]</p>
<p><u>GMD 4-8 Minimise Site Disturbance</u></p> <p>Minimise negative impact on the site environment by constraining construction activities.</p> <p>Reduce site clearance and deforestation by conserving at least 20% of the mature trees (Transplanting <u>may</u> be considered)</p>	<p>2 points</p> <p>[Total 2 Points]</p>
<p><u>GMD 4-9 Environmental Management System</u></p> <p>Encourage the planning, design and management integration to adopt an environmental friendly management system and practices during development</p> <ul style="list-style-type: none"> (a) Conduct site analysis and assessment before district development (b) Developer, masterplanner, and major contractor that are ISO 14000 certified (c) Project team comprises one Certified Green Mark Manager (GMM) or one Certified Green Mark Professional (GMP) (d) Environmental policy with measurable targets & programmes with management review and corrective action records 	<p>1 point</p> <p>0.5 point for each party (up to 1.5 points)</p> <p>0.5 point for GMM or GMFM, 1 point for GMP (up to 1.5 points)</p> <p>1 point</p> <p>[Total 5 Points]</p>

<p><u>GMD 4-10 Future Provision and Connections</u></p> <p>To actively encourage the future adaptability and flexibility of the site, including expansion</p> <p>Suitable design features have been specified to allow for future installation including:</p> <ul style="list-style-type: none"> (a) Utilities expansion and distribution upgrades (Gas, electricity, water, cooling) (b) Transport and infrastructure expansion plans (c) Others 	<p>1 point for showing potential of expansion for utilities expansion and distribution.</p> <p>1 point for demonstration that other elements have been considered.</p> <p style="text-align: right;">[Total 2 Points]</p>
<p>PART 4 – ENVIRONMENTAL PROTECTION</p> <p>CATEGORY SCORE :</p>	<p>Sum of Green Mark Points obtained from GMD 4-1 to 4-10:</p> <p>42 Points Maximum</p>

Part 5 – Green Buildings and Green Transport		Green Mark Points												
GMD 5-1 Green Buildings Within District		Green Mark Building Points (GMBP)												
<p>Encourage the adoption of green building practices in building design, construction and retrofitting within the district includes buildings assessed under the prevailing Green Mark schemes for buildings.</p> <p><u>Prerequisite Requirement:</u></p> <p><i>At least one building (GFA > 5,000 m²) at <u>Phase 1</u> to achieve the corresponding Green Mark rating assessed under the prevailing Green Mark schemes for buildings.</i></p> <table border="1"><thead><tr><th>Green Mark for District Award Rating</th><th>Minimum one Green Mark rated building (GFA > 5,000 m²) at <u>Phase 1</u></th></tr></thead><tbody><tr><td>Green Mark Certified</td><td>NIL</td></tr><tr><td>Green Mark Gold</td><td>Green Mark Gold</td></tr><tr><td>Green Mark Gold^{PLUS}</td><td>Green Mark Gold^{Plus}</td></tr><tr><td>Green Mark Platinum</td><td>Green Mark Platinum</td></tr></tbody></table>		Green Mark for District Award Rating	Minimum one Green Mark rated building (GFA > 5,000 m ²) at <u>Phase 1</u>	Green Mark Certified	NIL	Green Mark Gold	Green Mark Gold	Green Mark Gold ^{PLUS}	Green Mark Gold ^{Plus}	Green Mark Platinum	Green Mark Platinum	GMB Award Level	Weightage	GMBP = Weightage * GFA Percentage%
		Green Mark for District Award Rating	Minimum one Green Mark rated building (GFA > 5,000 m ²) at <u>Phase 1</u>											
		Green Mark Certified	NIL											
		Green Mark Gold	Green Mark Gold											
		Green Mark Gold ^{PLUS}	Green Mark Gold ^{Plus}											
		Green Mark Platinum	Green Mark Platinum											
Platinum	0.20	P1 = 0.20 * % GFA of Green Mark Platinum Buildings												
Gold ^{Plus}	0.15	P2 = 0.15 * % GFA of Green Mark Gold ^{Plus} Buildings												
Gold	0.10	P3 = 0.1 * % GFA of Green Mark Gold Buildings												
Total	GMBP = P1+P2+P3													
		[Total 20 Points]												
GMD 5-2 Green Urban Design Guidelines														
Formulation of green urban design guidelines to ensure that key green features at the district level are carried through to development at the individual parcel level														
(a) For all land parcels in the district		4 points												
(b) For all land parcels to be sold to other sub-developers		2 points												
(c) For strategic land parcels to be sold to other sub-developers		1 point												
		[Total 4 Points]												
GMD 5-3 Green Transport Within District														
<u>General:</u>														
(a) Conduct Traffic Modelling for the district to assess and make improvements to the district master plan		2 points for (a)												
(b) Compact and walkable district pattern for master plan; major building entrances with good access to nearest LRT or bus stops in accordance to local planning guidelines or within a 500m walking distance, with sheltered and connected linkage.		Part (b) will be assessed at Masterplan level to determine the overall efficiency of the district, up to 2 points.												
<u>Public Transport:</u>														
(c) Transit options connecting outwards from the main LRT nodes		1 Point for each Item (c) to (k) (Up to 7 Points)												
(d) Provide dedicated shuttle services and facilities to mass transit														

<p><u>Bicycle:</u> Promote cycling as a real alternative to cars for shorter journeys</p> <ul style="list-style-type: none"> (e) Network of bicycle lanes and routes that are safe, well lit and segregated with direct links to key areas and routes (f) Provision for secure and sheltered bicycle facilities to public amenities <p><u>Car Parking:</u></p> <ul style="list-style-type: none"> (g) Reduce carpark footprint by employing underground or multi-storey carpark etc. (h) > 10% of open air parking spaces can be designated for flexible use when not being used for parking, e.g. market stalls, play areas (i) Provide hybrid / electric vehicle refuelling / recharge stations <p><u>Pedestrian:</u></p> <ul style="list-style-type: none"> (j) Universal design features (barrier-free accessibility) to improve the accessibility for the physically challenged (k) Way finding strategies 	<p style="text-align: right;">[Total 11 Points]</p>
<p style="text-align: center;">PART 5 – GREEN BUILDINGS AND GREEN TRANSPORT</p> <p style="text-align: center;">CATEGORY SCORE :</p>	<p style="text-align: center;">Sum of Green Mark Points obtained from GMD 5-1 to 5-3:</p> <p style="text-align: center;">35 Points Maximum</p>

Part 6 – Community and Innovation	Green Mark Points
<p><u>GMD 6-1 Stakeholder Engagement, Feedback and Evaluation</u></p> <p>(a) Conduct residents/ building occupants' satisfaction survey or engage in public consultation exercise to solicit feedback to enhance the quality of the living environment in common facilities / public amenities. Alternatively, provide effective feedback channels (e.g. hotlines, emails, etc) for residents to take ownership of the district</p> <p style="padding-left: 40px;">i) At Design Phase ii) During construction / Post completion</p> <p>(b) Public consultation / feedback sessions to include the following key stakeholders:</p> <ul style="list-style-type: none"> • Public sector / government agencies • Community / residents committee • NGOs • Professional bodies • Trade unions <p>(c) Provide a proper evaluation of the feedback / survey</p> <p>(d) Release of findings and feedback received from the public consultation exercise or residents/ building occupants survey, including the list of follow-up actions taken</p>	<p style="text-align: center;"><u>GM Points for Residential Districts:</u></p> <p>(a) Up to 2 points for consultation at design phase (based on extent of consultation and community involvement) Up to 2 points for follow-up consultations with stakeholders during construction / post completion</p> <p>(b) 1 point for consultation of at least 2 key stakeholder groups</p> <p>(c) 1 point for providing proper evaluation of feedback/ survey findings</p> <p>(d) 1 point for release of findings and feedback received 1 point for addressing follow-up actions</p> <p style="text-align: center;"><u>GM Points for Industrial / Business Parks:</u> <u>GM Points for Commercial Districts:</u></p> <p>(a) 1 point for consultation with stakeholders during construction / post completion (based on extent of consultation and community involvement)</p> <p>(b) 1 point for consultation of at least two key stakeholder group</p> <p>(c) 1 point for providing proper evaluation of feedback/ survey findings</p> <p>(d) 1 point for release of findings and feedback received 2 point for addressing follow-up actions</p> <p style="text-align: right;">[Total 8 Points (R)] [Total 6 Points (I/BP) & (C)]</p>
<p><u>GMD 6-2 Public Awareness, Education and Community Involvement</u></p> <p>To encourage and promote sustainable lifestyle and integration within the district through the production of a dedicated outreach or education programme to increase public awareness on environmental sustainability and green features of the district</p> <p>(a) User guide brochures, information portals and facilities (such as visitor centres and exhibits) should be provided where appropriate to facilitate public awareness and education. These areas may include:</p> <ul style="list-style-type: none"> • Online energy efficiency and energy tracker • Refuse collection • Recycling facilities 	<p>Up to 2 points can be scored based on extent of outreach or education programmes and contents.</p>

<ul style="list-style-type: none"> • Water conservation and usage • Environmental technologies and info • Local transport information • Local amenities and local information • Community groups and activities • Religious building locations • Biodiversity of the area <p>(b) Encourage residents/ building occupants to participate in green activities</p>	<p>2 points for at least 1 activity per year</p> <p>Additional 1 point for each additional green activity organised per year (Up to 3 points)</p> <p>[Total 7 Points]</p>
<p><u>GMD 6-3 Green Lease</u></p> <p>Master developer to encourage green lease as an alternative to regular economic rental models within the district</p>	<p>2 points</p> <p>[Total 2 Points]</p>
<p><u>GMD 6-4 Intelligent Infrastructure</u></p> <p>(a) Provide easy access to high speed communications infrastructure (digital, fibre optic, etc) and provisions to allow for future growth and maintenance</p> <p>(b) Provision of public access to intelligent transport information, including transit routes and schedules, carparking lot availability, amenities nearby, etc. so as to reduce the transport demand</p>	<p><u>GM Points for Residential Districts:</u> 1 point each for (a) and (b)</p> <p><u>GM Points for Industrial / Business Parks:</u> <u>GM Points for Commercial Districts:</u> 2 points for (a), 1 point for (b)</p> <p>[Total 2 Point (R)] [Total 3 Points (I/BP) & (C)]</p>
<p><u>GMD 6-5 Safe Environment</u></p> <p>Design for good natural surveillance of public spaces</p>	<p>1 point</p> <p>[Total 1 Point]</p>
<p><u>GMD 6-6 Light Pollution Reduction</u></p> <p>Minimise light trespass from site, only light areas as required for safety and comfort</p>	<p><u>GM Points for Residential Districts:</u> 1 point</p> <p><u>GM Points for Industrial / Business Parks:</u> <u>GM Points for Commercial Districts:</u> 2 points</p> <p>[Total 1 Point (R)] [Total 2 Points (I/BP) & (C)]</p>

<p><u>GMD 6-7 Other Green Features and Innovation</u></p> <p>Encourage the use of other green features which are innovative and have positive environmental impact</p> <p>Examples:</p> <ul style="list-style-type: none"> • Dedicated bus and tram lanes on public roads • Car-free district • Use of pre-cast / pre-fabricated construction materials for infrastructure and public amenities • Common services tunnel • Adoption of local labour to ensure economic sustainability 	<p>2 points for each high impact item 1 point for each low impact item (Up to 5 points)</p> <p>[Total 5 Points]</p>
<p>PART 6 – COMMUNITY AND INNOVATION</p> <p>CATEGORY SCORE :</p>	<p>Sum of Green Mark Points obtained from GMD 6-1 to 6-7:</p> <p>26 Points Maximum</p>