GREEN$^{SL®}$ RATING SYSTEM FOR SUSTAINABLE CITIES

Version 1.0

Green Building Council of Sri Lanka

'Committed Leadership in Sustainability'

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PREFACE FROM GREEN BUILDING COUNCIL OF SRI LANKA

The natural environment together with our economy, health and productivity are immensely affected by the performance of the built environment. According to United Nations, habitat, cities consume 78 per cent of the world's energy and produce more than 60 per cent of greenhouse gas emissions even if they account for less than 2 per cent of the Earth's surface.

The Green Cities Rating System of Green Building Council of Sri Lanka (GBCSL) offers the valuable opportunity to respond positively to one of the greatest challenges of the day. It is a voluntary scheme where urban designers, engineers and city dwellers can achieve recognition as a 'Green City' together with governance for the city they are residing.

History shows how our forefathers built great cities, irrigation systems and religious monuments that coexisted with nature and yet provided a sustainable economy and lifestyle to the citizens. This initiative of the GBCSL is another humble step towards taking our society to that glorious past which we are still proud of as Sri Lankans.

We believe our effort will make zero-energy cities by the year 2050.

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FOREWORD

When considering the current urbanization trend in the world, it is amazing that, over four billion people around the world, approximately more than 50% of the global population, live in cities. That number is still fast growing, as individuals and families continue migrating to urban areas for various reasons, mainly seeking better livelihoods. It is noteworthy that in East Asia and the Pacific alone, cities house 1.2 billion people, almost equal to the total population of India. With the assumption that urban population would be doubling its current size in the next 30 years, it is estimated that, nearly 70 out of 100 people in the world will live in cities, by 2050.

However, the speed and scale of urbanization brings tremendous challenges. It is obvious that, widening income gaps, worsening pollution, aging buildings and bridges are all indicating signs that today's cities are struggling to keep up with city inhabitants' growing dreams for a sustainable and prosperous future. In addition, climate change further complicates the urbanization challenge. Some studies reveled that, by 2030, climate change and natural disasters may cost cities over US $300 billion each year, and push nearly 80 million more urban residents into poverty. The impact of COVID-19 will be most devastating in poor and densely populated urban areas, especially for the people living in informal settlements and slums worldwide, where overcrowding also makes it difficult to follow recommended measures such as social distancing and self-isolation.

At the same time, it is a fact that cities have become the world's major growth engine, generating more than 80% of the global GDP, while helping hundreds of millions of people to lift themselves out of extreme poverty. In addition, cities are also our greatest opportunity where innovation happens, wealth generation accelerates and efficiency gains are achievable. And as the world becomes increasingly urban and no way of returning back, we will never get an opportunity to select the correct path and make our cities resilient and sustainable, if we do not do it today.

The researchers found that, all these strengths and weaknesses of urbanization have attributed to the current situation where cities have become the main source for most of the climate change catastrophes, as they account for more than 70 percent of global

greenhouse gas emissions and two-thirds of the world's energy use. With the understanding of this situation and as a result of the global commitment to making urbanization right, we can see that the 'Sustainable City Concept' has become a reality today. It is praiseworthy that a broader consensus among all stakeholders has been reached to make cities inclusive, safe, resilient, and sustainable for all, and to revitalize their existence to achieve the Sustainable Development Goals set out by the United Nations. This situation drives the Green Building Councils around the world to formulate Green City Rating Systems, identifying norms and standards required to measure and evaluate the environmental performances of cities to certify them as Green and Sustainable Cities.

The Green Building Council of Sri Lanka (GBCSL), being the fully-pledged green promoting and endorsing organization, has formulated and introduced the 'GREEN^{SL} Rating System for Sustainable Cities' to respond positively to the greatest challenge of the day for making our cities inclusive, safe, resilient, and sustainable. It is a voluntary scheme where urban planners, architects, designers, engineers and city dwellers can achieve recognition as a 'Green City' together with the local government authorities, they are residing. This is a kind of repetition in our history as our forefathers built great cities, irrigation systems and religious monuments that co-existed with nature and yet provided a sustainable economy and lifestyle to the citizens. This initiative of the GBCSL is another step forward in taking our society to that glorious past, which we are still proud of as Sri Lankans.

The Green City Concept seeks at promoting an eco-friendly city that balances social, economic, and environmental dimensions, as well as good urban governance as its foundation. Also, one of the main concerns which need to be stressed upon is optimal and efficient use of natural resources. In this context, emerging cities have the opportunity to set a strong eco-vision that can be transformed into a long-term plan from day one itself. The rating system shall enable the development authorities and developers to apply green concepts and planning principles, so as to reduce environmental impacts that are measurable, and to improve the overall quality of life.

Prof. Ranjith Dissanayake
Chairman
Green Building Council of Sri Lanka

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We mention with gratitude the expert committee members for their expertise and reviews in perfecting the draft.

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- Ms. Samandhi Fernando
- Ms. Dilini Abeywardhana

GREENSL® RATING SYSTEM FOR SUSTAINABLE CITIES

POINT ALLOCATION

100 POINTS AVAILABLE

Criteria		Points
1.0 Management		**4 Points available**
Prerequisite 1	Green Building Accredited Professionals and Commitment	Required
Prerequisite 2	Citizen Engagement	Required
Prerequisite 3	Eco vision of the city	Required
Credit 1.1	Application of Appropriate Technologies and Information & Communications Technology (ICT) Integration	1 Point
Credit 1.2	Integrated Planning	2 Points
Credit 1.3	Recognize GREEN$^{SL®}$ rated built environment	1 Point
2.0 Ecology and Conservation		**19 Points available**
Prerequisite 1	Assess the Existing Ecosystem	Required
Credit 2.1	Existence of Green Coverage & Accessibility to Public Green Spaces	
Credit 2.1.1	Existence of Green Coverage	2 Points
Credit 2.1.2	Accessibility to Public Green and Open Spaces	3 Points
Credit 2.2	Restore, Rehabilitate and Conserve Natural Resources	4 points
Credit 2.3	Reduce Heat Island Effect	
Credit 2.3.1	Reduce Heat Island Effect- Roads	2 points
Credit 2.3.2	Reduce Heat Island Effect- Roof areas and vertical facades	2 points
Credit 2.4	Resilience Planning	
Credit 2.4.1	Vulnerability and Capacity Assessment	2 Points
Credit 2.4.2	Develop a Resilience Plan	2 Points
Credit 2.5	Encourage Re-Generation of Environmentally Degraded Areas	2 Point
3.0 Infrastructure Management		**6 Points available**
Credit 3.1	Light Pollution Reduction	1 Point
Credit 3.2	Noise Pollution reduction	1 Point
Credit 3.3	Visual Pollution reduction	1 Point
Credit 3.4	Air Pollution Reduction	1 Points
Credit 3.5	Material Recovery	1 Point
Credit 3.6	Preserve Archeological Sites and Heritage Buildings	1 Point
4.0 Waste Management		**5 Points available**
Prerequisite 1	Solid Waste Management Plan of the City	Required
Prerequisite 2	Assess the Nature & Volume of Solid Waste	Required
Credit 4.1	Waste Performance	2 Points

Credit 4.2	Special Waste Streams Management	2 Points
Credit 4.3	Smart Waste Management Systems	1 Point
5.0 Transportation Facilities		**20 Points available**
Credit 5.1	Transit Network	6 Points
Credit 5.2	Sidewalks and Pedestrian Facilities	3 Points
Credit 5.3	Bicycle Lanes and Cycling Facilities	2 Points
Credit 5.4	Urban Traffic Management and Parking Management	4 Points
Credit 5.5	Travel Demand Management (TDM)	2 Points
Credit 5.6	Transit Oriented Development (TOD)	2 Point
Credit 5.7	Alternative Energy Driven Vehicles	1 Point
6.0 Water Efficiency		**18 Points available**
Prerequisite 1	Water Quality	Required
Credit 6.1	Water conservation	3 Points
Credit 6.2	Innovative Treatment and Transmission of water	2 Points
Credit 6.3	Water System Performance	2 Points
Credit 6.4	Rainwater Harvesting	3 Points
Credit 6.5	Storm water Management	2 Points
Credit 6.6	Wastewater Management	
Credit 6.6.1	Wastewater Treatment	3 Points
Credit 6.6.2	Re-use treated waste water	3 Points
7.0 Energy and Atmosphere		**9 Points available**
Prerequisite 1	Enhanced Electricity Accessibility and Monitoring	Required
Credit 7.1	Energy Audit	3 Points
Credit 7.2	Encourage to Use of Renewable Energy	2 Points
Credit 7.3	Greenhouse Gas Emissions Management	4 Points
8.0 Social, Cultural and Economic Achievements		**17 Points available**
Prerequisite 1	Demographic Assessment	Required
Credit 8.1	Social Housing Initiatives & Social Initiatives	
Credit 8.1.1	Housing Initiatives	2 Points
Credit 8.1.2	Social Initiatives	1 Point
Credit 8.2	Quality of Life Performance	6 Points
Credit 8.3	Affordable Housing	1 Point
Credit 8.4	Accessibility of Elderly and Persons with disability	1 Point
Credit 8.5	Implementing Circular Economic Practices	2 Point
Credit 8.6	Recognize Cooperate Social Responsibility (CSR) with sustainability focus	1 Point
Credit 8.7	Promotion of Sustainable Products & Services	
Credit 8.7.1	Promotion of Sustainable Local Products & Services and Sustainable Consumption Habits	2 Point
Credit 8.7.2	Undertaking training /education & research on sustainable product & services	1 Point
9.0 Innovation		**2 Points available**
Credit 9.1	Innovation	2 Points

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INTRODUCTION TO GREEN BUILDING COUNCIL OF SRI LANKA (GBCSL)

Going green is no strange concept to us Sri Lankans, having a proud history of great civilizations with structures and monuments together with irrigation systems that impress the entire world even today. The balanced lifestyle and coexistence with nature, which is provided to the human society, is the ultimate goal of GBCSL's endeavor.

The GBCSL came into existence as a result of an emerging trend towards applying the greener concepts for built environment and now expand its interests on applying green concepts for construction materials, transport infrastructure and for cities.

The GBCSL launched in November 2009 as a non-profit organization is committed to develop a sustainable building industry for Sri Lanka by encouraging the adoption of green building practices. It is uniquely supported by both industries and government institutions across the country.

The GBCSL is now granted with "Emerging Member Status" by the World Green Building Council, which represents about 80 countries ranging from developed to developing nations world-wide.

Currently Prof. Ranjith Dissanayake leads the GBCSL as the chairperson while the board comprises of expert academic advisors and industrial agents.

Board Members

- **Prof. Ranjith Dissanayake (Chairman)**

  Senior Professor at the Department of Civil Engineering, University of Peradeniya, Sri Lanka
- **Prof. Priyan Mendis (Founder Chairman)**

  Professor at the Department of Civil and Environmental Engineering, University of Melbourne, Australia
- **Eng. Shiromal Fernando (Vice Chairman)**

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Committees of the Council

- Green Environmental Rating System & Life Cycle Assessment
- Transport Infrastructure in Built Environment
- Education & Training
- Awareness & Publicity
- International Relations
- Membership
- Volunteer Force

Institutions that have taken leadership in establishing GBCSL

- Sri Lanka Standards Institute (SLSI)
- Sri Lanka Institute of Architects
- The Institution of Engineers Sri Lanka
- Society of Structural Engineers Sri Lanka
- National Construction Association of Sri Lanka
- Institute of Quantity Surveyors of Sri Lanka
- National Academy of Sciences Sri Lanka
- Sri Lanka Institute of Nanotechnology
- Institute of Town Planners Sri Lanka
- Department of Civil Engineering, Department of Mechanical Engineering and Faculty of Architecture - University of Moratuwa
- Department of Civil Engineering - University of Peradeniya
- Department of Civil & Environmental Engineering - University of Melbourne

VISION OF GREEN BUILDING COUNCIL OF SRI LANKA

Our Vision is to transform the construction industry in Sri Lanka with traditional building practices and fully adopt sustainability as the means by which our environment flourishes, the economy prospers and society grows to ensure the future wellbeing of our motherland.

MISSION OF GREEN BUILDING COUNCIL OF SRI LANKA

The Mission is to develop the sustainability of the built environment by transforming the way it is planned, designed, constructed, maintained and operated and drive the adoption of green building practices through market- based solutions while helping to forge a new partnership between government, industry and other stakeholders.

INTRODUCTION TO GREEN$^{SL®}$ RATING SYSTEM FOR SUSTAINABLE CITIES TOOL

A Sustainable City can be defined as a city which shows high environmental performance relative to established benchmarks in terms of; quality of environmental assets (air, water, land/soil and biodiversity), efficient use of resources (water, energy, land and materials) while maximizing the economic and social co-benefits and considering its context (population size, socio-economic structure and geographical and climate characteristics). Most of the developing countries are now following this concept towards mitigating and adapting to, risks deriving from the global scale disaster, climate change.

The current world population of 7.7 billion, expected to reach 8.6 billion in 2030 and 9.8 billion in 2050 residing more people in urban areas than in rural areas. Almost 90% of this population growth happening in Asia and Africa. It is impossible to neglect the fact that there are no non-urbanized developed countries as the cities contribute over 80% of the global GDP being the major economic and financial hubs. (Cheshmehzangi, 2016). "The Status of Sri Lankan Cities 2018" Report by UN-Habitat reveals that the main have expanded rapidly over the past two decades at a rate of 6.42% per year and the new estimate for the urbanization in Sri Lanka is around 42%.

This trend will continue to grow as people migrate from rural areas to urban areas for better employment opportunities and standard of living. Also, Urban Sprawl has been identified as a major issue related to urban development because it increases the cost of service provision while causing major issues for environmental sustainability such as climate change, pollution, congestion and substandard living conditions. The onset of COVID-19 pandemic is an eye opener on the extent of environmental degradation that has taken place and the need to take urgent measures for the protection of environment and maintain environmental sustainability.

Therefore, in this context, one of the solutions that can be given is the concept of 'Sustainable Cities' where the growing urbanization is encouraged to embrace sustainable urban development principles into city planning framework while supporting to achieve SDGs (Sustainable Development Goals) stated by United Nations by 2030.

Thus, Green Building Council of Sri Lanka has developed a Sustainable City Rating tool to assess the cities according to the developed framework where these Green cities will balance social, economic and environmental dimensions based on a good urban governance as its foundation. Urban Planners, Urban Designers, Architects and Engineers can work together with local administration and communities to ensure that integrated planning and design can create a city based on sustainable planning principles to minimize the negative impacts on environment while improving the overall quality of city living.

Sustainable Cities Rating System of the Green Building Council of Sri Lanka is developed as a tool to recognize and promote sustainable urban development practices by establishing a bench mark for a sustainable city profile in Sri Lankan context.

The rating system is aimed at local government sector for developing and managing existing and new cities or for private sector investors and public-private partnerships, engaged in developing new urban centers in Sri Lanka.

The main feature of the rating system is the focus on community participation and the requirement to broad base the green initiatives for wider public participation in order to achieve the recognition.

Attributes Considered When Developing Sustainable Cities Rating Tool

Overall rating system is developed within a broad framework in order to achieve the following attributes considered as important to long term sustainability.

- Enhanced Livability
- Environmental Responsibility
- Economic Prosperity
- Social Inclusion
- Innovation & Design Excellence
- Strong Leadership & Commitment

Main Segments of the Rating System

The rating system recognizes the city profile under the following nine (09) segments and evaluates the impact of the initiatives undertaken against each segment based on the detailed guide lines stipulated:

1. Management
2. Ecology and Conservation
3. Infrastructure Management
4. Waste Management
5. Transportation Facilities
6. Water Efficiency
7. Energy and Atmosphere
8. Social, Culture and Economic Achievements
9. Innovation

The Rating System

- The rating system identifies points to be allocated (out of 100) under each of the nine segments of the sustainable city profile and each segment is expanded to include number of sub segments identified as cre3dits to cover a wider ambit of sustainable action or green initiatives.
- The system also focuses on the macro issues in the urban environment while recognizing the important micro features contributing to improving the overall quality of the urban environment all initiatives will be evaluated in this context.
- One of the main objectives of the rating system is to act as a catalyst for stimulating and attracting community participation to achieve environmental sustainability. Therefore, it is expected that the majority of the initiatives undertaken are focus on wider public participation and voluntary action.
- The rating system is based on a continuous assessment spanning a period of two years. Therefore, performance of the strategies and interventions to achieve sustainability under stated segments will be periodically assessed.

Ratings Offered

Pre requisites

Each segment in the points system identifies pre requisites that needs to be complied with, in order to qualify for points under the respective segments.

The point system

The points allocated under each segment is clearly indicated and guidelines are provided to meet the requirements and claim points under each segment. For clarity each segment is divided into number of sub segments identified as credits the point's allocation and the expected output under each sub segment (credit) are specified in the system.

Rating offered

In the point system following ratings are offered

Points	Rating Offered
40-49	Certified Sustainable City
50-59	Sustainable City Silver
60-75	Sustainable City Gold
75 and above	Sustainable City Platinum

Interim Rating

On submission of an application for rating, GBCSL shall commence processing of the application and shall provide guidelines to follow up on the procedure.

After six months an evaluation will be undertaken and GBCSL shall award 'emerging green city' status if satisfactory follow up action has been taken to achieve the stated sustainability targets.

At the end of one year, a further evaluation shall be undertaken and if satisfactory progress has been made a 'provisional rating' shall be assigned.

The final award shall be made on submission of a compliance report and a request for the award, claiming points as per the point system stipulated. (A guideline for the preparation of the report shall be provided by the GBCSL).

An independent evaluation by an expert panel appointed by GBCSL shall be undertaken on receipt of the compliance report. Subsequently a final evaluation shall be undertaken by a jury appointed by the council and recommendation made to the GBCSL for an award based on the recommendation. The applicant shall be given an opportunity present and justify the claim to the jury who will also visit the subject city before the determination of the rating.

Categorization of Cities for Rating

In-order to encourage sustainable urbanization at different scales, the rating shall be offered under three categories based on the number of inhabitants in each city:

Small City - 5,000 or more inhabitants

Medium City - 50,000 or more inhabitants

Large City - 150,000 or more inhabitants

The population thresholds were decided based on the population statistics related to existing urban centers in Sri Lanka. This will be periodically reviewed by the councils and the threshold will be adjusted. In order to ensure that the rating is assigned to urban centers, a minimum density of 60 persons per hectare is required within the identified city area for which rating is requested.

GLOSSARY

- **City**
  A large and densely populated urban settlement
- **Green City**

  A Green City is a city which shows high environmental performance relative to established benchmarks in terms of;

  i) quality of environmental assets (air, water, land/soil and biodiversity)

  ii) efficient use of resources (water, energy, land and materials)

  iii) mitigating, and adapting to, risks deriving from climate change

  while maximizing the economic and social co-benefits and considering its context (population size, socio-economic structure and geographical and climate characteristics)

- **Ecosystem**

  An ecosystem is a community of living organisms and their physical environment that interact as a functional unit.

- **Green Space**

  A patch of vegetated land for predominantly recreational use. It may include assets of different scales from green roofs or pocket gardens to large urban parks.

- **Green Infrastructure**

  A strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services It is present in both rural and urban settings. In urban areas, many different features may be part of the green infrastructure (e.g. parks, gardens, grassy verges, green walls or green roofs) as far as they are part of an interconnected network and are delivering multiple ecosystem services. These green urban elements (or blue if aquatic ecosystems are concerned) may be found within the city and in its peri-urban area.

- **Green Building**

  Green building is a holistic concept that starts with the understanding that the built environment can have profound effects, both positive and negative, on the natural environment, as well as the people who inhabit buildings every day. Green building is an effort to amplify the positive and mitigate the negative of these effects throughout the entire life cycle of a building.

- **Landscape**

  The traits, patterns and structure of a specific geographic area, including its biological composition, its physical environment and its anthropogenic or social patterns. An area where interacting ecosystems are grouped and repeated in a similar form

- **Land use**

  Land use describes the social and economic purposes for which land is managed (e.g. housing, intensive agriculture or transport). It comprises all the activities undertaken in a certain land-cover type

- **Landfill**

  Landfill is engineered depression in the ground into which waste is put.

- **Urban Sprawl**

  The unplanned and uncontrolled growth of urban areas into the surrounding countryside. Urban sprawl is the physical pattern of low-density expansion of large urban areas under market conditions into the surrounding agricultural areas. Development is patchy, scattered and strung out, with a tendency to discontinuity because it leap-frogs over some areas, leaving agricultural enclaves.

- **Urban Heat Island Effect**

  The urban heat island is a microclimatic phenomenon that occurs in urban areas, and results in a tendency to be hotter than its surroundings. It consists in a significant increasing of the temperature in the urban area respect to the surrounding peri-urban and rural neighborhoods.

- **Urban Resilience**

  The ability of a city as a socio-ecological-infrastructural system and its component parts to absorb and recover from shocks whilst retaining the essential same functions and identity, to adjust to stresses and learn from them to reorganize and develop, and to transform in order to adapt to social-economic and environmental changes, which involves framing resource management according to resource availability within this system over different temporal and spatial scales

- **Sustainable Mobility**

  The ability to meet the needs of society to move freely, gain access, communicate, trade and establish relationships without sacrificing other essential human or ecological values today or in the future

- **Smart power grid system**

  Interconnected grid with;

  1. Distributed, regional and central generation
  2. Hybrids (multiple means) of power generation at each scale
  3. Smart sensors in buildings for efficient use
  4. Smart technologies to designate critical areas during power losses
  5. New generation batteries and other storage technologies

- **Environmentally Degradation**

  Environmental degradation is the deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems; habitat destruction; the extinction of wildlife; and pollution.

- **Light Pollution**

  Waste light from building sites that produces glare, is directed upward to the sky, or is directed off the site. Waste light does not increase nighttime safety, utility, or security and needlessly consumes energy.

- **Noise pollution**

  Unwanted or excessive sound that can have deleterious effects on human health and environmental quality.

- **Visual pollution**

  Visual pollution is an aesthetic issue, referring to the impacts of pollution that impair one's ability to enjoy a vista or view.

- **Travel Demand Management (TDM)**

  A collection of strategies designed to reduce automobile trips and associated roadways congestion and parking demand by redistributing travel to alternative modes, times and routes

- **Transit Oriented Development (TOD)**

  Transit-oriented development is a mixed-use residential and commercial area designed to maximize access to public, and often incorporates features to encourage transit ridership. A TOD neighborhood typically has a center with a transit station or stop (train station, metro station, tram stop, or bus stop), surrounded by relatively high-density development with progressively lower-density development spreading outward from the center.

- **Renewable Energy**

  Renewable energy is a source that is, within a short time frame relative to the earth's natural cycles; sustainable, and include non-carbon technologies such as solar energy, hydropower, and wind, as well as carbon-neutral technologies such as biomass. Renewable energy resources capture their energy from natural energy sources, such as sunlight, wind, hydropower, biogas and geothermal heat that are self-replenishing (as opposed to non-renewable energy sources, e.g., oil, gas and coal, that can be used only one time).

- **Greenhouse Gases**

  Any gas that has the property of absorbing infrared radiation (net heat energy) emitted from Earth's surface and reradiating it back to Earth's surface, thus contributing to the greenhouse effect. Carbon dioxide, methane, and water vapor are the most important greenhouse gases. (To a lesser extent, surface-level ozone, nitrous oxides, and fluorinated gases also trap infrared radiation.)

- **Social Housing**

  Housing provided for people on low incomes or with particular needs by government agencies or non-profit organizations.

- **Circular Economy**

  An economic system aimed at eliminating waste and the continual use of resources. Circular systems employ reuse, sharing, repair, refurbishment, remanufacturing and recycling to create a closed-loop system, minimizing the use of resource inputs and the creation of waste, pollution and carbon emissions.

- **Supply chain**

  A network between a company and its suppliers to produce and distribute a specific product to the final buyer. This network includes different activities, people, entities, information, and resources. The supply chain also represents the steps it takes to get the product or service from its original state to the customer.

- **Sustainable consumption**

  Sustainable consumption is the use of material products, energy and immaterial services in such a way that their use minimizes impacts on the environment, so that human needs can be met not only in the present but also for future generations.

- **Vulnerability**

  Vulnerability is the degree to which a system is susceptible to and unable to cope with the adverse effects of injury, damage or harm (Source: IPPC. Methodological and Technological issues in technology transfer). This term normally refers to climate change effects. In this sense, urban vulnerability depends on the character, magnitude, and rate of climate change events and, on the other hand, on the city's sensitivity and adaptive capacity to them.

GREEN$^{SL®}$ RATING SYSTEM
FOR SUSTAINABLE CITIES

Version 1.0

MANAGEMENT

1.0 MANAGEMENT

Prerequisite 1: Green Building Accredited Professionals and Commitment

Required

Intent

Support and encourage the involvement of GBCSL Accredited Professionals in the implementation of green initiatives in Sustainable Cities.

Requirement

At least two principal participants of the Sustainable Cities Implementation Team shall be GBCSL Accredited Professionals.

AND

Form an interdisciplinary team with at least one professional from each category is stated as below. However, those three professionals should have a reasonable knowledge about the other areas as well.

- Category 1
  - Urban Planner
  - Architect / Urban Designer
  - Ecologist/Landscape Architect
- Category 2
  - Civil Engineer
  - Mechanical, Electrical and Plumbing (MEP) Engineer
  - Quantity Surveyor / Valuer
  - Sustainability Consultant
- Category 3
  - Financial Specialist/ Urban Economist
  - Real Estate Specialist
  - Management Specialist

Any other experts or stakeholders can be included as relevant to the city or community.

Potential Technologies and Strategies

The Accredited Green Building Professional must be engaged in the Green City assessment process from the initial planning stage to the completion of the final assessment.

The Accredited Green Building Professional should;

- Attend all planning and evaluation meetings of the proposed green city project
- Participate site visits and site assessment activities
- Prepare progress reports and forward preliminary submission to the GBCSL using the Preliminary Submission Format
- Prepare all necessary documentation for the final submissions to the Evaluation Panel with the assistance of all the other professionals engage in the green city assessment process.

Prerequisite 2: Citizen Engagement

Required

Intent

Encourage citizen-based development process, thereby improving government-citizen interface.

Requirements

A public/community consultation mechanism to ensure public/community participation should be available. Participation of a Community Based Organization (CBO) or a Community Interest Group (CIG) shall be acceptable if a formal understanding of their role in the process is established. In order to make the process inclusive from the inception, applicant shall engage a Community Based Organization (CBO) or a Community Interest Group (CIG) to work hand in hand with the community to involve them in the process and ensure that commitment and responsibility to achieve and maintain sustainability is generated within the community.

Submission Requirements

- Submit a written consent document from the community organization clearly identifying their commitment, responsibility and agreement for the initiative.
- Provide evidence of the CBO/CIG for their community involvement programs held in the city or held for the city.
- Narrative describing the community engagement techniques

Prerequisite: Eco Vision of the City

Required

Intent

Encourage the city to recognize the areas in the city that are poor in environmental performance and develop a proposal demonstrating the city's vision in encompassing principles of sustainability, thereby enabling the city to prioritize in terms of infrastructure upgrade and policy reforms.

Requirement

Examine and report the city's significantly problematic areas in terms of poor performance in environment, social and economic domains. Based on that, develop a holistic Eco vision of the city to ensure environmental sustainability. The Eco vision should include measurable goals to achieve sustainability in the following aspects:

- Land Use Planning
- Green Cover and Open Spaces
- Sustainable Mobility
- Solid Waste Management
- Water Efficiency
- Energy Efficiency
- Green Buildings/Infrastructure
- Community Participation

*The Eco-vision should reflect the city's milestones towards sustainability

Submission Requirements

- Brief review report on the city's problematic areas, areas that need to be improved
- Submit extract of Policy Document or Development Plan / Master Plan / Project Report(s) highlighting the Eco-vision of the City as well as goals for the aspects as stated above.

Credit 1.1 Application of Appropriate Technologies and Information & Communications Technology (ICT) Integration

1 Point

Intent

To encourage application of appropriate technologies and the use of innovative ITC applications thereby minimizing the negative impacts on environment and to improve the overall performance of the city.

Requirements

Encourage to incorporate some of the following technological applications appropriate to the city plan to ensure a better performance.

- On/off automatic controls for street lighting
- Smart metering for water supply at consumer level
- City dashboard system for real time performance tracking for infrastructure facilities such as power, water, waste, transport, air quality, etc.
- Smart power grid system
- Real time travel response
- Smart irrigation system for city landscape
- Automatic vehicle location and tracking
- Any other ICT applications contributing to environmental performance of the city

Submission Requirements

- Submit extract of development plan, master plan, project report, highlighting list of all technological and ICT applications planned or proposed within the city area including the time line.
- Provide a narrative on technologies, applications and the management plan.

Credit 1.2: Integrated Planning

2 Points

Intent

Intent is to ensure the high-performance and cost-effective outcomes through interrelationships between the city and its community.

Requirement

The work plan to achieve the rating within a span of reasonable time should be prepared with milestones established to achieve sustainability. It is recommended that the work plan is prepared considering the segments in the rating system covering all important activities identified.

An input schedule should also be prepared identifying the inputs of the professionals in the team, together with details of community participation and stakeholder inputs supplementing the work plan with clear time line to cover within the agreed period.

Potential Technologies and Strategies

Conduct regular meetings with the integrated project team to review project status, introduce new team members to project goals, discuss problems, formulate solutions, review responsibilities, and identify the next steps. The main principle of green city design is essentially about urban design efforts by creating an environment that ensures ecological functions of the city as an eco-system.

Submission Requirements

- Submit a report including city development proposals with showing evidence of integration of different aspects.

Credit 1.3: Recognize GREENSL® Rated Built Environment

1 Point

Intent

Intent is to recognize GREEN$^{SL®}$ rated Built Environment in the city that under assessment.

Requirements

Existing Buildings: Register for green certification of existing buildings above 4000 square feet that are owned and/or operated by the local government or another governmental authority under the Green^{SL} rating system for existing buildings certification system.
Points are awarded as per Table 1;

New Buildings: Influence all new constructions undertaken by the City Council or the community to achieve Green^{SL} rating system for built environment certification system.

Table 1: Points allocated for number of GREEN certified buildings

Category	Number of buildings registered or certified under the GREEN$^{SL®}$ rating system	Points
Small City	≥1	1
Medium City	≥3	
Large City	≥5	

** To get this point in addition to having above mentioned number of green buildings, the city council should recognize these as green buildings.

Potential Technologies and Strategies

Follow the guidelines in Green^{SL} Rating System for Built environment version 2 and Green^{SL} Rating System for Existing Buildings.

Submission Requirements

- Submit a report including total number of green rated buildings within the city with relevant certification documents.
- Evidence of recognizing the GREEN certified buildings in the city by the city council.

ECOLOGY AND PRESERVATION

2.0 ECOLOGY AND CONSERVATION

Prerequisite 1: Assess the Existing Ecosystem

Required

Intent

To assess existing ecosystem conditions and services provided by ecosystems, built landscapes, and other open spaces to guide the city development along with conservation, restoration and rehabilitation efforts.

Requirements

- Submit map (s) in the city area by illustrating key details such as topography, soil type, land use, vegetation, hydrology and aquatic ecosystems, sources of pollution and degraded ecosystems. Composite maps in this regard is preferred.
- Submit a list of threaten species (flora and fauna) within the city.

Potential Technologies and Strategies

Green city implementation team should begin by collecting a wide range of information such as topography, soils, vegetation and habitats, hydrology and aquatic ecosystems data. The assessment should demonstrate the relationships between the features and topics listed above and how these features influenced the city development. Some information are available in following websites.

- https://www.survey.gov.lk/
- http://www.agrimin.gov.lk/web/
- http://www.disastermin.gov.lk/web/
- https://www.iucn.org/

Credit 2.1: Existence of Green Coverage & Accessibility to Public Green Spaces

5 Points

Credit 2.1.1: Existence of Green Coverage

2 Points

Intent

Increase the green coverage of the City to enhance the environmental performance and to develop the human wellbeing.

Note: Green space is defined as land that is partly or fully covered with trees, shrubs, grass or other vegetation. This includes urban parks, trails and community gardens including roof top or vertical gardens.

Requirements

Provide easily accessible green coverage. Points are awarded as per Table 2;

Table 2: Points allocated for green coverage

Urban green space per capita	Points
12.0 m^2	1
15.0 m^2	2

Potential technologies and strategies

Should assess available green space in the city and decide whether to add more green spaces to the city or conserve the available space. City planners and design professionals have to find ways to incorporate accessible green-spaces to city such as; green roofs, green walls, parks and reserves, sporting fields, riparian areas like stream and river banks, greenways and trails, community gardens, street trees (nature stripe along roadsides) and nature conservation areas. Also, any program to increase green cover through tree planting campaigns, cleaning and greening of reservations, community action for protection of green areas with integration of public activities for better surveillance are some of the actions qualify for this point.

Submission Requirements

- Provide a map marking City's significant green cover and open spaces
- Tree inventory of the City
- Submit the per capita ratio of trees calculation and the method of calculation

Credit 2.1.2: Accessibility for Public to Green and Open Spaces

3 Points

Intent

Encourage easy accessibility for public to green and open spaces thereby enabling such spaces to be used by majority of the population, making a city healthy and livable.

Note:

Public green spaces include parks, botanical gardens, and riparian areas along water bodies.

Open Spaces include public playgrounds, multi-open space (median), sports complex etc. This shall not include areas under water.

Public access restricted areas will not be considered

Requirements

For public green/open space accessibility, points are awarded as per below.

IF

- Less than 25% of City's developed area is located within 400 m of total public green space/open spaces; 1 point
- Between 25% - 40% of City's developed area is located within 400 m of total public green space/open spaces; 2 point
- More than 40% of City's developed area is located within 400 m of total public green space/open spaces; 3 points

Submission Requirements

- Provide map marking City's significant public green spaces and open spaces. Demarcate the developed area that lies beyond 400 m of the green/open spaces.

Credit 2.2: Restore, Rehabilitate and Conserve Natural Resources

4 Points

Intent

To preserve and restore the natural resources within the city or community. By adopting existing environmental regulations and using native plants to suit local environmental conditions.

Requirements

- Submit a document indicating the strategies taken so far by the city council to restore/rehabilitate and conserve existing natural resources.
- Submit a natural resources conservation and restoring plan based on the study carried out under Prerequisite: Assess the Existing Ecosystem

Credit 2.3: Reduce Heat Island Effect

4 Points

Intent

Mitigate urban heat islands to improve the microclimate.

Credit 2.3.1 Reduce Heat Island Effect- Roads

2 points

Requirements

For Carriage-way and Service Roads

- Have an inventory of shaded carriage-way and service roads.
- Provide one or a combination of the following measures for carriage-way and service (arterial, sub-arterial, collector and local roads):
    - Shade from tree cover
    - Cool pavements
    - Or a combination

Table 3: Points allocated for percentage of shaded areas or cool pavements

Percentage of shaded areas or cool pavements from total road areas of carriage - way/ service roads	Points
≥ 20%	1
≥ 30%	2

Note: Cool pavements are defined as reflective pavements that help lower surface temperatures and reduce the amount of heat absorbed into the pavement. The Solar Reflective Index (SRI) value of cool pavements shall be at least 29 (and not higher than 64) (Source: Reducing Urban Heat Islands: Compendium of Strategies for Cool Pavements, U.S EPA, 2009).

Submission Requirements

- Identify responsible maintenance agencies and their methodology of maintenance.
- Detailed plan which is clearly indicating the shaded pavements, trees and shrubs.
- Submit the calculation and the methodology.

Credit 2.3.2 Reduce Heat Island Effect- Roof and Vertical Facades

2 points

Requirements

For exposed roof areas and vertical facades (external) of all buildings

- Establish a policy to incentivize buildings that use high reflective roofing material (or) vegetation (or) combination, to cover the exposed roof areas. Points are awarded as Table 4;

Table 4: Points allocated for percentage of vegetated roofs, high reflective roofing material or combination

Percentage of vegetated roofs, high reflective roofing material or combination over total exposed roof area and vertical green gardens	Points
≥ 25%	1
≥ 50%	2

Submission Requirements

- Submit the SRI calculation and the methodology.
- Submit extractions of local development regulations/mandates/policies encouraging the incorporations of vegetated roofs /high reflectance roofing materials
- Submit extractions of local development regulations/mandates/policies encouraging the incorporations of vertical green elements /high reflectance walling materials and finishing materials.

Credit 2.4: Resilience Planning

4 Points

Intent

To strengthen the resilience of communities to climate change risks, natural hazards and extreme events.

Credit 2.4.1 Vulnerability and Capacity Assessment

2 Points

Requirements

Identify the local environmental context and conduct a vulnerability and capacity assessment for climate change risks, natural hazards and extreme events such as; landslides, tsunamis, floods, wildfires, earthquakes, cyclones, storms, disease epidemics and so forth.

Potential Technologies and Strategies

- Vulnerability and Capacity Assessment – Assess the most exposed and affected sections of the city and community for above mentioned risks.
- Adaptation and Mitigation Goals - Set goals based on the vulnerability and capacity assessment

Credit 2.4.2 Develop a Resilience Plan

2 Points

Requirements

Develop a Resilience Plan for the City or community

Potential Technologies and Strategies for Resilience Plan

The plan should meet at least two of the following requirements:

- Climate Adaptation and Mitigation Strategies - Adaptation and mitigation strategies to meet the goals identified under Vulnerability and Capacity Assessment above.
- Fundamental Emergency Planning and Preparedness - Access to basic needs, first aid, emergency supplies, water, food communication, temporary shelter.

- Early Warning Systems - Strategies for early warning systems and operation of critical facilities during the extreme event and post-event rehabilitation. Demonstrate at least one early warning system in practice.
- Critical Infrastructure Location - Map and reduce over time any critical infrastructure that is located in designated high-risk areas.
- Policy Intervention - Incorporate building structure resilience strategy to withstand the potential damage due to natural hazards in the building regulations.
- Capacity Building - Design awareness programs to educate different stakeholders (at least one at community level and one at internal administrative level) about hazard management. Plan for implementation the programs at regular intervals for at least one year. The programs should have the provision for revisions after stakeholders' feedback.

Submission Requirements

- Provide statistics/data on the natural hazards the City has undergone in the last 50 years and areas that were most affected by the hazard
- Provide risk assessment of area by probability of occurrence and impact
- Identify zones which would be most affected in future
- Provide extracts of development regulations/policies/ public awareness efforts that facilitates for resilience from the identified hazards

Credit 2.5: Encourage Re-Generation of Environmentally Degraded Areas

2 Points

Intent

Restore or habilitate and use environmentally degraded areas in the City for future development to reduce demand for virgin land.

Note:

Environmentally degraded areas are areas previously used for industrial or commercial purposes with known or unknown pollution including soil, water or air contamination due to hazardous waste etc. These areas still have potential for redevelopment or other economic opportunities.

Requirements

- Map all the environmentally degraded areas within the city.
- Identify and prepare programs to improve & integrate environmentally degraded areas and Institute a policy to allocate future developments in environmentally degraded areas

Submission Requirements

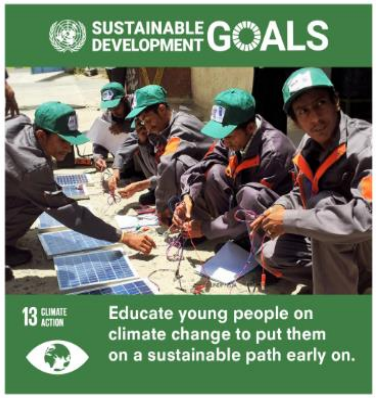
- Provide a map indicating all identified areas which are identified as environmentally degraded.
- Measures taken to re-generate identified degraded land.
- Evidence of mandates/policies/ development regulations directing /encouraging future development towards using degraded land.

Considered Sustainable Development Goal in the Criteria

Under Ecology and Preservation, the following Sustainable Development Goals set out by the UN are taken into consideration in this rating system.

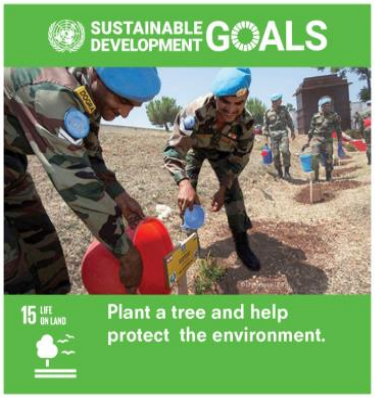
- UN SDG 11 Sustainable cities and communities,
- UN SDG 13 Climate action, UN SDG 14 Life below Water
- UN SDG 14 Life Below Water
- UN SDG 15 Life on Land

Goal 11: Sustainable Cities and Communities



Goal 13: Climate Action

Goal 14: Life Below Water



Goal 15: Life on Land

INFRASTRUCTURE MANAGEMENT

3.0 INFRASTRUCTURE MANAGEMENT

Credit 3.1: Light Pollution Reduction

1 Point

Intent

To minimize and manage ambient light levels to protect public health and the integrity of ecological systems and increase the night sky access and improve nighttime visibility.

Requirements

- Prerequisite: Relevant utility agency should have proper maintenance (during its entire life cycle) plan for street light system.
- LED lamps for public space light systems which proper maintains under any authority.
  Demonstrate increased use of LED lighting load for public space light system (Ex: public parks, bus stands, market etc.) The points are awarded as Table 5;

Table 5: Points allocated for increased use of LED lighting load

Installed LED lighting load (kW) / Total lighting load (kW)	Points
≥ 30%	1

OR

- Solar lighting (or similar renewable source) for public space light system which maintains under relevant utility agency.
  Demonstrate increased use of installed solar lighting load for public space light system (Ex: public parks, bus stands, market etc.). The points are awarded as Table 6;

Table 6: *Points allocation for increased use of solar powered lighting load*

Solar powered lighting load (kW) / Total lighting load (kW)	Points
≥ 2.5%	1

Submission Requirements

- Number of public space light system installed (including type, capacity, operating system (manually or photocell controlled)
- Public space light requirement.
- Calculations/evidence to prove above lighting loads.

Credit 3.2: Noise Pollution Reduction

1 Point

Intent

To minimize and maintain the noise level standards as specified in environmental law

Requirements

The noise levels should comply with the National Environmental (Noise Control) Regulations No. 1 of 1996.

Table 7: Maximum Permissible Noise Levels at Boundaries in LAeq'T

Area	LAeq'T	
	Day time	Night Time
Low Noise	55	45
Medium Noise	63*	50
High Noise	70	60
Silent Zone	50	45

*Provided that the noise level should not exceed 60 dB (A) inside existing houses, during day time.

In specific cases, the noise levels should comply with the schedule II, III, IV, V, VI, VII, and VIII of the regulations.

Note:

"LAeq 'T' means the equivalent continuous, A- weighted sound pressure determined over a time interval T(in dB).

"Low noise area" means an area located within any Pradeshiya Sabaha area.

"Medium noise area" means an area located within any Municipal Council or Urban Council area.

"High noise area" means any export processing zone established by the Board of Investment or industrial estate approved under part IV C of the National Environmental Act.

"Day time" from 06.00 hours to 18.00 hrs,

Potential Technologies and Strategies

Incompatible land uses

- Implement zoning controls and other land use policies to limit or avoid the proximity of noisy and noise-sensitive uses.

Construction

- Noise pollution levels and standards should be issued with the construction permission.
- Local authority should monitor the site condition regularly.
- Local authority should request the noise level log reports from the contractors considering the complexity of site.

Traffic Noise

- Local authority should obtain noise level report in key locations in roads quarterly from authorized institution of laboratory and testing services.
- Evidence for proper license with relevant authorities in mitigating traffic noise.

Machinery and Equipment

- Ensure the noise levels of machinery and equipment installed in buildings are subject to the prevailing regulation.
- Implement and enforce noise standards for loud machinery equipment and can restrict on the use, location, or timing of specific equipment or activities to protect health and sleep.
- Adopt building standards to require quite interiors.

Entertainment

- Permit and monitors outdoor public events and entertainment venues which are requiring building insulation and limiting hours of operation.

Noise Reduction by Soft and Hard Landscape

- Soft landscape – Refers to the lighter elements of a Landscape design like soil, plants, flower or even color combination.

- Hard Landscape - Refers to the heavy elements of a Landscape design like stone, rocks or driveways.

Submission Requirement

- Evidence of having a procedure and a mechanism by local authority for public complains on noise levels and local authority actions on that.
- Report submit by the contractors on ambient noise levels and noise levels during construction/operation stages.

Credit 3.3: Visual Pollution Reduction

1 Point

Intent

To maintain vistas towards city character

Requirements

Identify visually polluted hotspots and provide an implementation plan to mitigate vision pollution.

Potential Technologies and Strategies

- Local Authority should provide facilities for digital advertisement facilities, however only in specific locations with reference to a standard/code of practice.
- Poster advertisements should be allowed only on local authority approved spaces and penalty system should be enforced.

Submission Requirements

- Execution plan with measures to mitigate visual pollution of the city.

Credit 3.4: Air Pollution Reduction

1 point

Intent

To monitor and maintain air quality level to a safe level for human health.

Requirements

- Monitoring system for air pollution controls for factories and industrial activities.
- Local authority should obtain air quality monitoring report in critical areas from a competent authority of laboratory and testing services for the previous six-month period.

Submission Requirements

- Report of air quality monitoring.
- Actions plans to mitigate the air pollution if it's higher than the safe level

Credit 3.5: Material Recovery

1 Point

Intent

To encourage material recovery towards a circular economy through 7R system

Requirements

Option 1: Extended Producer Responsibility

Collection centers must be provided within the boundary and must be equipped with facilities to collect and store the waste products pertaining to the Extended Producer Responsibility (EPR) Policy in order to transfer these to the manufacturers. Collection centers must be within or outside the city boundary and may be operated by the municipality or other organizations such as Producer Responsibility Organizations (PRO).

AND

Mandate a Manufacturers or Producer's Extended Producer Responsibility (EPR) policy for companies within the city's jurisdiction to encourage refurbishment, remanufacturing and recycling. Policy should meet all of the following requirements:

- Address (i) Electronics and Electrical Equipment (EEE) and (ii) packaging or metal cans.
- Include specific guidelines regarding channelization, collection centers, storage, transportation, environmentally sound dismantling, recycling and refurbishment.
- Mandate companies to collect and recover minimum of 60% of the total annual waste generated.

OR

Option 2: Non-recyclable Waste Generation Reporting

- Conduct a waste stream audit for all non-recyclable waste generated within the city, by either weight or volume.
- Based on the waste stream study, identify and list top five major contributing waste producers.
- Report major contribution based on source and total weight or volume of waste generated.

- Local Authority must initiate a dialogue with identified producers to take appropriate measures for the safe collection, storage and recycling/reuse to take back product into their system.

Submission Requirements

- Extended producer responsible policy should be submitted for all the industries within the city area.
- Waste stream audit report, calculations on quantity (by weight or volume) of non-recyclable waste generated within the city.
- Document describing the major producers and the measures identified for safe collection, storage shipment, recycling/reuse to take back product into their system.

Credit 3.6: Preserve Archeological Sites, Heritage Buildings and Cultural Landscapes

1 Point

Intent

To preserve historic buildings, structures and sites and focus growth and rehabilitation through adaptive reuse and conservation.

Requirements

Historic Preservation

This option is applicable to cities or communities with at least one recognizes historic building, contributing building in a historic district, or cultural landscape within the city or community boundary.

Develop an inventory of designated and eligible historic structure(s) and site(s). Consider historic buildings that are outside the city or community boundary but may be impacted by development.

Adopt a policy for alteration (rehabilitation, preservation or restoration) of any historic building or a contributing building in a historic district to ensure that following requirements are met:

- Approval in the form of a certificate of appropriateness from Department of Archeology for any exterior alterations or additions for building subject to local review.
- Approval in the form of a certificate of appropriateness for alteration from the Department of Archeology in case of buildings subject to national review

Potential Technologies and Strategies

Avoid development activities on archeologically sensitive areas. All development should conform to the respective heritage policies, laws and regulations such as;

- Antiquities ordinance
- Central cultural fund act
- Galle heritage foundation act
- Urban development authorities act etc.
- International protocols such as Convention Concerning the Protection of the World's Cultural and Natural Heritage by UNESCO

Submission Requirements

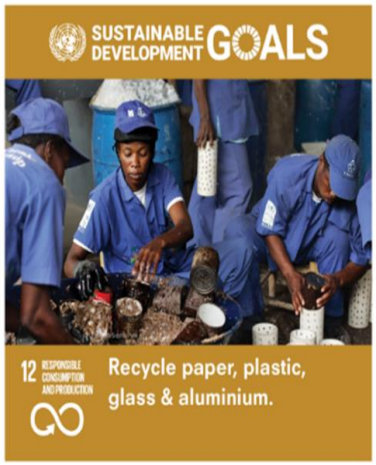
- Submit a summary report including all the information requiring in requirement section

Considered Sustainable Development Goal in the Criteria

Under Infrastructure Management, the following Sustainable Development Goals (SDGs) set out by the United Nations have been taken into consideration.

- SDG 9 - Industry, Innovation & Infrastructure
- SDG 12 - Responsible Consumption & Production
- SDG 15 - Life on Land

Goal 9: Industry, Innovation, and Infrastructure



Goal 12: Responsible Consumption and Production

Goal 15: Life on Land

WASTE MANAGEMENT

4.0 WASTE MANAGEMENT

Prerequisite 1: Solid Waste Management Plan of the City

Required

Intent

Intent is to encourage and recognize developing of a proper plan for managing solid waste of the City to ensure a clean and healthy atmosphere.

Minimize disposal of waste in landfills by proper segregation of waste at source and utilize solid waste as a potential resource thereby encouraging a clean and healthy city and promote reduce, reuse, recycle and recovery principals in waste management with other appropriate technologies.

Requirements

- Provide an integrated solid waste management plan for the city.

Submission Requirements

- Integrated solid waste management plan of the city

Prerequisite 2: Assess the Nature & Volume of Solid Waste

Required

Intent

To support sustainable waste management and move towards net zero waste.

Requirements

- Document the assumptions for differing diurnal and seasonal population if varying numbers are used to arrive at waste generation per capita.
- Identify the sources of waste generation

Submission Requirements

- Identified waste catchment area of the City
- Results of waste audits with weight per capita per day
- Total units (residential/commercial/industrial/institutional/other) within the area and population
- Zone map marked the waste collected area
- Number of units (residential/commercial/industrial/institutional/other) waste collected by local authority.

Credit 4.1: Waste Performance Score

2 points

Intent

To examine City's waste performance, i.e.; generation, resource consumption, waste efficiency against waste performance of benchmarking communities/cities.

Note:

Municipal solid waste must include waste generation from all sectors within the city or community including but not limited to residential, institutional, commercial, other sectors and open spaces.

Construction and demolition waste are not included under this credit. Exclude land clearing debris, soil and landscaping materials.

Requirements

Conduct a waste audit and measure the total weight of waste (in lbs., kg, or tons) that is generated, and the total weight that is diverted from landfills or incineration for a minimum period of the most recent calendar year.

- Municipal solid waste generated (in metric tons per year per capita)
- Total municipal solid waste is collected by the local authority or any other organization
- Municipal solid waste diverted (% of total generated)/ recycled by the local authority or any other organization

The Waste Performance Score rates the resource consumption and resource use efficiency of the city (waste generated and diverted) against the consumption and efficiency of comparable cities or communities.

The score is a value from 1-100 based on the cities' total weight of waste generated and the total weight of waste diverted from landfills and incineration facilities.

Performance Score Calculation

To calculate the Waste Performance Score, following data is required:

- Municipal solid waste generated (quantity and quality)
- Municipal solid waste collected by the local authority or any other organization.

- Municipal solid waste diverted by the local authority or any other organization and citizens by themselves (quantity and quality)
- Total population of the city

The waste generated is converted into an average daily waste generated per occupant, using Equation 1.

Equation 1.

Average daily waste generated = (waste generated / # days associated with waste total) / occupancy

The waste diverted is converted into a daily waste not diverted per occupant, using Equation 2.

Equation 2

Daily waste not diverted per occupant = (waste diverted / # days associated with waste total) / occupancy

The daily not diverted waste is calculated using Equation 3.

Equation 3

Daily not diverted waste per occupant = daily waste generated per occupant– daily waste diverted per occupant

The project's calculated average daily waste generated per occupant AND average daily waste not diverted per occupant are input into the waste scoring function to calculate the waste performance score.

Submission Requirements

- Results of Municipal waste performance
- Extractions of expected potential measures to mitigate waste generation and adopt a waste management policy for the city

Credit 4.2: Special Waste Streams Management

2 Points

Intent

To separate Biomedical, Hazardous waste and recyclable wastes and divert special waste streams from landfill to incinerators. Encourage to recover and recycle reusable only non-infection, non-hazardous materials.

Requirements

Measure and report the total weight of waste generated under special waste streams and the total waste diverted from landfill to incineration. Submit a report including data for one full calendar or fiscal year.

Report data for each of following special waste streams:

- Waste generated through special waste streams (quantity per year)
- Waste diverted (percentage diverted)
- The sources which generate biomedical and hazardous waste

Report the ongoing special waste management measures and propose sustainable waste management strategies for the special waste streams.

Special wastes are defined as non-municipal solid waste generated within the city or community, including industrial waste, agricultural, bio-medical waste, hazardous waste or any other as specific to the city.

Table 8: Points allocated for Reduced percentage of special waste

Reduced percentage of special waste (2010 as the base year)	Points
≤ 2.5%	1
≤ 5%	2

Potential Technologies and Strategies

- Practice Information Technology Asset Disposition (ITAD) in the city and reusing electrical and electronic materials.
- State or amend acts and regulations to reduce special waste streams

Submission Requirements

- Submit statistics of City's special waste (of hospitals/industries/manufacturers), weightage and point sources
- City regulations on proper segregation and handling of special waste and exact procedure.
- Extractions of policies/mandates/regulations that manages to reduce/divert special waste from land fills

Credit 4.3: Smart Waste Management Systems

1 Point

Intent

Intent is to improve operational efficiency of the waste management system.

Requirements

Provide smart waste management systems using any or both of the following to handle a minimum of 20% of the waste generated within the city.

Option 1- Pneumatic Transport Systems

- Loading Stations – Public areas and private property with pneumatic transport system will have hatches, called loading stations where the waste will enter the Automatic Waste Collection System (AWCS) pipe network. At this station, a minimum of two pipes one for compostable and another for recyclable waste will run underground.

- Transport Network – Underground transport network with appropriate diameters and protective coatings (e.g. 3-layer PE coating). PVC conduits containing both the compressed air conduits and system communication control cables will run parallel to the waste pipes.

- Central Waste Handling Facility – At central waste handling facility all pipes will transfer waste for compacting and automated software will direct the compacted waste to the proper container, from there to be trucked for recycling.

AND/OR

Option 2 - Smart Bins and Route Optimization

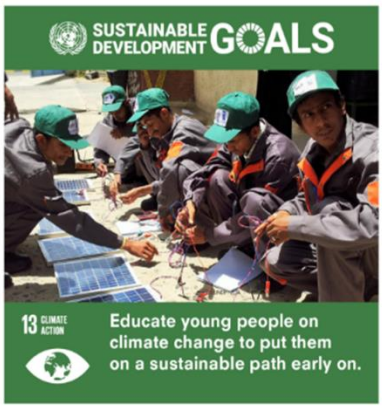
- Sensor Bins – Ultrasonic sensors installed in municipal bins to guide fill level of waste and a communication system will transfer this information to the cloud for further processing and analysis.
- Sensor Bins with Radio Frequency Identification (RFID) technology for e-waste: Electronic waste bins installed with ultrasonic sensors and RFID technology to automatically identify and track tags attached to products. The tags containing electrically stored information will exchange information between cloud and trucks for disposal or directly for the waste bins where the information from each bin is conveyed to the cloud and product recycling can be eased.

- Route Optimization – Information analyzed at the cloud will be processed further and sent to waste vehicle operators to optimize the fleet routing for waste collection.

Considered Sustainable Development Goal in the Criteria

Under the Waste Management Criteria, the following Sustainable Development Goals (SDGs) set out by the United Nations have been taken into consideration.

- SDG 13 – Climate Action
- SDG 14 – Life Below Water
- SDG 15 - Life on Land



Goal 13: Climate Action

Goal 14: Life Below Water

Goal 15: Life on Land

TRANSPORTATION FACILITIE

5.0 TRANSPORTATION FACILITIES

Credit 5.1: Transit Networks

6 Points

Intent

To encourage the use of public transportation through well integrated transit network

Requirements

Local authorities are encouraged to play a positive role in the public transport supply, operation, infrastructure provision and maintenance, promote inter-modality by close coordination with the transport service providers and citizen.

Points are awarded as below,

- Record keeping and liaising with public transport related institutions (2 points)

  Map showing public transit routes, transit stations, intermodal transfer facilities and tabulated information on route time tables, fare structures, etc. - 1 point

  Evidence of the involvement of the local authority in liaising with transport authorities and public transport facility improvement – 1 point

- City-wide coverage of Public Transits and modal share (3 points)

  Percentage of developed area of the city covered by public transport access (within 500m walking from a rail transit station, and 300m from a bus route)

  ≥ 50% in Central Business District (CBD) – 1 point

  ≥ 20% outside the CBD – 1 point

  Peak hour public transport modal share in the city (estimated) > 65% - 1 point

- Improvement of public transit facilities and usage since the base year (1 point)

  Improvement of peak-hour public transport modal share in 5 years > 1% (1 point)

  Increase the percentage use of public transport in the city as compared to the total transport, taken 2012 as the base year.

Potential Technologies and Strategies

Promotion of public transit patronage, starting from public bus and rail services to more specialized public transits, by frequent revision of transit routes and frequencies to match demand variation and by facilitating intermodal transfer through appropriate spatial, temporal and operational measures of modal integration.

Submission Requirements

- Submit Public transport network plan of the city as described above with tabulated data and evidence of involvement in public transport facility upgrading, interaction with transport authorities
- Submit the public transit coverage maps of the CBD and local authority limits separately, showing the developed areas and areas served by public transport as explained above. Show the detailed estimation of the peak-hour public transport modal share
- Submit calculations of the estimation of modal shares in base year and current year

Credit 5.2: Sidewalks and Pedestrian Facilities

3 Points

Intent

To encourage walking as a mode of transportation for citizens by providing continuous and designated pedestrian network

Requirements

The local authorities are to play a positive role in the provision and maintenance of safe and well-connected walking network, with proper surfacing, separation from motorized traffic, shading, drainage, lighting, rest areas etc. Sidewalks are to be provided with sufficient width to accommodate the pedestrian flows at the respective areas.

Points are awarded as below,

- City map showing the pedestrian sidewalks and other pedestrian facilities-1 point

  All pedestrian facilities (pedestrian crossings, signals etc.) and locations of major trip generators, attractors and transport terminals served by the pedestrian network supplemented by the physical details (such as width, pavement type, shading etc.) of the sidewalk and pedestrian links in tabular form

- Providing sufficiently wide sidewalks in the CBD-1 point

  Provision of continuous, hard surfaced sidewalks of minimum 1.5m width on either side of the road

  OR

  provision of continuous, hard surfaced sidewalks of minimum 2.0m width on one side of the road for over 60% of the motorable roads in the city center

- Providing adequate safety for pedestrians-1 point

  Provision of adequate pedestrian safety measures at all major pedestrian crossings (including push-button operated signals, grade-separated crossings, speed tables etc.), proper usage of markings and signage where necessary, and especially at locations where vulnerable road users are expected (schools, hospitals), evidence of conducting safety awareness programs at schools etc. liaising with traffic police

Potential Technologies and Strategies

Improvement of pedestrian safety by spatial and temporal separation of pedestrian movements from motorable traffic using dedicated pedestrian spaces and paths, grade separation or signalization at shared spaces to avoid conflicts; improvement of visibility, markings and signage to direct road users; introducing pedestrian paths to shorten the access and increase public convenience in reaching destinations.

Submission Requirements

- Submit city road network plan indicating all sidewalks, designated pedestrian pathways and alleyways, pedestrian crossings, supplemented with physical details of pedestrian links in tabular form.
- Submit evidence of safety improvements carried out, safety programs conducted and liaising with traffic police in safety improvements during the past two years

Credit 5.3: Bicycle Lanes and Cycling Facilities

2 Points

Intent

Encourage comfortable cycling experience by providing continuous and designated bicycle lane network, thereby promoting public safety and health

Requirements

Ensure adequate and safe cycling facilities are provided to cover major trip generators and attractors, transport terminals etc. and providing sufficient bicycle parking facilities at appropriate locations. Coverage of the network and the providing necessary safety requirements are considered important.

Points are awarded as below,

- City map showing the Bicycle lanes and other cycling facilities-1 point
  All cycling facilities (crossings, signals etc.) and locations of major trip generators, attractors and transport terminals served by the cycling network supplemented by the physical details (such as width, pavement type, shading etc.) of the bicycle lanes in tabular form

- Safety Measures related to Bicycle lanes-1 point
  Provision of necessary safety measures (such as curb lowering, signals, separation from motorway as well as pedestrian paths, lighting, markings and signage etc.), evidence of the local government taking active role in rider awareness and education in schools etc. and liaising with traffic police

Potential Technologies and Strategies

Provision of cycling facilities to improve safety of cyclists and other road users by spatial and temporal separation of bicycle movements from motorable and pedestrian traffic; provision of lighting, visibility, pavement, shelter, proper markings and signage along cycle paths and at bicycle parks; policy interventions to encourage cycling

Submission Requirements

- Submit city road network plan indicating all bicycle lanes (both along roadways and otherwise), designated cycling facilities such as proper pavement, drainage, lighting, shading, crossings, parking, supplemented with physical details of bicycle links in tabular form.
- Submit evidence of safety improvements carried out, safety programs conducted and liaising with traffic police in safety improvements during the past two years with respect to cyclists

Credit 5.4: Urban Traffic Management and Parking Management

4 Points

Intent

To address urban traffic congestion and safety issues through the implementation of appropriate traffic management policy.

Requirement

Promote local authorities to actively involved in the traffic data acquisition, maintaining, using data in the selection of appropriate traffic management techniques that can best address the local urban transport issues by coordinating and liaising with relevant public institutions, starting from the basic and simpler traffic management options, to develop in to advanced and more environmental-friendly traffic management options.

Parking management, as part of general traffic management, has to aim at minimizing roadside parking, encourage building developers to provide and maintain their parking requirements inside the premises, and promoting development of public off-street car parks near major locations with higher parking demands, such as hospitals, offices etc.

Points are awarded as below,

- Record keeping of the city traffic management systems – 1 point

  All locations with traffic and parking management implementation to be shown on a map of the city which is supplemented with necessary physical and operational information in a tabular form, evidence of frequent review of management options with the help of a multi-disciplinary committee that includes representations from traffic police, RDA, PRDA, transport authorities, local authority, business community, citizen groups and other stakeholders.

- Traffic data collection and maintenance– 1 point

  Periodic and continuous collection of traffic data and maintenance of traffic database (using data from different studies carried out by third party institutions)

- Implementation of advanced traffic management systems– 1 point

  Evidence of city-wide implementation of more advanced traffic management techniques described above.

- Parking Inventory of the city and frequent upgrading– 1 point

  Keeping an inventory of parking supply of the city; roadside, off-street (public and private) with operational information and demand data (if any). Evidence of the direct involvement of the local authority in developing parking facilities of the city through proper implementation of building regulations and special parking facility development projects.

Potential Technologies and Strategies

- Consider following areas when developing traffic management system,
- Minimize the need of travel by incorporating transportation in land use planning Safety improvement at junctions and intersections with shared right-of-way (manual control, roundabouts, signalizing, signalized roundabouts, grade separation).
- Circulatory improvements (directional restrictions, turning restrictions, one-way streets)
- Bus lanes, pedestrianized streets
- Parking restraints (by location, by type of vehicles, time of day, day of week, by duration) and parking fares (traffic wardens, parking meters)
- Optimizing road space (parking restrictions, reversible lanes)
- More advanced management systems (count-down signals, demand-responsive signals, coordinated signals along a route, area-wide traffic control (ATC), real-time traffic information systems, real-time parking information systems, ERP etc.)

Submission Requirements

- Submit city road network plan indicating all locations with traffic and parking management implementation, supplemented with physical and operational details of traffic and parking management in tabular form.
- Submit the parking inventory of the city
- Submit evidence of the involvement of the local authority in the frequent interactions with other institutions in carrying out, traffic management reviews and liaising with traffic police, RDA etc.

Credit 5.5: Travel Demand Management (TDM)

2 Points

Intent

To reduce the peak-hour traffic demand through the implementation of travel demand management policies

Requirement

Points are awarded as follows;

Evidence of local authority taking leading role in the study and implementation of TDM techniques

- Strategies covering more than one category and more than three strategies – 1 point

OR

- Strategies covering more than two categories and more than four strategies – 2 points
-

Potential Technologies and Strategies

- Reducing demand to travel (mixed land-use, work-from-home, telecommuting, e-shopping, online meetings)
- Reducing frequency of travel (four-day-work-week)
- Reducing travel distances (land-use readjustment, compact cities, smart cities, mixed land-use)
- Readjusting time of travel (staggered working hours, flexible work hours)
- Reducing number of vehicles (HOV promotion, carpooling, ride sharing)

Submission Requirements

Evidence of the involvement of local authorities in TDM implementation during the past 5 years

Credit 5.6: Transit Oriented Development (TOD)

2 Points

Intent

To improve the implementation of TOD policies to encourage public transit as well as development of land use near transit stations

Requirement

To encourage the local government institutions to play a leading role in the promotion of transit-oriented development in the city, coordinating with the relevant agencies and land-use planning with due consideration of the transit facilities

Points are awarded as follows;

Evidence of local authority taking leading role in the study and implementation of TOD techniques

- At least two interventions by the local authority implemented already and evidence of continued involvement – 1 point

OR

- At least four interventions by the local authority implemented already and evidence of continued involvement – 2 points

Potential Technologies and Strategies

Involvement of the local authorities either in direct participation or by promoting private sector, in residential and office / shopping developments within walking distance of the transit stations. Promotion of private developers may be recognizing TOD as a positive contribution at the approval process for development permits. Strengthening feeder services to and from the transit stations to cover major trip generators and attractors.

Submission Requirements

Evidence of the involvement of local authorities in TOD promotion during the past 5 years

Credit 5.7: Alternative Energy Driven Vehicles

1 Point

Intent

Intent is to reduce pollution by promoting alternatives to vehicles driven using fossil fuel.

Requirement

Points are awarded for;

Provide Electric Vehicle charging Facilities at minimum of two public parking places. Clearly identify and reserve these bays for the sole use by plug-in electric vehicles. Demonstrate that the combined number of private and public electric vehicle charging stations exceed 1 per 10,000 residents

Potential Technologies and Strategies

Encourage the use of vehicles powered by electricity, solar and other renewable energy sources and fuels by providing dedicated service facilities and infrastructure support.

Submission Requirements

- An inventory of facilities in the city for vehicles powered by alternative energy shown in the form of a map and details in tabular form
- Evidence of the involvement of local authorities in promoting the use of vehicles powered by alternative energy during the past 5 years

Considered Sustainable Development Goal in the Transport Facility Criteria

Following Sustainable Development Goals have been taken into consideration under Transportation Facility Criteria.

- UN SDG 9 Industry, Innovation & Infrastructure

Goal 9: Industry, Innovation, and Infrastructure

WATER EFFICIENCY

6.0 WATER EFFICIENCY

Prerequisite 1: Water Quality and Wastewater Management

Required

Intent

Intents are

(i) to provide all citizens with equitable access to clean drinking water that confirms NWS&DB standards;
(ii) Sustainable wastewater management; and
(iii) Applying reverse engineering techniques to the modified hydrological cycle for sustainable water resource management

Requirement

Water supply systems and sewerages serving the city or community must meet the following requirements:

Water and Sanitation Access

Case 1- 100% coverage of all buildings by water supply schemes and sewerages either by centralized or decentralized systems. This case also covers proper sanitary facilities including the disposal systems (e.g. septic tanks) that confirm SLS standards.

Case 2 – Provide a road map for cities which have not achieved 100% coverage of all buildings by water supply schemes and sewerages either by centralized or decentralized systems within five years of certification. This case also covers proper sanitary facilities including the disposal systems that confirm SLS standards.

Drinking Water Quality

Demonstrate compliance with NWS&DB Drinking Water Standards for the previous or the reporting year.

Treated Wastewater Quality

The effluents of centralized or decentralized sewerages must comply with CEA standards, and in case of septic tanks, the SLS standards.

Storm water Quality

Adopt a policy to maintain the sediment load (or the dominant contaminant) of storm water generated from construction and/or industrial sites not be 10% more than the pre disturbance scenario, whilst ensuring it will be equal or less than the pre disturbance scenario within two years. Pre disturbance scenario may be arrived via actual measurements an/or by referring a relevant baseline case.

Monitor the quality of storm water discharged from all types of land uses and ensure compliance with an internationally accepted standard (e.g. USEPA) after two years.

Potential Technologies and Strategies

Water and Sanitation Access

Requirement can be met by ground water extraction if it is permitted by law.

Drinking Water Quality

- Provide the following data for each water supply facility:
  - Frequency of water quality testing of effluent (quarterly, monthly, bi-monthly, etc.)
  - Water quality parameters
- Report on enforcement actions taken in case of non-compliance with NWS&DB water quality standards, under the following categories:
  - Violation of testing frequency
  - Violation in water quality parameter threshold

Treated Wastewater Quality

- Provide the following data for each wastewater treatment facility:
  - Frequency of testing treated wastewater (quarterly, monthly, bi-monthly, etc.)
  - Water quality testing parameters
- Report on enforcement actions taken in case of non-compliance with the CEA standards for effluents, under the following categories:
  - Violation of testing frequency
  - Violation in water quality parameter threshold

All sewerages must follow CEA standards on effluents.

Submission Requirements

- Drinking water quality report(s) from NWS&DB or in case of decentralized systems from a CEA registered laboratory for number of cases as agreed by GBCSL.

Credit 6.1: Water conservation

3 Points

Intent

To have sustainable water management system by reducing water use and demand as a means to conserve water in the city.

Requirement

Have a policy in place to ensure that the water consumption for the most the dominant land use (if it is > 75% of the total land) or the two dominant land uses do not exceed the following baseline criteria (baseline loading rates for other land uses should be taken from standards and internationally accepted sources such as SLS, USEPA); Points are awarded as Table 10;

Table 9: Baseline criteria

Land Use	Baseline
Residential facilities	120 L per day per capita
Day schools	50 L per day per capita
Hotels/Hospitals	200 L per bed
Office	0.48 L/s/day
Cinema	0.25 L/s/day

Table 10: Points allocated for reduction of consumption over baseline criteria

Percentage reduction of consumption over baseline criteria	Points
10%	1
20%	2
25%	3

Potential Technologies and Strategies

- Adopt and implementation of a water conservation policy for the city
- Public awareness about water scarcity and conservation
- Rain water harvesting
- Wastewater reuse and recycle
- Use of water efficient fixtures

Credit 6.2: Innovative Treatment and Transmission of water

2 Points

Intent

To supply water through innovative treatment and transmission using renewable energy.

Requirements

Reduce 25% of non-renewable energy consumption in water transmission by using renewable energy including solar, wind, low impact hydro and biomass or any other innovative strategy for transmission water (1 point).

Reduce 50% of non-renewable energy consumption in water transmission by using renewable energy including solar wind, low impact hydro biomass or any other innovation strategy for transmission water (2 points).

Potential Technologies and Strategies

- Solar (PV or thermal) and/or wind pumping
- Renewable energy driven water treatment
- Use of hybrid energy systems

In addition to the use of alternative onsite sources of water, use high efficiency fixtures. (e.g. water closets and urinals), Dry fixtures, such as toilets attached to composting systems, to reduce the potable water demand.

Submission Requirements

- Report on the energy consumption in water transmission and the contribution from renewable energy

Credit 6.3: Water System Performance

2 Points

Intent

To improve the operational efficiency of the water management systems through use of smart technology.

Requirements

Undertake water audit at least once a year to meet all of the following requirements (1 point)

- Water use inventory (i.e. water use based on the end use or land use), smart metering and water efficiency.
- Measure the amount of municipal water available and total water utilized from both municipal water supply (e.g. water supplied by NWS&DB) and other sources.
- System efficiency and root-cause analysis for water losses through leaks and excessive abstraction losses such as infiltration.
- Identify strategies for improving system efficiency.
- Action plan to reduce water wastage

Evidence for at least 2% water reduction compared to the previous year (1 point)

Credit 6.4: Rainwater Harvesting

3 Points

Intent

Utilize rainwater to recharge/fill existing reservoirs and prioritize rainwater harvesting in a sustainable way to reduce municipal water demand, whilst ensuring ground water recharge.

Requirements

- Develop City Rain Water Harvesting Plan(s) based on the meteorological study of the city (1 Point)
- Encourage City population to use rainwater.
  Points are awarded as Table 11.

Table 11: Points allocated for using rainwater in the city

Percentage of population using rainwater in the city (with 2010 as base year)	Points
≥ 10%	1
≥ 20%	2

Submission Requirements

- Plan of rain water harvesting
- Rainwater harvesting calculations with water usage
- Evidence for groundwater recharge

Credit 6.5: Storm Water Management

2 Points

Intent

To reduce runoff volume, prevent erosion and flooding while facilitating groundwater recharge. Flooding needs to be taken as a situation where precipitation overwhelming the capacity of natural and/or man-made storm water drainage systems, therein fully or partially inundating and damaging environmentally and/or socio-economically important areas.

Requirements

Option 1 - Flooding Incidences (1 point)

Case 1 - No reported flooding incidences in past five years

Provide the following details:

- Design details of storm water infrastructure; must include at least the design storm (rainfall) (intensity and return period).
- Strategies adopted to manage storm water beyond its designed limits considering various factors of safety and/or climate variability
- Strategies adopted to inspect and ensure maintenance of storm water infrastructure.

Case 2 - Flooding incidences were reported in past five years, however comprehensive action is taken to completely mitigate floods within five years

Provide the following details:

- Details on floods (location, duration, water depth, impacts on the environment/socio-economic environment and so forth)
- Initiatives such a formulation of a storm water master plan by the local authority and/or any government agency with details on the role played by the local authority
- Community based initiatives to mitigate flooding such as community participated cleanup of storm water drainages

OR

Option 2 - Green Storm Water Infrastructure (1 point)

Provide details on strategies adopted to inspect and ensure maintenance of existing Green storm water management facilities and techniques to enhance abstraction losses such as

infiltration, evapotranspiration, etc. To be qualified to get this credit evidence needs to be given on low non-renewable consumption of the storm water infrastructure.

Potential Technologies and Strategies

Green infrastructure and low-impact development rainwater management strategies and techniques improve upon that conventional approach by mimicking an area's natural hydrology or the hydrological status quo. These techniques involve minimizing disturbed areas, preserving pre-development runoff conditions, limiting the amount of impervious cover, and infiltrating, storing, evaporating, or detaining rainwater runoff.

- Planting rain gardens with native or adapted plant material (e.g. tree shrubs)
- Green roofs, permeable pavements
- Installing permanent infiltration or collection features that can retain at least the 80th percentile of regional or local rainfall events.

Submission Requirements

- Evidence of Green infrastructure and their effectiveness

Credit 6.6: Wastewater Management

6 Points

Intent

Wastewater auditing, and safe re-use of wastewater or treated wastewater for different end uses, therein by treating wastewater not as a waste but as a resource.

Notes:

- Non-potable applications include but not limited to flushing, irrigation, cooling tower make-up etc.
- If available should follow local and/or international standards and/or need to be certain the humans, flora and fauna are not faced a compromising situation.

Credit 6.6.1: Wastewater Treatment

3 Points

Requirements

- Assessing amount of wastewater generated in the city with a clear separation of different types of wastewaters and the sources (1 point)
- Demonstrate increase in treatment of wastewater generated in the city, with 2015 as the base year. Further, ensure that the treated wastewater conforms to the effluent quality standards specified by CEA.

Table 12: Points allocated for treatment of wastewater generated in the city

Percentage increase in treatment of wastewater generated in the city	Points
≥ 25%	1
≥ 50%	2

Potential Technologies and Strategies

- Auditing methods, methods on selection of representative samples
- Reliability and sensitivity analysis

Submission Requirements

- Details of wastewater auditing with reliability analysis

Credit 6.6.2: Re-use of Treated Wastewater

3 Points

Requirements

Demonstrate increase in reuse of treated wastewater (effluent) generated in the city, with 2015 as base year. Points are awarded as Table 13;

Table 13: Points allocated for reuse of treated wastewater generated in the city

Percentage increase in reuse of treated wastewater generated in the city	Points
≥ 5%	1
≥ 10%	2
≥ 15%	3

Potential Technologies and Strategies

Provide wastewater treatment systems to treat 100% of the wastewater generated from residential or commercial uses that are without hazardous compounds. Also incorporate laws to mandate on site treatment plan to treat 100% of the wastewater contaminated with hazardous compounds therein to eliminate the risk of contamination of public or centralized sewerages. All treatment systems must demonstrate that the wastewater in raw or treated form is used for an end use that is beneficial to the humans and/or environment.

Submission Requirements

- Evidence that all wastewaters are treated
- Evidence on reuse of wastewater

Considered Sustainable Development Goals in the Water Management Criteria

Following Sustainable Development Goals have been taken into consideration under Transportation Facility Criteria.

- UN SDG 6 Clean Water & Sanitation
- UN SDG 9 Industry, Innovation & Infrastructure

Goal 6: Clean Water and Sanitation

Goal 9: Industry, Innovation, and Infrastructure

ENERGY AND ATMOSPHERE

7.0 ENERGY AND ATMOSPHERE

Prerequisite 1: Enhanced Electricity Accessibility and Monitoring

Required

Intent

Intent is to provide safe, secured, reliable, and equitable access to electricity.

Requirements

Power system must meet the following requirements.

Cities with multiple utilities or service providers must aggregate the data from the respective utility to demonstrate compliance.

Case 1 - 100% coverage of households or population by electricity service

Case 2 - For cities which have not achieved 100% coverage of households or population by electricity supply, provide a roadmap for achieving the same within 5 years of certification.

Continuous monitoring and recording of interruptions for the complete distribution network at high, medium and low voltage levels.

Under special circumstances,

Identify city's critical loads or emergency facilities and essential services that require backup power during widespread outages or disasters. Determine minimum daily runtime requirements for all the emergency facilities and essential services. Demonstrate that the city, utility or service provider can supply power to all emergency facilities and essential services for at least duration greater than the minimum daily runtime for one week or longer.

Potential Technologies and Strategies

Assess current electricity plan of the city and if necessary, redesign it with highly complying of renewable energy to have an efficient access of electricity to all residents in the city. Hardening systems makes the major electrical equipment's less susceptible to damage by the severe weather events.

Submission Requirements

- Declaration from municipal official with authority for public works and/or energy infrastructure confirming 100% coverage of buildings with power supply. (Case 1)
- Commitment and narrative of roadmap for achieving 100% coverage within 5 years of certification or at the time of recertification. (Case 2)
- *Reliability performance monitoring:* Three months of recorded interruption information.
- *Power surety and resiliency:* List the cities' or communities' critical loads or emergency facilities and essential services, with their minimum daily runtimes, and the alternative power supply for each, including type, location, capacity, and minimum daily runtime.
- *Reliability, resiliency and power surety:* Narrative describing the design considerations and strategies undertaken to protect the power system from common external threats. For critical loads and emergency facilities, explain the energy storage or backup generators duty cycle, with their energy storage capacity (including fuel) and typical energy consumption.

Credit 7.1: Energy Audit

3 points

Intent

Assessing existing energy base environment and enhance energy efficiency while reducing energy loss.

Requirements

Conduct an energy audit

Required Documentation

- A report on energy audit of high energy users within the city with classification of different energy consumption sources (1 point)
- Strategies taken to reduce consumption of conventional energy use by high energy users (2 points). Points are awarded as Table 14;

Table 14: Points allocated for energy reduction

Percentage of energy reduction comparing to previous year by high energy users	Points
≥10%	2

Credit 7.2: Encourage to Use of Renewable Energy

2 Points

Intent

Encourage the use of renewable energy for built environment.

Requirement

Demonstrate that the city has plans to source at least 5% renewable energy to the total energy requirement of the city. Points are awarded as Table 7.2.

Table 15: Percentage of renewable energy

Percentage of Renewable Energy to Total energy requirement of the city	Points
5%	1
Above 5%	2

Potential technologies and strategies

- Assess the city for potential renewable energies including solar, wind, geothermal, biomass, hydro, and bio-gas strategies. When applying these strategies, take advantage of the net metering with local utility.

Submission Requirements

- Submit a plan identifying sources of renewable energy.
- Schematic plan highlighting location of on-site RE applications at city level.

Credit 7.3: Greenhouse Gas Emissions Management

4 Points

Intent

Intent is to support energy management and move towards a zero energy and emissions city.

Requirements

- Measure the annual Greenhouse Gas (GHG) emissions for the city (2 point).
- Polices adapted to reduce greenhouse gas emission in the city (1 point)
- Strategies successfully adapted to reduce greenhouse gas emission (1 point).

Submission Requirements

- Evidence to prove that there is a reduction in greenhouse gas emission.
- Submit the GHG emission calculation and the method of calculation.
- Evidence of executing strategies to reduce GHG emission.
- Submit a document with the polices that have adapted to reduce GHG emission.
- Supporting documentation for GHG emissions such as GHG inventory.

Considered Sustainable Development Goals in Energy and Atmosphere Criteria

Following Sustainable Development Goals have been taken into consideration under Transportation Facility Criteria.

- UN SDG 7 – Affordable and Clean Energy

Goal 7: Affordable and Clean Energy

SOCIAL, CULTURAL AND ECONOMIC ACHIEVEMETS

8.0 SOCIAL, CULTURAL AND ECONOMIC ACHIEVEMENTS

Prerequisite 1: Demographic Assessment

Required

Intent

Making housing and other infrastructure development to suite the demographic profile (all age categories, gender, disability persons, different ethnic groups, etc.)

Requirements

Provide a comprehensive demographic narrative that includes the following population and housing characteristics:

- Brief history of development, noting critical points of change for the overall area or specific neighborhoods.
- Age cohorts, including the following categories: Under 18 years, 18 years and over and 65 years and over.
- Racial/ethnic composition.
- Other prominent sociocultural groups present, such as migrants, religious groups, and linguistically isolated.
- A housing needs assessment addressing housing supply affordability, diversity of housing stock by unit and ownership type, and community demographics;

Submission Requirements

- Comprehensive demographic narrative describing all of the population and housing characteristics listed in the requirements.
- Overlay maps or interactive layers highlighting all of the demographic indicators listed in the requirement, residential densities within the city or community, highlighting the public accommodations and services.

Credit 8.1: Social Housing Initiatives & Social Initiatives

3 Points

Intent

To encourage city efforts to create new housing stocks or develop existing housing units to up lift the living standards of low-income families/citizens.

Credit 8.1.1: Social Housing Initiatives

2 Points

Intent

Demonstrate City's efforts to uplift the living conditions (access to basic services, access to basic health care and education) of housing such as;

- Development of Low-income areas
- Affordable housing
- Low income (Economically Weaker Section) housing Projects

Requirements

Demonstrate City's Slum Redevelopment and Affordable Housing projects with provision of appropriate infrastructure with respect to *a base line year.* Points are awarded as Table 16;

Table 16: affordable housing schemes development or redevelopment housing schemes

Increment of Affordable Housing Schemes development or redevelopment housing schemes percentage with compared to <*a baseline year*>	Points Allocated
≥ 10 %	1
≥20%	2

Submission Requirements

- Submit calculation of the slum redevelopment dwellings in the city as in year base or Calculate the total number of affordable housing / EWS housing dwellings in the city as in base year.
- Map indicating slump / low income dwellings of city as base year.
- Submit proof on successful redevelopment/relocation projects

Credit 8.1.2: Social Initiatives

1 Point

Intent

Demonstrate City's undertakings/efforts to improve the community engagement, interactions and recreational activities

Requirements

Improvements on community engagement, interactions, and recreational projects by conducting a qualitative social survey.

Submission Requirements

- Submit extractions of policies, regulations and plans indicating the basic utilities provided for the relocated/redeveloped projects
- Map indicating recreational activity places such as open-air theaters, gymnasiums, amusement parks, film halls, parks etc.
- Submit Calculation on city expenditure/resource allocation on community engagement/interaction /recreational projects compared to <*base year*> *3 consecutive years*

- Submit extractions on City's budget indicating provisions for community uplifting /engaging enhancement projects for current year

- List of cities owned/maintained or completed community engagement/interaction enhancing projects

- Demonstrate a year-on-year increment of such projects

Credit 8.2: Quality of Life Performance

6 Points

Intent

Living conditions and quality of life to encourage the improvement of the wellbeing and living standard of the city and its people.

Requirements

Measure all of the Quality of Life parameters below for a minimum period of the most recent calendar year or fiscal year. For all the following parameters the base year will be the previous year of the comparison year

I. Access to Education (1 point)

- Nursery, Primary Secondary and Vocational training opportunities in the city area

II. Economic Empowerment (1 point)

- Access to funds provided by local banks
- Self-empowerment projects
- Per capita income and gini factor of the city

III. Social Empowerment (1 point)

- Percentage of people receiving on government welfare

IV. Employment opportunity (1 point)

- Unemployment rate of the city –10% below the district average level (consider age between 18 to 55 years)

V. Health- 1 point

- Infant mortality- Should be equal or better than Sri Lankan rate
- Life expectancy- Should be equal or better than Sri Lankan rate
- Access to primary health care – all areas of the city should have all the primary healthcare facilities and a hospital within 5 km25 km, respectively.
- Community training and awareness on emergency health care

VI. Safety and crime prevention- 1 point

- Crime reduction
  Number of crimes should be less than the national average

- Fatal Accident reduction
  Number of accidents should be less than the national average

- Counseling facilities in the city

- Enforcement on occupational health and safety of the employees in the city

Submission Requirements

- Data for each of the metric in the prerequisite
- Supporting documentation clearly highlighting the data points in the respective documents
- Supporting documents for respects to each data responding items

Credit 8.3: Affordable Housing

1 Point

Intent

To provide an adequate and diverse supply of location-efficient and affordable housing options for all.

Requirements

Responding a comprehensive housing policy that addresses the following elements

- Neighborhood or housing enclaves within 800 meters of walking distance to public transport facilities
- Programs or code enforcement ensuring healthy housing standards for both rental and owner-occupied units

Promotion of affordable rental housing to encourage social mobility – at least 5% from the total housing stock

Emergency facilities for a disaster situation in coordination with governmental and/or non-governmental service providers.

Credit 8.4: Accessibility of Elderly and Persons with Disability

1 Point

Intent

To promote social inclusion and ensure the safety and accessibility of elderly and differently abled people.

Requirements

Provide barrier free accessibility for elderly and differently abled persons at least for three of the following public areas.

- Pedestrian Pathways
- Road Crossings
- Public spaces
- Public Toilets
- Parks and Recreational areas

Potential Technologies and Strategies

Any public building, public place or places where public come to seek good or services shall be designed in accordance with the design requirements specified in Disabled Persons (Accessibility) Regulations, no 01 of 2006 published in the Government Gazette.

Submission Requirements

- Submit a document highlighting strategy for provision of Barrier-free accessibility in selected public spaces as mentioned under requirement section.
- Submit a perception survey data

Credit 8.5: Implementing Circular Economic Practices

2 Point

Intent

To promote business models with circular processes respecting and optimizing the local raw materials and local skills as much as possible.

Requirements

- Recognize circular processes where efforts are made to design out waste and pollution, keep products and materials continually in use and regenerate natural systems are adopted
- Introduce new approaches and research to invent systems that are circular in nature and promote and facilitate such business processes in the city area.
- Designing out waste and pollution ensuring cleaner production processes and continual use and regeneration of materials for the production.
- Recognizes business models promoting cycles rather than linear processes.

Submission Requirements

Submit evidences that the initiative was made consciously and the resultant economic benefits have been established.

Credit 8.6: Recognize Cooperate Social Responsibility (CSR) with sustainability focus

1 Point

Intent

To cultivate corporate investment strategies to recognize local resources and facilitate skills training and product development based on the availability of local resource base, considering such inputs as part of corporate social responsibility.

Requirements

- Social responsibility action undertaken as a moral obligation and built into the system will be considered. This will mean that any CSR activity promoted for marketing or building self-reputation will not be considered.
- Recognizes consequence of CSR activities on environmental sustainability any intervention contributing to improving environmental quality through emission control cultivating environmentally friendly customs and traditions and protecting natural habitat.

Credit 8.7: Promotion of Sustainable Local Products & Services and Sustainable Consumption Habits

2 Points

Intent

To promote local product and services and enhance the required skills through training and education and increasing awareness of the community to appreciate the value of using local products and services to sustain the local economy.

Credit 8.7.1: Promote supply chain with sustainable local products & services and promote sustainable consumption

1 Point

Requirements

- Facilitate manufacturing of products and services using local raw materials and local skills.
- Conduct programs to promote local products and services and efforts to increase awareness of the benefits of using sustainable products and services.
- Promote sustainable consumption habits while ensuring food security within city area

Credit 8.7.2: Undertaking training /education & research on sustainable product & services

1 Point

Requirements

- Provide training/ education and promoting research on developing sustainable products and services
- Promote mechanisms to recognize green product and services with established standards and practices (E.g. Green labeling)

Considered Sustainable Development Goals in Economic, Social and Cultural Achievements Criteria

Following Sustainable Development Goals should be taken into consideration under Economic, Social and Cultural Achievements Criteria.

- UN SDG 1 – No Poverty
- UN SDG 2 - Zero hunger
- UN SDG 3 - Good Health & Well-Being
- UN SDG 4 - Quality Education
- UN SDG 5 - Gender Equality
- UN SDG 8 - Decent Work and Economic Growth
- UN SDG 12 - Responsible Consumption and Production
- UN SDG 16 - Peace, Justice and Strong Institutions

Goal 1: No Poverty

Goal 2: Zero Hunger

Goal 3: Good Health and Well-Being

Goal 4: Quality Education

Goal 5: Gender Equality

Goal 8: Decent Work and Economic Growth

Goal 12: Responsible Consumption and Production

Goal 16: Peace, Justice and Strong Institutions

INNOVATION

9.0 INNOVATION

Credit 9.1: Innovation

2 Points

Intent

Intent is to encourage Cities to achieve exceptional or innovative performances.

Requirements

One point is awarded for each Innovation credit achieved, up to a maximum of two. A City or community may use any combination of the options below.

Option 1 - Achieve significant, measurable environmental performance using a strategy not addressed in the GREEN$^{SL®}$ rating system.

Identify all of the following:

- Intent of the proposed innovation credit
- Proposed requirements for compliance
- Proposed submittals to demonstrate compliance
- Design approach or strategies used to meet the requirements. AND / OR

Option 2 - Achieve exemplary performance in any of the GREEN$^{SL®}$ Sustainable Cities prerequisite or credit. An exemplary performance point is typically earned for achieving double the credit requirements or the next incremental percentage threshold.

Potential Technologies and Strategies

Potential technologies benchmarking with existing innovative technologies and practices for achieving sustainability.

Submission Requirements

- Documentation to support the design approach or strategies used to achieve innovation.
- Identify the GREEN$^{SL®}$ for Sustainable Cities prerequisite or credit for exemplary performance

Considered Sustainable Development Goals in Innovation Performance Criteria

Following Sustainable Development Goals have been taken into consideration under Social and Cultural Consciousness Criteria.

- UN SDG 9 – Industry, Innovation & Infrastructure
- UN SDG 11 – Sustainable Cities and Communities

Goal 9: Industry, Innovation, and Infrastructure

Goal 11: Sustainable Cities and Communities

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