



सत्यमेव जयते

GREEN

RATING MANUAL 2021





Central Public Works Department

Green Rating Manual

2021



Directorate
CPWD, Nirman Bhawan, New Delhi
January, 2021



Developed in 2019 by CPWD team of:

- 1. Dr K M Soni, Additional Director General (TD)**
- 2. Mrs Usha Batra, Special Director General (WR)**
- 3. Er D K Garg, Chief Engineer, CDO**
- 4. Er C K Varma, Chief Engineer(E), CSQ**
- 5. Er Harish Kumar, Deputy Director General (W)**
- 6. Dr B N Shrivastava, Deputy Director General(H)**
- 7. Ar Yogendra Pal Singh Yadav, Deputy Architect**
- 8. Ar Deepali Mishra, Deputy Architect**



Vinit Kumar Jayaswal
Director General



सत्यमेव जयते

भारत सरकार
Government of India



केन्द्रीय लोक निर्माण विभाग
निर्माण भवन, नई दिल्ली-110011

Central Public Works Department
Nirman Bhawan, New Delhi-110011
Tel : 23062556/1317, Fax : 23061884
E-mail : cpwd_dgw@nic.in

From the Desk of Director General

Central Public Works Department was established on 12th July, 1854, and its history is entwined with the history of modern India. We have a formidable work force of about 7,000 professionals from civil engineering, electrical engineering, architectural and horticultural streams engaged in building the country. Our built environment includes residential, non-residential, educational and institutional buildings, roads, flyovers, bridges, sports stadia, border road, fencing and lighting.

We undertake works from concept to completion, including maintenance of buildings and services, even in difficult terrains and remote areas of the country. We also execute works in other countries including Nepal, Myanmar, Afghanistan and Sudan.

We have been carrying out works always with emphasis on quality, energy efficiency, water conservation and safety. Being technical adviser to the Government of India, we have also been bringing out important documents like CPWD Specifications, Schedule of Rates and Plinth Area Rates which are used extensively not only by our professionals but also by engineers, architects and horticulture officers from various public and private organisations.

Sustainability, functional efficiency and life safety are the most important aspects of building planning and designing. Since we are building a large number of structures every year, a need was felt to publish a Green Rating Manual encompassing all the sustainable design features practiced by us, and the first edition was brought out in the year 2019. A need was felt to revise this Manual in view of the experience gained over the past more than one year. Accordingly, 2021 edition is being published now.

I convey my appreciation to the Contracts, Specifications and Quality Assurance team members who have worked hard to publish this Manual.

Dated: 01.01.2021


(V K Jayaswal)
Director General
01.01.2021



Preface to 2019 edition

CPWD, having the in-house expertise in Architectural planning, Civil Engineering, Electrical and Mechanical Engineering and Horticulture has been conceptualizing, constructing and maintaining buildings from smallest size like residential unit to large buildings like institutional buildings, universities and offices.

Keeping in view the initiatives of Government of India for sustainable development, speedy and timely construction, quality and safety, and public welfare measures, CPWD has decided to develop its own green rating manual giving due weightage to sustainability, new technologies, quality and safety, and welfare measures as they affect sustainability.

The manual has been prepared considering green building and sustainability approach and CPWD being a premier construction agency and technical advisor to government of India is committed to enhance quality of life of people by planning and constructing green and sustainable buildings.

I hope that the manual will prove to be very useful and CPWD will be able to rate its buildings to ensure that they perform the function as well as fulfil the aimed purpose of sustainability at national level.

(Usha Batra)

SDG(WR), Mumbai



Prologue to 2019 edition

Sustainable development is the necessity for the very existence of human beings. Buildings consume large resources, both during construction and their operational period. Therefore, sustainable approach must be considered while planning, constructing and maintaining the buildings.

Green building concept is not new now. The concept generally includes energy efficiency, water efficiency and comfort level for the occupants. This is defined through efficient architectural design, sustainable building materials, energy efficient equipment, indoor air quality, water conservation and prevention of wastage. Such concept includes quality and safety of the structure, green construction processes, timely completion of projects, and welfare measures for common people though important for durability of structures, preventing air pollution, conserving natural resources and for wellbeing of citizens related to sustainable development. Therefore, this manual has been prepared based on green building concept considering sustainable criterion. As the government is committed for improving quality of citizens, policies related to their welfare are also included in the rating system.

Rating is proposed under nine broad criteria such as Architectural Planning and Design, Quality and Safety, Sustainable Building Materials, Green Construction Measures, Water Conservation Measures, Energy Efficiency and Conservation, Waste Management, Welfare Measures, and Landscape and Horticulture. Rating shall be done considering maximum 100 marks. The buildings/projects are to be rated as Green, Green plus and Super Green based on the score obtained by them.

Rating criteria include steps to be taken during pre-construction stage, execution and post construction stage by the architects and engineers involved in various stages hence the evaluation shall be required from the concept stage to completion stage of the buildings.

The Engineer in Charge will be required to register online for the rating. Necessary documentation will also be done by the site engineers either online or physical form. A team of officers drawn from Architects, E&M engineers and Civil engineers will be visiting the site as per the requirements or the instructions issued by the Directorate from time to time. The rating will be awarded once the building is complete, occupied and operational. It is assumed that once the building is planned and executed as green and sustainable, it will remain so during its life cycle to the extent planned. Hence, final rating shall be awarded within 3 months of the occupancy.



In few criteria, a clear-cut approach has been given which is just mathematical or pre-determined but all criteria cannot be defined in such a way and also it is not desirable like innovation criterion. Innovation has to be defined by the architects and engineers responsible for planning and executing the work and the team will then assess it, rate it and award the marks.

Marks will be given in whole numbers and not in decimals. Approval from local bodies like Municipal corporations, fire and environment or as applicable is the prerequisite for award of green rating.

Your suggestions for its improvement will always be welcomed and highly appreciated.

(Dr K M Soni)

ADG(TD)



Index

S No.	Description	Page Number
1.	Basic Philosophy	1
2.	Procedure and Ratings	2 - 5
3.	Criterion 1: Architectural Planning and Design	6 - 7
4.	Criterion 2: Quality and Safety	8 - 9
5.	Criterion 3: Sustainable Building Materials	10 - 11
6.	Criterion 4: Green Construction Measures	12 - 13
7.	Criterion 5: Water Conservation Measures	14
8.	Criterion 6: Energy Efficiency Measures	15 - 16
9.	Criterion 7: Waste Management	17
10.	Criterion 8: Welfare Measures	18
11.	Criterion 9: Landscape and Horticulture	19
12.	Certificate and Plaque Samples	20



1. Basic Philosophy

- Green building concept involves welfare of people. Welfare measures are important for all stakeholders including workers, site staff, users and public.
- Energy efficient architectural design, equipment, conservation of energy, and energy generation from renewable sources, all lead to green building concept.
- Quality and safety lead to durable structures which in turn lead to green buildings. Unsafe structures lead to non-durable structures, hence structural safety is of paramount importance for green building concept.
- Time overrun generally leads to cost overrun and low productivity, and thus adversely affects green building concept. It also leads to more pollution.
- Early completion of work leads to savings of resources, reduction of pollution and early use of assets, thus resulting in conservation of resources.
- Lack of planning and non-availability of drawings in time lead to delay in completion of work, which is against green building concept.
- Integration of services and their easy maintenance during the life cycle of buildings without generation of waste lead to green building concept.
- Building materials consume large amount of energy in manufacturing and transportation. Hence judicious selection of low embodied energy materials is important for green building concept.
- Construction of energy net plus buildings needs to be encouraged as they contribute to generation of energy for use in other buildings also.
- Use of products from waste resources and non-toxic/non-hazardous products contribute significantly to green building concept.
- Air, water and noise pollution adversely affects green building concept.
- Conservation of water, use of water efficient fittings and recycling of waste water contribute to green building concept.
- New and emerging technologies lead to speedy construction, which in turn leads to early completion of work. This contributes to green building concept.



2. Procedure And Ratings

2.1 Registration and Registration Fee

All CPWD projects costing more than Rs.50 crore shall be registered online with Green Rating Processing and Management System through the link available on CPWD website. For deposit works, the registration may be done after obtaining written consent of the client. The registration shall be done by the Executive Engineer Civil or Electrical concerned, as applicable.

No fee shall be levied for processing of application, assessing and awarding the rating for buildings constructed by CPWD.

A registration fee of Rs.10,000 (Rs.Ten Thousand only) shall be charged for buildings not constructed by CPWD. In addition, actual expenditure incurred on travelling and lodging charges for site visit by the assessing officers shall be payable by the building owner.

2.2 Green Rating Cell

A Green Rating Cell will be established in every Region and Project Region of CPWD except in Delhi NCR. CPWD Training Academy shall assess the rating of buildings in Delhi NCR. The Green Rating Cell shall consist of officers drawn from architecture, civil, electrical and horticulture streams, as detailed below.

For Works of Delhi NCR

- (i) One CE(C)/SE(C) of CPWD Training Academy, Ghaziabad.
- (ii) One CE(E)/SE(E) of CPWD Training Academy, Ghaziabad.
- (iii) One CA/SA of CPWD Training Academy, Ghaziabad.
- (iv) One Director(H)/DD(H) of CPWD Training Academy, Ghaziabad

For Project Regions and Regions

- (i) One CE(C)/SE(C)/EE(C)
- (ii) One CE(E)/SE(E)/EE(E)
- (iii) One CA/SA/Arch
- (iv) One DD(H)/AD(H)



Note: The members of the Green Rating Cell shall be nominated by ADG (Training & Research), CPWD Training Academy, Ghaziabad; or the head of the Project Region or Region as applicable.

2.3 Ratings

The building shall be rated based on the total marks obtained in the criteria given in clause 2.4. Minimum 50% marks are required in each criterion to be eligible for green rating. The rating once awarded shall be valid for a period of five years. The buildings shall be classified as Super Green, Green Plus, and Green, depending on the total marks scored, as given in Table 1.

Table 1: Ratings

Certification	Qualifying marks
Super Green	86-100
Green Plus	71-85
Green	55-70

2.4 Criteria and marking system

The criteria and maximum marks for rating of buildings are given in Table 2.

Table 2: Criteria and Marking System for Rating of Buildings

Criterion	Criterion subhead	Criterion name	Maximum marks
1. Architectural Planning and Design Total Marks: 16	1.1	Solar passive architectural design strategy	4
	1.2	Accessibility in built environment	2
	1.3	Availability of integrated architectural drawings	5
	1.4	Layout/site planning	3
	1.5	New and innovative design approach	2



2. Quality and Safety Total Marks: 12	2.1	Availability of quality assurance plan	4
	2.2	Availability of safety plan	4
	2.3	Availability of structural drawings	4
3. Sustainable Building Materials Total Marks: 16	3.1	Use of fly ash bricks/AAC blocks/recycled C&D waste products	2
	3.2	Use of alternatives to natural timber	2
	3.3	Use of fly ash in cement or cement concrete	2
	3.4	Use of local materials	2
	3.5	Use of recycled materials	3
	3.6	Adherence to Make in India Policy	2
	3.7	Use of non-toxic and non-hazardous materials	3
4. Green Construction Measures Total Marks: 14	4.1	Use of air pollution and noise control measures	2
	4.2	Use of trenches for integrated services	2
	4.3	Use of new technologies for green construction	3
	4.4	Use of equipment to avoid generation of C&D waste	3
	4.5	Use of new technologies for speedy construction	4
5. Water Conservation Measures Total Marks: 7	5.1	Recycling of water	3
	5.2	Rain water harvesting	2



	5.3	Use of water efficient fixtures	2
6. Energy efficiency Measures Total Marks: 22	6.1	Energy efficient building envelope	4
	6.2	Energy efficient lighting, fans, ACs, and controls	4
	6.3	Energy efficient pumps, lifts & other equipment	2
	6.4	Integration of controls with IBMS and sensors for light fixtures	3
	6.5	Generation of renewable energy	8
	6.6	Innovation in energy efficiency	1
7. Waste Management Total Marks: 4	7.1	Waste management policy	1
	7.2	Sewage treatment plant or Organic waste converter	2
	7.3	Waste segregation facilities	1
8. Welfare Measures Total Marks: 4	8.1	Toilet and health check-up facilities during construction	2
	8.2	Welfare measures for workers during construction	2
9. Landscape and horticulture Total Marks: 5	9.1	Trees protection and transplantation	3
	9.2	Irrigation features	1
	9.3	Reuse of excavated soil	1

In case any specific criterion is not applicable, the same will not be considered and the marks will be proportioned by excluding the marks of such criteria/criterion from 100 marks. For example, if after excluding a particular criterion, marks obtained are 65 out of maximum marks 95, the same will be proportioned as $65 \times 100 / 95 = 68.42$ rounded off to next full number that is 69.



3. Criterion 1: Architectural Planning and Design

Synopsis: Architectural planning and design strategy should be based on sustainability, energy efficiency, functional efficiency, aesthetics and innovation. The essential elements of such strategy are solar passive architecture, optimising functional efficiency of the building, minimising hard areas in landscape, preserving sustainable site features, designing as per existing topography and micro climate, providing adequate shafts for better and effective maintenance, and provisions for accessibility norms, integrated services, and innovation.

Total Marks: 16

Compliance Procedure and Award of Marks

Criterion 1.1: Solar passive architectural design strategy, Maximum Marks: 4

1.1.1 Orientation of building, Maximum Mark: 1

The design should adopt the most favourable orientation in North-South for hot and dry or humid climate to minimise heat gain from the building envelope. Where it is not possible to achieve this orientation, shading devices should be used to minimise heat gain 1 Mark

1.1.2 Window to wall ratio, Maximum Mark: 1

For all climatic zones, the window to wall ratio should be in the range of 20% to 40% for all climatic zones 1 Mark

1.1.3 Zoning and massing as per solar path analysis and prevailing wind direction, Maximum Mark: 1

Zoning as per solar path analysis and prevailing wind direction 1 Mark

**1.1.4 Any other climate responsive passive architecture design
Maximum Mark: 1**

Any other climate responsive passive architecture design 1 Mark

Criterion 1.2: Accessibility in Built Environment, Maximum Marks: 2

- (a) If all the 16 norms of barrier free built environment have been followed (1. Main Entrance 2. Ramps 3. Doors 4. Corridors 5. Lifts 6. Stairs 7. Handrails 8. Toilets 9. Drinking Water 10. Signage 11. Emergency Exit



12. Public Telephone 13. Resting Facilities 14. Parking 15. Reception and Information Counters 16. Canteen) 2 Marks
- (b) More than 60% (physical) norms followed 1 Mark
- (c) Less than 60% (physical) norms followed Nil

Criterion 1.3: Availability of integrated civil, mechanical, electrical and plumbing services, and landscape drawings

Maximum Marks: 5

- (a) All BIM drawings made available within the following period from the date of start of work stipulated in the agreement
EPC contracts: within 6 months
Non-EPC contracts: within 3 months 5 Marks
- (b) All BIM drawings available within 3 months beyond (a) above 2 Marks
- (c) Building drawings delayed beyond (b) above 1 Mark

Criterion 1.4: Layout/site planning, Maximum Marks: 3

1.4.1 Minimization of roads and hard area (Green area is minimum 60% of plot area minus building footprint area), Maximum Mark:1

- Minimization of roads and hard area (Green area is minimum 60% of plot area minus building footprint area) 1 Mark

1.4.2 Segregation of pedestrian and vehicular traffic, Maximum Mark:1

- Segregation of pedestrian and vehicular traffic 1 Mark

1.4.3 Minimum disturbance to land/site topography, Maximum Mark: 1

- Minimum disturbance to land/site topography 1 Mark

Criterion 1.5: Innovation, Maximum Marks: 2

- New and innovative architectural planning and design approach shall be awarded 2 Marks



4. Criterion 2: Quality and Safety

Synopsis: Quality and safety are supplementary to each other in construction works and part of sustainability. Quality and safety plans should be prepared before commencement of work so that execution is carried out with quality and safety.

Total Marks: 12

Compliance Procedure and Award of Marks

Criterion 2.1: Availability and implementation of quality assurance plan

Maximum Marks: 4

2.1.1 Availability of quality assurance (QA) plan, Maximum Marks: 2

- | | | |
|-----|---|---------|
| (a) | QA plan made available within the following period from the date of start of work stipulated in the agreement.
EPC contracts: within 3 months
Non-EPC contracts: within 1 month | 2 Marks |
| (b) | QA plan made available within 1 month beyond (a) above | 1 Mark |
| (c) | QA plan delayed further or not prepared | Nil |

2.1.2 Implementation of quality assurance plan, Maximum Marks: 2

- | | | |
|-----|---|---------|
| (a) | Full implementation of quality assurance plan | 2 Marks |
| (b) | Part or no implementation of quality assurance plan | Nil |

Criterion 2.2: Availability and implementation of safety plan

Maximum Marks: 4

2.2.1 Availability of safety plan, Maximum Marks: 2

- | | | |
|-----|--|---------|
| (a) | Safety plan made available within the following period from the date of start of work stipulated in the agreement
EPC contracts: within 3 months
Non-EPC contracts: within 1 month | 2 Marks |
| (b) | Safety plan made available within 1 month beyond (a) above | 1 Mark |
| (c) | Safety plan delayed further or not prepared | Nil |



2.2.2 Implementation of safety plan, Maximum Marks: 2

- | | | |
|-----|---|---------|
| (a) | Implementation of safety plan as per policy of the Department | 2 Marks |
| (b) | Part or no implementation of safety plan | Nil |

Criterion 2.3: Availability of structural drawings, Maximum Marks: 4

- | | | |
|-----|--|---------|
| (a) | All structural drawings made available within the following period from the date of start of work stipulated in the agreement
EPC contracts: within 3 months
Non-EPC contracts: within 1 month | 4 Marks |
| (b) | Partly available but without hindrance leading to delay | 2 Marks |
| (c) | Partly available with hindrance leading to delay in completion | Nil |



5. Criterion 3: Sustainable Building Materials

Synopsis: Waste has to be converted into resource and used as building material ensuring quality and sustainability. Therefore, use of materials manufactured from waste is considered in this criterion. Apart from this, use of local materials provides employment opportunity to locals and also contributes to green concept due to reduced transportation. Therefore, use of local materials, “Make in India” products and non-toxic and non-hazardous materials is also included in this criterion.

Total Marks: 16

Compliance Procedure and Award of Marks

Criterion 3.1: Use of fly ash/C&D waste products, Maximum Marks: 2

- | | | |
|-----|--|---------|
| (a) | Use of fly ash bricks/AAC blocks/recycled C&D waste products | 2 Marks |
| (b) | No such re-cycled waste products used in the work | Nil |

Criterion 3.2: Use of alternatives to natural timber, Maximum Marks: 2

- | | | |
|-----|-------------------------------|---------|
| (a) | No use of natural timber | 2 Marks |
| (b) | Partial use of natural timber | 1 Mark |
| (c) | Only natural timber used | Nil |

Note: The alternative of plant origin shall be Forest Stewardship Council Certified.

Criterion 3.3: Use of fly ash in cement or cement concrete

Maximum Marks: 2

- | | | |
|-----|---|---------|
| (a) | Use of fly ash blended cement in 100% cement works | 2 Marks |
| (b) | Use of fly ash blended cement in 50% to 100% cement works | 1 Mark |
| (c) | Use of fly ash blended cement in less than 50% cement works | Nil |

Criterion 3.4: Use of local materials, Maximum Marks: 2

- | | | |
|-----|---|---------|
| (a) | Use of local material/items (available within 100 km) to the extent of minimum 5% or more of the cost of construction | 2 Marks |
| (b) | Use of local material/items (available within 100 km) to the extent of Minimum 2% to 5% of the cost of construction | 1 Mark |



- (c) Use of local material/items (available within 100 km) less than 2% of the cost of construction Nil

Criterion 3.5: Use of recycled materials, Maximum Marks: 3

3.5.1 Use of recycled aggregate, Maximum Mark: 1

- (a) Use of recycled sand, aggregates or manufactured sand: Minimum 25% of the total quantity used 1 Mark
- (b) Use of recycled sand, aggregates or manufactured sand: Less than 25% of the total quantity used Nil

**3.5.2 Use of recycled materials in flooring and false ceiling
Maximum Mark: 1**

- Use of recycled materials in flooring and false ceiling 1 Mark

3.5.3 Use of recycled materials in landscape/art works, Maximum Mark: 1

- Use of recycled materials in landscape/art works 1 Mark

Criterion 3.6: Adherence to Make in India policy for civil, E&M and all other products, Maximum Marks: 2

- (a) Full adherence to Make in India policy 2 Marks
- (b) Adherence to Make in India policy only for civil works 1 Mark
- (c) Non-adherence of Make in India policy Nil

**Criterion 3.7: Use of non-toxic & non-hazardous materials
Maximum Marks: 3**

3.7.1 Use of non-toxic paint, Maximum Marks: 2

- (a) Use of low VOC primer and paint (having VOC less than 50 gram/litre) in all applications 2 Marks
- (b) Use of primer and paint having VOC 50 grams/litre or more Nil

3.7.2 Adherence to waste management rules, Maximum Mark: 1

- (a) Following hazardous waste management rules 1 Mark
- (b) Not following (a) above Nil



6. Criterion 4: Green Construction Measures

Synopsis: Building construction involves adoption of a large number of environment friendly methods, equipment and technologies to avoid pollution and wastage.

Total Marks: 14

Compliance Procedure and Award of Marks

Criterion 4.1: Air pollution and noise control measures, Maximum Marks: 2

4.1.1 Pollution control measures, Maximum Mark: 1

- | | | |
|-----|---|--------|
| (a) | Use of air pollution control measures like washing tyres of transportation vehicles, sprinkling of water etc. to reduce air pollution | 1 Mark |
| (b) | Not abiding by condition (a) above | Nil |

4.1.2 Barricading of site, Maximum Mark: 1

- | | | |
|-----|--|--------|
| (a) | Use of barricading of minimum 3 m height or as per the norms of the local body | 1 Mark |
| (b) | Not abiding by condition (a) above | Nil |

Criterion 4.2: Trenches for integrated services, Maximum Marks: 2

- | | | |
|-----|--|---------|
| (a) | Construction of trenches for integrated utility services like fire, water supply, air conditioning, telephones, electric cabling etc | 2 Marks |
| (b) | Construction of trenches for part utility services. | 1 Mark |
| (c) | No construction of trenches for services | Nil |

Criterion 4.3: New technologies for green construction, Maximum Marks: 3

- | | | |
|-----|--|---------|
| (a) | Adoption of green construction technologies for buildings, roads, or other works, laying utility services with trenchless technology | 3 Marks |
| (b) | If adopted partly | 1 Mark |
| (c) | If not adopted | Nil |

Criterion 4.4: Use of equipment/techniques to avoid generation of C&D waste, Maximum Marks: 3



4.4.1 Use of small equipment to avoid breakage of walls for laying water supply lines, Maximum Mark: 1

Use of small equipment to make chases and avoid breakage of walls to lay water supply lines 1 Mark

4.4.2 Use of small equipment to make chases and avoid breakage of walls to lay electrical conduits, Maximum Mark: 1

Use of small equipment to make chases and avoid breakage of walls to lay electrical conduits 1 Mark

4.4.3 Use of small equipment to drill holes and avoid breakage of walls for other services, Maximum Mark: 1

Use of small equipment to drill holes and avoid breakage of walls for other services 1 Mark

Criterion 4.5: New technologies for speedy construction, Maximum Marks: 4

- (a) Completion of work as per scheduled period mentioned in the Preliminary Estimate 2 Marks
- (b) Completion of work before 1/16th of scheduled period 3 Marks
- (c) Completion of work before 1/8th of scheduled period 4 Marks



7. Criterion 5: Water Conservation Measures

Synopsis: Use of water efficient fixtures, rain water harvesting, recycling of waste water and conservation of treated water need to be adopted in building construction and operation during its life cycle.

Total Marks: 7

Compliance Procedure and Award of Marks

Criterion 5.1: Recycling of water, Maximum Marks: 3

- | | |
|---|---------|
| (a) Recycling to the extent of 80% water | 3 Marks |
| (b) Recycling to the extent of 50-80% water | 2 Marks |
| (c) Recycling to the extent of 20-50% water | 1 Mark |
| (d) Recycling to less than 20% | Nil |

Criterion 5.2: Rain water harvesting either by storage or ground water recharge or both, Maximum Marks: 2

- | | |
|---|---------|
| (a) 100% rain water harvested | 2 Marks |
| (b) 20% to 50% of rain water harvested | 1 Mark |
| (c) Less than 20% of rain water harvested | Nil |

Criterion 5.3: Use of water efficient fixtures, Maximum Marks: 2

5.3.1 Use of low flow water supply fixtures, Maximum Mark: 1

- | | |
|---------------------------------------|--------|
| Use of low flow water supply fixtures | 1 Mark |
|---------------------------------------|--------|

5.3.2 Use of low flow/waterless flushing fixtures/urinals, Maximum Mark: 1

- | | |
|---|--------|
| Use of low flow/waterless flushing fixtures/urinals | 1 Mark |
|---|--------|



8. Criterion 6: Energy Efficiency Measures

Synopsis: Buildings require energy both during construction and operation. Energy requirements of the buildings depend on comfort level and indoor air quality. Hence, conservation of energy through energy efficient fittings and equipment, and on-site generation of energy through renewable sources are very essential for reduction of carbon emissions.

Total Marks: 22

Compliance Procedure and Award of Marks

Criterion 6.1: Energy efficient building envelope, Maximum Marks: 4

- | | | |
|-----|----------------------|---------|
| (a) | Super ECBC compliant | 4 Marks |
| (b) | ECBC + compliant | 3 Marks |
| (c) | ECBC compliant | 2 Marks |

Criterion 6.2: Energy efficient lighting, fans and air conditioners

Maximum Marks: 4

6.2.1 LED lights and ceiling fans, Maximum Marks: 2

- | | | |
|-----|--|---------|
| (a) | Use of 100% LED lights and BEE 5 star rated ceiling fans | 2 Marks |
| (b) | Use of >75% LED lights and BEE 5 star rated ceiling fans | 1 Mark |
| (c) | Use of <75% LED lights and BEE 5 star rated ceiling fans | Nil |

6.2.2 Air conditioning system (window/split Acs), Maximum Marks: 2

- | | | |
|-----|---|---------|
| (a) | Use of 100% BEE 5 star rated window/split Acs | 2 Marks |
| (b) | Use of >75% BEE 5 star rated window/split Acs | 1 Mark |
| (c) | Use of <75% BEE 5 star rated window/split ACs | Nil |

6.2.3 Air conditioning system (Central AC/VRV system) (In lieu of 6.2.2)

Maximum Marks: 2

- | | | |
|-----|---|---------|
| (a) | Coefficient of performance and integrated part load value/ integrated energy efficiency ratio as per latest ECBC building norms | 2 Marks |
|-----|---|---------|



- (b) Coefficient of performance and integrated part load value/ integrated energy efficiency ratio below latest ECBC building norms Nil

(Refer to Table 5.1, 5.2, 5.2.2.2, 5.2.2.3, 5.3, 5.4, 5.5, 5.6 on page 42, 43 of Energy Conservation Building Code, 2017 for ECBC building norms).

Criterion 6.3: Energy efficient pumps, lifts and other equipment

Maximum Marks: 2

- (a) Providing all pump sets and DG sets with BEE 5 star rating 1 Mark
- (b) Providing lifts with VFDs in motors, gearless system 1 Mark
- (c) Providing lifts with regenerative braking [in lieu of (b) above] 1 Mark

Criterion 6.4: Integration of controls with IBMS and sensors for lighting fixtures, Maximum Marks: 3

6.4.1 Integrated building management system, Maximum Marks: 2

Providing Integrated building management system (IBMS) 2 Marks

6.4.2 Sensors for light fixtures, Maximum Mark: 1

Providing sensors for lighting fixtures 1 Mark

Criterion 6.5: Generation of solar power or renewable energy

Maximum Marks: 8

- (a) On-site generation of 100% of power requirement of the building (net zero or net plus building) 8 Marks
- (b) On-site generation of 10% of power requirement of the building 2 Marks
- (c) For other conditions Marks will be given on pro-rata basis between 2 to 8

Note: In case of net plus building to the extent of 20% or more, additional 4 marks to be awarded, i.e. 12 marks against 8.

Criterion 6.6: Innovation in energy efficiency, Maximum Mark: 1

The assessment of innovation measures in energy efficiency will be made by the team making the assessment.



9. Criterion 7: Waste Management

Synopsis: Waste has to be managed during construction, and after occupancy of the building for hygiene, human comfort, welfare, energy efficiency and sustainability.

Total Marks: 4

Compliance Procedure and Award of Marks

Criterion 7.1: Waste management policy, Maximum Mark: 1

- | | | |
|-----|--|--------|
| (a) | Availability of waste management plan conforming to solid waste Management rules/policy within 3 months of award of work | 1 Mark |
| (b) | If delayed or not available | Nil |

Criterion 7.2: Sewage treatment plant/organic waste converter Maximum Marks: 2

- | | | |
|-----|--|---------|
| (a) | Providing sewage treatment plant and organic waste converter | 2 Marks |
| (b) | Providing sewage treatment plant or organic waste converter | 1 Mark |
| (c) | None of the above | Nil |

Criterion 7.3: Waste segregation, Maximum Mark: 1

- | | | |
|-----|---|--------|
| (a) | Providing segregation facilities for C&D, wet and dry waste | 1 Mark |
| (b) | If not provided | Nil |



10. Criterion 8: Welfare Measures

Synopsis: The objective of green building and sustainability is to mitigate the adverse impact of construction activities on the environment to improve the quality of life of present and future generations. Therefore, welfare measures of workers, engineers and others at construction site are part of green building concept.

Total Marks: 4

Compliance Procedure and Award of Marks

Criterion 8.1: Toilet facility for workers and staff as per norms during construction along with signages, Maximum Marks: 2

8.1.1 Toilets for workers and staff with signage, Maximum Mark: 1

Toilets for workers and staff 1 Mark

8.1.2 Separate toilets for ladies with signage, Maximum Mark: 1

Separate toilets for ladies 1 Mark

Criterion 8.2: Welfare Measures during construction, Maximum Marks: 2

8.2.1 Welfare measures for workers, staff and their children

Maximum Mark: 1

Welfare measures for workers, staff and their children like health check-up, shelter, canteen, crèches etc. with proper signage 1 Mark

8.2.2 Office and other areas for site staff, Maximum Mark: 1

Providing office, conference room and display arrangements for architects, engineers and other staff with signage 1 Mark



11. Criterion 9: Landscape and Horticulture

Synopsis: Landscaping and horticulture bring down the surrounding temperature leading to reduction in energy demand during summer, reduce air pollution, improve indoor air quality, help recharge ground water and protect environment.

Total Marks: 5

Compliance Procedure and Award of Marks

Criterion 9.1: Trees protection and transplantation, Maximum Marks: 3

- | | | |
|-----|--|---------|
| (a) | Laying out buildings to avoid cutting of trees | 3 Marks |
| (b) | Laying out buildings with 80-100% transplantation of trees | 2 Marks |
| (c) | Laying out buildings with 60% transplantation of trees | 1 Mark |

Criterion 9.2: Irrigation system, Maximum Mark: 1

- | | | |
|-----|--|--------|
| (a) | Efficient irrigation system like micro, drip or sprinkler irrigation | 1 Mark |
| (b) | Not as per (a) above | Nil |

Criterion 9.3: Reuse of excavated soil, Maximum Mark: 1

- | | | |
|-----|--|--------|
| (a) | 100% reuse of excavated soil at the site | 1 Mark |
| (b) | Not as per (a) above | Nil |





Samples

CERTIFICATE

	<p>Government of India Central Public Works Department</p>	
<p>Central Public Works Department (CPWD) hereby certifies that</p>		
<p>.....(Name of Building)</p>		
<p>GHAR Registration No.....</p>		
<p>has successfully achieved the Green Building Standards required for the following level of certification</p>		
<p>Green/Green Plus/Super Green</p>		
<p>under the</p>		
<p>Green Habitat Accomplished Rating</p>		
<p>(Director General)</p>		

PLAQUE

	<p>Government of India Central Public Works Department</p>	
<p>Central Public Works Department (CPWD)</p>		
<p>AWARDS</p>		
<p>GREEN PLUS RATING</p>		
<p>TO</p>		
<p>XYZ BUILDING, NEW DELHI</p>		
<p>under the</p>		
<p>Green Habitat Accomplished Rating (GHAR)</p>		
<p>ON</p>		
<p>DATE</p>		
<p>(Director General)</p>		



Committed for
Sustainable Development



Government of India
Ministry of Housing and Urban Affairs
CENTRAL PUBLIC WORKS DEPARTMENT