Confederation of Indian Industry

Indian Green Building Council

Greening India since 2001

IGBC Green Schools

Rating System

Pilot Version

Reference Guide

October 2015

(Edited with Addendum 1.0)

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Confederation of Indian Industry
CII-Sohrabji Godrej Green Business Centre

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- Ms Smita Godrej Crishna, Chairperson, CII – Green Schools
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Contents

Foreword from the Indian Green Building Council (IGBC)

India would be one of the leading nations with a young population of 765 million, by 2030. This population covers almost half the population of the country as on today. Children spend almost 30% of their time in schools. Therefore, developing healthy school environment is going to be a priority for parents, teachers and school managements. Access to dust-free environment, good sanitation, natural lighting & ventilation, hygiene and general awareness on the principles of protecting our nature would go a long way in preparing young children for a future that would be bright, challenging and prosperous. It would even impact the way children would think and incorporate them in their daily lifestyle. Needless to say, these apply to schools of all kinds – Government and Private.

Against this background, Indian Green Building Council (IGBC) has launched 'IGBC Green Schools Rating System®. This rating program is a tool to facilitate schools to go green, thereby transforming young minds. The main objective to launch IGBC Green Schools Rating System is developing as many green schools as possible along with the support of industry. This program is structured and designed to have a very simple approach. It would enable both new schools and existing schools to incorporate and monitor the environmental friendly concepts that would result in tangible and intangible benefits to the school. This overarching objective is to instill the eco-sensitivity amongst the children.

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IGBC Green Schools Rating System

IGBC set up the Green Schools Core Committee to develop a rating program to address school children from Kindergarten to Higher secondary (KG to + 2). The committee comprises of key stakeholders including educationists, principals, school managements, industry representatives and architects. The committee, with a diverse background and knowledge has enriched the rating system both in its content and process.

The School rating system is unique in the sense that it addresses eco-education, Health & hygiene besides the infrastructural facilities, energy efficiency, water conservation and waste management. Aspects like nutrition, physical activity & safety are also addressed.

Any project can apply for IGBC Green Schools Rating System certification, if it meets all the mandatory requirements and achieve the minimum required credit points. Different levels of green building certification are awarded based on the total credits earned. The guidelines detailed would also help in implementation and monitoring of eco-friendly measures.

All the schools going for IGBC Green Schools Certification should adhere to the local building laws and stipulations.

Benefits of Green & Healthy Schools

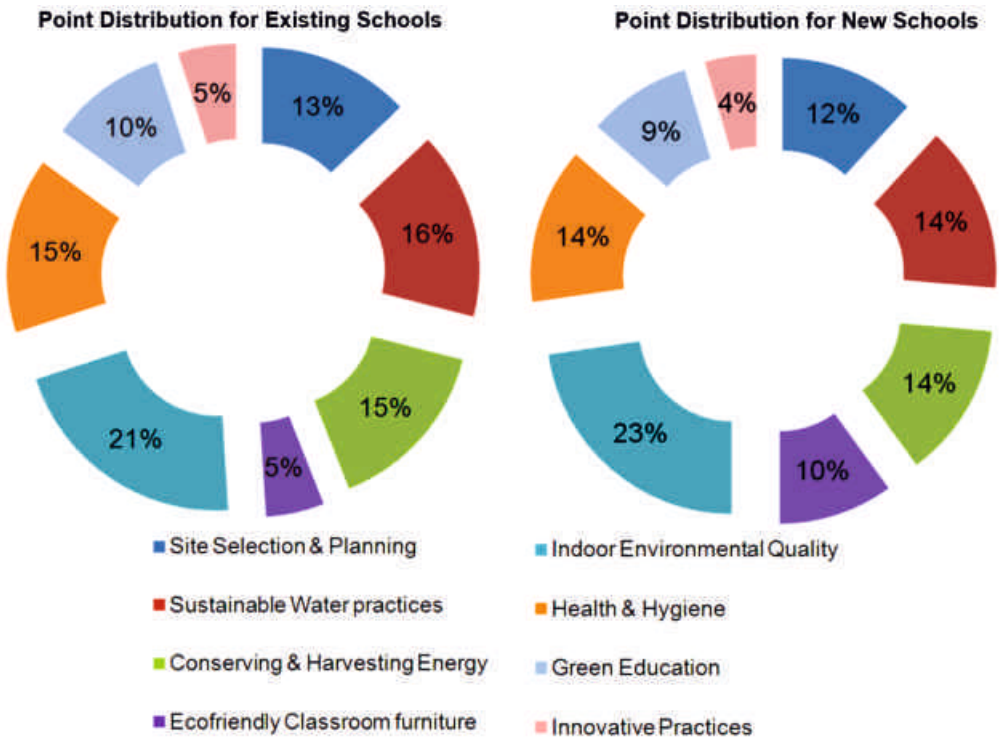
These benefits to the schools can be broadly categorized under performance, pedagogy, community and responsibility:

PERFORMANCE *Student's performance & Building's performance*	• Fresh air, daylight, improved indoor environment enhances the performance of students • Water efficiency, energy efficiency and post monitoring improves building performance
PEDAGOGY *Science & Art of education*	• Eco-sensitivity is both a passion and science. Children get sensitised to environmental aspects
COMMUNITY *Help to educate the greater community*	• Knowledge sharing within the school helps in reaching out to parents and nearby communities.
RESPONSIBILITY *Towards environment*	• Children learn to take responsibility for their own actions that concerns the environment

Schools can have tremendous benefits, both tangible and intangible. The most tangible benefits are the reduction in water and energy consumption. Intangible benefits include health & wellbeing of children, enhanced air quality and excellent day lighting.

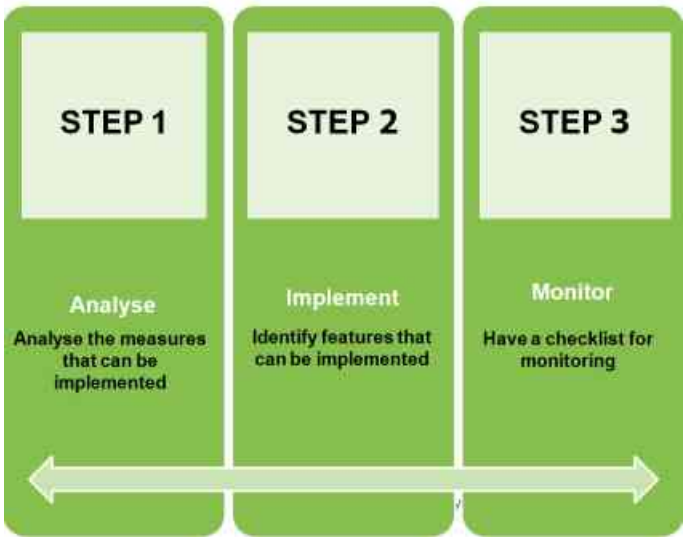
The Approach:

Indoor air, water and health have been accorded due importance. The weightage to various environmental attributes is depicted in the chart below:



Both teachers and school children can participate in the design and implementation:

- Step 1: Analysis & Documentation
- Step 2: Checklist preparation
- Step 3: Identify and implement



Applicability of Green Schools Rating System

The rating system is designed such that both existing schools and new schools can use the guidelines.

- **Existing Schools:** Schools which already at operational levels
- **New Schools:** Schools that are getting constructed.

Registration & Certification Process

Schools interested in IGBC Green Schools Rating System Certification can register with the Council. Projects can be registered on IGBC website (www.igbc.in) under 'IGBC Green Schools Rating System '. The registration is the initial step which will help in establishing contact with IGBC and provide access to several resources like Reference guide and Calculation templates.

The various levels of rating awarded are:

Certification Level	Existing Schools	New Schools	Recognition
Certified	50-59	55-65	Best Practices
Silver	60-69	66-76	Outstanding Performance
Gold	70-79	77-87	National Excellence
Platinum	80-100	88-110	Global Leadership

The council would recognise green schools that achieve one of the rating levels with a formal letter of certification and a mountable plaque.

Updates and Addenda

As the rating system continues to improve and evolve efforts would be directed in developing a robust, simple easy-to-use tool that can help the schools. Any feedback from children and teachers are welcome.

IGBC GREEN SCHOOLS RATING SYSTEMCHECKLIST			
Credits		**Existing Schools (ES)**	**New Schools (NS)**
Site Selection & Planning (SSP)			
SSP Mandatory Requirement 1	*Local Building Regulations*	*Required*	*Required*
SSP Credit 1	Top-Soil Preservation	1	*1*
SSP Credit 2	Eco-friendly Commuting Practices	2	2
SSP Credit 3	Parking Capacity	2	2
SSP Credit 4	Greenery in Campus 20%, 30%	2	2
SSP Credit 5	Minimise Heat Exposure to Sun: Non roof 50%, 75%	2	2
SSP Credit 6	Minimise Heat Exposure to Sun: Roof 50%, 75%	2	2
SSP Credit 7	Universal Design	2	2
	TOTAL	13	13

Sustainable Water Practices (SWP)			
SWP Mandatory Requirement 1	*Rainwater Harvesting, Roof & Non-roof, 25%*	*Required*	*Required*
SWP Credit 1	Rainwater Harvesting, Roof & Non-roof 50%, 75%	2	2
SWP Credit 2	Water Efficient Plumbing Fixtures 10%, 20%	2	2
SWP Credit 3	Turf Design 30%, 15%	2	2
SWP Credit 4	Water Efficient Landscaping 25%, 50%	2	2
SWP Credit 5	Water Efficient Irrigation System	1	1
SWP Credit 6	Grey Water Treatment 75%, 95%	4	4
SWP Credit 7	Use of Treated Grey Water 25%, 50%	2	2
SWP Credit 8	Water Use Monitoring	1	1
	TOTAL	16	16

Conserving & Harvesting Energy (CHE)			
CHE Mandatory Requirement 1	*Eco-friendly Refrigerants (For air-conditioning)*	*Required*	*Required*
CHE Credit 1	Ozone Depleting Substances	1	1
CHE Credit 2	Energy Efficient Lighting Fixtures 25%, 50%	2	2
CHE Credit 3	Energy Efficient Fans 30%, 40%	2	2
CHE Credit 4	Energy Efficient Appliances and Equipment	3	3
CHE Credit 5	Energy Sub-metering	1	1
CHE Credit 6	Onsite Renewable Energy 5%, 10%	4	4
CHE Credit 7	Solar Water Heating Systems	1	1
CHE Credit 8	Distributed Power Generation	1	1
	TOTAL	15	15

Eco-friendly School Material (ESM)			
ESM Mandatory Requirement 1	*Waste Segregation*	*Required*	*Required*
ESM Credit 1	Organic Waste Management 75%, 95%	*2*	*2*
ESM Credit 2	Green Policy	*1*	*Not Applicable*
ESM Credit 3	Salvaged Materials 2.5 %	*Not Applicable*	1
ESM Credit 4	Eco-friendly Wood Based Materials, 25%, 50%	2	2
ESM Credit 5	Materials with Recycled Content 10%, 20%, 30%	*Not Applicable*	3
ESM Credit 6	Local Materials 20%, 30%, 40%	*Not Applicable*	3
	TOTAL	5	11

Indoor Environmental Quality (IEQ)			
IEQ Mandatory Requirement 1	*Tobacco Smoke Control*	*Required*	*Required*
IEQ Mandatory Requirement 2	*Minimum Daylighting 40%*	*Not Applicable*	*Required*
IEQ Mandatory Requirement 3	*Fresh Air Ventilation 40%*	*Not Applicable*	*Required*
IEQ Credit 1	Area of classrooms	2	2
IEQ Credit 2	Anthropometric dimensions in spaces	2	6
IEQ Credit 3	Daylighting 50%, 75%, 95%	6	6
IEQ Credit 4	Fresh Air Ventilation 50%, 75%, 95%	6	6
IEQ Credit 5	Toxin-free Environment	1	1
IEQ Credit 6	Dust-free Interiors	1	1
IEQ Credit 7	Exhaust Systems	2	2
IEQ Credit 8	Building Flush-out	1	1
	TOTAL	21	25

Health & Hygiene (HH)			
HH Mandatory Requirement 1	*Toilet Facilities*	*Required*	*Required*
HH Mandatory Requirement 2	*Drinking Water Facility*	*Required*	*Required*
HH Credit 1	Access to Healthy Food	4	4
HH Credit 2	Minimum Sports Amenities	4	4
HH Credit 3	Dedicated Playground	4	4
HH Credit 4	Organic Fertilisers & Pesticides	1	1
HH Credit 5	Green House-keeping	2	2
	TOTAL	15	15

Green Education (GE)			
GE Credit 1	Green Schools Committee	4	4
GE Credit 2	Green extra-curricular activities	6	6
	TOTAL	10	10
Innovative Practices (IP)			
IP Credit 1.1	Exemplary Performance	1	1
IP Credit 1.2	Exemplary Performance	1	1
IP Credit 1.3	Exemplary Performance	1	1
IP Credit 2	Innovation in Practices	1	1
IP Credit 3	IGBC AP	1	1
	TOTAL	5	5
Total Number of Points		**100**	**110**

Site Selection & Planning

1

Local Building Regulation

SSP Mandatory Requirement 1 — Required

Intent:

Ensure that the school conforms to statutory building norms, so that the students & teachers are housed in a safe facility.

Requirements:

- School building should meet the requirements of the local building bye-laws.

Documents Required:

- Approved school building plan.
  (OR)
- Sanctioned letter from local authority.
  (OR)
- Fit-for-occupancy certificate.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: The school should ensure that it should meet local building bye-laws. The bye-laws would typically include fire safety norms, ground coverage, height restrictions, maximum built up area, minimum open space requirements, parking provisions, etc.
- Guideline 2: Fit-for-Occupancy certificate is a document that provides authorization from local government for a building to be used as a public edifice. The purpose of the certificate is to provide verification that the building is in full compliance with current building codes and is fit for occupancy.

Top Soil Preservation

SSP Credit 1 **Point(s): 1**

Intent:

Protect the top soil and control soil erosion, thereby reducing negative impacts to the site and surroundings.

Requirements:

Existing Schools

- Adopt measures to prevent carrying away of soil during storms.

New Schools

- The top 6-8 inches of soil to be stockpiled prior to construction, for reuse.
- Develop appropriate measures to address soil erosion, post occupancy.

Note: If the top soil (6-8 inches) in the project is not fertile (or) suitable for preservation, the project may provide relevant justification.

Documents Required:

- A narrative on top soil preservation measures implemented in school.
- Provide photographs/ drawings/ sketches of measures implemented in school.

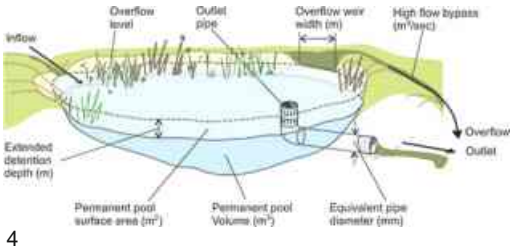
Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Preserve top soil and reuse it during landscaping in school. When the top soil is stockpiled during construction, it should be covered with tarpaulin or any other covering material. Upto 8 inches top soil is considered as rich organic soil.
- Guideline 2: Mulching- It is one of the process that can be adopted for preserving topsoil in school. Mulching is placing hay, grass, wood chips, straw or gravel on the soil surface to cover and hold soil. It conserves the moisture content in soil and improves the fertility in soil.
- Guideline 3: Sedimentation tank- Sedimentation basin/pond is run-off detention systems that promote settling of sediments through the reduction of flow velocities. It helps in settling of soil and ultimately helps in conserving the soil.

2 Covering top soil by tarpaulin

3 Process of mulching



4 Sedimentation pond

Eco-friendly Commuting Practices

SSP Credit 2 **Point(s): 2**

Intent:

Encourage students & teachers to adopt environment friendly transit systems to minimise environmental impact from automobile use.

Requirements:

Ensure school shall adopt following measures: (*as applicable*)

- Atleast 20% of students & teachers, either walk or bicycle to the school.

  (OR)

- Atleast 30% of students & teachers, transit by public bus or rail and the bus stop/ railway station should be located within 500m from school.

  (OR)

- Atleast 50% of students & teachers, transit by school bus.

Documents required:

- Details on number of students & teachers coming by walk / bicycle /school bus / public transport.
- Google map showing that the bus stop or railway station is located within 500 m of walking distance from the school.
- Purchase invoice of procured buses or contract document between the school & bus service provider (As applicable).
- For new schools, submit declaration letter from owner/ principal indicating the percentage of students & teachers that will transit by environment friendly transit systems.

Guidelines & Examples

(These guidelines are illustrative)

- Guideline 1: Identify the number of students coming by school bus or public transport.

  For example, strength of the school is 1000, for meeting the credit requirement atleast 200 (20%) students should either walk or come by bicycle and atleast 300 (30%) students should come by school bus or public transit.

- Guideline 2: You may locate your school on Google earth/ map along with the public bus stop/ railway station within 500 m.

Parking Capacity

SSP Credit 3 **Point(s): 2**

Intent:

Provide adequate parking within the site to minimise disturbance caused due to parking on public roads, thereby enhancing the quality of civic life

Requirements:

- Provide parking spaces for following:
  - 100% of school buses/ vans.
  - Bicycle racks to cater to the requirement considered under SSP Credit-2

Documents required:

- Details on number of parking spaces provided for buses and bicycles.
- Site plan showing the parking spaces provided for buses and bicycles.
- Photographs showing the provided parking spaces.

Guidelines & Examples

(These guidelines are illustrative)

- Guideline 1: Some examples of photographs that can be documented:

5 Dedicated space for parking school buses

6 Dedicated space for parking bicycles

Greenery in campus

SSP Credit 4 **Point(s):1, 2**

Intent:

Encourage greenery within the campus, thereby providing habitat and promoting biodiversity.

Requirements:

- Demonstrate atleast 20% of site area excluding building footprint is vegetated

% of greenery	Points
≥ 20 %	1
≥ 30 %	2

Note: Playgrounds, water bodies & turf area with activity should be excluded from this credit calculation.

Documents required:

- Site plan highlighting vegetative areas
- Calculation sheet describing total site area & area with vegetation
- Photographs of vegetated area provided in school campus

Guidelines & Examples

(These guidelines are illustrative)

- Guideline 1: A vegetative space includes areas with shrubs, trees, ground covers (other than turf area with activity such as playing).
- Guideline 2: Identify the vegetative spaces within the school campus and demarcate it on the site plan.
- Guideline 3: For calculations, let us consider following assumptions:

  Total Area of the school campus is 15,000 sq.m.
  - Building foot print is 2,500 sq.m.
  - Playground area is 9,000 sq.m.
  - Vegetated space is 2,200 sq.m.
    - Turf area is 500 sq.m
    - Area with native species is 1,200 sq.m
    - Area with drought tolerant species is 300 sq.m.
    - Other Species area is 200 sq.m.
  - Non-roof impervious area is 1000 sq.m.
  - Water body is 300 sq.m.

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Guideline 4: The area excluding building footprint, playground & water body is 3,200 sq.m. For meeting this credit, atleast 640 sq.m (20%) of the area should be provided with vegetation.

Minimise Heat Exposure to Sun: Non-Roof

SSP Credit 5 **Point(s): 1, 2**

Intent:

Reduce impervious surfaces being exposed to sun, to minimise impact on microclimate.

Requirements:

- 50% of exposed non-roof impervious areas have atleast one or combination of the following:
  - Shade from tree cover within 5 years
  - Open grid pavers, including grass pavers

  Note: Playgrounds can be excluded from this credit calculation.

% of non-roof impervious areas	Points
≥ 50%	1
≥ 75%	2

Documents required:

- No. of existing trees / saplings planted.
- Total non-roof area, area covered with trees (foliage) or open grid pavers.
- Photographs illustrating the area covered with trees or open grid pavers.

Guidelines & Examples

(These guidelines are illustrative)

- Guideline 1: The non-roof impervious areas include footpaths, pathways, roads, uncovered surface parking and other impervious areas.
- Guideline 2: For calculations, say area of the school campus is 15,000 sq.m and non-roof impervious area is 1,000 sq.m. For meeting this credit, atleast 500 sq.m (50%) of area should be, covered with tree shade or provided with open grid pavers.
- Guideline 3: Some of the examples of photographs that can be documented

8 Non-roof areas covered with tree shade

9 Non-roof areas covered with grass pavers

Minimise Heat Exposure to Sun: Roof

SSP Credit 6 **Point(s):1, 2**

Intent:

Reduce concrete surfaces being exposed to sun, to minimise impact on microclimate.

Requirements:

- Atleast 50% of roof should be covered with china mosaic tiles

  (OR)
- Atleast 50% of roof should be painted white (with 1 coat, 8 mils)

  (OR)
- Provide vegetation to cover atleast 50% of the exposed roof areas

% of roof Areas	Points
≥ 50%	1
≥ 75%	2

Documentation required:

- Details of total roof area along with roof area covered with tiles/ paint/ vegetation.
- Photographs of strategies adopted by school.

Guidelines & Examples

(These guidelines are illustrative)

- Guideline 1: For calculations, say area of the school campus is 15,000 sq.m and roof area is 2,500 sq.m. For meeting this credit, atleast 1,250 sq.m (50%) of area should be, covered with china mosaic tiles or painted white or vegetation.
- Guideline 2: Some examples of photographs that can be documented

10 Roof garden

11 China Mosaic tiles installed on the roof

Universal Design

SSP Credit 7 **Point(s): 2**

Intent:

Ensure that the school building/ campus design caters to differently abled people.

Requirements:

- Ensure School adopt following measures:
  - Rest room designated for differently abled.
  - Hindrance-free movements in common area (in regard to floor levels).
  - Non-slippery ramps with gradient not less than 1:20, at entrance & exit to the building.
  - In schools which have multilevel floors, provide lifts or ramps with handrails for movement.
  - Provide Braille assisted facility in the lifts.
  - Preferred parking for differently abled.

Documents required:

- A narrative on the strategies adopted for hindrance-free movement.
- Drawings highlighting designated restrooms for differently abled.
- Drawings highlighting the location of ramps (along with the gradient) at the entrance & exit to the building.
- Photographs illustrating the designated restrooms, ramps, parking spaces and Braille assistance facility provided by school.

Guidelines & Examples

(These guidelines are illustrative)

- Guideline 1: Preferred parking spaces refer to the spaces that are closest to the building entrance.
- Guideline 2: Some of the examples of photographs that can be documented

12 Non-slippery ramps with handrail

13 Rest room for differently abled

14 Signage for preferred parking

Sustainable Water Practices

1

Rainwater Harvesting, Roof & Non-roof

SWP Mandatory Requirement 1 — Required

Intent:

Adopt rainwater harvesting methods, to enhance ground water table and reduce potable water usage.

Requirements:

- ❖ Provide rainwater harvesting system to capture 25% of run-off volumes from roof and non-roof areas.

  The harvesting system designed should cater to atleast "one day normal rainfall*" occurred in the last 5 years.

  Notes:

  - **To arrive at one day normal rainfall, divide peak month rainfall occurred in each year (in last 5 years) by the number of rainy days in the respective month and take the average of the five values obtained. Abnormal rainy days like flash floods can be excluded from calculations.*
  - *In areas where the Central/ State Ground Water Board does not recommend artificial rain water recharge (or) if the groundwater table is less than 4 m, the project is required to provide justification for not implementing rainwater harvesting system.*

Documents required:

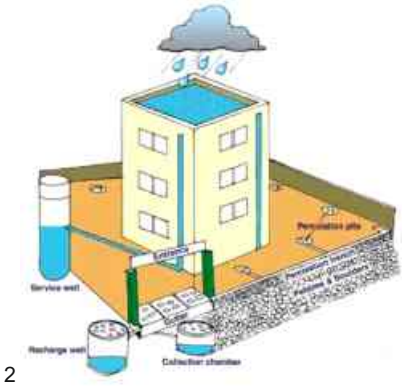
- ➢ Calculations demonstrating the percentage of runoff volumes captured / harvested from roof & non-roof areas.
- ➢ Details of the rainwater harvesting system specifying storage / harvesting capacity of system.
- ➢ Photographs of the implemented measures.

Guidelines & Examples:

(These guidelines are illustrative)

- ▪ Guideline 1: Rainwater can be harvested by storing water or redirecting water to a deep pit with percolation.

  Rainwater harvesting reduces dependency on potable water supply. Recharging of aquifers maintains groundwater levels and combats progressive depletion of ground water levels.



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Schematic of rain water harvesting

- Guideline 2: It is very important to understand the approach towards rainwater harvesting. The main aspects that need to be considered for rainwater harvesting calculations are:
  - Average normal rainfall/ day for the particular city
  - Amount of water that school can harvest (Run-off volume)
  - Measures that school can adopt (Percolation pit, storage tank etc.)
- Guideline 3: Rainwater harvesting calculation
  - Average normal rainfall/ day for the particular city
    - Arrive at average normal rainfall by dividing peak month rainfall occurred in each year (in last 5 years) by the number of rainy days in the respective month and take the average of the five values obtained. Abnormal rainy days like flash floods can be excluded from calculations.

Note: For rainfall information, one can refer Indian Metrological Department data at http://www.imd.gov.in

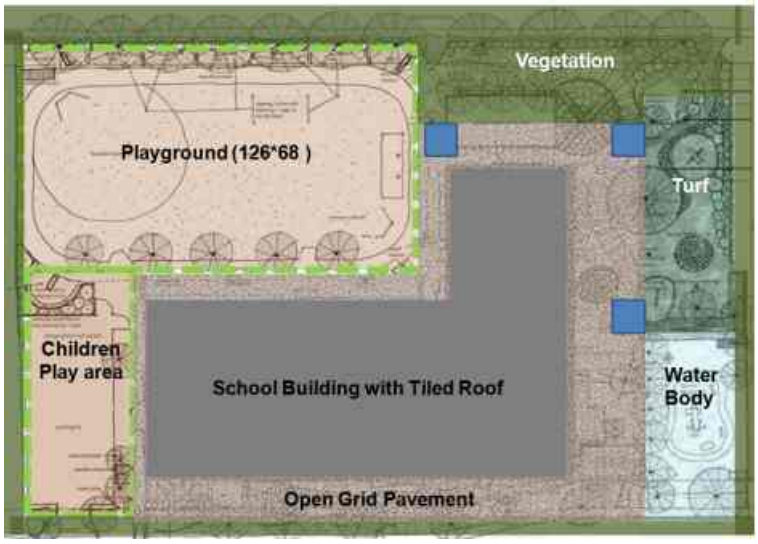
The Average normal rainfall/ day can be calculated as shown in the table below:

Average normal rainfall (r)					
Location	**Year**	**Peak Rainv Month**	**Total Rainfall (mm)**	**Number of rainy days**	**Normal rainfall/dav (mm)**
Hyderabad	2007	August	280	15	19
	2008	July	472	15	31
	2009	July	304	15	20
	2010	June	346	15	23
	2011	August	233	15	16
Average normal rainfall/ day (mm)					**22**
Average normal rainfall/ day (m)					**0.022**

Note: If the number of rainy days in respective months is not available, a maximum of 15 rainy days can be considered to arrive at normal rainfall

- Amount of water that school can harvest (Run-off volume)
  - First Step:

    Calculate the run-off volume from roof and non-roof areas is to identify:
    - Surface types
    - Area of each space



Site plan highlighting the different surface types

- Second Step:

  Once the type of surface is known, the next step is to know the run-off coefficient for the identified surface types.

  The Run-off coefficients (c) for typical surface types are listed below:

Runoff coefficients for Typical Surface Types

S No	Surface Type	Runoff coefficient
1	Cemented / Tiled Roof	0.95
2	Roof Garden (<100 mm thickness)	0.95
3	Roof Garden (100 – 200 mm thickness)	0.3
4	Roof Garden (201 – 500 mm thickness)	0.2
5	Turf, Flat (0 – 1% slope)	0.25
6	Turf, Average (1 - 3% slope)	0.35
7	Turf, Hilly (3 - 10% slope)	0.4
8	Vegetation, Flat (0 - 1% slope)	0.1
9	Vegetation, Average (1 - 3% slope)	0.2
10	Vegetation, Hilly (1 - 3% slope)	0.25
11	Concrete Pavement	0.95
12	Gravel Pavement	0.75
13	Open-grid Concrete Pavement	0.75
14	Open-grid Grass Pavement	0.5
15	Water Body	0
16	Playground	0.35

○ Third Step

Calculate impervious areas for the identified surface types.

- Summation of all impervious areas of different surface types will give the total impervious area.
- The total run-off volume can now be calculated by multiplying total impervious area and average normal rainfall.

○ Fourth Step

- The final step is to harvest atleast 25% of the total roof and non-roof run-off volume.

Sample calculations have been illustrated below:

Rainwater Harvesting Calculations

Assuming a school having a site area of 15,000 sq.m, and a roof area of 2,500 sq.m

S.No	Surface type	Run-off coefficient (c)	Area (m^2) (a)	Impervious area (m^2) I = (c × a)
1	Tiled Roof	0.95	2500	2375
2	Playground	0.35	9000	3150
3	Turf, Flat (0-1% slope)	0.25	500	125
4	Vegetation, average (1-3% slope)	0.2	1700	340
5	Open Grid Pavement	0.75	1000	750
6	Water Body	0	300	0
Total impervious area in sq.m. (∑ I)				6740
Average normal rainfall in m (R)				0.022
Total roof and non-roof run-off volume in cu.m (∑ I × R)				148.28
Storage capacity of pond/ tank etc. in cu.m				30
Harvesting capacity of recharge pits in cu.m (3 no's)				60
Percentage (%) of run-off volume harvested				**60.69%**

- Measures that the school can adopt for rain water harvesting:
  - Collecting Rain water
    - In this method, rain water collected from the roof & non-roof areas of the building is diverted to a storage tank/ pond, etc;

Collection of rain water in storage tank

3

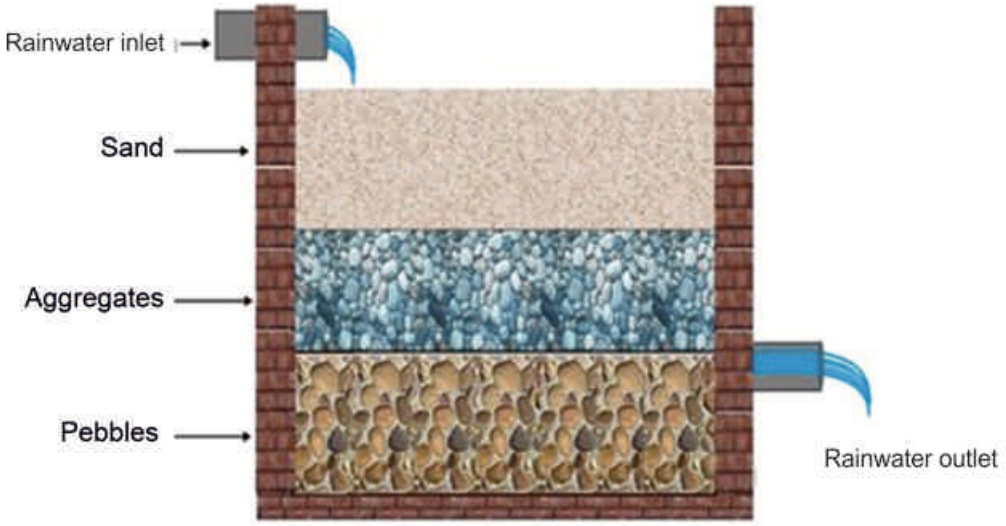
Notes:

1. *It is recommended to divert the first flood because this has the highest concentration of dust and other particles. This can be done by installing first-flush diverter.*
2. *Use filters at inlet of the storage tank before collection. These filters help in removing solid particles and maintain clean rain water in storage tank.*

- Penetrating Rain Water to the ground

– In this method, rain water from the roof & non-roof areas of the building is diverted to deep pits such as percolation pits, recharge wells etc; This helps in recharging ground water.

– Recharge pits are small pits of any shape rectangular, square or circular, constructed with brick or stone masonry wall with deep hole at regular intervals. Top of pit can be covered with perforated covers. Bottom of pit should be filled with filter media such as aggregates, sand etc.



4 Section showing rainwater harvesting pit

– To determine the capacity of the recharge pit, the percolation rate of the soil is to be calculated. Percolation rate can be arrived by getting the soil tested.

– Determine the number of harvesting pits that can be provided in the site.

Harvesting capacity of the recharge pits (X) can be arrived by multiplying the percolation rate /day (Y) and number of harvesting pits (Z).

Harvesting capacity of the recharge pits 'X' = Y × Z

Rainwater Harvesting, Roof & Non-roof

SWP Credit 1 **Point(s): 1, 2**

Intent:

Adopt rainwater harvesting methods, to enhance ground water table and reduce potable water usage.

Requirements:

- Provide rainwater harvesting system to capture atleast 50% of run-off volumes from roof and non-roof areas.

  The harvesting system designed should cater to atleast "one day normal rainfall" occurred in the last 5 years.*

  **To arrive at one day normal rainfall, divide peak month rainfall occurred in each year (in last 5 years) by the number of rainy days in the respective month and take the average of the five values obtained. Abnormal rainy days like flash floods can be excluded from calculations.*

% of run-off volume harvested roof & non-roof	Points
≥ 50 %	1
≥ 75 %	2

Documents required:

- Calculations demonstrating the percentage of runoff volumes harvested from roof & non-roof areas.
- Details of the rainwater harvesting system specifying storage / harvesting capacity of system.
- Photographs of the implemented measures.

Guidelines & Examples:

- Please refer to the guidelines and examples in SWP Mandatory Requirement 1 - Rainwater Harvesting, Roof & Non-roof.

Water Efficient Plumbing Fixtures

SWP Credit 2 **Point(s): 1, 2**

Intent:

Install water efficient fixtures, to reduce the consumption of potable water.

Requirements:

- Use water efficient plumbing fixtures whose flow rates are atleast 10% less than the baseline criteria. The baseline criterion is as below:

Baseline Flow Rates for Plumbing Fixtures

Fixture Type	Maximum Flow Rate	Duration	Daily uses per person / day
Water Closets	6 LPF (Full flush)	1 Flush	1 for male 1 for female
	3 LPF (Half flush)	1 Flush	2 for female
Urinals	4 LPF	1 Flush	2 for Male
Health Faucet	4 LPM	15 Seconds	1
Faucet/ Taps	8 LPM	15 Seconds	4
Kitchen Taps	8 LPM	15 Seconds	6
Showerhead	10 LPM	8 minutes	0.1

Source: Uniform Plumbing Code – India, 2008

Water Efficient Plumbing Fixtures	Points
10% less than the baseline	1
20% less than the baseline	2

Documents required:

- List of plumbing fixtures with their corresponding flow rates.
- Manufacturer/ Information brochures of the plumbing fixtures used, indicating the flow rates of fixtures installed.
- Calculations showing the percentage reduction in the amount of potable water utilised, by using efficient plumbing fixtures.

Guidelines & Examples:

(These guidelines are illustrative)

5 Components of Aerator

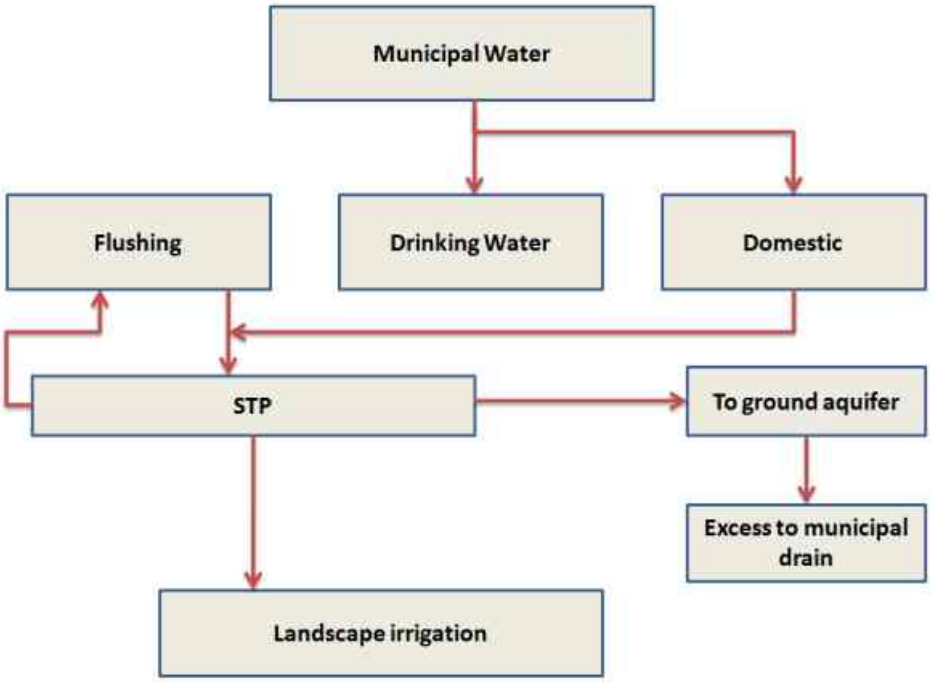
- Guideline 1: Select efficient plumbing fixture to reduce 20-30% of water consumption.
  - Efficient plumbing fixtures may include dual flush fixtures for water closet, aerators for sink taps & wash taps and low flow showers & health faucets.
  - Aerator helps to restrict excess water flow from taps in the toilets. Aerator mixes air into the water stream.

    Note: Aerators can also be installed in the existing fixtures
- Guideline 2: In existing schools, water audit can be performed to understand the water consumption. This also helps in identifying the measures to reduce water consumption
- Guideline 3:Sample calculation

  Say, the number of students & teachers of the school are 1000, the water use reduction can be calculated as

Fixture Type	Duration	Daily uses per person / day	Number of students and teachers (n)	Baseline		Proposed	
				Flow rate/ capacity (fb)	Total water use (litres) Tb = (n x fb)	Flow rate/ capacity (fp)	Total water use (litres) Tp = (n x fp)
Water Closets	1 Flush (Full Flush)	1 for male	500	6 LPF	3000	4 LPF	2000
		1 for female	500	6 LPF	3000	4 LPF	2000
	1 Flush (Half Flush)	2 for female	500	3 LPF	3000	2 LPF	2000
Urinals	1 Flush	2 for male	500	4 LPF	4000	2 LPF	2000
Health Faucet	0.25	1	1000	4 LPM	1000	2 LPM	500
Faucet/ Taps	0.25	4	1000	8 LPM	8000	6 LPM	6000
Total water use (litres/day)					22,000		14,500
Number of working days				200			
Total Annual water use in litres (Total water use x Number of working days)					44,00,000		29,00,000
Percentage reduction of water usage from the baseline				**34.09 %**			

WATER BALANCE CHART



Turf Design

SWP Credit 3 **Point(s): 1, 2**

Intent:

Limit turf area in landscape, to minimise potable water consumption.

Requirements:

- Design turf area to an extent of maximum 30% of the landscaped area.

% of turf area to total landscape area	Points
≤ 30%	1
≤ 15%	2

Note: Playgrounds and artificial turf should be excluded from this credit calculation.

Documents required:

- Landscape plan highlighting total area covered with turf.
- Calculations demonstrating the percentage of landscape area covered with turf.
- Photographs illustrating turf area.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Turf refers to lawn, an area of grass maintained for decorative or recreational use. It involves high water consumption, high continuous maintenance.

  Limiting turf area helps in reducing the water consumption.
- Guideline 2: Identify the turf area in the total landscape area of the school.

  For calculations, say the total landscape area (excluding playground) in school campus is 2,200 sq.m. For meeting this credit, a maximum 660 sq.m (30%) of area should be covered with turf.

  Sample calculation for determining the percentage of landscape area covered with turf is given below:

Type of vegetation	On Ground (sq.m.)
Turf	500
Native species	1200
Drought tolerant species	300
Other plant species	200
Total	**2200**

Total landscaped area (sq.m)	2200
Total Turf area (sq.m)	500
Percentage(%) of vegetated area with turf	**22 %**

- Guideline 3: Example of photograph that can be documented:

6

Photograph showing turf area in school

Water Efficient Landscaping

SWP Credit 4 **Point(s): 1, 2**

Intent:

Adopt water efficient landscape species, to reduce potable water consumption.

Requirements:

- Ensure atleast 25% of total landscape area is provided with native/ drought tolerant plant species.

% of landscape area provided with native/ drought tolerant plant species	Points
≥ 25%	1
≥ 50%	2

Notes:

- *Do not plant monocultures (single species) or an excessive number of same species*
- *For this credit calculation, potted plants should not be considered under landscaping.*

Documents required:

- Calculations demonstrating the percentage of landscape area provided with native/ drought tolerant plant species.
- List of native / drought tolerant species (including trees, shrubs, herbs, climbers and grass) used in the school campus.
- Landscape plan highlighting the location of areas planted with native / drought tolerant species.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1:
  - Native plants are those plants that are indigenous or naturalized to a given area in geologic time.
  - Drought tolerant species are those plants which can adapt to arid and drought conditions.
- Guideline 2: Identify the total landscape area and area planted with native / drought tolerant species in the school.

  For calculations, say the total landscape area (excluding playground) in school campus is 2,200 sq.m. For meeting this credit, atleast 550 sq.m (25%) of the landscape area should be covered with the native/ drought tolerant species.

Sample calculation for determining the percentage of landscape area provided with native/ drought tolerant species is given below:

Type of vegetation	On Ground(sq.m)
Turf	500
Native species	1200
Drought tolerant species	300
Other plant species	200
Total	2200

Total landscaped area (sq.m)	2200
Total area with native/ drought tolerant species (sq.m)	1500
Percentage(%) of vegetated area with native and drought tolerant species	**59%**

Water Efficient Irrigation System

SWP Credit 5 **Point(s): 1**

Intent:

Reduce the demand for irrigation water through water-efficient irrigation technology.

Requirements:

- ❖ Provide highly efficient irrigation systems for landscape such as drip irrigation, sprinklers, etc.

Documents required:

- ➢ Description of the installed irrigation systems.
- ➢ Photographs of the installed irrigation systems.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Use sprinklers for turf watering and drip irrigation for plants/ trees.
- Guideline 2:
  - Drip irrigation is an irrigation method that saves water by allowing water to drip slowly to the roots of plants, through a network of valves, pipes, tubing, and emitters.
  - Sprinkler irrigation is a method of distributing water through a system of pipes, usually by pumping. It is then sprayed into the air through sprinklers so that it breaks up into small water drops which fall on the ground.

7 Sprinkler system installed in turf

8 Drip irrigation system

Waste Water Treatment

SWP Credit 6 **Point(s): 2, 4**

Intent:

Treat waste water to tertiary standards, so as not to pollute the water streams.

Requirements:

- Provide an on-site treatment system to treat atleast 75% of waste water generated in the school campus.

% of waste water treated	Points
≥ 75%	2
≥ 95%	4

Note: The quality of waste water treated should meet the prescribed values by Central (or) State Pollution Control Board, as applicable.

Documents required:

- Details of treatment plant installed in the school.
- Test reports of the treated waste water.
- Photograph of the treatment plant.

Guidelines & Examples:

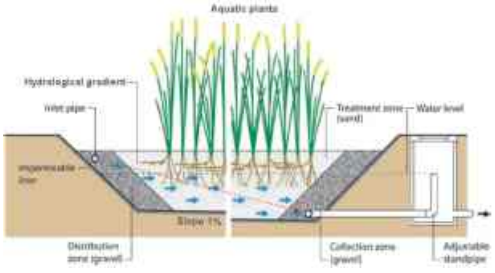
(These guidelines are illustrative)

- Guideline 1: Waste water treatment plant consists of applying technology to treat and improve the quality of wastewater.
- Guideline 2: Waste water can be treated by chemical or biological treatment methods.

  Some of the examples to treat waste water through chemical process are chlorination, ozonation, neutralization, etc.

  Examples of biological treatment processes include phytoremediation, root zone treatment etc.
- Guideline 3: Phytoremediation is the use of green plants to remove pollutants from waste water. This technology uses plants to remove contaminants/ heavy metals from the soil through the roots.

9 Phytoremediation process



10 Root zone treatment plant

Use of Treated Waste Water

SWP Credit 7 **Point(s): 1, 2**

Intent:
Use treated waste water for in-situ applications, to reduce dependence on potable water.

Requirements:

- ❖ Use atleast 25% of treated waste water for in-situ applications

% of waste water treated	Points
≥ 25%	1
≥ 50%	2

Notes:

- *The quality of waste water to be used should meet the prescribed values by Central (or) State Pollution Control Board, as applicable.*
- *Students should not have any direct contact with the treated waste water.*

Documents required:

- ➢ Details of water consumption for various applications in the school.
- ➢ Calculation showing total water consumption and percentage of treated waste water used.
- ➢ Test reports of the treated waste water.
- ➢ Water balance sheet showing supply and demand.

Guidelines & Examples:

(These guidelines are illustrative)

- ▪ Guideline 1: Estimate the water demand for flushing based on occupancy and for irrigation based on landscape design.

  As a thumb rule, 6 lit/ sq.m/ day can be considered for irrigation.
- ▪ Guideline 2: Install dual plumbing lines if treated waste water is used for flushing purposes.
- ▪ Guideline 3: Ensure periodic testing of treated waste water to meet the quality standards as prescribed by Central/ State Pollution Control Board.
- ▪ Guideline 4: Ensure that watering in landscape area is done before or after the school hours.

- Guideline 5: Sample calculations demonstrating the percentage of treated waste water reused are given below:

Total volume of waste water generated (litres/day)	**14,500**
Capacity of sewage treatment plant (litres)	15,000
Efficiency of STP	90%
Total Volume of waste water treated & available for reuse (litres/day)	13,050
Number of working days	200
Total volume of treated waste water available annually (litres)	26,10,000

Application	Volume of Water Required Annually (Litres)	Volume of Treated Waste Water Reused (litres)
Flushing	16,00,000	16,00,000
Landscaping	48,18,000	10,10,000
Total	64,18,000	26,10,000

Total volume of water required annually (for landscaping & flushing)	**64,18,000**
Total volume of treated waste water used annually	**26,10,000**
Percentage of treated waste water used anually	**40.66%**

Water Use Monitoring

SWP Credit 8 **Point(s): 1**

Intent:

Have in place measuring system for water consumption, to measure and monitor the water performance.

Requirements:

- ❖ Provide meters for the following water applications (as applicable):
  - Bore wells
  - Treated waste water
- ❖ Have in place a logging system for purchased water, if any.

Documents required:

- ➢ List of water meters installed in the campus with supporting photographs.
- ➢ Water balance sheet showing supply and demand.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Identify all the major water consuming areas and install systems to monitor their consumption.
- Guideline 2: Track the performance of the installed systems by comparing the estimated performance to the actual performance. This aids in evaluating the performance of the installed systems in comparison the baseline performance and for further enhancements, if necessary.

11

Water Meter

Conserving & Harvesting Energy

1

Eco-friendly Refrigerants

CHE Mandatory Requirement 1 *(Applicable only for air-conditioned schools)* **Required**

Intent:

Encourage use of eco-friendly refrigerants in the school, thereby minimising the impact on ozone layer depletion.

Requirements:

- ❖ Demonstrate centralised Heating Ventilation & Air-conditioning (HVAC) equipment installed in the school is CFC & HCFC free.

Documents required:

- ➢ A declaration letter from owner indicating the refrigerants used.
- ➢ Manufacture/ Information brochures of the HVAC equipment installed.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: CFCs (chlorofluorocarbons) and HCFCs (hydro chlorofluorocarbons) are the refrigerants (liquid substance used for cooling) present in air-conditioning systems. They are the major contributors in depleting the ozone layer present around the earth. The Montreal Protocol, in 1999 was amended for phase out of CFCs & HCFCs (hydro chlorofluorocarbons)
- Guideline 2: The ozone layer refers to a region of Earth's stratosphere that absorbs most of the Sun's UV radiation. CFC & HCHC are some of the chemical which results in depletion of ozone layer. It is suspected that variety of biological consequences such as increases in skin cancer, damage to plants etc results due to increased UV exposure due to ozone depletion.
- Guideline 3: For existing equipment, refrigerant can be replaced with CFCs & HCFCs free refrigerants.
- Guideline 4: The graph shown below gives a brief of ozone depletion potential & Global warming potential of various HFCs & Halons.

2 Contribution of HFCs and Halons in the Environment

Ozone Depleting Substances

CHE Credit 1 **Point(s): 1**

Intent:

Encourage use of eco-friendly refrigerants & halons in the school, thereby minimising the impact on ozone layer depletion.

Requirements:

- **CFC-free Refrigerants**

  Demonstrate that refrigerants used in the unitary air-conditioners are CFC (chlorofluorocarbon) free.

  (AND)

- **Halon-free Fire Suppression Systems**

  Demonstrate that fire suppression systems used in the school are free from halons or any other ozone depleting substances.

Documents required:

- A declaration letter from owner indicating the refrigerants and fire suppression systems used.
- Manufacture/ information brochures of the unitary air-conditioners and fire suppression systems installed.
- Photographs of the fire suppression systems used in school.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Fire suppression systems are used either put out a fire or stop it from propagating.
- Guideline 2: The fire suppression system can be either wet or dry. A wet sprinkler system is constantly charged, i.e. water is always in the pipes. This type of fire suppression system can be automatic, and it will activate if the system senses smoke or excessively high temperature. Dry sprinklers are manual systems that can only be activated after a water source is connected to a stand pipe.
- Guideline 3: Photographs below, shows schematic of fire suppression system installed.

3
Halon-free fire suppression system, manually operated

4
Automated fire suppression system

Energy Efficient Lighting Fixtures

CHE Credit 2 **Point(s): 1, 2**

Intent:

Enhance energy efficiency in schools by installing efficient lighting fixtures, thereby reducing the environmental impacts associated with energy use.

Requirements:

- Demonstrate 25% improvement over the base case in energy consumption by using energy efficient interior lighting fixtures.

  The wattage (W) to be considered in base case for interior lighting is 55W

%	Points
≥ 25 %	1
≥ 50 %	2

Documents required:

- Area statement of all interior spaces.
- Number of lighting fixtures along with the wattage details.
- Photographs of the installed lighting fixtures.
- Manufacturer brochure indicating the wattage of lighting fixtures.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Sample calculation for base case.

  Basecase scenario: Document the existing lighting fixtures details (carpet area, number of fixtures, luminare capacity, operating hours etc.) in the school.

BASECASE SCENARIO- ***Lighting Fixtures*** **Number of working days (n) = 200**						
Location	**Carpet area (sq.m)**	**Number of fixtures (f)**	**Luminare capacity (kW)**	**Operating hours (hr)**	**Energy consumption by lighting fixtures in a day (kW x hr x f)**	**Total energy consumption by lighting fixtures in entire year (W x Hr x f x n)**
Classroom 1	50	6	0.055*	3	0.72	144
Lab 1	20	2	0.055*	1	0.24	48
					Total	**192**

*Including ballast

- Guideline 2: Sample calculation for proposed case.

  Proposed scenario: Document the proposed (new) lighting fixtures details installed in the school.

PROPOSED SCENARIO- ***Lighting Fixtures*** **Number of working days (n) = 200**						
Location	**Carpet area (sq.m)**	**Number of fixtures (f)**	**Luminare (kW)**	**Operating hours (hr)**	**Energy consumption by lighting fixtures in a day (kW x hr x f)**	**Total energy consumption by lighting fixtures in entire year (W x Hr x f x n)**
Classroom 1	50	6	0.018 (T8)	3	0.324	64.8
Lab 1	20	2	0.018 (T8)	1	0.036	7.2
					Total	**72**

Note: The carpet area, number of occupants and operating hours in the base scenario and proposed scenario should have the same values.

Once the energy consumption by lighting fixtures for existing scenario and proposed scenario is calculated, the percentage (%) improvement needs to be calculated.

Percentage (%) improvement (X) =

(Basecase scenario - Proposed scenario) / (Basecase scenario) x 100

Considering this formula, the percentage improvement for above explained example:

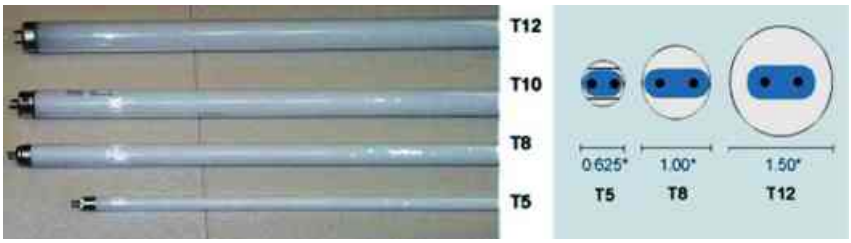
X= (192-72) / (192) x 100

X= 62.5%

The percentage improvement in energy consumption by use of efficient lighting fixtures is 62.5%

- Guideline 3: The wattage of the lighting fixture is usually printed on the fixture.
- Guideline 4: You may select BEE star rated or equivalent lighting fixtures as they are efficient than the conventional fixtures.

5 T8 tube light of 20W



6 Various sizes of tubelights available in the market

Energy Efficient Fans

CHE Credit 3 **Point(s): 1, 2**

Intent:

Enhance energy efficiency in schools by installing efficient fans, thereby reducing the environmental impacts associated with energy use.

Requirements:

- Use or replace atleast 30% of fans in school with minimum BEE 3-star rated or equivalent fans.

%	Points
≥ 30 %	1
≥ 40 %	2

Documents required:

- Details on number efficient fans along with total number of fans used in the school.
- Photographs or purchase order of the installed efficient fans.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: The sample provided below demonstrates the parameters that need to be considered for calculating the percentage of fans replaced.

Space	No. of existing fans	No. of fans replaced
Classroom 1	4	2
Lab 1	2	0
Total	6	2

Percentage of total fans replaced = (Total no. of fans replaced/ Total no. of existing fans) x 100

= (2/6) x 100

= 33%

- Guideline 2: The wattage of energy efficient fans available in the market includes:
  - BEE 5 star rated fans (52 W)
  - BEE 4 star rated fans (55 W)
  - BEE 3 star rated fans (56 W)

Note: Wattage of the conventional fans is 75 W

Energy Efficiency in Appliances & Equipment

CHE Credit 4 **Point(s): 1, 2, 3**

Intent:

Encourage the use of efficient appliances & equipment, thereby reducing the environmental impacts associated with energy use.

Requirements:

- Provide atleast 50% of computers/ monitors/ printers which are rated under Energy Star or equivalent program.

  (AND)
- Provide all unitary air-conditioners with minimum BEE 3-star rating or equivalent

  (AND)
- Provide refrigerators/ electric geysers/ television/ projectors/ printers with minimum BEE 3-star rating or equivalent

Appliances	Points
Computers (50%)	1
Unitary air conditioners (100%)	1
Refrigerators/ Electric geysers/ Television/ projectors (100%)	1

Documents required:

- Purchase bill for the appliances
- Photographs illustrating the appliances installed in school

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Various star rated appliances available in Indian markets are television, ACs, freeze, washing machine, water heaters, pumps etc.
- Guideline 2: The star rated equipments in India have BEE logo (illustrated in photograph below:)

7 BEE 3 star rated logo

8 BEE 4 star rated unitary air-conditioner

Energy Sub-Metering

CHE Credit 5 **Point(s): 1**

Intent:

Encourage continuous monitoring to identify improvement opportunities in school.

Requirements:

- Provide sub meters for energy monitoring for the following, as applicable:
  - Lighting
  - Renewable energy generation
  - Power backup systems (Generator sets etc.)
  - Air-conditioning
  - Any other energy consuming equipment and systems

Documents required:

- A narrative describing the installed energy metering system.
- Single line drawing showing the installed energy metering system.
- Purchase invoice/ payment receipts and manufacturer brochures of the installed energy meters.
- Photographs of energy meters installed in the school campus.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Identify all major energy consuming equipment and install sub meters to monitor energy consumption.
- Guideline 2: Implementation of sub meters help in ensuring accountability and gives an opportunity to enhance the energy performance.

9 Energy meter installed in a school

On-Site Renewable Energy

CHE Credit 6 **Point(s): 2, 4**

Intent:

Encourage use of renewable technologies for on-site power generation, to minimise environmental impacts of using fossil fuels.

Requirements:

- Install renewable energy systems for atleast 5% of annual total energy consumption in the school.

Percentage	Points
≥ 5%	2
≥ 10%	4

Documents Required:

- A narrative describing the on-site renewable technologies installed.
- Details on total energy consumption (kWh) of the school and percentage of energy generated through on-site renewable technologies.
- Photographs of on-site renewable technologies installed in the school campus.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: On-site renewable technologies may include
  - Solar photovoltaic
  - Micro wind turbines
  - Combined solar PV and wind energy

10 Solar panel installed in a school

11 Micro-wind turbines installed on a building

- Guideline 2: Identify total energy consumption of the school.

  For example, say the total annual energy consumption of a school is 5,000 kWh, for meeting this credit atleast 250 kWh (5%) of electricity should be generated through on-site alternative sources of energy.

Solar Water Heating Systems

CHE Credit 7 **Point(s): 1**

Intent:

Encourage use of alternative sources of energy for water heating applications, to minimise the environmental impacts of using fossil fuels.

Requirements:

- Provide solar water heating system for atleast 50% of hot water requirement for schools.

  Note: In case the school does not have hot water requirement, this credit is not applicable.

Documents required:

- A narrative describing alternative sources of energy used for water heating.
- Details on total hot water requirement of the school and percentage of water heated through alternative sources of energy.
- Photographs of alternative energy systems installed in the school campus.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Identify hot water requirement of the school.

  For example, say hot water requirement of a school is 100 liters/day, for meeting this credit atleast 50 liters of hot water should be through alternative sources of energy.

12

Solar hot water installed in a school

Distributed Power Generation

CHE Credit 8 **Point(s): 1**

Intent:

Encourage use of eco-friendly fuels, so as to reduce dependency on fossil fuels

Requirements:

- Install hybrid distributed power generation sets which operate with both, bio-fuels/ non-edible oils/ any other non-fossil fuel catering to atleast 10% of the connected load of the school.

  Note: These sets should comply with the Central Pollution Control Board (CPCB) requirements for emission and noise levels.

Documents Required:

- A narrative on the type of installed distributed power generation system in school
- Details on total connected load of school building and capacity of the distributed power generation system
- Manufacture brochures indicating the specifications of the distributed power generation system.
- Photographs of the installed distributed power generation system in school.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Distributed Power Generation is an energy system based on interconnected small and medium size power generators.
- Guideline 2: Hybrid system available in the market.
- Guideline 3: Sample calculation below demonstrates the parameters that needs to be considered

Total Connected load of the school (kVA)	**120 kVA**
Capacity of the hybrid DG set	**12 kVA**

Eco-friendly School Materials

1

Waste Segregation

ESM Mandatory Requirement 1 — Required

Intent:

Facilitate segregation of school waste at source, so as to prevent the waste being sent to land-fills.

Requirements:

- ❖ Provide atleast two bins to collect dry waste (one for paper and other for plastic / metal) and one bin to collect wet waste(organic waste) in each floor, generated in school.
- ❖ Provide a common facility to divert the collected waste with separate bins, which is easily accessible for hauling.

Documents required:

- ➢ A narrative describing the measures implemented for waste diversion.
- ➢ Details of number of bins placed in the school for segregation.
- ➢ Photographs of bins for waste segregation.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Waste segregation is the process of segregating waste at source. School broadly generates three kind of waste - food waste, paper waste, plastic waste.
- Guideline 2: Dry waste includes waste paper, shredded paper, news paper, plastic boxes or bottles, plastic covers etc.
- Guideline 3: Wet waste includes left out food items, vegetable or fruit peels, garden waste, etc.

2

Waste segregation bins provided in school

Organic Waste Management

ESM Credit 1 **Point(s): 1, 2**

Intent:

Ensure effective organic waste management in school, so as to prevent the waste being sent to land-fills.

Requirements:

- Install on-site organic waste treatment system for treating atleast 75% of organic waste generated in the school.

% of organic waste treated	Points
≥ 75 %	1
≥ 95 %	2

Documents required:

- A narrative describing the organic waste treatment method adopted in the school campus.
- Details on quantity on organic waste, generated/ to be generated and treated in the school campus.
- Photographs of the organic composter/ compost pit in the school campus

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Organic waste includes the waste which can be treated biologically like food items, garden waste etc.
- Guideline 2: Organic waste generated can be treated through composting or mechanical processes. The manure generated through these processes can be used as an organic fertilizer for plants.

3 Organic waste, by putting in these pots, can easily be converted into compost

4 Organic waste converter

Green Policy

ESM Credit 2 *(Applicable only for Existing Schools)* **Point(s): 1**

Intent:

Adopt green practices as and when school goes for renovation, thereby reducing the environmental impacts.

Requirements:

- Have a policy in place which indicates the adoption of the following practices during renovation of the school building:
  - Atleast 2.5% (by cost) of the building materials to be sourced from salvaged or reused materials.
  - The total recycled content of building materials shall constitute to, atleast 10% of total cost of the materials used in the school.
  - Atleast 20% (by cost) of the building materials are manufactured locally within a distance of 400 km.

Documents required:

- A narrative on strategies adopted to implement the green policy.
- A policy signed by the owner, indicating the use of salvaged/ reused materials, materials with recycled content, and locally manufactured materials for any future renovation activities.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Building materials include civil materials (brick, cement, glass, aluminum, metal, ceramics etc) and interior materials (furniture, carpets, gypsum boards, etc.)
- Guideline 2: Salvaged materials are construction materials recovered from existing buildings of construction sites and reused in other buildings.
- Guideline 3: Recycled Content is the content in a material or product derived from recycled materials versus virgin materials. Recycled content can be materials from recycling programs (post-consumer) or waste materials from the production process or an industrial/ agricultural source (pre-consumer or post-industrial).
- Guideline 4: Locally manufactured materials are those which are assembled as a finished product within a distance of 400 km.

Salvaged Materials

ESM Credit 3 *(Applicable only for New Schools)* **Point(s): 1**

Intent:

Encourage reuse of building materials, thereby reducing the dependence on virgin materials.

Requirements:

- Demonstrate atleast 2.5% (by cost) of the total materials is sourced from salvaged or reused materials.

% of salvaged materials	Points
≥ 2.5 %	1

Documents required:

- Calculation sheet describing the percentage of salvaged materials used.
- Invoice/ purchase bills showing the details of the procured salvaged material.
- Photographs of salvaged furniture / materials used.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Salvaged materials are construction materials recovered from existing buildings of construction sites and reused in other buildings.
- Guideline 2: Commonly, salvaged materials include structural beams & posts, flooring, doors, brick and decorative items.
- Guideline 3: Identify the total cost for materials.

  For example, the total cost for purchasing the materials is Rs 9,65,83,807. For meeting this credit atleast Rs 24,14,595 (2.5%) of furniture should be made of salvaged materials.

5 Storage cabinet in classrooms made out of salvaged wood

Storage cabinet in school labs, made out of salvaged wood

Eco-friendly Wood Based Materials

ESM Credit 4 **Point(s): 1, 2**

Intent:

Encourage use of eco-friendly wood based materials, thereby conserving forest resources.

Requirements:

- Demonstrate atleast 25% of the total wood based materials (by weight/ volume/ cost) used in the school have composite wood/ rapidly renewable materials/ certified wood.

% of materials having composite wood	Points
≥ 25 %	1
≥ 50 %	2

Documents required:

- Calculation sheet describing the percentage of composite wood/ rapidly renewable materials/ certified wood used.
- A declaration from owner indicating the use of composite wood/ rapidly renewable materials/ certified wood in the existing wood based materials used in the school. (For Existing Schools)
- Manufacturer brochure indicating the percentage of composite wood/ rapidly renewable materials/ certified wood in the procured wood based materials. (For New Schools)
- Photographs of furniture / materials with composite wood/ rapidly renewable materials.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Composite wood includes a range of derivative wood products which are manufactured by binding or fixing the strands, particles, fibers, veneers or boards of wood, together with adhesives, or other methods of fixation to form composite materials.
  - Composite wood can be used for window and door frames, indoor furniture such as tables, chairs, storage cabinets; railings, fences, landscaping timbers, cladding, park benches, etc.
- Guideline 2: A rapidly renewable material is one that requires 10 years or less to grow, raise, and harvest. Rapidly renewable materials require less land and therefore they are considered more environments friendly.
  - Some of the examples are bamboo, rosewood, eucalyptus, sunflower seeds, linoleum, etc.

- Guideline 3: Certified wood comes from responsibly managed forests which meet the long term forest product needs while maintaining the biodiversity of forested landscape.
- Guideline 4: Identify the total cost for purchasing wood based materials.

  For example, the total cost for purchasing wood based materials is Rs 12,00,000, for meeting this credit atleast Rs 3,00,000 (25%) of wood based materials should be made of composite wood/ rapidly renewable materials/ certified wood.

6

7

School Furniture made of composite wood

8

Desks & chairs in a school made out of bamboo

9

Storage cabinet made out of bamboo

Materials with Recycled Content

ESM Credit 5 *(Applicable only for New Schools)* **Point(s): 1, 2, 3**

Intent:

Encourage use of materials which contain recycled content to reduce environmental impacts associated with the use of virgin materials.

Requirements:

- Use materials with recycled content such that the total recycled content constitutes atleast 10% of the total cost of the materials used in the school.

% recycled content	Points
≥ 10 %	1
≥ 20 %	2
≥ 30 %	3

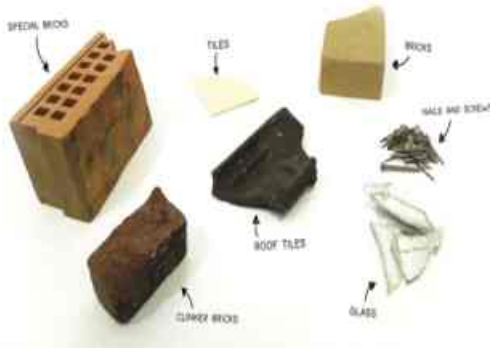
Documents required:

- Calculation sheet describing the percentage of recycled content.
- Manufacturer/ Information brochure indicating the amount of recycled content.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Recycled Content is the content in a material or product derived from recycled materials versus virgin materials. Recycled content can be materials from recycling programs (post-consumer) or waste materials from the production process or an industrial/ agricultural source (pre-consumer or post-industrial).
- Guideline 2:
  - Post consumer recycled content is derived from materials that can no longer be used for their original purpose.
  - Pre- consumer recycled content consists of raw materials diverted from waste stream during the manufacturing process.
- Guideline 3: Some of the examples of materials with recycled content are steel, cement, glass, AAC blocks, flyash bricks, etc.



10 Different materials with recycled content

11 Flyash Bricks

- Guideline 4: Sample calculations showing the percentage of recycled content are given below:

Total cost of materials					**Rs 9,65,83,807**		
Material/ Product	**Manufacturer Name**	**Quantity**		**Material/ Product cost**		**Percentage of recycled content**	**Recycled content value (Rs.)**
		Number	**Units (Metric)**	**Cost per unit (Rs)**	**Total cost (Rs)**		
Concrete	A	1,67,892	Cu.ft	99	1,66,21,308	20%	33,24,262
Reinforcement	B	5,39,653	kg	51	2,75,22,303	35%	96,32,806
Brick Work (6" flyash bricks)	C	1,33,625	Sq.ft	45	60,13,125	70%	42,09,188
Aluminium windows	D	25,697	Sq.ft	190	48,82,430	15%	7,32,365
Glass work	E	1,02,788	Sq.ft	12	12,33,456	35%	4,31,710
Tiling	F	1,38,764	Sq.ft	100	1,38,76,400	13%	18,03,932
Total Recycled content value					**Rs 2,01,34,263**		
Percentage					**20.84%**		

Local materials

ESM Credit 6 *(Applicable only for New Schools)* **Point(s): 1, 2, 3**

Intent:

Encourage use of building materials available locally, thereby, minimising the associated environmental impacts resulting from transportation.

Requirements:

- Ensure atleast 20% of the total building materials (by cost) used in the building are manufactured locally within a distance of 400 km.

% of local materials	Points
≥ 20 %	1
≥ 30 %	2
≥ 40 %	3

Documents required:

- Calculation sheet describing the percentage of local materials.
- Manufacturer brochure indicating the distance between manufacturing unit and the school.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Locally manufactured materials are those which are assembled as a finished product within a distance of 400 km.
- Guideline 2: Manufacturing refers to the final assembly of components into the building material/ product that is furnished and installed by the tradesmen. Assembly here does not include on-site assembly, erection or installation of finished components, as in structural steel, miscellaneous iron or systems furniture.
- Guideline 3: The procurement of local building materials will reduce the transportation costs.

Locate materials within 400km

- Guideline 4: For example, the total cost of building materials is Rs 9,65,83,807. Atleast, Rs 1,93,16,761 (20%) of the building materials should be procured locally.

Sample calculations showing the percentage of local materials are given below:

Total cost of materials						**Rs 9,65,83,807**
Material/ Product	**Manufacturer Name**	**Quantity**		**Material/ Product cost**		**Distance between school and manufacturing location (Km)**
		Number	**Units (Metric)**	**Cost per unit (Rs)**	**Total cost (Rs)**	
Reinforcement	A	5,39,653	kg	51	2,75,22,303	300
Brick Work (6" flyash bricks)	B	1,33,625	Sq.ft	45	60,13,125	100
Glass work	C	1,02,788	Sq.ft	12	12,33,456	100
Tiling	D	1,38,764	Sq.ft	100	1,38,76,400	150
Total cost of materials manufactured locally					**4,86,45,284**	
Percentage					**50.36%**	

Indoor Environmental Quality

1

Tobacco Smoke Control

IEQ Mandatory Requirement 1 — Required

Intent:

Eliminate exposure of students & teachers to tobacco smoke thereby reducing health impacts caused due to passive smoking.

Requirements:

- ❖ Adopt following measure:
  - ➢ Display 'no smoking zone' signage boards in all major locations in school campus.
    - Informative signage to educate users about adverse effects due to smoking.
    - A no smoking signage at the main entrance indicating that smoking is prohibited within 100 meters from the school campus.

Documents required:

- ➢ Photographs of signage boards installed at common spaces such as auditorium, parking spaces, reception/ waiting areas, etc and at the main entrance.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Identify various common spaces in the school and educate users on various adverse effects due to smoking
- Guideline 2: Some of the examples of photographs that can be documented:

2 No-smoking signage

3

Minimum Daylight

IEQ Mandatory Requirement 2 *(Applicable only for new schools)* **Required**

Intent:

Ensure all regularly occupied spaces are daylit, thereby improving health and well-being of the students & teachers.

Requirements:

Atleast 40% of regularly occupied spaces shall meet the daylight factor as mentioned below:

S No	Visual task	Prescribed Daylight Factor
1	Classroom desk top, chalkboards	2.5
2	Laboratory/ Workshops/ Drawing	2.5
3	Library reading tables	2
4	Staff room, office area	2

Documents required:

- List of regularly occupied and non-regularly occupied spaces along with the daylight factor designed.
- Floor plans highlighting the regularly occupied spaces meeting the daylight factor requirement.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Daylight factor is a constant ratio between illuminance at an indoor point to outdoor point.
- Guideline 2: Daylight factor calculation:

  Average daylight factor can be calculated using the formula given below:

  Day light factor = $\frac{\text{Window area}}{\text{Floor area}}$ X Actual visual transmittance (VLT) of glazing used X constant X 100

  - *Constant value for windows on walls = 0.2 & windows on roof (skylight) = 1.*
  - VLT can be known from technical brochure provided by manufacturer, shown below:

Colour and type	VLT Visible light transmission %	VLR Visible light reflectance External %	VLRi Visible light reflectance Internal %	Shading co-efficient	SHGC	U-value W/m²K
single glazed - monolithic						
clear float						
3mm	90	8	8	0.99	0.86	5.9
4mm	89	8	8	0.97	0.84	5.9
5mm	88	8	8	0.95	0.82	5.8
6mm	88	7	7	0.93	0.81	5.8
8mm	87	7	7	0.89	0.77	5.7
10mm	86	7	7	0.86	0.75	5.7
12mm	84	7	7	0.83	0.72	5.6
15mm	83	6	6	0.82	0.71	5.5
19mm	81	6	6	0.77	0.67	5.4

4

Fresh Air Ventilation

IEQ Mandatory Requirement 3 *(Applicable only for new schools)* Required

Intent:

Ensure all regularly occupied spaces are adequately ventilated, thereby improving health and well-being of students & teachers.

Requirements:

Naturally Ventilated Schools:

- ❖ All multi occupied spaces in the school shall have openings equal to or greater than 4% of the total carpet area.

Notes:

- *Multi occupied spaces include classrooms, staff rooms, laboratories, auditorium*
- *Doors, windows & ventilators can be considered as openings and should be kept open during occupancy.*

Mechanically Ventilated Schools:

- ❖ Demonstrate that the fresh air ventilation in all multi occupied areas shall meet the minimum ventilation rate of 0.12 cfm/ sq.ft.

Documents required:

- ➢ Calculations demonstrating the percentage of openable area considered in regularly occupied spaces.
- ➢ Floor plans clearly demarcating the openings.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Openings may include windows, doors and ventilators.
- Guideline 2: The sample provided below demonstrates the parameters that need to be considered for calculating the percentage of openable area.

Space	Carpet area in m^2 (a)	Openable area in m^2 (b)	Prescribed percentage or openable area	Percentage or openable area (b/a) x 100	Achieved/ Not achieved
Classroom 1	50 sq m	10	15%	20%	Achieved
Lab 1	20 sq m	5	15%	10%	Not achieved

- Guideline 3: Once the parameters are filled, total regularly occupied spaces meeting the requirement needs to be calculated.

  For example, say total area of regularly occupied spaces is 3,500 sq.m, for meeting this credit atleast 1,400 sq.m (40%) of regularly occupied spaces should meet the prescribed percentage of openable area.

Area of Class Room

IEQ Credit 1 **Point(s): 2**

Intent:

Ensure classrooms are well designed with appropriate occupant density, so as to enhance student's productivity.

Requirements:

- The gross area and number of students in classrooms should meet the following requirements:

Category	No. of students per classroom	Minimum gross area of class rooms (in m^2) / student
Pre-school	20-25	2.0
Primary / Junior school	40	1.5
Secondary / Higher secondary	40	1.2

Source: IS 8827- 1978- affirmed in 2006: Recommendations for basic requirement of school buildings, 4.3- Area of class room, table 2

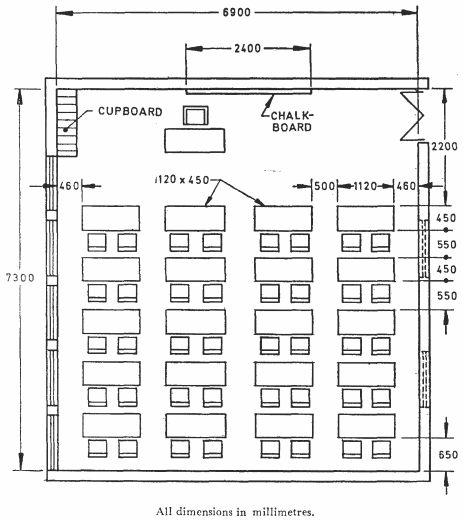
Documents required:

- Details on area and strength of the students per class room.
- Typical class room layout / floor plans.

Guidelines & Examples

(These guidelines are illustrative)

- Guideline 1: Example of classroom arrangement that school can adopt.



Typical illustration of a class room

Note: The arrangements are only illustrative. School can develop their own sitting arrangement.

Source: IS 8827- 1978- affirmed in 2006: Recommendations for basic requirement of school buildings, Figure 2 & Figure 3

Anthropometric Dimensions in spaces

IEQ Credit 2 **Point(s): 2, 4, 6**

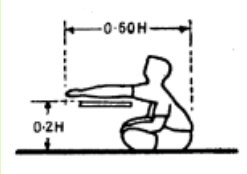
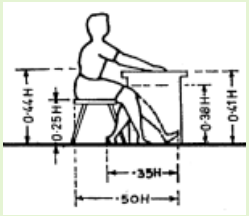
Intent:

Design school with anthropometric dimensions, so as to ensure comfort of the student.

Requirements:

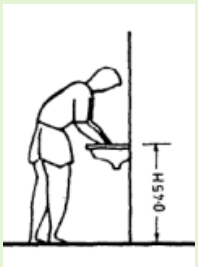
Provide anthropometric dimensions for classroom furniture, toilet fixtures and sill height, parapet wall & riser of stairs as following:

- Furniture in Classrooms (2 Points)

Anthropometric dimension	H (Standing height of a Student, in m)		
	Primary (5-10 years)	Secondary (10-13 years)	Higher Secondary (13-17 year)
 Squatting position	1.15	1.4	1.6
 Position with Furniture	1.15	1.4	1.6

Source: IS 4383-1990- Anthropometric dimensions for school children age group 5-17 years

- Toilet Fixtures for students (2 points) *(Applicable only for New Schools)*

Anthropometric dimensions	H (Standing height of a Student, in m)		
	Primary (5-10 years)	Secondary (10-13 years)	Higher Secondary (13-17 year)
 Wash basin	1.15	1.4	1.6

❖ Sill height, Parapet wall & Riser of stairs (2 Points) *(Applicable only for New Schools)*

Architectural Element	Height (H), in m
Parapet Wall	1 – 1.2
Sill Height	0.6 – 0.9
Riser of the stairs	0.12 – 0.15

Documents required:

- List of anthropometric dimensions considered for furniture, toilet fixtures and sill height, parapet wall & riser of stairs.
- Photographs of furniture, toilet fixtures, sill height, parapet wall & riser of stairs.

Guidelines & Examples:

- Guideline 1:
  - Anthropometry: Anthropometry refers to the measurement of the human individual.
  - Anthropometric dimension: It is the measurement of the size and proportions of the human body, as well as parameters such as reach and visual range capabilities.
- Guideline 2: Some of the examples of photographs that can be documented:

5

6

7

Anthropometric dimensions for furniture in classrooms: Pre-nursery (primary), nursery (primary) and higher secondary classes

8

Anthropometric dimensions for toilet fixture installed

Daylighting

IEQ Credit 3 **Point(s): 2, 4, 6**

Intent:

Ensure all regularly occupied spaces are daylit, thereby improving health and well-being of students & teachers

Requirements:

Existing Schools

- Atleast 50% of regularly occupied spaces shall meet the minimum illumination levels as mentioned below:

S No	Visual task	Prescribed Illumination levels (lux)
1	Classroom desk top, chalkboards	150 - 300
2	Laboratory/ workshops	150 - 300
3	Library reading tables	200 - 300
4	Drawing/Typing	300

Source: IS 8827- 1978- affirmed in 2006: Recommendations for basic requirement of school buildings, Table 5- Illumination levels on work areas for school buildings

% area daylight	Points
50%	2
75%	4
95%	6

New Schools

- Atleast 50% of regularly occupied spaces shall meet the minimum daylight factor as mentioned below:

S No	Visual task	Prescribed Daylight Factor
1	Classroom desk top, chalkboards	2.5
2	Laboratory/ Workshops/ Drawing	2.5
3	Library reading tables	2
4	Staff room, office area	2

% area daylight	Points
50%	2
75%	4
95%	6

Documents required:

Existing Schools

- List of regularly occupied and non-regularly occupied spaces along with the illumination levels measured.
- Floor plans showing the illumination levels measured in all regularly occupied space

New Schools

- List of regularly occupied and non-regularly occupied spaces along with the daylight factor designed.
- Floor plans highlighting the regularly occupied spaces meeting the daylight factor requirement.

Guidelines & Examples:

(These guidelines are illustrative)

Existing Schools

- Guideline 1: Illumination level is the level of light when an object can be seen properly. Illumination levels are measured in lux.
- Guideline 2: The illumination levels (lux) can be calculated by an instrument called as lux meter. This meter is readily available in Indian market at an affordable cost.
- Guideline 3: Please note that the illumination level should be monitored only for daylight. Before starting the monitoring process, the artificial lighting fixtures should be switched off.
- Guideline 4: Sample provided below demonstrates the parameters that need to be considered for meeting the requirement.

Digital lux-meter

Space	Carpet area (m^2)	Illumination level prescribed (lux)	Illumination level monitored by lux meter (lux)	Achieved/ Not achieved
Classroom 1	50	300	325	Achieved
Lab 1	20	300	208	Not Achieved

- Guideline 5: Once the parameters are filled, total regularly occupied spaces meeting the requirement needs to be calculated.

For example, say total area of regularly occupied spaces is 3,500 sq.m, for meeting this credit atleast 1,750 sq.m (50%) of regularly occupied spaces should meet the prescribed illumination levels.

New Schools

- Please refer guidelines under IEQ Mandatory Requirement 2

Fresh Air Ventilation

IEQ Credit 4 **Point(s): 2, 4, 6**

Intent:

Ensure all regularly occupied spaces are adequately ventilated, thereby improving health and well-being of students & teachers.

Requirements:

Naturally Ventilated Schools:

❖ All multi occupied spaces in the school shall have openings as following:

% of opening area to carpet area	Points
≥ 6 %	2
≥ 8 %	4
≥ 10 %	6

Notes:

- *Multi occupied spaces include classrooms, staff rooms, laboratories, auditorium*
- *Doors, windows & ventilators can be considered as openings and should be kept open during occupancy.*

Mechanically Ventilated Schools:

❖ Demonstrate that the fresh air ventilation in all multi occupied spaces shall meet the following:

Cfm/Sq.ft	Cfm/Occupant	Points
0.12	5.0	2
0.12	7.5	4
0.12	10	6

Documents required:

➢ Calculations demonstrating the percentage of openable area considered in regularly occupied spaces.

➢ Floor plans clearly demarcating the openings.

Guidelines & Examples:

(These guidelines are illustrative)

▪ Please refer guidelines under IEQ Mandatory Requirement 3

Toxin-free Environment

IEQ Credit 5 **Point(s): 1**

Intent:

Encourage use of material with low emissions, so as to reduce adverse health impacts on the students and teachers.

Requirements:

Existing Schools

- Provide a policy indicating use of low VOC paints and coatings.

  Note: The measures indicated in the policy shall be implemented within 3 years from the date of policy and shall include list of identified low VOC paints and coatings along with manufacturer details.

New Schools

- Use paints and coatings with low or no VOC content for 100% of interior wall and ceiling surface area.

Paints and Coatings	VOC Limit (g/L)
Non-flat (glossy paints)	150
Flat (Mat paints)	50
Anticorrosive anti-rust paints	250
Varnish	350

Documents required:

- For existing schools, submit a policy and a narrative on the procurement plan.
- Manufacturer/ information brochure of paints and coatings with VOC content.
- Purchase order for the procured paints and coatings.

9 Paint container highlighting low VOC content

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Volatile Organic Compounds (VOCs) are a large group of carbon-based chemicals that easily evaporate at room temperature.
- Guideline 2: Breathing low levels of VOCs for long periods of time increases risk of several health problems. Some of the symptoms are eye, nose & throat irritation, headache, Nausea, cancer.
- Guideline 3: Low VOC paints are easily available in Indian market. Usually, VOC content is indicated on the paint container.

Dust-free Environment

IEQ Credit 6 **Point(s): 1**

Intent:

Encourage use of dust-free products, so as to reduce adverse health impacts on the students and teachers.

Requirements:

- ❖ Use dust-free products in interiors such as chalk pieces, duster, etc.
- ❖ All the entrances of the school should have a foot mat.
- ❖ Every classroom should be cleaned on a daily basis.

Documents required:

- ➢ A narrative on the daily cleaning practices.
- ➢ Manufacturer/ information brochure of dust-free product.
- ➢ Bills for the procured dust free chalks.
- ➢ Photographs of the foot mats.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Some of the examples of dust free products are:

10 Dust Free Chalk pieces

11 Foot mats at entrance

Exhaust Systems

IEQ Credit 7 **Point(s): 2**

Intent:

Ensure that kitchen, toilets and laboratories are adequately ventilated, so as to enhance the indoor air quality.

Requirements:

- Design exhaust systems in kitchen, toilets and laboratories as per the requirements provided in the table below:

Location	Minimum Airflow	
Kitchen / Mess	For < 9.3 sq.m (100 sq.ft) floor area	100 cfm
Toilets	For < 4.64 sq.m (50 sq.ft) floor area	50 cfm
Laboratories	For < 50 sq.m (538 sq.ft) floor area	500 cfm

Documents required:

- Floor plans showing location of exhaust systems.
- Manufacturer/ information brochure of exhaust systems installed.
- Photographs of installed exhaust systems.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Identify kitchen/ mess (food preparation area), toilets and laboratories in school.
- Guideline 2: For example, say area of kitchen (food preparation area) is 20 sq.m. for meeting this credit the school needs to install exhaust fan of capacity 215 cfm.
  - Instead of installing one exhaust fan of capacity 215 cfm, school can install two or more exhaust fans meeting 215 cfm of capacity.

Building Flush-out

IEQ Credit 8 **Point(s): 1**

Intent:

Avoid exposure to indoor airborne contaminants before occupying the school, so as to reduce adverse health impacts.

Requirements:

- Perform a building flush-out for ten days by keeping all windows open before the building is occupied. Flushing is to be carried after paints & coatings and adhesives & sealants have been applied.

  (OR)

- If the building prefers to carry out the flush-out using forced ventilation systems, the flush-out can be carried out for five days.

  Note: Existing schools shall perform building flush-out once the repainting is done.

Documents required:

- A narrative describing the flush-out procedure followed.
- Declaration letter indicating the dates and number of days flush-out is performed.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Flush-out is a process used to remove indoor air pollutants like volatile organic compounds (emitted from adhesives, paints, carpets, furnishings etc.)
- Guideline 2: Flush-out needs to be carried out just before the occupancy, and after interior finishes such as adhesives, sealants, interior paints, coatings, varnish, carpets, etc., are used.
- Guideline 3: Forced ventilation such as exhausts, may be used to carry out building flush out.

Health & Hygiene

1

Toilet Facilities

HH Mandatory Requirement 1 — Required

Intent:

Provide clean toilets, so as to reduce infections on students and teachers, thereby enhancing their health.

Requirements:

- ❖ Provide separate toilets for boys and girls in the school.
- ❖ Clean all toilets at least, twice-a-day.

Documents Required:

- ➢ A narrative on cleaning and monitoring practices.
- ➢ Floor plans highlighting the toilets for boys and girls.
- ➢ Log sheet on frequency of toilet cleaning in schools.

Guidelines & Examples:

(These guidelines are illustrative)

- ▪ Guideline 1: Log sheets include the details on the time intervals followed in cleaning the toilets.
  - Proper cleaning of toilets should be done followed by filling of log sheet by the concerned person at least twice a day

Location: _____

Date	Toilet & Hand Washing Facilities		Soap		Single-use Paper Towels		Toilet Paper		Trash Can		Potable Water		Employee's Initials
	Checked	Cleaned	Checked	Filled	Checked	Filled	Checked	Filled	Checked	Emptied	Checked	Filled	

Sheet Reviewed by: _____ on _____
(Management) (Date)

Restroom & Toilet Facility Maintenance Log

Drinking Water Facility

HH Mandatory Requirement 2 — Required

Intent:

Ensure each student in the school has access to clean drinking water, so as to enhance the wellbeing of the children.

Requirements:

- ❖ Provide quality drinking water to meet, Indian Standards Specification for Drinking Water IS:10500, 1992 (attached in Annexure)

Documents Required:

- ➢ Water quality report
- ➢ Photographs of provided drinking water facility within school

Guidelines & Examples:

(These guidelines are illustrative)

- ▪ Guideline 1: Some photographs of drinking water facility in school:

2 Drinking water facility in school

3 Drinking water purifier

Access to Healthy Food

HH Credit 1 **Point(s): 4**

Intent:

Ensure each student in the school has access to healthy food, so as to enhance the wellbeing of the children.

Requirements:

- Provide nutritious food meeting atleast below requirements:

S No	Food Items	Quantity per Day / Child	
		Primary	Upper Primary
1	Food Grains	100 gms	150 gms
2	Pulses	20 gms	30 gms
3	Vegetables (leafy also)	50 gms	75 gms
4	Oil & Fats	5 gms	7.5 gms
5	Salt & Condiments	As per need	As per need

Source: Mid- day meal scheme, Ministry of Human Resource Development, Government of India

Documents Required:

- A narrative describing measures adopted by school to provide healthy food.
- List of food items served in the school.
- A declaration from owner confirming that the food provided to students, meet the requirements.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Identify the list of food items offered by the school in a week
- Guideline 2: A Log sheet can be maintained by school on the nutritional value of provided food.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Breakfast							
Mid-Morning Snack							
Lunch							
Mid-Afternoon Snack							
Supper							
Water Servings							
Total Calories							

Minimum Sports Amenities

HH Credit 2 **Point(s): 4**

Intent:

Design spaces for indoor and outdoor games, so as to enhance growth & health of students.

Requirements:

- Provide at least two indoor and two outdoor playing facilities within the school campus.

  Note: The outdoor facility in this credit may not be as large as playground area indicated under HH credit 3.

Documents Required:

- Details on the indoor and outdoor game facilities provided in the school.
- Photographs of the games facilities provided in the school.

Guidelines & Examples

(These guidelines are illustrative)

- Guideline 1: Indoor games in school include caroms, table tennis, chess etc.
- Guideline 2: Outdoor games in school include kho-kho, running etc.

4

5

Indoor games

6

7

Outdoor games

Dedicated Playground

HH Credit 3 **Point(s): 4**

Intent:

Design spaces for physical activities, to enhance growth and health of students.

Requirements:

- **Option 1**
  - **Case 1: Secondary School**

    Provide playground for outdoor sports with a minimum of 68m x 126m* for effective play activities.

  - **Case 2: Primary School**

    Provide playground for outdoor sports with a minimum of 18m x 36m* for effective play activities.

**Source: National Building Code (NBC) of India 2005, Part 3- Development Control Rules and General Building Requirement, Clause 5.5.1- Educational Facilities.*

(OR)

- **Option 2**

  If a school doesn't have playground, then they should provide an alternate arrangement for playground.

  - Tie-up with nearby municipal playground or sports club within your vicinity.

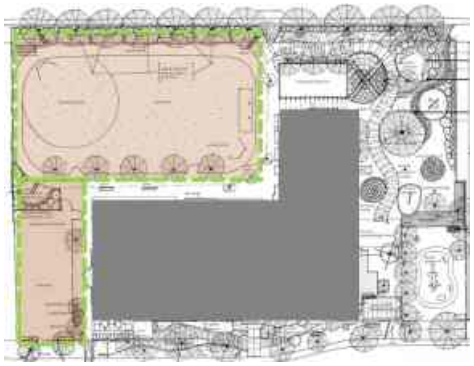
Documents required:

- Details on area of playground.
- Site plan highlighting the playground area (or) agreement between school management and the appropriate authority, in case the school has a tie-up with sports club or nearby municipal playground.
- Photographs of playground.

Guidelines & Examples

(These guidelines are illustrative)

- Guideline 1: Example of site plan with playground is given below



Site plan highlig hting playground area

Photograph illustrating school playground

Organic Fertilisers and Pesticides

HH Credit 4 **Point(s): 1**

Intent:

Ensure use of organic fertilisers and pesticides so as to reduce health impacts on school students and teachers.

Requirements:

- ❖ Use organic fertilisers and pesticides for landscaping purposes in school.

Documents required:

- ➢ List of fertilisers and pesticides used.
- ➢ Manufacturer brochure indicating that used fertilisers/ pesticides are organic.

Guidelines & Examples

(These guidelines are illustrative)

- Guideline 1: Organic fertilisers are those derived from animal or vegetable matter.
- Guideline 2: Few examples of organic fertilisers are neem based organic fertilisers (neem oil, neem cake, neem seed powder, etc.), manure, vermicompost fertiliser, seaweed fertiliser, etc.

9

10

Photographs illustrating organic fertilisers

Green Housekeeping

HH Credit 5 **Point(s): 2**

Intent:

Use environment friendly cleaning products, so as to prevent chemical related health hazards.

Requirements:

- ❖ Provide eco-friendly housekeeping products in the school.

Documents required:

- ➢ A declaration from owner indicating that only eco-friendly housekeeping products will be used in the school.
- ➢ List of housekeeping products used in the school.
- ➢ Manufacturer/ information brochures & purchase order of the products used.

Guidelines & Examples

(These guidelines are illustrative)

- Guideline 1: Housekeeping products include hand wash, soaps & detergents, toilet cleaning solutions etc.
- Guideline 2: Housekeeping chemical should be GS-37 certified or equivalent

11

12

Housekeeping Chemicals with green seal

Green Education

1

Green Schools Committee

GE Credit 1 **Point(s): 2, 4**

Intent:

Ensure school has a committee in-place, to encourage and implement eco-friendly practices.

Requirements:

- ❖ The school shall constitute a formal committee with teachers & students to identify and implement atleast two green activities (2 Points)
- ❖ Regular monitoring of implemented green activities by school teacher/ administrator.(2 Points)

Documents Required:

- ➢ A narrative on the committee including
  - List of committee members
  - List of identified green activities
  - Strategies adopted for implementation of green activities.
- ➢ Photographs showing the implemented green activities. (For Existing Schools)

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: School may include
  - Statement of objective
  - Guidelines to be followed in operational level such as energy saving measures, water conservation measures, waste management activities, eco-friendly commuting practices etc.
  - Monitoring of green features implemented.
  - Log sheet
- Guideline 2: Green activities may include gardening, e – waste collection, awareness campaigns to nearby communities on importance of health, nutritious food & hygiene, biodiversity conservation, reduction of environmental pollution, etc.

2 Students distributing seeds to nearby community

3 Campaign by students

Green Extra-curricular Activities

GE Credit 2 **Point(s): 2, 4, 6**

Intent:

To increase student engagement, by fostering active participation in environmental projects.

Requirements:

- Provide the following
  - Organise atleast two awareness programs on green education during the year. (2 points)
  - Organise atleast one educational tour for children to visit green projects during the year. (2 points)
  - Participate in atleast one environmental related competition during the year. (2 points)

Documents Required:

- A narrative on the awareness program conducted for the students.
- A narrative on the outcome of the awareness program, educational tour, and environmental related activities conducted.
- Photographs showing awareness program, educational tour, environmental related activities conducted.

Guidelines & Examples:

(These guidelines are illustrative)

- Guideline 1: Awareness programs may include presentation/ talk/ workshop by experts, documentary or feature film on environment, etc.
- Guideline 2: Educational tour may include visit to zoo, biodiversity parks, national parks, museums, heritage buildings etc., within or outside the city.
- Guideline 3: Environmental related competition may include painting/ essay competition, quiz, performance arts such as play, dance, music, etc.
- Guideline 4: Some examples of photographs that can be documented are:

4 Painting Competition

5 Quiz

6 Talk by expert

7 Visit to heritage structures

8 Visit to Zoo

Innovative Practices

Exemplary Performance

IP Credit 1

Point(s): 3

Intent:

Provide schools an opportunity to be awarded points for exemplary performance above requirements set by the IGBC Green School Rating System

Requirements:

- Credit 1.1: Exemplary Performance

  Identify the credits to exceed the next incremental threshold requirement of the base credit as mentioned in the IGBC Green Schools Rating System.

- Credit 1.2: Exemplary Performance

  Same as credit 1.1

- Credit 1.3: Exemplary Performance

  Same as credit 1.1

Documents Required:

- A narrative stating strategies adopted in the respective exemplary performance credits.
- Calculations indicating the next incremental threshold percentage achieved in the respective credit.

List of Base Credits eligible for Exemplary Performance

Site Selection and Planning	
SSP Credit 4	Greenery in campus ≥ 40%
SSP Credit 5	Minimise Heat Exposure to Sun: Non-Roof: ≥ 95%
SSP Credit 6	Minimise Heat Exposure to Sun: Roof ≥ 95%
Sustainable Water Practices	
SWP Credit 1	Rainwater Harvesting, Roof & Non-roof: ≥ 95%
SWP Credit 2	Water Efficient Plumbing Fixtures: ≥ 30%
SWP Credit 3	Turf Design: No turf
SWP Credit 4	Water Efficient Landscaping: ≥ 75%
SWP Credit 7	Use of Treated waste Water: ≥ 75%
Conserving and Harvesting Energy	
CHE Credit 2	Energy Efficient Lighting Fixtures: ≥ 75%
CHE Credit 3	Energy Efficient Fans: ≥ 50%
CHE Credit 6	On-Site Renewable Energy: ≥ 15%
Eco-friendly School Materials	
ESM Credit 3	Salvaged Materials: ≥ 5% (Only for New Schools)
ESM Credit 4	Eco-friendly Wood Based Materials ≥ 75%
ESM Credit 5	Materials with Recycled Content: ≥ 40% (Only for New Schools)
ESM Credit 6	Local materials: ≥ 50% (Only for New Schools)

Innovation in Practices

IP Credit 2 **Point(s): 1**

Intent:

Provide school an opportunity to be awarded points for innovative practices

Requirements:

- ❖ Identify the intent of the proposed innovation credit, the proposed requirement for compliance, and the proposed documentation to demonstrate compliance, and the design approach used to meet the required elements.

  Notes:

  - *Innovative strategies or measures not covered by the rating system*
  - *Strategy must be significantly better than standard sustainable design practices*
  - *Measures must be voluntary. Measures that are mandated by the local bye-laws and not addressed in the rating system are not eligible for Innovation.*

Documents Required:

- ➢ A narrative describing intent, requirements, potential strategies and technologies adopted in the respective innovation credits. Strategies adopted must be significantly better than standard sustainable design practices.
- ➢ Other supporting documents such as drawings, photographs, illustrations, cut-sheets, test reports, etc., as applicable.

IGBC Accredited Professional

IP Credit 3 **Point(s): 1**

Intent:

Support and encourage the involvement of IGBC Accredited Professional in the green landscape project.

Requirements:

- ❖ Atleast one principal participant of the project team shall be an IGBC Accredited Professional (IGBC AP).

Documents Required:

- ➢ A copy of IGBC AP certificate of owner or any other consultant involved in the project.

Annexure-I

INDIAN STANDARD SPECIFICATIONS FOR DRINKING WATER IS: 10500

S.NO.	Parameter	Requirement desirable Limit	Remarks
1.	Colour	5	May be extended up to 50 if toxic substances are suspected
2.	Turbidity	10	May be relaxed up to 25 in the absence of alternate
3.	pH	6.5 to 8.5	May be relaxed up to 9.2 in the absence
4.	Total Hardness	300	May be extended up to 600
5.	Calcium as Ca	75	May be extended up to 200
6.	Magnesium as Mg	30	May be extended up to 100
7.	Copper as Cu	0.05	May be relaxed up to 1.5
8.	Iron	0.3	May be extended up to 1
9.	Manganese	0.1	May be extended up to 0.5
10.	Chlorides	250	May be extended up to 1000
11.	Sulphates	150	May be extended up to 400
12.	Nitrates	45	No relaxation
13.	Fluoride	0.6 to 1.2	If the limit is below 0.6 water should be rejected, Max. Limit is extended to 1.5
14.	Phenols	0.001	May be relaxed up to 0.002
15.	Mercury	0.001	No relaxation
16.	Cadmium	0.01	No relaxation
17.	Selenium	0.01	No relaxation
18.	Arsenic	0.05	No relaxation
19.	Cyanide	0.05	No relaxation
20.	Lead	0.1	No relaxation
21.	Zinc	5.0	May be extended up to 10.0
22.	Anionic detergents (MBAS)	0.2	May be relaxed up to 1
23.	Chromium as $Cr+^{6}$	0.05	No relaxation
24.	Poly nuclear aromatic Hydrocarbons	–	--
25.	Mineral Oil	0.01	May be relaxed up to 0.03
26.	Residual free Chlorine	0.2	Applicable only when water is chlorinated
27.	Pesticides	Absent	--
28.	Radio active	–	--

S.No	Parameter	IS: 10500 Requirement (Desirable limit)	Undesirable effect outside the desirable limit	IS: 10500 Permissible limit in the absence of alternate source
Essential Characteristics				
1.	pH	6.5 – 8.5	Beyond this range the water will effect the mucous membrane and / or water supply system	No relaxation
2.	Colour (Hazen Units), Maximum	5	Above 5, consumer acceptance decreases	25
3.	Odour	Unobjectionable	–	--
4.	Taste	Agreeable	–	–
5.	Turbidity, NTU, Max	5	Above 5, consumer acceptance decreases	10
Following Results are expressed in mg/1 :				
6.	Total hardness as CaCO3, Max	300	Encrustation in water supply structure and adverse effects on domestic use	600
7.	Iron as Fe, Max	0.30	Beyond this limit taste / appearance are affected, has adverse effect on domestic uses and water supply structures, and promotes iron bacteria.	1.0
8.	Chlorides as Cl, Max	250	Beyond this limit test, corrosion and palatability are effected	1000
9.	Residual, Free Chlorine, Min	0.20	–	–
Desirable Characteristics				
10.	Dissolved solids, Max	500	Beyond this palatability decreases and may cause gastro intentional irritation	2000
11.	Calcium as Ca, Max	75	Encrustation in water supply structure and adverse effects on domestic use	200

12.	Magnesium as Mg, Max	30	--	100
13.	Copper as Cu, Max	0.05	Astringent taste, discolouration and corrosion of pipes, fitting and utensils will be caused beyond this	1.5
14. 0.1	Manganese as Mn, Max	0.1	Beyond this limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures	0.3
15.	Sulphate as So_4 Max	200	Beyond this causes gastro intentional irritation when magnesium or sodium are present	400
16.	Nitrates as No_3	45	Beyond this methanemoglobinemia takes place	100
17.	Fluoride, Max	1.0	Fluoride may be kept as low as possible. High fluoride may cause fluorosis	1.5
18.	Phenolic compounds as C_6H_5OH, Max	0.001	Beyond this, it may cause objectionable taste and odour	0.002
19.	Mercury as Hg, Max	0.001	Beyond this, the water becomes toxic	No relaxation
20.	Cadmium as Cd, Max	0.01	Beyond this, the water becomes toxic	No relaxation
21.	Selenium as Se, Max	0.01	Beyond this, the water becomes toxic	No relaxation
22.	Arsenic as As, Max	0.05	Beyond this, the water becomes toxic	No relaxation
23.	Cyanide as CN, Max	0.05	Beyond this, the water becomes toxic	No relaxation
24.	Lead as Pb, Max	0.05	Beyond this, the water becomes toxic	No relaxation
25.	Zinc as Zn, Max	5	Beyond this limit it can cause astringent taste and an opalescence in water	15
26.	Anionic detergents as MBAS, Max	0.2	Beyond this limit it can cause a light froth in water	1.0
27.	Chromium as Cr^{6+}, Max	0.05	May be carcinogenic above this limit	No relaxation
28.	Ploynuclear aromatic hydrocarbons as PAH, Max	–	May be carcinogenic	--

29.	Mineral Oil, Max	0.01	Beyond this limit undesirable taste and odour after chlorination take place	0.03
30.	Pesticides, Max	Absent	Toxic	0.001
31.	Radioactive materials a) α emitters Bq/1, Max b) β emitters Pci/1, Max	-- –	– –	0.1 1
32.	Alkalinity, Max	200	Beyond this limit taste becomes unpleasant	600
33.	Aluminum as Al, Max	0.03	Cumulative effect is reported to cause dementia	0.2
34.	Boron, Max	1	–	5

Source of Images:

Sustainable site planning

1. Unique Teaching Resources, http://www.uniqueteachingresources.com/school-bus-book-report.html
2. Jarvis House, http://wwwjarvishouse.blogspot.in/2012/03/
3. Total Lawn care, http://www.totallawncareinc.com/
4. Sydney Catchment Authority, http://www.sca.nsw.gov.au/catchment/living/stormwater/during-construction
5. Team bhp forum, http://www.team-bhp.com/forum/commercial-vehicles-india
6. M.C.L Saraswati Bal Mandir, Hari Nagar,New Delhi
7. Diwan Chandra Arya Vidyalaya, New Delhi
8. Sohrabji Godrej Green Business Centre
9. ISRO, IMGEOS & NDEM Facility, National Remote Sensing Centre, Shadnagar
10. Sohrabji Godrej Green Business Centre
11. CEAT Tyres, Halol
12. CRY, Kolkata Volunteer Blog, http://cryeastvols.wordpress.com/2012/06/
13. Fusion Home Modifications, http://fusionhomemodifications.com.au/our-work.html
14. Wikipedia, The great encyclopedia, http://en.wikipedia.org/wiki/Disabled_parking_permit

Sustainable water practices

1. Cartoon Movement, http://www.cartoonmovement.com/cartoon/1132
2. Sustainable Sanitation and Water Management, SSWM, http://www.sswm.info/category/implementation-tools/water-sources/hardware/precipitation-harvesting/rainwater-harvesting-u
3. Madhya Pradesh Pollution Control Board, http://www.mppcb.nic.in/rwh.htm
4. TNAU Agritech Portal, Agriculture, http://agritech.tnau.ac.in/agriculture/agri_majorareas_watershed_rainwaterharvesting.html
5. GWS Plumbing Services, http://gwsplumbing.com/diagrams
6. M.C.L Saraswati Bal Mandir, Hari Nagar, New Delhi
7. Atlantic, http://www.alcde.com/comm.htm
8. TNAU Agritech Portal, Agriculture, http://agritech.tnau.ac.in/agriculture/agri_majorareas_watershed_rainwaterharvesting.html
9. CII - Sohrabji Godrej Green Business Centre
10. MAD Scientists & Associates, http://environmentalconsultingohio.wordpress.com/
11. Indiamart, http://www.indiamart.com/vision-enviro/flow-meters.html

Conserving & harvesting energy

1. Gunkul, http://www.gunkul.com/Knowledge/Coservation.php
2. Ecotech, http://www.polarresponsiblerecovery.com/128-2/
3. Fire cover.net, http://www.fire-cover.net/fire-extinguishers.php
4. Evacuation plan & Procedures, https://www.osha.gov/SLTC/etools/evacuation/fixed.html
5. LED Wholesalers, http://shop.ledwholesalers.com/
6. LED Wholesalers, http://shop.ledwholesalers.com/
7. Bureau of Energy Efficiency, http://www.beeindia.in/
8. Bureau of Energy Efficiency, http://www.beeindia.in/
9. Instruments Agencies, http://www.measuringinstrumentsindia.com/
10. REVA-Administrative Block, Bangalore
11. Green Wing Energy, http://greenwindenergy.net/smallwindturbinetechnology.html
12. Star Energy System, http://www.starenergyindia.com/domesticfpc.html

Eco-friendly school materials

1. Ajit Kumar, http://www.ajitkumar.co.in/2012/09/energy-conservation-act-2001.html
2. Navin's Springfield, Chennai

REFERENCES

3. Purple Expressions, http://purpleexpressions.blogspot.in/
4. Citizen Matters, http://bangalore.citizenmatters.in/articles/print/4565-bbmp-corners-apartments-over-garbage-is-it-legal
5. S.Co Ed Vidhyalaya, L-Block, Hari Nagar, New Delhi
6. Salwan Public School, Mayur Vihar, New Delhi
7. Home Wood Bound Collection, http://www.homewoodbound.com/2012/01/welcome-to-our-blog-xx/
8. Green School Bali, http://www.greenschool.org/
9. Vissbiz, http://www.vissbiz.com/entryway-tables-and-mirrors/
10. Inhabitat, http://inhabitat.com/dutch-designer-dave-hakkens-creates-cool-rubble-floors-from-recycled-materials/
11. CivilBlog.org, http://civilblog.org/2014/04/22/specification-for-burnt-clay-fly-ash-building-bricks-is-13757-1993-3/

Indoor environmental quality

1. Savy Rest, http://www.savvyrest.com/blog/indoor-air-quality
2. AllState Sign & Plaque, http://www.allstatesign.com/no-smoking-in-the-school-building-sign.html
3. Compliance Signs, http://www.compliancesigns.com/NHE-6963.shtml
4. Saint Gobain, http://www.saint-gobain.fr/en
5. Candor International School, Bangalore
6. Candor International School, Bangalore
7. M.C.L Saraswati Bal Mandir, Hari Nagar,New Delhi
8. Candor International School, Bangalore
9. Olympic, Premium
10. Readers, http://www.readers.in/kores-brite-dust-less-chalk.html
11. Sehgal Foundation 'Green Building', New Delhi

Health & Hygiene:

1. Playground Invitations, http://rofl-lol.com/school-playground-cartoon/
2. Lady Sivasamy Girls' Higher Sec. School, http://www.mylaporetimes.com/2011/12/lions-club-provides-improved-drinking-water-facility-for-school/
3. Salwan Public School, New Delhi
4. King's Matriculation Higher Secondary School, http://kingsedu.org/activities.htm
5. St. Michael's High School, http://www.stmichaelshighschool.com/facilities.html
6. Oxford Grammar School, Hyderabad, http://www.oxfordgrammarschool.com/preprimary_2011_12.html
7. AYUSH – Isha Organic Health Systems, http://www.ishaoutreach.org/ayush/snapshots/events/independence-day-celebration-2011/
8. Salwan Public School, New Delhi
9. Nico Orgo USA. Inc, http://www.nicoorgousa.com/organic_products/orgo_neem_cake
10. S. K. International, Saharanpur, Uttar Pradesh, http://www.indiamart.com/skinternational/soil-protection-vermicompost-fertilizer.html
11. Arab Cleaning CO. W.L.L, http://www.arabcleaning.com/index.php?manufacturers_id=20
12. National Chemical Laboratories, http://www.nclonline.com/green_seal.php

Green Education:

1. Grass Fed Europe, http://www.grassfedeurope.com/catalog/home.php?language=en
2. Cotton Hill Government Girls Higher Secondary School, Thiruvananthapuram, http://www.newindianexpress.com/cities/thiruvananthapuram/CMs-Call-for-Conservation/2014/05/23/article2239400.ece
3. Kids for tigers, WWF
4. CII Green Schools Project Painting Competition, http://www.tribuneindia.com/2003/20031004/chd.htm#biz
5. Wild Wisdom Inter-school Quiz Competition, New Delhi, http://www.wwfindia.org/news_facts/?2760
6. St. Gregorios School, Mumbai, http://newswatch.nationalgeographic.com/2014/02/21/kids-in-india-come-together-to-save-tigers/
7. Oxford Grammar School, Hyderabad, http://www.oxfordgrammarschool.com/preprimary_2011_12.html
8. Oakridge International School, Newton Campus, http://oisnewton.blogspot.in/2014/02/a-visit-to-zoo-pp1.html

Notes

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About CII
(Confederation of Indian Industry)

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, playing a proactive role in India's development process. Founded in 1895, India's premier business association has over 7200 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 100,000 enterprises from around 242 national and regional sectoral industry bodies.

CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, healthcare, education, livelihood, diversity management, skill development, empowerment of women, and water, to name a few.

The CII theme of 'Accelerating Growth, Creating Employment' for 2014-15 aims to strengthen a growth process that meets the aspirations of today's India. During the year, CII will specially focus on economic growth, education, skill development, manufacturing, investments, ease of doing business, export competitiveness, legal and regulatory architecture, labour law reforms and entrepreneurship as growth enablers.

With 64 offices, including 9 Centres of Excellence, in India, and 7 overseas offices in Australia, China, Egypt, France, Singapore, UK, and USA, as well as institutional partnerships with 312 counterpart organizations in 106 countries, CII serves as a reference point for Indian industry and the international business community.

About IGBC
(Indian Green Building Council)

The Indian Green Building Council (IGBC), part of Confederation on Indian Industry (CII) was formed in the year 2001. The vision of the Council is to enable sustainable built-environment for all and facilitate India to be one of the global leaders in sustainable built-environment by 2025.

IGBC is strong with a membership base of more than 1,932 members which is progressively increasing over the years. Members comprise of all stakeholders of the construction industry viz. Architects, Interior Designers, Landscape Consultants, MEP Consultants, Builders, Developers, Product and Equipment Manufacturers, Corporate, Institutions and Government agencies.

The Council presently has 15 Chapters spread all over the country to cater to the aspirations of various states and regions. These chapters are headed by eminent Architects and Developers.

To seed the ideas of green building concepts in the minds of young people, IGBC has started Student chapters in various architectural and engineering colleges.

The council has in the past 10 years facilitated 2,771 Green Buildings in the country with a footprint of 2.23 Billion sq.ft. covering the varied building types viz. commercial, residential, hospitals, airports, Schools, airports, retail, factory buildings, townships and SEZs.

The council closely works with State and Central Governments, World Green Building Council, bilateral and multi-lateral agencies in promoting green building concepts.

Confederation of Indian Industry

Indian Green Building Council
Greening India since 2001

Confederation of Indian Industry

CII-Sohrabji Godrej Green Business Centre

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