GREEN AUDIT OF ANJUMAN-I-ISLAM'S KALSEKAR TECHNICAL CAMPUS

Submitted in partial fulfillment of the requirements for the degree of Bachelor of Engineering

By

SINGH SNEHAL	(15CE06)
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Under the guidance of

Prof. Rohan Dasgupta

Department of Civil Engineering

School of Engineering and Technology

Anjuman-I-Islam's Kalsekar Technical Campus

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A Project Report on

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CERTIFICATE

This is to certify that the project entitled as "**Green Audit Of Anjuman-I-Islam's Kalsekar Technical Campus**" is a bonafide work of **Singh Snehal (15CE06), Ansari Waseem (18DCE02), Shaikh Fuzail (18DCE14)** and **Shamsi Soheb (18DCE18)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of "Undergraduate" in "Civil Engineering".

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Place: New Panvel

Declaration

We declare that this written submission represents our ideas in our own words with others idealogicies / thoughts have been included; we have adequately cited and refered the original sources for literature.We also declare that, we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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ABSTRACT

The construction industry in India is one of the largest economic activities and is growing rapidly. The International Energy Agency estimated that existing buildings are responsible for more than 40% of the world's total primary energy consumption and for 24% of global carbon dioxide emissions. One strategy for achieving that transformation is most widely known by the term Green Building. We have gone past the point where going "green" is an option. It has now become an absolute necessity to not only mandatorily construct green but rate Green Quotient of our existing buildings also according to suitable green rating systems.

In this work, the detailed green audit of the Anjuman-I-Islam's Kalsekar Technical Campus is done. The tool adopted for rating is the IGBC Green Campus Rating System (New & Existing). Green audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste which can be used for a recycling project or to improve waste minimization plan. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of green impact on campus. In AIKTC we did the audit process in three stages i.e Pre audit, On site audit and Post audit. The pre audit stage involved initial interviews with management to clarify policies,records of activities in the implementation of mitigation measures and Collection of required data for capmus's green audit. The baseline data prepared for the AIKTC will be a useful tool for campus greening, resource management, planning of future projects, and a complete document for implementation of sustainable development of the college. After collecting the data from institute the on site audit performed which showing the detail of points obtained by the campus .The rating of the campus in each category has been done and the points have been allotted based on the existing condition of the campus. By this evaluation process, the degree of sustainability of the Campus is analyzed and rating is given. It will be a guiding factor in adapting measures for increasing its sustainability.

CONTENT

LIST OF FIGURE

LIST OF TABLE

CHAPTER 1
INTRODUCTION

1.1. GENERAL

A 'green' building is a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on our climate and natural environment. It assures intensified quality of air, well-being of inhabitants, safety and conservation of scarce national resources. In order to grapple with the climatic effects we need to enable the path of **sustainable development** for which Institutions play the most effective role in society.

Green buildings preserve precious natural resources and improve our quality of life. The construction sector for the last 10 years has done extremely well in embracing the green concepts. Though initially it started with individual buildings but now IGBC Green Campus rating system is designed for both New and Existing Campuses and now penetrating into other forms of environment such as Administrative campuses, Convention centers, Educational campuses, Healthcare campuses, Hospitality campuses, IT parks, Industrial parks, Leisure & Recreational campuses, Military campuses, Religious campuses, etc.The green concepts and techniques in campuses can help address National issues like water efficiency, energy efficiency and reduction in fossil fuel use in commuting, handling of consumer waste and conserving natural resources. Most importantly, these concepts can enhance occupant health, happiness and well-being. Against this background, the Indian Green Building Council (IGBC) is in the process of launched 'IGBC Green Campus rating system to address the National priorities. This rating programme is a tool which enables the designer to apply green concepts and reduce environmental impacts that are measurable. Green Campuses can have tremendous benefits, both tangible and intangible. The most tangible benefits are the reduction in water and energy consumption right from day one of occupancy. The energy savings could range from 20 - 30 % and water savings around 30 - 50%. Intangible benefits of green campus include health & well-being of the occupants, enhancing air quality & promoting biodiversity, safety benefits and conservation of scarce national resources. Green rating systems quantify the environmental performance of the analyzing building. Some of the prominent rating systems around the world are:-

[BREEAM (UK), LEED (USA), GREEN STAR (Australia)], [GRIHA (India), SAGRS (Saudi Arabia)] and [SBTool (collaborative)] respectively launched by developed countries, developing countries and group of countries globally.

Following are currently the most effectively used rating systems of green building in India:-

- Green Rating for Integrated Habitat Assessment (GRIHA).
- Leadership in Energy and Environment Design (LEED).
- IGBC rating system.

1.11 IGBC Green Campus rating system

IGBC Green Campus rating system is a voluntary and consensus based programme. The rating system has been developed based on materials and technologies that are presently available. The objective of IGBC Green Campus rating system is to facilitate the creation of **Site Planning and Management, Sustainable Transportation, Water Conservation, Energy Efficiency, Material and Resource Management, Health & Well-being, Green Education & Innovation in Design.**

The rating system evaluates certain mandatory requirements & credit points using a prescriptive approach and others on a performance based approach. The rating system is evolved so as to be comprehensive and at the same time user-friendly. The ratings awarded to the respective campuses are valid for 5 years only, after this period they have to reapply for renewing the certification to the Indian green building council. The rating system requires the application of National standards and codes like the Bureau of Indian Standards (BIS), Central Ground Water Board guidelines, Central Pollution Control Board guidelines, Energy Conservation Building Code (ECBC), MNRE Guidelines, MoEFCC guidelines, National Building Code (NBC), and Renewable Energy Certificates (RECs).

The IGBC system is most acknowledged and preferred. The overarching objective is to better the National standards so as to create new benchmarks. The programme is fundamentally designed to address National priorities and quality of life for occupants.

Some of the unique aspects addressed in this rating system are as follows:

- Optimization of water use for construction
- Improving lung space in the campus by emphasizing on green cover
- Encourage more green buildings in the campus IGBC Green Campus Rating System
- Effective management of waste generated in campus
- Promotion of bicycles as a mode of transportation
- Encourage facilities for improving health & well-being of occupants

1.2 PROBLEM STATEMENT

Leading to the need of sustainable development All India council for technical education (AICTE) has announced that every campus must go for the system of green campus. "The Confederation of Indian Industry" (CII) in 2001 launched IGBC (Indian Green Building Council) under which they have described precisely what are essentials needed to be in a campus for it to be a green building. For All types (New & Existing) of campuses the rating system has all parameters considered in it.

Our campus, Anjuman-I-Islam's Kalsekar Technical Campus (AIKTC) is not yet certified as a green campus by any green building rating agency. Therefore, as per AICTE's announcement as mentioned above, it is the need of the hour for our campus to go for the certification of green campus; preferably under the guidelines provided for Green Campus by IGBC Rating System.

1.3 PROPOSED SOLUTION

As we know that we have to make our campus as a green campus for which we must have to evaluate it as per the rules and method given for different aspect in the IGBC like Energy efficiency, Sewage management, water conservation and eco-friendly environment are also a part of making its green campus. We will be suggesting those things to our campus for completion of green campus.

1.4 OBJECTIVES

- To conduct Green Audit of AIKTC
- To calculate Green Score of AIKTC based on IGBC Green Campus Rating System for Existing Campuses
- To recommend Green Retrofitting measures to achieve IGBC Green Campus Certification
- To carry out Cost Analysis required for the recommendations given

CHAPTER 2
LITERATURE REVIEW

2.1 GENERAL

During the literature review for this work, we have referred quite a few texts, different case Studies and technical research papers from various national and international journals. This part focuses on the literature of green audit performed on different organizations.

2.2 REVIEW OF LITERATURE

Hilma tamiami fachrudin (2020) researched on green campus concept based on architect perspective. They described that the Aim of this paper is to achieve good environmental quality thorough green concept indicators and their principles such as water conservation, landscape, energy conservation, transportation, waste management and education. They said each university should focus on their targeted and prioritized strategies given by green curriculum, green procurement policies, energy conservation, waste treatment, transportation, planning and design, green offices, green labs, green it and learning, teaching and they also researched for realized green campus. They obtained the results from different respondents; they stated that the campus is related to campus prestige because it shows that the campus cared about the environment.

Sisriany & Fatimah (2017) have done a case study on IPB Dramaga Campus using 10 UNEP's (United Nations Environment Programme.)Green University Toolkit. Their main objective of this study was to analyze IPB Dramaga Campus sustainability through criterias of UNEP. They mentioned the method stages used were data collection, analysis, assessment and recommendations. They used gap analysis for data analysis and asses it with Likert's Scale Scoring. They concluded with results as: - green level of campus was moderate with total score of 31. Energy, Carbon and Climate change was moderate, Water wasn't Good, Waste and Procurement was moderate, while Bio Diversity and Ecosystem was very good, Panning & Design, Green IT and Transportation was good. Green Office wasn't very good.They finally recommended that Green level of IPB Dramaga Campus will increase from Moderate to Very Good with a proper development and implementation of Green Office, Green Campus Audit, Green Champion, Green Financial Strategies, Water Treatment, Green Lab and Off Campus Transportation.

Pradiprao and Attar (2018) performed green audit on five organizations. They analyzed the green audit reports of these organizations thoroughly. The thirteen factors are renewal source, rainwater harvesting, carbon neutrality, plantation of trees, E-waste management, hazardous waste management, campus energy intensity, green house gas inventory, water usage and reporting, food procurement and disposal, indoor air quality and ground water table harvesting on which green reports were generated, based on

those factors the comparative study was conducted by the Authors over those selected organizations. Through all these case studies they observed that audits were carried out for factors such as waste generation and management, water reuse, plantation of tree, campus energy intensity and indoor air quality are very important for sustainable development so they included these factors almost in all the reports of the organizations. They had defined the steps under green audit which are carried out by the authors in three stages i.e. Pre audit, on site audit and Post audit. In the end of each audit reports recommendations and suggestions were given by them. Also they suggested some improvisations for rating system, which must include proper calculations of all areas of green audit that will eventually help organizations to recognize where they were lacking in order to become well organized green building.

Nur Izie Adiana Abidin et al (2019) researched on Building Energy Intensity Measurement for potential retrofitting of zero Energy building in higher learning institution. They analyzed both term like Building Energy Intensity (**BEI**) and energy consumption in existence building such as higher learning institution (**HLI**) and service sector. After that they implemented the retrofitted to the structure which employed by energy efficient technology. They took electricity as a main component of energy consumption and they found all others consumption and modified by retrofitting technology. Overall view is created as the potential to retrofit towards zero energy balance by them which is done by audit, lean energy, green technology and clean energy which is improved the BEI and built better environment.

Yahya et al. (2014) have discussed how refurbishing of existing buildings can increase campus sustainability but they realised that refurbishing all campus buildings is impractical, uneconomical and includes thorough planning & prioritisation. Further they discussed about green potential of buildings as a concept that can also be really helpful in achieving sustainability of existing campus buildings. They have researched all the case studies carried out globally and have briefly described the history of green building rating tools like Building Research Establishment (BRE), Building Research Establishment Environmental Assessment Methodology (BREEAM), Leadership in Energy and Environmental Design (LEED), Comprehensive Assessment System for Built Environment Efficiency (CASBEE) & Green Building Index (GBI).They could find ample literature over GBRT and did enough data analysis; So they could frame that the objective of GBRT is to assess the green potential of the building after it is refurbished into green buildings .Apart from ascertaining the level of sustainability of a particular building, they could say GBRT has also acted as an incentive to building owners to add value to their properties. On the contrary, they perceived that objective of GPRT is to assess the green potential of the building before it is refurbished into green buildings. They obtained that due to lack of literature specifically on green potential assessment, green building rating tools (GBRT) were deemed most suitable for adoption and modification for the GPRT. They brought up the identifying methods and indicators that can be adopted for the analysis of green potential over existing buildings. They discovered that while literature on green potential assessment is limited, the frameworks of other types of analysis concerning green buildings are still viable. Hereby reviewing relevant literature on existing assessment tools they discussed about Assessing Green Potential, review of existing building assessment tool Green

Potential Assessment Tool (GPAT), Green Building Rating Tools, Green Potential Rating Tool & comparison of GBRT & GPRT which is also illustrated properly.

Rwelamila et al. (2016) have described the complex and dynamic behavior of power and politics within HLIs(Higher Level Institutions) in Africa.They observed that the GCBIs (Green campus building Initiatives) as unavoidably acting as stakeholders having different norms, backgrounds , needs and expectations. They could clearly see how the involved governance issues of GCB projects need to be able to have power skilfully and politically to manage GCBI successfully also to emphasize over project politics and monitor inappropriate use of power in order to avoid failed GCBIs models. Hence they concentrated to have sustainable GCBIs that will require HLIs to embrace project management's best practices also known as "enterprise project management" As a formal culture. They said ,to create this culture it will require the 5 major steps ;which are well described and if EPM becomes a formal culture in a HLI then GCBIs will be implemented as projects and programs .They concluded Normatively, GCB strategies to be aligned and moved from HLI corporate level through projects /programs & portfolios in a systematic manner to provide cohesion, visibility and better communication.They could interpret GCB projects won't always be well managed as formal processes and would be developed and maintained by project leadership teams and governance through HLI business case prosses rather than project management processes.

Rao & Dr. Aithal (2006) researched on Green Education Concepts & Strategies in Higher Education Model, In which they discussed how Education sector can transform itself into Green Education by attaining their full capabilities in the Opportunities, Challenges, consequences and sustainability of education. They observed how Green concept is used to achieve effective management of energy in Green management in education, Green service industries and many other fields in the society. They took the difference between conventional education and sustainable education as ideal system (sustainable system) in consideration .Also they did analysis on education model services and what kinds of education are provided by organizations. They suggested organizations as individual strategies to consider following (1) Competitive strategies (2) Monopoly strategy (3) Sustainable strategy (4) Amix of Blue and Green (5) Unethical strategy, also Some other strategies to be used in green education such as 1) Incorporating Sustainable Principles into Coursework 2) Acquainting Green Service Learning Requirements 3) Enforcing Existing Problem Solving Using Green Concept 4) Bridging Higher Education With Future Employers 5) Learning from Other's Experiences and 6) Green Model Analysis were also pointed.

Ramesh et.al (2018) stated that the international energy agency said the Existing building are responsible for more than 40% of world's total primary energy consumption and for 24% of global carbon dioxide emission so that they had performed green audit on school of engineering and technology, jain university campus by following IGBC green campus rating system (new & existing) to making it as a green campus. In that they had explained each credits of IGBC such as site planning and

management(SPM),sustainable transport(ST), water conservation(WC), Energy efficiency(EE), material , resource management(MRM), health and well being(HWB), innovation in design(ID) and green education(GE) in detailed and showed How they allotted points for each credits of IGBC based on existing condition of the campus. In the end they had discussed all the credits where they lacked to achieve minimum required points and concluded how to overcome by it to make a campus as green campus as per different certifications.

CHAPTER 3
METHODOLOGY

3.1 GENERAL

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The criteria, methods and recommendations used in the audit were based on the identified risks. The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the documents, interviewing responsible persons and data analysis, measurements and recommendations. The methodology adopted for this audit was a three step process comprising.

3.2 METHODOLOGY

1) Pre Audit:

This is formation of project. Firstly we have done detailed study on IGBC rating system guidelines for existing campus and then prepared a spreadsheet in MS Excel software for clearing the scope of work of each credit which is given in IGBC rating system. The sample of prepared excel file is shown below.

GREEN CAMPUS AUDIT REPORT.

SUSTAINABLE TRANSPORTATION

	Description	POINTS(Awarded)	POINTS(Achieved)	NOTES	Exemplary P	REMARKS
Credit 1	**Pedestrian Network**	1 to 3		· Pedestrian network here refers to footpaths and pathways. Trees/ Saplings shall be in place at the time of occupancy for shading. Shade from newly planted saplings shall be within 5 to 8 years of planting.		
	Provide shade for pedestrian network areas through tree cover or structured cover, for comfortable pedestrian access.	2				
	Provide adequate illumination (Lux levels) for pedestrian network within the campus, as per National Building Code of India, Part 8 - Building Services, Section - 1 Lighting and Ventilation, Table - 4 Recommended Values of Illuminance. The code recommends lux	1				
Credit 2	**Bicycle Lane Network**	2 to 4			Innovation in Design Process, if 100% of the bicycle network is designed exclusively for bicycles.	
	Option 1:- Bicycle Lane Network	2		Design bicycle lane network within the campus to connect to all main buildings and basic amenities.		
	Option 2:- Bicycles Provision	2		For educational 1 for every 25 occupants. **OR** Have a bicycle servicing facility within the campus (or) an alternative system to ensure that the bicycles would be in working condition.		

Figure 3:- SAMPLE DETAILING WORK ON EXCEL SPREADSHEET

Based on the different credits we had prepared a list of relevant documents which is needful for IGBC module. The documents are collected from different departments of AIKTC campus such as architectural department, Admin office and Maintenance department with the permission of higher authority of AIKTC.The list of collected documents are as follows:

SR.NO	Documents file	Purpose
1.	Electrical cover sheet	For electrical network
2.	Electrical/lighting plan	For lighting network & accessories
3.	Mechanical cover sheet	For plumbing network & accessories
4.	Blue print	For dimensions of campus
5.	Architecture plan	For amenities and measurement of built up area
6.	On & off site renewable energy certificates	To know the Total Annual Energy Consumption
7.		➢ Municipal water pumping ➢ Ground water pumping ➢ Treated waste water pumping ➢ Exterior area lighting including
8.	Rainwater harvesting	➢ Average peak month rainfall (in mm) & one-day rainfall (% of average peak month rainfall) ➢ High groundwater table
9.	High ground table data	➢ Run-off coefficients for typical surface types
10.	Turf area & Drought area	Total landscaped area
11.	Management of irrigation system	➢ Number of central shut-off valve ➢ Soil moisture sensors

Figure 4:-LIST OF COLLECTED DOCUMENTS

2) On site Audit:

It is an intermediate and most important Audit for completion of project. In which we required a visual survey on site for evaluating existing information of campus related to each modules of IGBC.for example plumbing fixtures, No. of trees, no. of AC and many others. Based on condition the allotment of points for each credit was done. Simultaneously we had prepared a rough sheet for collected information from site.

NOTE: Unfortunately we are unable to do a site audit because of COVID-19 pandemic, so we did study of different documents which is obtain by various departments in terms of soft copy only and completed the work as much as possible. We have mainly focused on major part of audit such as energy efficiency, water conservation and environmental condition of campus.

3) Post audit:

This is ending part of project. This required analysis of all informative data which is procured from pre audit and on site audit, made corrections for data if there any mistakes are happened.After getting successive data we merged pre audit data and on site audit data and make a draft sheet.

After that we kept a comparison between draft sheet and ratings system of IGBC guidelines for the sake of obtaining score of existing campus, also we achieved the level of campus (Result) under environmental sustainability and get certification from IGBC.Based on the results the recommendations were given for different credits to achieving more points for campus.

CHAPTER 4
RESULTS

Results are been displayed as per **IGBC Guidelines** for Existing Campus in tabular format.

4.1 CREDITS DETAILING TABLE

CREDIT 1: SITE PLANNING AND MANAGEMENT

Sr.no	Credits	Minimum points required for Certification	Points Earned by AIKTC
MR 1	Green Buildings within the Campus	Required	Unavailable
MR 2	Soil Erosion Control	Required	Unavailable
1.1	Green Buildings within the Campus	10	9
1.2	Site Preservation	NA	0
1.3	Green Cover or Vegetation	6	0
1.4	Heat Island Reduction, Non-roof	4	3
1.5	Outdoor Light Pollution Reduction	2	3
	Total Credit Score	**22**	**15**

Table 1:- SPM RESULTS

CREDIT 2: SUSTAINABLE TRANSPORTATION

Sr.no	Credits	Minimum points required for Certification	Points Earned by AIKTC
1.1	Pedestrian Network	3	0
1.2	Bicycle Lanes Network	4	0
1.3	Access to Sustainable Transportation	4	0
	Total Credit Score	**11**	**0**

Table 2:- ST RESULTS

CREDIT 3: WATER CONSERVATION

Sr.no	Credits	Minimum points required for Certification	Points Earned by AIKTC
MR 1	Rainwater Harvesting	Required	Unavailable
1.1	Rainwater Harvesting	6	0
1.2	Landscape Design	4	0
1.3	Management of Irrigation Systems	2	0
1.4	Wastewater Treatment and Reuse	4	0
1.5	Optimize Water Use for Construction	NA	0
1.6	Water Metering	2	2
	Total Credit Score	**18**	**2**

Table 3:- WC RESULTS

CREDIT 4: ENERGY EFFICIENCY

Sr.no	Credits	Minimum points required for Certification	Points Earned by AIKTC
1.1	Energy Efficiency in Infrastructural Equipment	10	2
1.2	On-site Renewable Energy	5	1
1.3	Off-site Renewable Energy	4	0
1.4	Energy Metering	2	2
	Total Credit Score	**21**	**5**

Table 4:- EE RESULT

CREDIT 5: MATERIAL & RESOURCE MANAGEMENT

Sr.no	Credits	Minimum points required for Certification	Points Earned by AIKTC
MR 1	Segregation of Waste, Post-occupancy	Required	Unavailable
1.1	Organic Waste Management, Post occupancy	3	0
1.2	Handling of Waste Materials, During Construction	NA	0
1.3	Local Materials	NA	0
	Total Credit Score	**3**	**0**

Table 5:- MRM RESULTS

CREDIT 6:- HEALTH & WELL BEING

Sr.no	Credits	Minimum points required for Certification	Points Earned by AIKTC
MR 1	Tobacco Smoke Control	Required	Unavailable
1.1	Basic Amenities	1	0
1.2	Health & Well-being Facilities	4	4
1.3	Universal Design	1	0
1.4	Basic Facilities for Construction Workforce	NA	0
	Total Credit Score	**6**	**4**

Table 6:- HWB RESULTS

CREDIT 7: GREEN EDUCATION

Sr.no	Credits	Minimum points required for Certification	Points Earned by AIKTC
1.1	Green Education	2	0
1.2	Green Campus Guidelines	1	0
	Total Credit Score	**3**	**0**

Table 7:- GE RESULTS

CREDIT 8: INNOVATION & DESIGN

Sr.no	Credits	Minimum points required for Certification	Points Earned by AIKTC
1.1	Innovation in Design Process	4	1
1.2	IGBC Accredited Professional	2	0
	Total Credit Score	**6**	**1**

Table 8:- ID RESULTS

4.2 FINAL POINTS TABLE

Sr.no	CATEGORY	Minimum points required for Certification	Points Earned by AIKTC
1.	Site Planning and Management	22	15
2.	Sustainable Transportation	11	0
3.	Water Conservation	18	2
4.	Energy Efficiency	21	4
5.	Material and Resource Management	03	1
6.	Health and Well-being	06	4
7.	Green Education	03	0
8.	Innovation in Design	06	1
	TOTAL	**90**	**27**

Table 9: Final points

Green Points	Certification Level
36 – 44	**Certified**
45 – 53	**Silver**
54 – 66	**Gold**
67 – 90	**Platinum**

Table 10 :-Selection criterion for certification

CHAPTER 5
CONCLUSION & RECOMMENDATIONS

5.1 CONCLUSION

1. AIKTC isn't currently eligible for green building criteria as per IGBC Guidelines for Existing campus.
2. The Total GREEN SCORE of AIKTC is 27/90.
3. As the minimum level of certification is 36: we still fall short for 9 points to become Green Certified Campus.
4. If the Recommendations stated are implemented then we can achieve 18 more points.
5. This will lead us to obtain (27+18) Green Score of 45.
6. AIKTC has enough potential to become A CERTIFIED GREEN CAMPUS if right improvisations and measures are taken.

5.2 RECOMMENDATIONS

Following are the credits that are needed to be improvised and implemented in order to achieve minimum certification level by AIKTC as per IGBC Guidelines for Existing Campus :-

- Promote Green Education on campus level.(Achievable points-2).
- If the Green Audit would be conducted by minimum 3 IGBC Accredited professionals then we would get more authentications in project score. (Achievable points-2).
- Prepare and give descriptive Green Campus Guidelines to campus occupants and facility team to help them to maintain and use green aspect of the campus (Achievable points-1).
- Promote use of energy On-site renewable to minimize impacts of fossil fuel energy and Demonstration of on-site renewable energy generation plant (Achievable points-4).
- Encourage the use of Off-site renewable energy technologies and Demonstrate that the project has purchased Renewable Energy Certificates (Achievable points-5).
- To treat waste water generated within the campus and reuse (Achievable points-4).

Other than these points which are easily possible for our college to achieve there are more points which can be achieved by little more effort and we might go for gold level of certification.

- For providing bicycle provision like making peoples who live near campus come by using bicycle (Achievable points-2)
- If we make shade for parking up to 50% of parking area. (Achievable points-1)
- By making a Rain Water accumulation tank (RWH) which can at least accumulate 1 day of rainfall. (Achievable points- 2 to 6)
- By increasing production of onsite renewable energy u to 10%. (Achievable points-1

These are points can be considered while improving our campus overall rating

CHAPTER 6
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ANNEXURE 1
EXCEL SPREADSHEET

GREEN CAMPUS AUDIT REPORT.

SPM (SITE PLANNING & MANAGEMENT)

	Description		POINTS(Awarded)	POINTS(Achieved)	NOTES	Exemplary Performance	REMARKS
CREDIT 1:-	OPTION 1		10	9		Exemplary Performance: This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if more than 45% of the campus built-up area is registered and/ or 35% of the campus built-up area is certified.	NOT APPLICABLE
	(a):-Green Buildings Built-up Area within the Campus .	Registered Projects (Built-up area of campus, excluding parking)					
		20%	1				
		25%	2				
		30%	3				
		35%	4				
		40%	5				
	OR						
	OPTION 1 (b):-Certified Projects Built-up Area	Certified Projects ((Built-up area of campus, excluding parking).					
		10%	1				
		15%	2				
		20%	3				
		25%	4				
		30%	5				
	OPTION 2 :- Green Features in the Campus Buildings	Design/ Retro-fit individual buildings with atleast 5 of the following green features, as outlined in Annexure II - Criteria for Green Features in the Campus Buildings:-	10				
		Passive Architecture	2				
		Heat Island Effect, Roof	2				
		Water Efficient Plumbing Fixtures	3				
		Waste Water Reuse	2				
		Eco-friendly Refrigerants	1				
		Energy Efficient Lighting Fixtures	3				
		High Performance Air-conditioning Equipment	3				
		On-site Renewable Energy	3				
		Daylighting	2				
		Outdoor Views	1				
CREDIT 2:-	Site Preservation(1 point for each measure, maximum 3 points & Not applicable for Existing Campuses)	Demonstrate that the campus complies with atleast one of the following measures:	5	0			NOT APPLICABLE
		Existing Landscape	1		Retain atleast 10% of the existing landscape		
		Natural Rocks	1		Retain atleast 50% of natural rocks (by surface area), excluding building footprint		
		Preserve or Transplant Existing Trees	1		Preserve or transplant atleast 75% of existing fully grown trees within the campus		
		Site Contour	1		Retain site contour to an extent of atleast 50% of the site, including building footprint area		
		Water Bodies and Channels	1		Retain 100% of water bodies and channels existing on the site		

		Case A: Green Cover or Vegetation (Percentage of Site Area with Green Cover / Vegetation)	6				
		Demonstrate that the campus has retained or restored green cover or vegetation, for atleast 15% of the site area.			Grass medians, grass pavers, jogging track, open-air theatre, parking areas, driveways, walkways, playground, swimming pool, etc ., are considered as site disturbance. • Vegetation on the ground shall only be considered;		
		> 15%	1				
		GREEN CAMPUS AUDIT REPORT.					
CREDIT 3:-	Green Cover or Vegetation	> 20%	2		vegetation over built structures such as roofs, basement, podiums,	The project is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if more than 30% of the site area is provided with green cover/ vegetation.	
		> 25%	3	3			
		AND/OR					
		Case B: Plantation of Tree Saplings (Minimum number of Tree Saplings per Acre) (Including Existing and Transplanted Trees)	6		Tree saplings shall be in place at the time of occupancy. • Only native / adaptive tree saplings shall be considered for this credit calculation. • Saplings planted in pots shall not be considered for credit calculations. • Development footprint includes building footprint and other hardscape areas such as parking, footpaths, walkways, roads, grass medians, grass pavers, etc.,		
		The green cover shall have minimum 15 trees per acreage or plant tree saplings that can mature into fully grown-up trees with large canopy in the next 5 to 8 years.					
		15	1				
		20	2				
		25	3	3			
CREDIT 4:-	Heat Island Reduction, Non-roof	Option 1: Non-roof Impervious Areas (Provide one or more of the following measures, for atleast 50% of exposed non-roof impervious areas within the campus.)1.Shade from existing tree cover/ newly planted sapl ings within 5 to 8 years of planting. 2. Open grid pavers or grass pavers 3. Hardscape materials (including pavers) with SRI of atleast 29 (and not higher than 64).	1 TO 4		• Non-roof impervious areas include, but not limited to, footpaths, pathways, roads, driveways, bicycle lanes uncovered surface parking, and other impervious areas. • Trees / Saplings shall be in place at the time of certification.	ID Credit 1 - Innovation in Design Process: Option 1: If more than 95% of exposed non-roof impervious areas are under tree cover (and/ or) with open grid pavers/ grass pavers (and/ or) hardscape materials with an SRI of atleast 29 (and not higher than 64). Option 2: If more than 95% of the parking spaces are under cover.	
		> 50%	1	0			
		> 75%	2				
		Option 2: Covered Parking (Provide atleast 50% of the parking spaces under cover.)	1 to 4		• 'Covered surface parking' here refers to structured covered parking • The exposed roof of the parking shall meet 'Heat Island Effect - Roof' criteria.		
		> 50%	1	0			
		>75%	2				
CREDIT 5:-	Outdoor Light Pollution Reduction	Option 1: Prescriptive Approach	2				
		Upward Lighting:		0	Design exterior lighting such that no external light fixture emits more than 5% of the total initial designed fixture Lumens, at an angle of 90 degrees or higher from	Total initial designed fixture Lumens shall be based on the sum total of all fixtures installed on site.	
		AND					
		Lighting Power Density:			The lighting power density should be		
		Option 2: Simulation Approach	2				
		Upward Lighting			Design exterior lighting such that all		
		AND					
		Lighting Power Density:		0	The lighting power density should be reduced by 25% for exterior areas vis- à-vis the ASHRAE Standard 90.1-2010 baselines, Section 9.4.3 - Exterior	Classify the project under one of the lighting zones, as defined in ASHRAE Standard	
SPM Mandatory							

		Option 1: Green Buildings Built-up Area within the Campus			Ensure atleast one building in the campus (or) 15% of the built-up area (excluding parking) within the campus (whichever is		
		OR					

	GREEN CAMPUS AUDIT REPORT.						
SPM Mandatory Requirement 1	Green Buildings within the Campus	Option 2: Green Features in the Campus Buildings	REQUIRED.	0	Design / Retro-fit individual buildings with the following green features, as outlined in Annexure I – Mandatory Criteria for Green Features in the Campus Buildings: 1) Water Efficient Plumbing Fixtures 2) Energy Efficient Lighting Fixtures 3) High Performance Air-conditioning Equipment (applicable only for air-conditioned buildings in the campus)	**The project should show compliance through the same option in both SPM Mandatory requirement 1 & SPM Credit 1: Green Buildings within the Campus.**	
SPM Mandatory Requirement 2	Soil Erosion Control	**Implement the following measures in the campus, as applicable:** **Soil erosion control measures must conform to the best management practices highlighted in the National Building Code (NBC) of India 2005, Part 10, Section 1, Chapter 4** **Protection of Landscape during Construction and Chapter 5 - Soil and Water Conservation** **Fertile topsoil to be stockpiled prior to construction, for future reuse or donation** **Develop appropriate measures to address soil erosion, after occupancy.**			If the top soil (10-20 cm) in the project is not fertile (or) suitable for preservation, in such a case the project may provide relevant justification.		

Table 11: SPM

GREEN CAMPUS AUDIT REPORT.

SUSTAINABLE TRANSPORTATION

	Description	POINTS(Awarded)	POINTS(Achieved)	NOTES	Exemplary	REMARKS
Credit 1	**Pedestrian Network**	1 to 3		footpaths and pathways.Trees/ Saplings shall be in place at the time of occupancy for shading.Shade from newly planted saplings shall be within 5		
	Provide shade for pedestrian network areas	2				
	Provide adequate illumination (Lux levels) for	1	0			
Credit 2	**Bicycle Lane Network**	2 to 4			Process, if 100% of the bicycle network is designed	
	Option 1:- Bicycle Lane Network	2	0	Design bicycle lane network within the		
	Option 2:- Bicycles Provision	2	0	Far educational 1 for every 25		
Credit 3	**Access to Sustainable Transportation**	2 to 4				
	Option 1: Public Transport	2	0	Provide access to a public		
	Option 2: Shuttle Service	2				
	2.1:- Electric/ CNG-powered Vehicles		0	Operate or have a contract in place for		
	2.2:- Conventional Vehicles (Fossil Fuel based		0	Operate or have a contract in place for		

Table 12: ST

GREEN CAMPUS AUDIT REPORT.

WATER CONSERVATION

		Description	POINTS(Awarded)	POINTS(Achieved)	NOTES	Exemplary Performance	REMARKS
WC Mandatory Requirement 1	Rainwater Harvesting	**Case A: Rainwater Harvesting** Table 1:-Average Peak Month Upto 250 9% (251 – 350) -7.5% (351 – 500)- 6% (501 – 700) -4.5% 701 & above - 3% **Case B: High Groundwater Table** Table 2 – Run-off coefficients for Typical Surface Types Surface type & Run off coefficient. Cemented / Tiled Roof :-0.95 Roof Garden (<100 mm thickness) :-0.5 Roof Garden (100 – 200 mm thickness :- 0.3 Roof Garden (201 – 500 mm) thickness:-0.2 Roof Garden (> 500 mm thickness) 0.1 Turf, Flat (0 - 1% slope) 0.25 Turf, Average (1 - 3% slope) 0.35 Turf, Hilly (3 - 10% slope) 0.4 Turf, Steep (> 10% slope) 0.45 Vegetation, Flat (0 - 1% slope) 0.1 Vegetation, Average (1 - 3% slope) 0.2 Vegetation, Hilly (1 - 3% slope) 0.25 Vegetation, Steep (> 10% slope) 0.3 Concrete Pavement 0.95 Gravel Pavement 0.75 Open-grid Concrete Pavement 0.75 Open-grid Grass Pavement 0.5 Water Bodies (lined)Ex: Swimming Pools:-0.95 Water Bodies (un-lined)Ex: Water Pond :-0	REQUIRED	0	Design rainwater harvesting system to capture/ percolate atleast 'one-day rainfall*' runoff volumefrom roof and non-roof areas in the campus. * One-day rainfall can be derived from 'percentage of average peak month rainfall' given in Table - 2. To arrive at average peak month rainfall, consider an average of atleast last 5 years peak month rainfall (of the respective year). In areas where the Central / State Ground Water Board does not recommend artificial rain water recharge (or) if the groundwater table is less than 8 meters, the project is required to provide justification for not implementing rainwater harvesting system.	• For rainfall information, refer Indian Meteorological Department data at http: //www.imd.gov.in • Runoff volume = Surface area x Runoff Coefficient x Rainfall. • For run-off coefficients for typical surface types, refer Table 3 - Run-off coefficients for Typical Surface Types. • Consider Rainwater Harvesting Guidelines from National Building Code (NBC) of India, Part 11 - Approach to Sustainability (as and when available), Section 7.2 - Rainwater Harvesting - Surface runoff. • In areas where the water percolation is limited, collection tanks / water bodies may be provided to meet the above requirement. • Filtering of suspended solids shall be ensured by providing suitable filtering media before letting the water into the collection tanks, water bodies and municipal storm water drains.	
WC Credit 1	Rainwater Harvesting	Case A: Rainwater Harvesting Design rainwater harvesting system to capture/ percolate atleast 'one-day rainfall*' runoff volume from roof and non-roof areas. *One-day rainfall can be derived from 'percentage of average peak month rainfall' given in Table - 4. To arrive at average peak month rainfall, consider an average of atleast last 5 years peak month rainfall (of the respective year). Table 3 - Criteria to arrive at 'One-day Rainfall' S No | Average Peak Month Rainfall (mm) | One-day Rainfall (% of Average Peak Month Rainfall) 2 points | 4 points | 6 points 1 | Upto 250 | 12% | 15% | 18% 2 | 251 – 350 | 10% | 12.5% | 15% 3 | 351 – 500 | 8% | 10% | 12% 4 | 501 – 700 | 6% | 7.5% | 9% 5 | 701 & above | 4% | 5% | 6% Case B: High Groundwater Table Design rainwater harvesting system to capture/ percolate atleast 'one-day rainfall*' runoff volume from roof and non-roof areas. *One-day rainfall can be derived from 'percentage of average peak month rainfall' given in Table - 4. To arrive at average peak month rainfall, consider an average of month rainfall (of the respective year). Table 4 - Criteria to arrive at 'One-day Ra infall' for Projects with High Groundwater Table S No | Average Peak Month Rainfall (mm) | One-day Rainfall (% of Average Peak Month Rainfall) 2 points | 4 points | 6 points 1 | Upto 250 | 6% | 9% | 12%	2 to 6	0	• For rainfall information, refer Indian Meteorological Department data at http://www.imd.gov.in WC Mandatory Requirement 1 - Rainwater Harvesting • Runoff volume = Surface area x Runoff Coefficient x Rainfall. For run-off coefficients for typical surface types, refer Table 3 - Run-off coefficients for Typical Surface Types in. • Consider Rainwater Harvesting Guidelines (as and when available) from the National Building Code (NBC) of India, Part 11 - Approach to Sustainability, Section 7.2 - Rainwater HarvestingSurface Runoff. • In areas where the water percolation is limited, collection tanks may be provided to meet the above requirement. • Filtering of suspended solids shall be ensured by providing suitable filtering media before letting the water into the collection tanks, water bodies and municipal storm water drains.	**This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if rainwater runoff from roof & non-roof areas is captured and / or recharged, as per Table-5 listed below:** Table 5 - Criteria to arrive at 'One-day Rainfall' for Exemplary Performance S No | Average Peak Month Rainfall (mm) | One-day Rainfall (% of Average Peak Month Rainfall) Case A: Rainwater Harvesting | Case B: High Groundwater Table 1 | Upto 250 | 21% | 15% 2 | 251 – 350 | 17.5% | 12.5% 3 | 351 – 500 | 14% | 10% 4 | 501 – 700 | 10.5% | 7.5% 5 | 700 & above | 7% | 5%	

		2 | 251 – 350 | 5% | 7.5% | 10% 3 | 351 – 500 | 4% | 6% | 8% 4 | 501 – 700 | 3% | 4.5% | 6% 5 | 701 & above | 2% | 3% | 4%					
WC Credit 2:-	Landscape Design	Limit use of turf in the campus to conserve water and / or ensure that landscaped area is planted with drought tolerant / native / adaptive species (excluding turf species). Type of Landscape & Percentage of landscape total area Total Landscaped area Turf Area < 40% 1 < 20% 2 Drought Tolerant/ Native / Adaptive Species Area > 40% 1 > 60% 2	1 to 4 1 2 1 2	0	Notes: • The landscape here refers to soft landscaping, which includes only pervious vegetation. • Drought tolerant species are those species that do not require supplemental irrigation. Generally accepted time frame for temporary irrigation is 1 to 2 years. • For this credit calculations, turf area in play areas, golf course, etc., shall also be considered. • Vegetation on the ground shall only be considered; vegetation over built structures such as roofs, basement, podiums, etc., shall not be considered. • Potted plants shall not be considered as vegetation.	**This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if more than 80% of the landscaped area is planted with drought tolerant / native / adaptive species.**	
WC Credit 3:-	Management of Irrigation Systems	Reduce water demand for irrigation through water efficient management systems and Central shut-off valve Soil moisture sensors integrated with irrigation system Turf and each type of bedding area must be segregated into independent zones Atleast 50% of landscape planting beds must have a drip irrigation system to reduce Atleast 75% of turf area must have sprinkler irrigation system to reduce water loses Time based controller for the valves such that evaporation loss is minimised and Pressure regulating device(s) to maintain optimal pressure to prevent water loss Any other innovative methods for watering	1 to 2	0	• This credit is applicable only for those projects which have atleast 10% of the site area landscaped. • Vegetation on the ground shall only be considered; vegetation over built structures such as roofs, basement, podiums, etc., shall not be considered. • Potted plants shall not be considered as vegetation.		
WC Credit 4:-	Waste Water Treatment and Reuse	Waste Water Treatment Have an on-site treatment system to handle 100% of waste water generated in the campus, to the quality standards suitable for reuse, as prescribed by Central (or) State Pollution Control Board, as applicable AND Waste Water Reuse Use treated waste water for atleast 25% of the total water required for landscaping and centralised Air-conditioning cooling tower make-up water (if the project uses centralised water-cooled chillers) Points are awarded as below: Application (in aggregate) | Percentage of Total Water Catered trough Treated Waste Water | Points Landscaping and | ≥ 25% | 1 Centralised Air-conditioning cooling tower make-up | ≥ 50% | 2	1 to 4 2 2	0	• Waste water here refers to grey, black and industrial water. • The credit point(s) can be claimed only if the waste water is treated in-situ and reused in-situ. In case the local authorities insist the project to divert waste water to a centralised /common waste water treatment plant outside the campus, then the project can show compliance with 'Case-2' given above, by reusing treated wastewater from the centralised / common / any other waste water treatment plant. • Treated waste water sourced from other sites / local authorities through permanent piped connections or other means can also be considered to show compliance for 'waste water reuse'. • Water from sources such as bore wells, natural wells, municipal water systems is considered as potable water. • Captured rain water can also be considered to show compliance. • The water requirement and average number of watering days for landscaping shall be considered as 6 liters per sq.m. per day (i.e. 6 liters/ sq.m./ day) for a minimum of 300 days. OR Justify if the water requirement and the average number of watering days for landscaping is less than the above requirement. • Vegetation on the ground shall only be considered for landscape water requirement calculations; vegetation over built structures such as roofs, basement, podiums, etc., shall not be considered • Potted plants shall not be considered under vegetation.	**This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if treated waste water is used for atleast 75% of the total water required for landscaping and centralised Air-conditioning cooling make-up water (if the project uses water-cooled chillers).**	
WC Credit 5:-	Optimise Water Use for Construction (Not applicable for Existing Campuses)	Demonstrate that the project has reduced atleast 50% of the potable water required AND The treated waste water shall meet the quality standards suitable for reuse during construction, as prescribed by:Bureau of Indian Standards (BIS) – Plain and Reinforced Concrete (Code of Practice) IS 456 : 2000, Section 2 - Materials,Workmanship, Inspection and Testing, 5.4 - Water, Table 1 - Permissible Limit for Solids' (Or) Central (or) State Pollution Control Board	1	0	• Treated waste water from other sites/ local authorities through piped connections or other means can also be considered to show compliance. • The baseline water requirement for construction activities shall be defined by the project team with supporting calculations.		NOT APPLICABLE
WC Credit 6:-	Water Metering	Encourage sub-metering to improve water performance and thereby save potable water.Demonstrate sub-metering for atleast three of the following water use applications, as applicable: (1 point for every three measures; maximum 2 points) • Municipal water supply • Bore water consumption • Treated waste water consumption	1 to 2	2			

		• Water consumption for landscape requirements • Water consumption for centralised Air-conditioning cooling tower makeup • Building-level water consumption • Any other major source of water consumption					

Table 13: WC

GREEN CAMPUS AUDIT

ENERGY EFFICIENCY

Description		POINTS(Awarded)	POINTS(Achieved)	NOTES	Exemplary Performance	REMARKS
	Energy					
	Efficiency in infrastructural	1 to 10	1			
	equipment					
	n 1 -Lighting sy	5				
	ting power den	5				
	Reduction in Lighting Power Density for Exterior Areas					
	> 30%	1	1			
	>35%	2				
	>40%	3				
	>45%	4				
	>50%	5				
	ighting control	2				

CREDIT 1	All non-emergency exterior & common area lighting such as landscaping, surface and covered parking, pathways, bicycle lanes, street lighting should have Daylight sensor/ Timer-based control	All non- emergency exterior & common area lighting such as landscaping, surface and covered parking, pathways, bicycle lanes, street lighting should have Daylight sensor/ Timer- based control		Pumps & motors which are used only for domestic and sewage water supply should be considered. · Pumps & motors which are used for firefighting and other non-regular applications need not be considered.	Lighting Power Density (LPD) is reduced by atleast 55% for exterior areas over ASHRAE Standard 90.1-2010 baseline. COP/ IPLV of Centralised Air-conditioning systems is atleast 10% over ASHRAE Standard 90.1-2010 baseline.	
	2 - Pumps and	**2**	0			
	Pumps shall have minimum efficiencies as listed below: (2 points)					
	Capacity of the Pump minimum efficiency					
	≥ 50					
	14 ≥ 60					
	o 49 ≥ 70					
	0 ≥ 85					
	Motors (> 3.5 HP) with efficiency of atleast 85% (1 point)					

	Option 3 - Centralised Air-conditioning Systems	**3**	0	For projects where use of water cooled chillers is not allowed by the local authorities due to unavailability of water for cooling tower make-up, air cooled chillers can be considered in base case in lieu of water cooled chillers. Baseline COP/ IPLV of air cooled chillers will be as per ASHRAE Standard 90.1-2010.		
	conditioning systems shall have a COP/ IPLV of atleast Efficiency of Centralised Air conditioning systems over ASHRAE Standard 90.1-2010 baseline					
	>2.5%	1				
	>5%	2				
	>7.5%	3				
CREDIT 2	**e Renewable E** generated to the Total Annual Energy	**1 to 5** 5	0	supply. Pumps & motors which are used for firefighting and other non-regular applications need not be considered. Renewable energy sources include solar energy, wind power, bio-mass,bio-gas, geo-thermal energy, etc.	under ID Credit 1 - Innovation in Design Process,if on-site renewable energy generation is atleast 60% of total annual energy consumption of the campus infrastructural	
	>10%	1				
	>20%	2				
	>30%	3				
	>40%	4				
	>50%	5				
	e Renewable E Renewable Energy Certificates (RECs) equivalent to	**1 to 4**	1			

CREDIT 3 .	atleast 20% of total annual Certificates Purchased to the Total Annual Energy Consumption of the Campus Infrastructural Equipment/	4		Infrastructural equipment shall include exterior lighting and centralised pumps & motors used only for domestic and sewage water supply. Pumps & motors which used for firefighting and other non-regular applications need not be considered Type of renewable energy source shall be in compliance with the Ministry of Newand Renewable Energy (MNRE), Government of India and respective State Regulatory Commissions.Off-site renewable energy so generated shall be counted only once. · Hydro power projects with 25 MW or lesser size shall only be considered under this credit.For credit calculations, RECs purchased in the last 6 months of building operation can also be considered, to show compliance. In case, the Project purchases RECs	This credit is eligible for exemplary performance under ID Credit 1 - Innovation in Design Process, if the project has purchased Renewable Energy Certificates (RECs) equivalent to atleast 60% (or) invested in off-site renewable energy equivalent to 100% of total annual energy consumption of the campus infrastructural equipment/ systems, excluding buildings.	
	>20%	1				
	>40%	2				
	>60%	3				
	>80%	4				
	OR					
	Option 2 -Off-site Renewable Energy Investments Demonstrate that the project has invested in off-site renewable energy equivalent to atleast 20% of total annual energy consumption of the campus infrastructural equipment/ systems, excluding buildings.					
	the Total Annual Energy	4				

	Consumption of the Campus	4		and the Project.		
	>20%	1	1			
	>40%	2				
	>60%	3				
	>80%	4				

	nergy Meterin	**1 to 2**	2			
	following energy use applications, as applicable: (1 point for					
	cipal water pum	1	1			
	und water pump	1	0			
	d waste water p	1	1			
	Exterior area lighting, including landscapes	1	1			
CREDIT 4	d air-conditionin	1	1		This credit is not eligible for exemplary performance	
	able energy gen	1	0			
	Power backup systems (e.g. Generators sets)	1	1			
	evel energy con	1				
	Any other energy consuming equipment and systems	1	1			

Table 14: EE

GREEN CAMPUS AUDIT

MATERIAL AND RESOURCE

MRM Mandatory Requirement 1		
Segregation of Waste, Post-occupancy		
	Dry and Wet Waste	Provide separate bins to collect dry waste (paper, plastic, metals, glass, etc.,) and wet waste (Food), at all the exterior common areas of the campus, as applicable. Divert the collected waste to a centralised facility, which is easily accessible for hauling.
	Hazardous Waste	In addition to dry and wet waste bins, provide separate bins for safe disposal of the following hazardous waste, at the centralised facility: Batteries 'e' waste Lamps Medical waste

Description		POINTS(Awarded)	POINTS(Achieved)	NOTES	Exemplary	REMARKS
Credit 1	**Organic Waste Management, Post-occupancy**	1 to 3	1	For calculation, food waste can be considered as 0.1 kg per person (i.e. 0.1 kg/ sq.m/ day) or as prescribed by the local byelaw, whichever is more stringent; landscaped waste can be considered as 0.2 kg per sq.m per day (i.e. 0.2 kg/ sq.m/ day).		
	food waste >75%	1	0			
	garden waste > 25%	1	1			
	> 50%	2	0			
Credit 2	**Handling of Waste**	1	0	Construction and demolition waste here		
	Local Materials (NOT	2		manufactured within a distance of 400 km. Assembly of building materials shall not be considered.Extraction and processing of raw materials need not be considered as part of this credit		
	Percentage of Local					
	> 50%	1	0			
	> 75%	2	0			

Table 15: MRM

GREEN CAMPUS AUDIT

GREEN EDUCATION

Description		POINTS(Awarded)	POINTS(Achieved)	Compliance Option	Exemplary Performance	REMARKS
CREDIT 1	Green Education	2	0	1)Organise atleast three outreach/ educational programmes in a year with the involvement of campus occupants, local communities & NGOs, to increase public awareness on environment sustainability and green features of the campus.The outreach/ educational programmes can include, but not limited to, promotional materials (posters, brochures, etc.,), information portals, awareness programmes. 2) Constitute a formal committee/ forum with the involvement of campus occupants, local communities & NGOs, to identify and implement atleast two eco-friendly practices/ green initiatives within and outside the campus. The eco-friendly practices/ green initiatives can include, but not limited to, clean & green campaigns on waste segregation & recycling, water conservation, energy conservation, use of public transportation/ bicycles/ car pooling, world green building week, earth hour. 3) Institute awards to acknowledge the efforts of campus occupants, local communities, NGOs for implementing eco-friendly practices/ green initiatives.	This credit is not eligible for exemplary performance	

CREDIT 2	**Green Campus Guidelines**	**1**	0	Develop & publish the following: **1)** Project specific green campus guidelines providing information that helps campus occupants to implement and ise the green features, post occupancy. **2)**Project specific green campus operation & maintenance and renovation guidelines providing information that helps facilities team to implement the green features, during operation and renovation process.	This credit is not eligible for exemplary performance	

Table 16: GE

GREEN CAMPUS AUDIT REPORT

(ID) INNOVATION IN DESIGN

	Description	POINTS (Awarded)	POINTS (Achieve)	Exemplary Performance	REMARKS.
Credit 1		Points: 1-4	1		
Credit 1.1	Innovation in Design Process	1	1		
	Option 1 : Innovation				• Measures must be voluntary. Measures that are mandated by the
	(OR)				
	Option 2: Exemplary Performance			• As a general rule, points for exemplary performance	
Credit 1.2	Innovation in Design Process	1			Same as credit 1.1
Credit 1.3	Innovation in Design Process	1			Same as credit 1.1
Credit 1.4	Innovation in Design Process	1			Same as credit 1.1
Credit 2	IGBC Accredited Professional	Points: 2	0		Atleast three participants of the project team shall be IGBC Accredited

Table 17:- ID

GREEN CAMPUS AUDIT REPORT.

HEALTH & WELL-BEING

Mandatory Requirement 1					
	Description	**POINTS (Awarded)**	**POINTS(Achieve)**	**REMARKS.**	
Compliance Options	OPTION 1:-No Smoking	**mandaory**	yes	Demonstrate that smoking is prohibited in the campus	
	OR				
	OPTION 2:-Outdoor Smoking Areas		yes	outdoor smoking areas, minimum of	
	Basic Amenities				
HWB Credit 1	Provide atleast seven basic amenities within the campus, with	**Points: 2 (for New**	NA	Accommodation facilities (Guest house, Hotel, Service apartment)	
HWB Credit 2	Health & Well-being Facilities	**(2 points)**	2	health & well-being facilities to cater to atleast 10% of campus Health & well-being facilities include, but not limited to, aerobics, gymnasium, swimming pool, yoga, meditation, indoor games, outdoor games, playground, etc	
	(AND/ OR)				
	Healthcare, Emergency & Security Facilities	**(2 points)**	2	provide first-aid/ clinic, pharmacy, emergency alarm, surveillance system etc	
HWB Credit 3	Universal Design	**Points: 2 (for New Campuses), Points: 1 (for Existing Campuses)**	0	TAKE GUIDANCE OF guidelines of the National Building Code (NBC) of India 2005	
HWB Credit 4	Basic Facilities for Construction Workforce	**Points: 1 (Not**	NA	First-aid and emergency facilities	

Table 18:- HWB

ANNEXURE II
LIST OF COLLECTED DOCUMENTS WITH THEIR SPECIFICATIONS

LIST OF DOCUMENTS REQUIRED FROM CAMPUS

SR. NO	Documents file	Purpose	Discription	Remarks
•	**Electrical cover sheet**	For electrical network	Efficiency/ COP values	Used in ENERGY EFFICIENCY (partially data obtained due to pandemic)
•	**Electrical/lighting plan**	For lighting network & accessories	lighting fixture type, quantity, total lumens, upward lumens and upward lighting percentage, exterior lighting fixtures	Used in ENERGY EFFICIENCY. (Collected data in terms of soft copy from maintenance dept.)
•	**Mechanical cover sheet**	For plumbing network & accessories	List of plumbing fixtures (flow and flush),flow rates, water pressure	Used in WATER CONSERVATION. (data not found)
•	**Blue print**	For dimensions of campus	(site plan, floor plans, sections & elevations, images, as applicable) showing the passive architectural features	Used in SITE PLANNING AND MANAGEMENT (Soft copy collected from architect dept.)

•	**Architecture plan**	For amenities and measurement of built up area	Name of the project, Location, Registration number, Type of rating system, Built-up area (excluding parking), Year of registration/ certification (as applicable),number of exterior opening with 0.5 projection factor	Used in SITE PLANNING AND MANAGEMENT. (Soft copy collected from architect dept.)
•	**On & off site renewable energy certificates**	To know the Total Annual Energy Consumption and percentage of offsite renewal waste	location, technical details, total annual energy generation(kWh)	Used in ENERGY EFFICIENCY. (data not found)
•	**Energy metering system**	Building-level energy consumption, Any other energy consuming equipment and systems	Municipal water pumping, Ground water pumping, Treated waste water pumping, Exterior area lighting landscapes, Centralized air-conditioning systems Renewable energy generation, Power backup systems (e.g. Generators sets)	Used in ENERGY EFFICIENCY. (Partially data collected from maintenance dept.)
•	**Rainwater harvesting**	• Average peak month rainfall (in mm) & one-day rainfall (% of average peak month rainfall) • High	capture/ harvest rain water from roof & non-roof areas,run-off volume,location of rain water harvesting including cross	Used in WATER CONSERVATION. (unable to collect full data)

		groundwater table	sectional drawing, average peak month rainfall (mm)	
•	**High ground table data**	• Run-off coefficients for typical surface types	level of water table,	(data not found)
•	**Turf area & Drought area**	Total landscaped area	Area covered: turf, drought tolerant species, native, adaptive & other plant species on the ground	(data not found)
•	**Management of irrigation system**	Landscape planting beds for drip irrigation system, watering system, methods for watering	Number of central shut-off valve, Soil moisture sensors, Turf and each type of bedding area,Time based controller for the valves,Pressure regulating device Innovative	Used in WATER CONSERVATIO N (partially data found)
•	**Waste water treatment & reuse**	On-site treatment system to handle 100% of waste water generated from campus	quality standards of the treated waste water,location,wa ter demand for landscaping, flushing and air-conditioning cooling tower make-up water (if the project uses water-cooled chillers), and quantity of waste water reused for such applications	N.A

•	**Water metering**	• Municipal water supply • Bore water consumption • Treated waste water consumption • Water consumption for landscape requirements • Water consumption for centralised Air-conditioning cooling tower makeup • Any other major source of water consumption	list of water meters,location	(not covered fully)
14	**Counting of Machineries**	1)Number of AC 2)Number of water pumps	Details of the pumps & motors indicating the efficiency	This is also Not completed
15	**Green education system**	Activities for public awareness. Formal committee involvement with other communities	green features,post occupancy	(data found from dept.)

16	**Other data**	Taking information which is not completed by others resources	area of green cover or vegetation,existing trees,plants,Segregate and divert dry waste,wet waste area,location	by reference of SSR of AIKTC

Table 19: DOCUMENT COLLECTED