

**B.L.D.E.A ASSOCIATION'S  
S.B. ARTS AND K.C.P. SCIENCE COLLEGE  
VIJAYAPUR**

**Green Audit Report.  
2020 – 21**

BLDEA's S.B Arts and K.C.P Science College

**Principal Lead Auditor:**

**Mallikarjun A Kambalyal.** CEA, ISO 5001, 14001 Lead Auditor.

**Audited by:**

**SUNBSHUBH TECHNOVATIONS PVT LTD.,  
120-2, LGF, 'A' wing, IT Park,  
Hubli – 580029. Karnataka. India.**

**German off: Neuer Weg 166, 47803 Krefeld,  
Dusseldorf. Germany Anbieter-Nr 1041388**



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Green audit report - 2020

EXECUTIVE SUMMARY.

<b>Sr No</b>	<b>Observation*</b>	<b>Problems*</b>	<b>Resulting losses*</b>	<b>Remedial measures*</b>	<b>Capital*</b>	<b>Projected savings*</b>	<b>Category 7</b>
1	Differently abled friendly audit	New initiative - Self assessment			In house	Not applicable	7.1.7
2	Battery placement	Battery shell in conductor loop	Low performance & self-discharge.	Design the stacking arrangements.	In house resources	25% of the cost of the batteries.	7.1.2, 7.1.6
3	Battery regeneration.	Short life span	300% of the cost of the battery.	Subject all batteries to regeneration made.	Rs.20.00 Lacs or as per user agreement	300 %	7.1.2,
4	Electrical	Old tube lights	High energy consumers	LED lights of appropriate ratings.	Rs.80/- to Rs.250/- per unit	Rs.175/- per tube per annum. ROI of 1 years.	7.1.6
5	Natural Lighting	Uncleaned windows and ventilators, forced switching on of tube lights	High energy bills	Clean the window panes and allow maximum natural light penetration.	Nil, part of routine, In house manpower.	Substantial cost of energy bills on lighting.	7.1.2, 7.1.6

<b>Sr No</b>	<b>Observation*</b>	<b>Problems*</b>	<b>Resulting losses*</b>	<b>Remedial measures*</b>	<b>Capital*</b>	<b>Projected savings*</b>	<b>Category 7</b>
6	Natural Ventilation	Permanently closed ventilators.	Creation of hot air pockets below the ceiling.	Open the Ventilators for easy exit of hot/warm air from the rooms.	Nil, In house manpower.	Eliminates use of Electrical Fans and Substantial cost of energy bills	7.1.2, 7.1.6
7	Placement of projector	Information not visible/high brightness	No objectives are delivered	Re align.	Nil,	Good deliverables.	
8	Fuel leakage and safety	Poor pipe quality	Fuel loss and possible life loss	Replace with standard specified pipes.	Rs.200 per pipe	Life safety	
9	Solar Power	Required power not generated	Nearly 75% of the loss in energy generation	Amalgamate all standalone solar panels.	Few thousands based on site conditions.	Revenue loss to the extent of 75% of the energy	

\* For details, please follow the discussions in the report.

\* The criteria classification may change. Please check with the directives before posting the initiatives.

## GREEN AUDIT COMPLETION CERTIFICATE

I, Mallikarjun A Kambalyal, endorse and confirm that the Green Audit has been carried out on 3<sup>rd</sup> November 2020 under the instructions of Dr A S Pujar, Principal, BLDE Association's S B Arts and KCP Science College, Vijayapur.

This report is generated based on the site visits and evidence collected from the site.

All attempts have been made to evaluate the scope for development and inculcate green practices in the campus and extended throughout the campus. The focus is also laid to make positive impact on the society for a better living.

I also confirm and sign this certificate, in case the institution needs demonstration, my team of professionals shall be happy to do so.

We present this report to much more than the legal or mandatory compliances. This report is tabled in two parts. The first forms the core discussions which are general in nature. The second section is subject specific under the statutory requirements of the NAAC accreditation norms. They are Audit reports on, Green aspects, Energy aspects, Environment aspects, Health aspects and the discussions on net CARBON FOOTPRINT & the CARBON HANDPRINT initiatives.

Any modifications, changes, omissions after the site visit shall be exclusive.

**Authorised Auditor.**

**Mallikarjun A. Kambalyal** B.E (E&C)

Certified Energy Auditors EA-3485& ISO 50001:2011 & ISO14001:2015 Lead Auditor.



## BUREAU OF ENERGY EFFICIENCY



Examination Registration No. : **EA-3485** Serial Number **2838**

Certificate Registration No. : **2838**

### Certificate For Certified Energy Manager

This is to certify that Mr./Mrs./Ms. **Mallikarjun A Kambalyal** Son/Daughter of Mr./Mrs. **Andanappa V Kambalyal** who has passed the National Examination for certification of energy manager held in the month of **April 2006** is qualified as certified energy manager subject to the provisions of Bureau of Energy Efficiency (Certification Procedures for Energy Managers) Regulations, 2010.

This certificate shall be valid for five years with effect from the date of award of this certificate and shall be renewable subject to attending the prescribed refresher training course once in every five years.

His /Her name has been entered in the Register of certified energy manager at Serial Number **2838** being maintained by the Bureau of Energy Efficiency under the aforesaid regulations.

Mr./Mrs./Ms. **Mallikarjun A Kambalyal** is deemed to have qualified for appointment or designation as energy manager under clause (1) of Section 14 of the Energy Conservation Act, 2001 (Act No.52 of 2001).

Given under the seal of the Bureau of Energy Efficiency, this **7<sup>th</sup>** day of **February, 2013**

Secretary  
Bureau of Energy Efficiency  
New Delhi

Dates of attending the refresher course	Secretary's Signature	Dates of attending the refresher course	Secretary's Signature
<b>28.01.2020</b>			

**Bureau of energy Efficiency Regd No: EA3485**

*Certificate of Successful Completion*

**Intertek**

*This is to Certify that*

**MALLIKARJUN A KAMBALYAL**

*has successfully completed the*

**Intertek**

***CQI & IRCA Certified ISO 14001:2015  
Auditor Conversion Training Course***

*The Course includes the assessment and evaluation of Environmental Management Systems to conform to the requirements of ISO 14001:2015 and ISO 19011:2011*

*This course is certified by the Chartered Quality Institute (CQI) and the International Register of Certificated Auditors (IRCA)  
– IRCA REFERENCE 18093 –*

*The course meets the training requirements for individuals seeking certification under the IRCA Auditor Certification Schemes*



*Authorising Signature: Vystra Astumova*

*Course Dates: 14<sup>th</sup> – 16<sup>th</sup> July 2017*

*Certificate Number: 47730*

*Membership Application To Be Made Within 3 Years From Last Day of Course*

121807

**ISO Certified Lead Auditor. Certificate No: 47730**

**bsi.**

## BSI Training Academy

This is to certify that

**Mallikarjun A. Kambalyal**

has attended and passed

**Energy Management Systems (ENMS) Auditor/Lead Auditor Training Course  
(ISO 50001:2011)**



Premanand Ramakrishnan, Director of Training

Date: 14/04/2016 - 18/04/2016

Certificate Number: ENR-00253448

This certificate is valid for 3 years from the date above for the purpose of registering as an auditor with IRCA.



Course number A17583 certified by IRCA

The British Standards Institution is incorporated by Royal Charter  
BSI India, The Mira Corporate Suites (A-2), Plot 1 & 2, Inwestr Nagar Metturu Road, New Delhi 110065, India Tel: +91 11 2862 9000



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**ISO Certified Lead Auditor. Certificate No: ENR-00253448**



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**Brief note on Green Audit.**

Please refer to <http://www.disabilityindia.co.in/> for more information.

The green audit primarily lays focus on Energy use, its impact on environment and remedial measures.

It is equally focused on ways of making life of differently abled persons easy and readily adoptable to changing working environment.

Every citizen has to feel self-sufficient on economic front and self-reliant on meeting his daily chores.

While we have discussed elaboratively on Energy and Environmental aspects in the connecting audit reports, let us understand how we can focus on making differently abled life more meaningful. Thus, the special focus.

**Disabilities for Differently Abled.**

In order to develop awareness in the higher education system and also to provide necessary guidance and counselling to differently-abled persons, it is expected that the Institutes

<b>Facilitate admission of differently-abled persons in various courses.</b>	<b>Provide guidance and counselling to differently abled individuals.</b>
<b>Create awareness about the needs of differently abled persons and other general issues concerning their learning</b>	<b>Assist differently-abled graduates to gain successful employment in the public as well as private sectors.</b>

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## THE MAJOR FUNCTIONS OF THE INSTITUTION SHOULD BE,

- To provide counselling to differently - abled students on the types of courses they could study at the higher education institutions.
- To ensure admission of as many differently-abled students as possible through the open quota and also through the reservation meant for them.
- To gather orders dealing with fee concessions, examination procedures, reservation, policies, etc., pertaining to differently-abled persons.
- policies, etc., pertaining to differently-abled persons.
- To assess the educational needs of differently abled persons enrolled in the higher education institutes to determine the types of assistive devices to be procured.
- To conduct awareness programmes for teachers of the institute about the approaches to teaching, evaluation procedures, etc, which they should address in the case of differently-abled students.
- To study the aptitude of differently-abled students and assist them in getting appropriate employment when desired by them after their studies.
- To celebrate important days pertaining to disability such as the World Disabled Day, White Cane Day, etc., in the institute and also in the neighbourhood in order to create awareness about the capabilities of differently-abled persons.
- To ensure maintenance of special assistive devices procured by the higher education institute under the HEPSN scheme and encourage differently-abled persons to use them for enriching their learning experiences.
- To prepare annual reports with case histories of differently-abled persons who are benefited by the HEPSN scheme sanctioned to the higher education institute.

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## Providing Access to differently-abled persons

It has been felt that differently-abled persons need special arrangements in the environment for their mobility and independent functioning. It is also a fact that many institutes have architectural barriers that disabled persons find difficult for their day-to-day functioning. The colleges are expected to address accessibility related issues as per the stipulations of the Persons with Disabilities Act 1995, and ensure that all existing structures as well as future construction projects in their campuses are made disabled friendly. The institutes should create special facilities such as ramps, rails and special toilets, and make other necessary changes to suit the special needs of differently-abled persons. The construction plans should clearly address the accessibility issues pertaining to disability. Guidelines on accessibility laid out by the office of the Chief Commissioner of Disabilities.

### Providing Special Equipment to augment Educational Services for Differently abled Persons

Differently-abled persons require special aids and appliances for their daily functioning. These aids are available through various schemes of the Ministry of Social Justice and Empowerment. In addition to the procurement of assistive devices through these schemes, the higher education institute may also need special learning and assessment devices to help differently-abled students enrolled for higher education. In addition, visually challenged students need Readers. Availability of devices such as computers with screen reading software, low-vision aids, scanners, mobility devices, etc., in the institutes would enrich the educational experiences of differently-abled persons. Therefore, colleges are encouraged to procure such devices and provide facility of Readers for visually challenged students.



## Green audit objectives.

Green Audit was initiated in the beginning of 1970's, with the motive of inspecting the work executed within an organization, whose exercises could cause risk to the health of inhabitants and the environment. It exposes the genuineness of the proclamation made by the organisation with the concern on health issues. As a consequence of their operations with respect to environmental pollution it is the duty of the organisation to carry out the green audit of the ongoing processes for various reasons, such as,

- To make sure whether one is performing in accordance with the relevant rules and regulations,
- To improve the procedures and aptness of material in use,
- To analyse the potential duties and to determine a way which can lower the cost and to the revenue.

Through green audit one gets adoration as to how to improve the condition of the environment. There are various factors that were forced upon and determine the growth of/or conduct of green audit. Incidents like,

- Decades old Bhopal gas tragedy, that has left its residual effect which still haunts us.
- Our buildings catching fire due to various reasons,
- Industries blowing off taking valuable human lives etc
- People going sick, feeling tired, after long hours of operations in the organization,
- Increased demand of generators due to inconsistent power supply, which has resulted or lead into recent floods and droughts,

are some of the situations to ponder about!

To address various issues in context with human health, green audit is assigned to "Criteria 7" of NAAC (National assessment and accreditation council) accreditation. NAAC is a self-governing organization in India that declares the institutions as Grade "A", Grade "B", or Grade "C", according to the scores assigned at the time of accreditation.

The other intention of organising green audit is to update the environment conditions in and around the institutions i.e., within the compound and outside the compound. It is carried out with the aid of performing certain tasks like waste management, energy consumed, diesel burnt it performing the objective of the organization.

Know about  
this Audit and  
the objectives

...

- Why?
- Where?
- What?
- When?
- How?

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**Lastly to self-assess the net carbon footprint of the conduct of process in the organization.**

### **The goals of green audit**

- The purpose of carrying out green audit is securing the environment and cut down the threat posed to human health.
- To Make sure that rules and regulations are complied with.
- To avoid the environmental interruptions that are more difficult to handle and their corrections call for high cost.
- To suggest the best protocol for adding to sustainable development.
- To execute the process of the organisation utilising minimum natural resources and efficient use of those resources contributing to minimum waste generation.

### **How is the green audit conducted?**

#### **Pre-audit**

- Planning
- selecting the team of auditors both internal and external
- schedule the audit facility
- acquire the background information
- visit areas under audit

#### **On site conditions:**

- Understand the scope of audit
- Analyse the strengths and weaknesses of the internal controls
- Conduct audit with end user comfort focused and making it easy to perform.
- Collect necessary evidence so that the stakeholders stand to understand how and where they are going wrong in the process of their conduct.
- Post audit draw the report based on the data collected.
- On confirmation of the preliminary report, draw a final report of the observations and inference with accuracy more near to implementable way.
- Discuss various remedial measures for alternatives if required.
- Prepare an action plan to overcome the shortcomings with continual observation on the action plan initiated.

### **Steps under green audit**

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**Water audit:** Water is one of the cheapest commodities next to the Air we breathe. Although we Indians, use less water in comparison to western countries. However, the extent of pollutants that we leave behind has polluted all the resources including the deep well.

Rainwater harvesting is one of the best techniques that can be adopted by harvesting the rainwater and using it at the time of scarcity. The audit team to observe and investigate the relevant methods that can be adopted and implemented and draw the balance of use of water.

**Waste management audit:** The point of generation of waste, the type of waste generated, i.e., hazardous, recyclable and organically compostable wastes and segregating method at the point of generation for easy and best way to handle the same. Evaluating such methods to minimise the use of resources in the process of their management.

**Energy audit:** It deals with use of energy in the conduct of the process. The priority is topmost for conservation over efficiency; hence, energy auditor should always consider not to use the energy if necessary. At best it can be used judiciously.

**Environmental quality audit:** It analyses air quality, noise level and the programs undertaken by the institution for plantation creating awareness of trees around us and how nature provides us with remedial measures within its framework.

**Health audit:** In the process of use of resources and conduct of the activities, they can develop impact on human health, that might be off minutely harmful, cause permanent disorder or may even cause death. Occupational health hazards are discussed in detail and the stakeholders are informed of the same and required necessary remedial measures indicated.

**Renewable energy:** To make in organisation net zero net zero carbon emission use of renewable resources including energy such as solar wind biogas geothermal energies are put into ooh utilisation.

**Carbon handprint:** The net impact All the above energy audits should be to make an organisation contribute zero emissions which are called bye bhai use of water generation of waste use of energy environmental damage health damage and finally to explore if the

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campus or direction can go in in contributing to third-party emissions minimising

**Benefits of green audit:** To draw home the benefits, the system has been separated out into various audits as listed above. In doing so, and if audit findings are effectively implemented there are many advantages that can be practised in the process

- Recognise the cost saving methods through waste minimising and managing technologies.
- Point out the prevailing and forth coming complications.
- Authenticate conformity with the legal requirements.
- Empower the organisation to frame a better environmental performance.
- Portray a good image of the institution which helps build better relationships with the group's organisations, stakeholders in and around its operations

**Enhance the alertness for environmental guidelines duties and conduct of preparedness for any eventualities due to environmental disasters.**



## DAY'S RESOURCES USE PLEDGE

We, The Principal, staff and students, adopt responsible practices in our day's energy use with due regard to the environment. We pledge to avoid using electrical power where not needed. We also pledge to use judiciously the electrical power by using Energy efficient products. We shall practice to switch off all appliances when not in use.

PURPOSE: To realistically and comprehensively reduce energy consumption, assure acceptable indoor air quality, and improve energy efficiency on campus through methods that are consistent with a safe, secure, and inviting campus community. As outlined in this policy, energy conservation will be accomplished by developing a proactive and progressive approach to providing energy efficient, responsible, and cost-effective operations on campus. This policy will be reviewed and updated periodically as public awareness, management techniques, and technologies change.

APPLIES TO: Faculty, staff, students, and visitors.

CAMPUS: B.L.D.E. ASSOCIATION'S S.B.ARTS AND K.C.P. SCIENCE COLLEGE VIJAYAPUR.

We pledge to speak in open forums for the energy conservation first, Energy Efficiency next and eliminating of High Energy use appliances for better or low energy use one's.

We commit ourselves to the safe operation of all our needs, be it in classrooms, library, canteen, on road, off road, in-campus out-campus as well as at our place of stay.

We adhere to reduce environmental load by efficiently using resources, saving energy, reducing waste, encouraging material recycle, with special emphasize to minimising emissions of greenhouse gases, ozone depleting substance and particle matter. we endure to minimise environmental loads and adopt environmentally friendly technologies when ordering and purchasing necessary products and resources.

We endure to attend educational programs and promulgate our close friends and colleagues to follow suite.

We endure to ensure that we recognize the essence of this Energy use policy by actively and aggressively conducting workshops and training to all in environmental concepts.

We make wide ranging social contribution to close association with the students, teaching staff, administrative staff, housekeeping staff by disclosing Energy use (Star rating appliances) information and supporting minimized consumption of Energy.

Principal

(proposed)

Indicative template for display at all prominent areas, classrooms, waiting rooms, canteen, library, relaxing areas in the campus.

## FACTOR CONSIDERATION

It is vital factor to consider the limitations beyond human control. However, our work culture, should be oriented towards the better and safe dwelling. Considering the present health hazards, Not forgetting the ongoing COVID, the quality of air and after effects of the pollution caused by our activities need to be addressed and all the young generations should be educated to mitigate all negative impact.

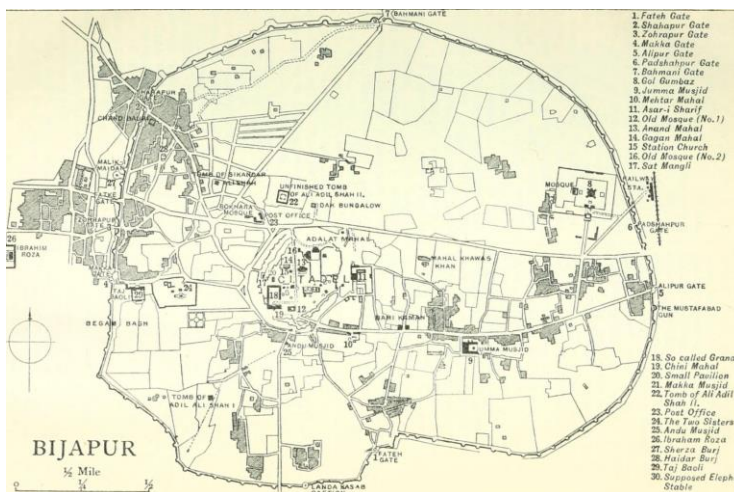
[https://en.wikipedia.org/wiki/Bijapur\\_district,Karnataka](https://en.wikipedia.org/wiki/Bijapur_district,Karnataka)

**Bijapur**, officially known as **Vijayapura**,<sup>[1]</sup> is the district headquarters of **Bijapur District** of **Karnataka** state of India. It is also the headquarters for **Bijapur Taluka**. Bijapur city is well known for its historical monuments of architectural importance built during the rule of the **Adil Shahi** dynasty. It is also well known for the sports by the popular Karnataka premier league team as Bijapur Bulls. Bijapur is located 530 km (330 mi) northwest of the State Capital **Bangalore** and about 550 km (340 mi) from **Mumbai** and 384 km (239 mi) west of the city of **Hyderabad**.

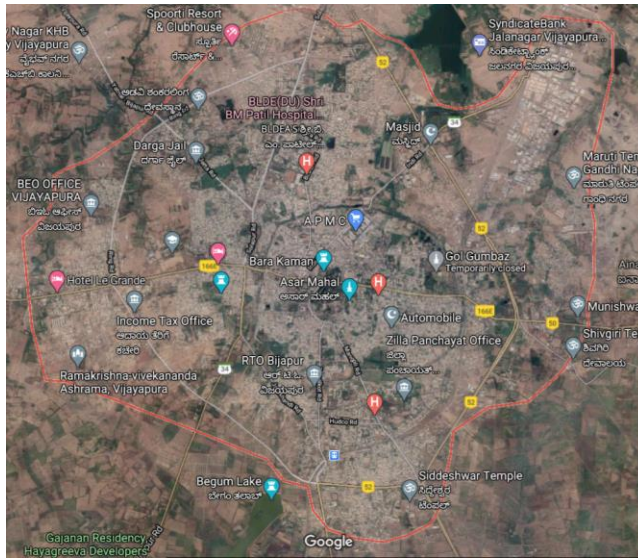
The city was established in the 10th-11th centuries by the **Kalyani Chalukyas** and was known as **Vijayapura** (City of victory). The city was passed to **Yadavas** after Chalukya's demise. In 1347, the area was conquered by the **Bahmani Sultanate**. After the split of the Bahmani Sultanate, the **Bijapur Sultanate** ruled from the city. Relics of the Sultanates' rule can be found in the city, including the **Bijapur Fort**, **Bara Kaman**, **Jama Masjid**, and **Gol Gumbaz**.



Political map of the Bijapur district



Vijayapura, one of the popular heritage cities located in the Karnataka state of India is also one of the top ten populated cities in Karnataka. The Bijapur city has been declared as one of the corporations in the state of Karnataka last year. Bijapur urban population as per 2011 census is 326,000, perhaps the 9th biggest city in Karnataka. Bijapur Mahanagara Palike (BMP) is the newest Municipal Corporation formed under the KMC act along with **Shimoga** and **Tumkur** Municipal Corporations.<sup>[2]</sup> Administratively, Vijayapura district comes under **Belgaum** division along with **Bagalkote**, **Belgaum**, **Dharwad**, **Gadag**, **Haveri** and **Uttara Kannada** (Karwar) districts.



The civic administration of the city is managed by the Bijapur City Corporation and office of Deputy Commissioner in Bijapur. The office of Deputy Commissioner has the responsibility of rural areas in Bijapur, while the corporation administers the city of Bijapur. Effective administration of the heritage city of Bijapur is the main intention behind all the activities of Bijapur City Corporation.

## Geography

Bijapur District has an area of 10541 square kilometres. It is bounded on the east by [Gulbarga District](#), on the southeast by [Raichur District](#), on the south and southwest by [Bagalkot District](#), and on the west by [Belgaum District](#), and by the [Maharashtra](#) of [Sangli](#) on the northwest and [Sholapur](#) on the north, Sangli on the north-west (both of [Maharashtra](#) state).

It consists 5.49% of Karnataka state area. It lies between 15 x 50 and 17 x 28 North Latitude and 74 x 54 and 76 x 28 East Longitude. The administrative headquarters and chief town is Bijapur.

Geographically, the district lies in the tract of the [Deccan Plateaus](#). The lands of the district can be broadly divided into three zones: the northern belt consisting of the northern parts of Bijapur Taluks of Indi and Sindagi; the central belt consisting of Bijapur city; the southern belt consisting of the rich alluvial plains of the Krishna Rivers parted from the central belt by a stretch of barren Trap. The northern belt is a succession of low rolling uplands without much vegetation, gently rounded and falling into intermediate narrow valleys. The upland soil being shallow, the villagers are generally confined to the banks of the streams and are far away from one another. The Don River Valley has plains and consists of rich tracks of deep black soils stretching from west to east in the central part of the district.<sup>[14]</sup> Across the Krishna River is a rich plain crossed from west to east by two lines of sandstone hills. Further south towards [Badami](#) and southwest to east by two lines of [sandstone](#) hills. Further south towards Badami and southwest of Hunagund, the hills increase the number and the [black soil](#) gives way to the red

There are 34 rain gauge stations in Bijapur District. The average annual rainfall for the district is 553 mm with 37.2 rainy days. The monsoon generally breaks in the district during June and lasts till October. The highest mean monthly rainfall

is 149 mm in the month of September and lowest is 3 mm in February. The annual rainfall variation in the district is marginal from place to place.

The soils of Bijapur District can be categorized as a low to moderately yielding area (1000 to 8000 L/h) 72.2% of district falling in this category. From considerable part of the district (9%) poor yielding (less than 1000 L/h sources) or non-feasible areas have been reported. The talukas having largest poor yielding area, are Muddebihal (19%) followed by Indi (15%), Bijapur and Sindagi (13% each), Basavan Bagewadi (4%). Low yielding areas (1000 to 4000 L/h source) in the district constitute about 40% of the district, with the largest being Basavan Bagewadi (54%) and smallest in Indi taluka Moderate yields (4000 to 8000 L/h source) are reported from 36% of the district, highest being in Bijapur with 70% of the area, and lowest being in Sindagi with 19% of the taluka. High yielding areas (more than 8000 L/h sources) over 15% of the district. The smallest area under this category is in Sindagi Taluka (2% each) and largest is in Muddebihal (29% each) where very lengthy contact zones occur between traps and other formations

On the basis of projections from this information, the main parameters affecting water quality in Bijapur can be expected to be brackishness (salinity) and hardness (PH). Salinity affects the district in high to low groundwater problem areas and occurs in areas all along the major and minor river courses and stream courses.

In 2014, Sajjade Peeran Mushrif became the first Mayor of the historical City Bijapur.<sup>[7]</sup>

## Climate and temperature

Bijapur has a semi-arid climate. It is located at 16.83°N 75.7°E.<sup>[8]</sup> It has an average elevation of 606 metres (1988 ft).

The climate of Bijapur district is generally dry and healthy. In summer, especially in April and May it is too hot; at that time the temperature lays between 40-degree Celsius to 42-degree Celsius. In winter season, from November to January the temperature is between 15-degree Celsius to 20-degree Celsius. Usually the district has dry weather, so the humidity varies from 10% to 30%.

hideClimate data for Bijapur (1981–2010, extremes 1901–2012)													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	39.4 (102.9)	41.1 (106.0)	41.9 (107.4)	43.3 (109.9)	44.9 (112.8)	43.0 (109.4)	36.9 (98.4)	36.5 (97.7)	37.4 (99.3)	37.3 (99.1)	35.0 (95.0)	34.6 (94.3)	44.9 (112.8)
Average high °C (°F)	30.8 (87.4)	33.9 (93.0)	36.9 (98.4)	39.0 (102.2)	39.1 (102.4)	33.6 (92.5)	30.9 (87.6)	30.5 (86.9)	31.4 (88.5)	31.6 (88.9)	30.5 (86.9)	29.7 (85.5)	33.1 (91.6)
Average low °C (°F)	16.5 (61.7)	18.3 (64.9)	21.9 (71.4)	24.1 (75.4)	24.0 (75.2)	22.7 (72.9)	22.0 (71.6)	21.7 (71.1)	21.6 (70.9)	21.0 (69.8)	18.5 (65.3)	15.7 (60.3)	20.7 (69.3)
Record low °C (°F)	7.0 (44.6)	8.9 (48.0)	11.2 (52.2)	15.8 (60.4)	17.8 (64.0)	17.2 (63.0)	16.1 (61.0)	16.7 (62.1)	16.1 (61.0)	12.2 (54.0)	5.6 (42.1)	6.0 (42.8)	5.6 (42.1)
Average rainfall mm (inches)	4.0 (0.16)	0.6 (0.02)	5.7 (0.22)	20.6 (0.81)	39.8 (1.57)	108.0 (4.25)	66.9 (2.63)	92.3 (3.63)	156.9 (6.18)	119.7 (4.71)	25.0 (0.98)	7.7 (0.30)	647.1 (25.48)
Average rainy days	0.2	0.1	0.8	1.4	3.3	5.8	5.5	5.6	8.3	5.7	2.0	0.4	39.1
Average relative humidity (%) (at 17:30 IST)	38	31	28	30	34	56	65	65	62	54	49	43	47

Source: India Meteorological Department<sup>[9]</sup>

## Rainfall

The district has 34 rain gauge stations. The average annual rainfall for the whole district is 552.8 mm, with 37.2 rainy days. The monsoon

generally reaches the district by June and lasts till October. Though the total rainfall is not high, the district benefits both from the south-west and the north-east monsoons. The annual rainfall varies from place to place within the district.

## Soil

The district has two types of soil. First one is, "deep black soil" (or yeari bhoomi), which is good for the crops like jawar, wheat, pulses, sunflower, etc. The major portion of the district consists of this kind of soil which has a great moisture-holding capacity. Second one is "red soil" (or masari /maddi bhoomi), which is generally poor, good for irrigation and horticulture.

## Rivers

Krishna river, which is the most important river of the district. It flows about 125 miles in the district. A dam is built across the river at Almatti, Bhima river flows in northern part of district for about 20 miles. It overflows in the rainy season and spreads over a wider area, which is thereby rendered extremely fertile land. In central part of district Doni river flows.

## Economy

Farming and agriculture related business is the main occupation for many people in the district. Of the total geographical area of 10,530 square kilometres, 7,760 square kilometres is available for cultivation which is 74% of the total area, while areas under forest account for only 0.19% of the total area. Only 17.3% of the net cultivable area is irrigated and the balance 82.7% of the area has to depend on the monsoon.

The major oilseed crops are sunflower, groundnut and safflower. Horticulture crops like grapes, pomegranate, ber, guave sapota, lime are also grown. A recent trend shows that there is a low shift towards fruit crops like Pomegranate and grapes of the total area of 8,610 square kilometres. Covered during 2002-03 cereals occupy about 55.2% by oilseeds 24.5% pulse 15.6% and other commercial crops like [cotton](#) and [sugarcane](#) about 4.8%. There is a slight shift towards commercial crops like cotton and sugarcane over last 2 years. The land holding pattern in the district indicates that small and marginal farmers account for 4% of total land holdings and 0.6% of the total land, semi-medium for 27.5% with 10.1% of total land while 68% of the holdings are above 20,000 m<sup>2</sup>, accounting for 89.3% of land. Many small-scale industries are working in the district however no large-scale industry can be found in the district.

Classification of Labour Force	No. of Workers
Cultivators or Farmers	2,21,060

<b>Agricultural Laborers (Non-Land Owners)</b>	<b>2,87,778</b>
<b>Artisans</b>	<b>17,776</b>
<b>Home based / Cottage Industries</b>	<b>18,232</b>
<b>Services and Other sectors</b>	<b>1,95,573</b>

## Education

Of late Bijapur is emerging as a hub for professional education. Previously (i.e., before the 1980s) there were very few professional educational institutions. Along with the professional colleges there are many colleges which provide under-graduate and post-graduate degrees in the faculty of arts, science and social-sciences. Many of these colleges except professional are affiliated to [Rani Chennamma University](#) Belagavi viz, [B.L.D.E.A'S A.S.PATIL COLLEGE OF COMMERCE\(Autonomous\)MBA Programme, Bijapur](#). Rani Chennamma University has a Post-Graduation Centre at Bijapur also. Engineering colleges are affiliated to [Visvesvaraya Technological University](#) viz, [B.L.D.E.A's V.P. Dr. P G Halakatti College of Engineering and Technology](#) and [SECAB College of Engineering and Technology](#) and Medical colleges are affiliated to [Rajiv Gandhi University of Health Sciences](#).<sup>[30]</sup> viz, BLDEA's B M Patil Medical College, Hospital and Research Centre and Al-Ameel Medical College, Hospital and Research Centre, [Sainik School, Bijapur](#) and [Karnataka State Women's University](#). Various post-graduate courses like MBA, MCA are conducted here. Additionally, Bijapur boasts of the only Sainik school in the whole state. This is a residential school preparing cadets for the Defence forces.

The Bijapur district is known for its temples, structural monuments, art and architectural heritages, archaeological sites and cave temples. With the objective to spread education in this area, Karnataka University opened its Post-Graduate Centre in 1993.

[Karnataka State Women's University](#), established in 2003 in the city of Bijapur is the only Women's University in Karnataka dedicated exclusively for women's education. It is recognized under 2(f) and 12(B) of the UGC Act. Seventy women's colleges spread in twelve districts of North-Karnataka are affiliated to this University. The University offers various UG programmes leading to bachelor's degree in Arts, Business Administration, Computer Applications, Commerce, Education, Fashion Technology, Home Science, Physical Education, Science and Social College of agriculture (estd. 1990) under University of Agricultural Sciences, Dharwad is located 6 km away from city bus stand is one of the few institutes made for research on dry land agriculture.

## EXECUTIVE SUMMARY.

<b>Sr No</b>	<b>Observation*</b>	<b>Problems*</b>	<b>Resulting losses*</b>	<b>Remedial measures*</b>	<b>Capital*</b>	<b>Projected savings*</b>	<b>Category 7</b>
1	Differently abled friendly audit	New initiative - Self assessment			In house	Not applicable	7.1.7
2	Battery placement	Battery shell in conductor loop	Low performance & self-discharge.	Design the stacking arrangements.	In house resources	25% of the cost of the batteries.	7.1.2, 7.1.6
3	Battery regeneration.	Short life span	300% of the cost of the battery.	Subject all batteries to regeneration made.	Rs.20.00 Lacs or as per user agreement	300 %	7.1.2,
4	Electrical	Old tube lights	High energy consumers	LED lights of appropriate ratings.	Rs.80/- to Rs.250/- per unit	Rs.175/- per tube per annum. ROI of 1 years.	7.1.6
5	Natural Lighting	Uncleaned windows and ventilators, forced switching on of tube lights	High energy bills	Clean the window panes and allow maximum natural light penetration.	Nil, part of routine, In house manpower.	Substantial cost of energy bills on lighting.	7.1.2, 7.1.6

<b>Sr No</b>	<b>Observation*</b>	<b>Problems*</b>	<b>Resulting losses*</b>	<b>Remedial measures*</b>	<b>Capital*</b>	<b>Projected savings*</b>	<b>Category 7</b>
6	Natural Ventilation	Permanently closed ventilators.	Creation of hot air pockets below the ceiling.	Open the Ventilators for easy exit of hot/warm air from the rooms.	Nil, In house manpower.	Eliminates use of Electrical Fans and Substantial cost of energy bills	7.1.2, 7.1.6
7	Placement of projector	Information not visible/high brightness	No objectives are delivered	Re align.	Nil,	Good deliverables.	
8	Fuel leakage and safety	Poor pipe quality	Fuel loss and possible life loss	Replace with standard specified pipes.	Rs.200 per pipe	Life safety	
9	Solar Power	Required power not generated	Nearly 75% of the loss in energy generation	Amalgamate all standalone solar panels.	Few thousands based on site conditions.	Revenue loss to the extent of 75% of the energy	

\* For details, please follow the discussions in the report.



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## **ACKNOWLEDGEMENT:**

SUNSHUBH TECHNOVATIONS PVT LTD., is pleased to express its sincere gratitude to the management of B.L.D.E.ASSOCIATION'S S. B. ARTS AND K. C. P. SCIENCE COLLEGE VIJAYAPUR for entrusting SUNSHUBH RENEWABLES & RESEARCH CENTRE with the assignment on Green Earth practices based on Educate, Practice, Advocate & Manage the resources in their educational organization.

We acknowledge the assignment allocation sent by Email on 19<sup>th</sup> Oct 2019.

We also wish to thank Dr. A S Pujar Principal & Chairman, and Dr. U S Pujeri – IQAC Co-ordinator , Green Audit Co-Ordinator, who have been constantly following with the green aspects and developments in the college. It was on their instance that we got to evaluate the initiatives undertaken.

The officials and the maintenance staff for the help rendered during the energy flow study.

We would fail if we neglect to appreciate the sincere efforts put in by the Faculty

- Dr. A S Pujar – Principal/Chairman
- Dr. K G Pujari – Administrative Advisory Committee Member
- Dr. U S Pujeri – IQAC Co-ordinator
- Prof.(Smt). V R Patil – NAAC Co-Ordinator Member
- Prof. G R Ambli – Member
- Prof. B S Bagali – Member
- Prof.(Smt). S D Patil – Member
- Prof. S G Joshi – Member
- Shri. S B Heralagi – Office Superintendent
- Smt. Savita Kanakreddi – Librarian

Without the crucial and significant support from the fellow teaching team the potential energy saving options and carbon footprint reduction would not be a reality. Wishing the team, a great success, we deeply express our gratitude and heartfelt "THANK-YOU" for allowing us to assess the energy flow scenario there by the GREEN STATUS.

Mallikarjun A. Kambalyal. B.E.(E&C).

Certified Energy Auditors (EA-3485)

SUNSHUBH TECHNOVATIONS PVT LTD.,

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### **LIMITATIONS:**

Our recommendations are in the interest of conservation of Electrical Energy and Green Culture i.e., the reduction in CARBON FOOTPRINT. The compliance to the recommendations will be subjected to meeting the safety and Environmental rules and guidelines.

### **AUTHENTICATION & DATE OF GREEN AUDIT:**

- This Audit has been carried out on 4<sup>th</sup> Nov 2020 under the instructions Dr. A S Pujar – Principal/Chairman and in the presence of Dr. U S Pujeri – IQAC Co-ordinator and Prof(Smt). V R Patil – NAAC Co-Ordinator Member
- During the process of the Audit, the following lists of instruments were (considered for) use (wherever applicable).

Mallikarjun A. Kambalyal. B.E.(E&C).  
Certified Energy Auditors (EA-3485)  
SUNSHUBH TECHNOVATIONS PVT LTD.,

## **LIST OF INSTRUMENTS:**

During the process of the Audit, the following lists of instruments were (considered for) use (wherever applicable).

<b>Sr No.</b>	<b>INSTRUMENT</b>	<b>MAKE</b>	<b>APPLICATION</b>
1	Digital Power Analyser(PC Interfaced)	SCHIVAN ARNOX	Electrical Machinery.
2	Accessories -3000 Amps	ARNOX	Higher load UPTO 3000 Amps,
3	Accessories -200 Amps	ARNOX	UPTO 200 Amps,
4	Thermal Imager	FLIR	Identify loose contacts and bearing losses
5	Power Analyser (Manual)	MECO	Electrical Machinery.
6	Infrared Thermometer	METRAVI	Thermal (Fuel) Energy.
7	Digital (Contact) Temperature & Humidity Meter.	METRAVI	Electrical Machinery. (A/C's And Cooling Towers)
8	Digital Tachometer	METRAVI	Electrical Machinery.(A/C's And Cooling Towers)
9	Lux Meter	METRAVI	General & Task Lighting.
10	Sound Level Meter	METRAVI	Electrical Machinery. Generator Sound Proofing
11	Digital Anemometer	METRAVI	Electrical Machinery.(A/C's And Cooling Towers)
12	Digital KW Meter	METRAVI	Electrical Machinery.
13	Digital Power Factor Meter	METRAVI	Electrical Machinery.
14	Lap Top Computer	HP	To Interface The Instruments For More Accurate - Sophisticated Readings In Sensitive Equipment.
15	Ultrasonic flow meter		Measure liquid flow.
16	Portable Vibration Meter.	METRAVI	Structural Stability
17	Live cable detector probe	-	Detect hidden cables for safety audit.
18	Power Analyser – EMM 5	Beluk	For remote communication and detailed audit.
19	Power Analyser – ELITE PRO	Beluk	Power Analyser.
20	PT's for Transformer audits.	KALPA	On field auditing of transformer loading and imbalance evaluation.

- Only appropriate instruments were used wherever necessary.

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## **ABOUT GREEN AUDIT:**

B.L.D.E.ASSOCIATION'S S. B. ARTS AND K. C. P. SCIENCE COLLEGE VIJAYAPUR has asked SUNSHUBH TECHNOVATIONS PVT LTD., Hubli., to conduct the Green Audit for their Institution.

In this context, the management of the Institute represented by Dr. S R Kandagal Principal, entrusted us the task of conducting the feasibility study to reduce energy consumption and adopt green habits.

SUNSHUBH TECHNOVATIONS PVT LTD., represented by Mr. Mallikarjun A. Kambalyal made a detailed study and readings of various appliances were taken and carried out the Green audit along with the safety parameters.

We hope the points presented will be self-explanatory, if there is need for any clarification, we are open for discussions.

## **ONGOING STATUS:**

It's an optimistic & highly dedicated team effort lead by the Principal & the senior staff who have dedicated all their wits & free time to initiate Green Carpet the entire college premises. It is also a fact that there do exist, few short comings which however is unintentional & on being trained & educated the campus should look for continued minimized waste generation. With all due appreciation to the management, staff involved & cooperation by the students, we have made few suggestions which on implementation, will reduce, demand for water & electrical power. It will also reduce the existing level of pollution to bear minimum.

There is high potential among the students to be educated and further spread the knowledge of going ZERO waste generation in their respective colonies and society they dwell in, contributing positively to the cause of greener earth.

**NO WASTE – NO POLLUTION – NO HEALTH HAZARD.**

## DISCUSSIONS ON EXECUTIVE SUMMARY:

Aerial View of the College Campus.



The institution has set a very novel Mission, Vision and Objective. It is also prominently exhibited in all prominent places. Aerial view indicates that the management has shown keen interest in providing the amenities and is focusing on keeping the campus green there by the cool environment within the boundaries of the college.





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## Green Audit Internal committee.

Few guidelines to approach on primary requirements, Do's and Checks by in-house team, with focus to Differently abled and medically paralytic personal.

### Access Auditing

Environmental access is a set of norms and standards designed to provide safe and independent use of varied environments such as transportation, roads, buildings and communications by people with disabilities. Universal design is a commitment for designing products and environments for the broadest population possible, especially for the people who have not been considered as part of the general population.

However, accessibility has been one of the most neglected issues in the disability sector. The estimated 70 million disabled persons in India remain confined to their homes, as attempts to travel, enter buildings, parks, shops, etc, can be unsafe and humiliating. In the past 5 years, the Government in New Delhi has made just 13 buildings accessible for disabled people. Environmental access is a legal right for people with disabilities and should therefore be strictly enforced. Attitudinal changes have to be brought about among policy makers in the government and private sectors, design professionals, architects, manufacturers.

### The Access Audit

The disability sector has to take the responsibility of enforcing the law. In the last 5 years the response from the government and the private sector has been lukewarm, hence the need for access audits. The aims of the audit and its follow-up are to:

- Identify the extent of the problem of access to public buildings
- To create awareness of the importance of the concept of barrier-free environments for people with disabilities
- To enforce the inclusion of accessibility for people with disabilities in the official agenda of government and private agencies

The use of universal design and accessibility codes have the potential to produce designs that are non-discriminating, offer equal opportunity and provide personal empowerment to all uses. Public places like shopping complexes, parks, cinemas, government and private offices, training centres all need to be made accessible for people with different disabilities. The process has to begin by assessing the problem and taking firm action towards making the built environment disabled-friendly.

### The Process

The audit process has to be well planned so as to make it a successful and fruitful exercise. The process involves the participation of many people. Consequently, the auditing organization has to take utmost care in coordinating and planning the event. Broadly one can categorize the audit process into three groups:

- [Pre-audit preparation](#)
  - [Introductory meeting](#)
  - [Media mobilization](#)

- 
- [The Audit team](#)
  - [The Partners](#)
  - [Audit process](#)
    - [The core audit team](#)
    - [Media management](#)
    - [Overall coordination](#)
  - [Post audit reporting and follow-up](#)
    - [Reports to be submitted to the organization audited](#)
    - [Report of the access audit project](#)

An audit takes about 90 minutes to conduct. However, to make the audit effective, it is advisable to spread an audit of 5 places over 2 days as the audit of a hotel or a hospital is expected to take more time than that of a bank or cinema hall.

### [Pre-audit preparation](#)

#### [Introductory Meeting](#)

The auditing organisation should convene a meeting to discuss the audit process. The letter should brief the members about the importance of audit and the agenda for the meeting. [Sample letter](#)

During the meeting the following points should be discussed:

- Drawing up the core group (the group can include organizations representing different disabilities) which would plan the audits
- Nominating or appointing a coordinator
- Definition of the role of each member of the group
- Identification of organizations to be audited
- Drawing up of a budget for the audit process
- Nominating a person who would centralize all information and be a relay person on the day of the audit
- Working out strategies for media mobilization
- Drawing up the audit team, partners of the process
- Drawing up a detailed schedule with specified dates

This group should decide to meet periodically to report on the progress of their individual audits.

#### [Media Mobilization](#)

An audit is a process of not only identifying public places which are not "comfortably accessible" but also for creating awareness of the fact that environmental access is a legal right for people with disabilities. Hence mobilization of the media is important. To mobilize the media the following should be done:

- Invitation to a press conference should be sent to chief reporters and chief photographers of various newspapers and magazines and to the news desks of various channels and to other media contacts. [Sample letter](#)
- Follow-up to ensure participation in the press conference



- 
- A press kit must be prepared, containing a background note of the issue, a copy of The Disability Act, relevant papers from the CPWD manual to be distributed on the day of the press conference Samples
  - A press conference should be held to present the issues and its importance
  - News reports must be compiled
  - The media should be provided with all relevant details from time to time so that they can be fully involved in the process.
  - A detailed letter, including the schedule for the audit should be sent to the media before the audit explaining the details and soliciting participation [Sample letter](#)
  - Follow-up to ensure participation in the audit

### *The Audit Team*

The core audit team should comprise of a group of people with different types of disabilities (persons with limited mobility, wheelchair users, persons visual impairment, including low vision, with speech and hearing impairments, persons with mental handicap), parents, architects, and professionals. Further, this team should have people of different age groups and/or of varying degrees of disability to ensure a holistic audit. The core group should total between 10 and 12. The team should also include a photographer to collect photographic evidence.

A pre-audit meeting could set in motion the primary communality of opinion of the importance of the audit and the process. The program and meeting points should be communicated well in advance to the team and replacements should be identified for each member in case a member cannot attend the audit for any reason.

The team would also have to be briefed on filling up the audit checklist. The checklist should be communicated to the members of the audit team well in advance so that any queries can be answered before the audit.

[Top](#)

### *The Partners*

The partners of the audit, which include the media and other agencies in the sector, should be kept fully informed of the audit process and invited to be present at the day of the audit. [Sample letter](#) inviting them to an information meeting.

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### *Organization To Be Audited*

The organization to be audited should be informed of the aims of the audit along with the detailed schedule of the audit. The letter to the organization must include a list of the parts of the buildings and facilities that the team would visit. The sample letter requests an appointment with the head of the organization on the day of the audit for submitting the representation. The sample letter of representation should be prepared before and taken to the venue on the day of the audit.

Constant coordination with the organization to be audited is of utmost importance for a successful audit and the implementation of any suggestions for improvement that may be made by the audit team.

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## Audit Process

This section discusses the planning and implementation of the actual audit. The planning for the audit should cover:

- The core audit team
- Media management
- Overall coordination

### *The Core Audit Team*

- The audit team should assemble outside the venue in advance to discuss the process of the audit.
- The attendance sheet should be signed by all the members of the assembled team Sample
- The team members should know the parts of the building they are to audit.
- The appropriate part of the audit checklist should be used for each section of the building audited. It is important to address each item of the checklist.
- The group should assess the area taking all kinds of disability into account.
- The photographer must be briefed and be guided by a member of the core audit team.
- The results of the different parts of the audit must be compiled.
- The audit team should meet the authorities of the organization, with the media, to inform them of the findings of the audit and submit a representation. The team must get a commitment to incorporate the changes necessary to make the building disabled-friendly.

### *Media Management*

The media members should be asked to assemble at one place from where they will be transported to the venue of the audit or they should assemble at the site of the audit. A person must be appointed to coordinate with the media. A press briefing should be held and the media provided with a press kit. The media must be invited to join the team when it submits its representation to the head of the organization.

### *Overall Coordination*

Since the audit process involves many people, a well-defined programme for the audit has to be drawn up. The following must be kept in mind:

- A schedule. A person should be nominated to monitor adherence to the planned programme.
- A designated Coordinator for overall synchronization of the audit goals

The following items must be carried by the audit team:

- copies of the audit checklist
- pens and hard boards
- attendance sheets

- 
- copy of The Disability Act, 1995
  - awareness materials
  - copy of the representation to be submitted to the organization audited
  - press kits

### Post Audit Reporting And Follow-Up

The reporting of the audit is in 2 parts:

- a. Report on the building being audited, for submission to the organization which houses the building; and
- b. Complete report containing all the details relevant to the entire audit exercise.

### Reports To Be Submitted To The Organization Audited

The data collected during the audit must be compiled and a report must be prepared. The report would be based on the following points:

- name of the place audited
- date of the audit
- members of the audit team
- observations on the areas audited, and the main conclusions of the audit
- suggestions for short-term and long-term improvement, based on the CPWD guidelines
- follow-up guidelines

A time-frame can be suggested for adopting the suggested changes. This report must be handed over to the audited organization, with a letter of appreciation for courtesies and cooperation extended, a copy of the completed audit checklist used to audit the institution and a copy of the relevant CPWD guidelines (sample formats)

### Report Of The Access Audit Project

A report of the audit itself must be drawn up. It should include the aims, the details of the audit process, i.e., the pre-audit preparation, the process itself and the post audit reporting and follow-up, including the results of the audit and suggestions for improvement, which have been made. The report should include photographs and copies of news clippings of the audits. This report must be archived for future reference and follow-up action.

### Brief Description Of The Essentials Of A Building That Are Evaluated

#### Entrances/Exits

The main entrances and exits of buildings must be clearly identifiable and easily accessible. They must be wide enough to accommodate wheelchair users. Steps and ramps must have hand railings of contrasting colours. Building should have automatic sliding doors. In multistorey buildings, the entrance should permit access to a conveniently located elevator. Emergency exits should be easily identifiable and accessible.

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## *Parking*

Parking for people with disabilities should be available near the building. It should be accessible to cross-disability groups equally. Accessible indoor parking spaces should be located closest to the elevators and within 50 metres of building entrance. The parking slots reserved for people with disabilities should be marked with the international symbol of accessibility. There should be procedures in place to make sure that non-disabled people do not use parking spaces reserved for people with disabilities. Drop off areas should be marked by a well-defined signage system and an accessible travel path from this area to the building should be available.

## *Ramps*

Complementary ramps should be available next to stairs. The gradient of ramps should allow easy use by wheelchair users. Appropriate landings should be available and the ramps should be wide enough for use by wheelchair users. Ramps surfaces should be slip-resistant and clear of obstacles. They should be protected on both sides. Ramps should be marked with the international symbol of accessibility.

## *Elevators*

Elevators should be easily accessible and identifiable. The doors should be wide enough to accommodate wheelchair users and the space inside should be sufficient for them. Elevators should have handrails of contrasting colours on three sides and be at appropriate heights. Visual and audible signals indicating the arrival at different floors should be available. Emergency intercoms should be usable without voice communication in emergencies. Tactile/ Braille instructions should be provided for the communication systems.

## *Stairs*

Stairs should be easily accessible and identifiable. The minimum width of the stairs should be wide enough and the landings have enough space at the top and bottom. The stair surfaces and nosing should be slip resistant. Handrails should be provided for staircases.

## *Corridors*

The minimum unobstructed width of corridors should be wide enough for wheelchair users and should allow manoeuvring through doors along the length of the corridor. The corridors should have guiding blocks along its length.

## *Washrooms, Toilets And Bathrooms*

Separate toilets should be available for people with disabilities. They should be clearly identifiable and accessible. The doors should be wide enough and should be lockable from inside and releasable from outside. There should be enough manoeuvring space inside. All floor surfaces should be slip resistant. Mirrors, flushing arrangements, dispensers and toilet paper should be mounted at appropriate heights. They should be equipped with alarm systems for emergencies.

## *Public Telephones*

There should be at least one telephone accessible to wheelchair users and should be equipped with hearing aids. The numbers should be embossed to allow easy identification. The coin slots should be at appropriate heights.

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### *Counters*

This includes reception counters, ticket counters, cash counters and administration counters. Counters should be easily identifiable and accessible to wheelchair users. Counter staff should be able to communicate with persons with hearing and visual disabilities.

### *Drinking Water Facilities*

They should be easily accessible and the fountain head accessible to wheelchair users.

The area around the fountain should be dry to prevent falls. Glasses should be provided at drinking water facilities. The taps should be easily manoeuvrable.

### *Eating Outlets*

Accessibility of eating outlets for people with various kinds of disability must be assessed. Tables, service counters and cash counters should be at appropriate heights. There should be enough place inside for easy movement by wheelchair users. A menu card should be available in Braille. Facilities should be available for people with speech impairment to place orders.

### *Audit Of Specific Areas Of Buildings*

Some buildings have areas specific to them and different aspects must be looked when auditing them.

### *Hospitals*

Patients have to visit the examination and sample collection rooms of hospitals and may get admitted to wards in them.

### *Examination Rooms*

Examination rooms should be easily identifiable and accessible. The examination tables should be of the right size and height.

### *Sample Collection Rooms*

Sample collection rooms should be easily identifiable and accessible. The rooms should be large enough to enable easy mobility within them. The toilets attached to sample collection rooms should be easy to use. The sample collection tables should be easily accessible.

### *Wards*

Wards should be easily identifiable and accessible to people with different disabilities. Space in wards should allow easy mobility by wheelchair users. All fixtures should be at accessible heights. They should be obstacle free. Guiding lines should be available for people with visual impairment.

### *Banks*

All counters should be easily identifiable and accessible. Counters should be at appropriate heights. The staff at the counters should be able to communicate with people with hearing impairments. The manager's office should be easily identifiable and accessible. Various forms should be placed at accessible counters and space should be available for the clients to fill the forms easily.

Automatic Teller Machines (ATM) should be easily accessible to clients with various

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types of disability. They should be placed in areas, which allow mobility for wheelchair users. They should be slip resistant and have grab bars.

#### *Hotel Rooms*

At least one room easily accessible should be located on the ground floor to enable rapid evacuation in case of emergencies. The room should be equipped with an alarm system. All fixtures and controls should be at accessible heights. The space in the room should allow mobility for a wheelchair user. The windows should allow unobstructed viewing for wheelchair users. Room facilities, like phones, fire alarms, wake-up alarms, etc., should be accessible to people with different disabilities.

#### *Cinema Halls*

Tickets counters and the hall should be easily accessible. Specific seats should be allocated to wheelchair users.

#### *Government Offices*

The public areas should be accessible to people with different disabilities. The counter staff should be able to guide people with different disabilities. Letter boxes should be accessible.

#### *Historical Sites*

The site details should be available in Braille. Trained guides should be available for people with different disabilities. Shops should be accessible.

#### *The Disability Access Audit Checklist*

The disability access audit checklist includes details that have to be looked into for carrying out a disability access audit. They must be completely and accurately filled out to carry out a meaningful audit.

The checklist has been divided into two parts. Part 1 (A to K) is for areas common to all buildings audited, while Part 2 (L to Q) deals with areas specific to locations, like banks, cinema halls, etc. It is non-exhaustive and should be adapted to specific needs.

The checklist must be filled in by answering "yes", "no", or "not applicable" to the questions. Observations made in the remarks column during the audit will determine how disabled friendly a location is.

### **Indicative In-house check list for disabled friendly persons.**

DISABILITY ACCESS AUDIT CHECKLIST
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Date of audit:  
 Staff In charge:  
 Department:  
 Audited by (organization):  
 General Remarks & Suggestions:  
 Name of the team leader and signature

<b>A ENTRANCE</b>	
<b>1 Before main entrance</b>	
Are there steps?	Yes/No*. If yes, how many
Does the steps have railings?	Yes/No*. If yes, one/both sides
Is there a ramp? Does the ramp have railings?	*Yes/No
Does the ramp have an edge protection?	*Yes/No*. If yes, one/both sides *Yes/No*. If yes, height of edge Protection:
<b>2 Main Entrance</b>	
Is the width of the entrance greater than or equal to 900 mm?	Yes/No*. Width:
Type of door	Automatic/Swing/Sliding*
Type of door handle (if applicable)	Lever/knob*
Is the height of door handle between 900 mm - 1100 mm?	Yes/No*. Height of kerb:
Is there a kerb at entrance?	Yes/No*. Gradient:
Is there a kerb ramp?	Yes/No*.
Is there the International Symbol of Access (Disabled Logo) displayed?	Yes/No*.
<b>3 Side Entrance</b>	
Location (e.g., along Haig Road) (if there is more than one location, please specify all)	Yes/No*. If yes, location at
<b>4 Side Entrance</b>	
Is the width of the entrance greater than or equal to 900 mm?	Yes/No*. Width:
Type of door	Automatic/Swing/Sliding*

	Type of door handle (if applicable)	Lever/knob*
	Is the height of door handle between 900 mm - 1100 mm?	Yes/No*. Height of kerb:
	Is there a kerb at entrance?	Yes/No*. Gradient:
	Is there a kerb ramp?	Yes/No*.
	Is there the International Symbol of Access (Disabled Logo) displayed?	Yes/No*.
5	Is side entrance accessible to the wheel-chair-users?(Please use section A2 as a guideline).	Yes/No*. If no, give details:
6	Is the accessible entrance clearly identifiable?	Yes/No*. If no, give details:
7	Is the entrance wide enough?	Yes/No*. If no, give details:
8	Is the door a push-open door?	Yes/No*. If no, give details:
9	In multi-storey buildings, does the accessible entrance permit access to a conveniently located elevator?	Yes/No*. If no, give details:
10	Is the entrance landing area sufficient?	Yes/No*. If no, give details:
11	Is the entrance landing easily identifiable?	Yes/No*. If no, give details:
12	Are there tactile landing areas free of obstacles?	Yes/No*. If no, give details:
13	Is the entrance landing area free of obstacles?	Yes/No*. If no, give details:
14	Are emergency exits easily identifiable?	Yes/No*. If no, give details:
15	Are emergency exits easily accessible?	Yes/No*. If no, give details:
B	<b>CAR PARKING</b>	
1	Is there a parking lot for the disabled person within the building?	
	Are there accessible parking facilities?	Yes/No*
	Are indoor parking spaces located closest to accessible elevators?	Yes/No*
	Are accessible parking spaces within 50 meters of building entrances?	Yes/No*
2	If yes, how many are there and state location where these can be found (e.g., Basement 1, lot#112, near lift)	Yes/No*. If yes, location at
3	Is there the International Symbol of Access (Disabled Logo) printed on the parking lot	Yes/No*.Size of logo: Yes/No*.If yes, describe signboard used:



	Is there a vertical and visible signboard indicating that the lot is for the disabled driver?	Yes/No*. Size of logo: Yes/No*. If yes, describe signboard used:
4	Are there directional signs within the parking lot to indicate the location of the parking lot for the disabled person?	Yes/No*.
5	Size of parking lot. (Min. Size: 4800 mm x 3600 mm)	Dimension:
6	Please provide information on accessibility from the parking lot to the lift lobby/building entrance.	<p>Please tick on the box and delete accordingly for the following:</p> <p>There is kerb/no kerb at the Entrance of the lift lobby.</p> <p>There is a kerb ramp at the Entrance of the lift lobby. Gradient:</p> <p>There is a swing/automatic/ Manual* door leading to the main building</p> <p>Width of door entrance is at least 900 mm wide Width:</p> <p>Corridor width is at least 1200 mm wide Width:</p> <p>Width of lift door is at least 900 mm wide Width: State the type of flooring used:</p>
C	<b>TAXI STAND</b>	
1	Is there a taxi stand at the building? If yes, please state the location (e.g., at the main entrance)	Yes/No*. Location:
2	Is there a kerb at the taxi stand?	Yes/No*.
3	Are these one/two kerb ramps for boarding and alighting the taxi?	One/Two* Kerb Ramp for Boarding. Yes/No*. Ramp for Alighting. Yes/No*.
D	<b>LIFT</b>	
1	Is the lift accessible to every floor?	Yes/No*.
	Is there an accessible path leading to the elevator?	If no, please specify which floor(s) the lift stops on:
	Is the elevator door easy to identify?	If no, please specify which floor(s) the lift stops on:
2	Is the clear door opening width more than 900 mm?	Yes/No*. Width:

3	Is the height of the call button (outside the lift) between 900 mm-1100 mm?	Yes/No*. Height between:
	Is the space inside the elevator enough?	Yes/No*. Height between:
4	Is there an audio system installed (talking lift) for the lift?	Yes/No*.
5	Are there Braille/raised (for the visually impaired persons) numbers used on the control panel?	Yes/No*. Height between:
	Is the control panel placed at a height of between 900 mm - 1200 mm from the floor level	Yes/No*. Height between:
7	Are there grab bars inside the lift?	Slides: Yes/No*.
	Are the doors and handrails of the elevator of contrasting colour?	Slides: One/Both* Rear: Yes/No*.
8	Are the grab bars placed at height of 900 mm from the floor?	Yes/No*. Height:
9	Is the emergency intercom usable without voice communication?	Yes/No*.
10	Is the door opening/closing interval long enough?	Yes/No*.
11	Is the floor of the elevator non-slippery	Yes/No*.
E	<b>PUBLIC TELEPHONE</b>	
1	Are there public telephones for the disabled person. If yes, provide location (e.g., level 1,2)	Yes/No*. Location:
2	Is the height of the operable parts (highest and lowest) of the public Phone between 800 mm-1200mm	Yes/No*. Actual height between:
3	Is there a clear knee space of more than 680 mm	Yes/No*. Actual clear knee space:
4	Is there at least one telephone equipped with hearing aids?	
5	Are the numerals on the telephone raised to allow identification by touch?	
6	Is the coin slot mounted at an appropriate height?	

7	Are accessible facilities identification?	
<b>COUNTERS</b>		
1	Is the counter easily identifiable?	
2	Is the level of the counter accessible?	
3	Is the staff able to communicate with people with visual, hearing and speech impairment?	
4	Is the staff supportive to mentally-challenged clients?	
<b>PUBLIC TOILETS</b>		
1	Are there separate toilets for the disabled person? Is the accessible toilet identified by a sign?	Yes/No*.
	Is the entrance to the public toilet accessible to people with disabilities?	Yes/No*.
	Is the width of the door wide enough?	Yes/No*.
	Is there enough manoeuvring space in the toilet?	Yes/No*.
2	Are the toilets for the disabled person available on every floor?	Yes/No*. If no, specify on which floor they are available
3	What type of toilets is provided?	Individual/Compartment/Both*
4	Are the measurements of the toilet for the disabled person the same (if there are more than one toilet)?	Yes/No*.

5	<p>If the toilets for the disabled persons are different from one another, please complete separate copies for each toilet surveyed</p> <p>Sketch toilet surveyed (include door, water closet, wash basin, door and grab bars)</p>	<p>State location of toilet checked</p> <p>Please tick on the box and delete accordingly for the following</p> <p>Individual washroom/compartment * Individual washroom: Have clear dimensions between opposite walls of not less than 1750 mm. Actual dimension: mm x mm</p> <p>Water Closet Compartment Have clear dimensions of not less than 1500 mm by 1750 mm Actual dimension: mm x mm Door width more than 900 mm Actual width: No kerb/kerb ramp* at the Entrance to the toilet. If there is a kerb ramp, the gradient is: Door handles are located:     Inside/Outside/Both sides*     Door opens outwards / inwards*     Door is a swing / folding / sliding* door</p> <p>One horizontal grab bar is mounted at a height of between 280 mm and 300 mm from the top of the water closet seat and one horizontal grab bar is mounted on the side wall closet to the water extending from the rear wall to at least 450 mm-in-front of the water closet seat. Actual height: Actual height:</p> <p>Water basin has a clear knee Space of at least 750 mm wide by 200 mm deep by 680 mm high with an additional toe space of at least 750 mm wide by 230 mm deep by 230 mm high. Actual clear knee space:     (W) x (D)     (H)</p> <p>Water closet is located between 460 mm - 480 mm from the centreline of the water closet to adjacent wall. Actual distance: Clear dimension of 750 mm from the front edge of the toilet bowl to the rear wall. Actual distance:     The passage way leading to the cubicle is at least 900 mm. Actual width:</p>
6	Is there at least one accessible shower?	

7	Are grab bars installed in bathtubs and showers at an appropriate height?	
8	Are accessible showers equipped with shower seats?	
9	Are the grab bars slip resistant?	
10	Can grab bars withstand load?	
11	Is the mirror at an appropriate height?	
12	Is the rest room equipped with an alarm system accessible to people with different disabilities?	
13	Are flushing arrangements, toilet paper and other dispensers mounted at an appropriate height?	
14	Are flushing mechanisms easy to operate?	
15	Are the doors lockable from inside and released from outside in emergency situations?	
<b>DRINKING WATER FACILITY</b>		
1	Is the water tap easily accessible?	
2	Can it be easily manoeuvred by a person with poor hand function?	
3	Is the area dry?	
4	Are glasses provided?	
<b>CAFETERIA</b>		
1	Is there an eating outlet located within the building?	Yes/No*. Location:
2	Is the eating outlet generally accessible to the disabled?	Yes/No*.
3	Is there a circulation path/passageway of at least 900 mm wide to allow the wheelchair user to move around the eating outlet and order their food?	Yes/No*.
4	Is there a table reserved for the disabled?	Yes/No*. If no, give details of seating arrangements:- Height of table-top not higher than 800 mm with a minimum clear knee of 700 mm x 480 mm deep. If no, provide Measurement:      Table-top: Clear knee space: x

		Table with fixed stools/chairs Table without fixed stools/chairs
5	Are there directional signs to lead the disabled person to the reserved table?	Yes/No*.
6	Is there enough leg clearance space below the table?	Yes/No*.
7	Is the height of the table appropriate?	Yes/No*.
8	Is the height of the cash counter appropriate?	Yes/No*.
9	Is there a menu card available in Braille?	Yes/No*.
10	Is there a facility for a person with speech impairment to be able to place an order?	Yes/No*.
11	Do the tables have straight legs?	Yes/No*.
H	<b>STAIRCASE</b>	
1	Applies to flights of steps Check the following:	State where the staircase is located:
2	Are there handrails	Yes/No*. If yes, one/both sides
3	Height of hand rails between 800 and 900 mm from the floor	Yes/No*. Actual height:
4	Are the handrails continuous	Yes/No*.
5	Is there a levelled platform at the top and bottom step extending not less than 300 mm (with railing)	Levelled platform: Yes/No*. Extended railing: Yes/No*.
6	Steps specifications	Uniform riser: Yes/No*. Open Riser: Yes/No*. Height of risers: Protruding nosing: Yes/No*.
7	Is the minimum width of the stairs enough?	
8	Is the landing space at the top and bottom of the stairs enough?	
9	Are the stair nosing slip-resistant?	
10	Is the location of the stairs clearly identifiable?	
11	Is a handrail installed?	
12	Do the stairs have guide strips?	
I	<b>SLOP RAMPS</b>	

	Applies to slope ramps Check the following:	State where the slope ramps are located:
1	Are there handrails	Yes/No*. If yes, one/both sides
2	Height of hand rails between 800 and 900 mm from the floor	Yes/No*.Actual height:
3	Are the handrails continuous	Yes/No*.
4	Is there a levelled platform at the top and bottom ramp extending not less than 300 mm (with railing)	Levelled platform: Yes/No*.Levelled railing: Yes/No*.
5	Is the width of the ramp at least 1200 mm	Yes/No*.Actual width:
6	Ramp landings are provided at regular intervals of not more than 9000 mm of every horizontal run	Yes/No*.Length of horizontal run:
7	Is an edge protection available	Yes/No*.
8	Type of flooring used	Specify:
9	Describe the condition of the flooring	e.g., levelled, tiles popping up, uneven surfaces
10	Are grafting found in the open area	Yes /No*
11	Are the gratings covered?	Yes/No*
12	Are grating placed across the dominant placed across the dominant of travel	Yes/No*
13	Is the width of spaces found between the grating strips less than 12 mm	Width:
1	General description of accessibility within the premises	<p>Paths to various locations of Attractions are easy and Accessible.</p> <p>Quite accessible but there are Steps (manageable).</p> <p>Not quite accessible, there are Many obstacles such as</p> <p>Inaccessible in most areas. (please specify)</p>
<b>CORRIDORS</b>		
	Is the minimum unobstructed width of the corridor wide enough for wheelchair users?	
	Does the corridor width allow manoeuvring through doors located along its length	
	Does the corridor have guide strips?	
	Is the corridor pathway obstruction-free?	
Any other comments:		
Name of Facilitator(s):		Name of Surveyor(s):

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While we focus on making the campus disabled person friendly, the energy and environmental aspects are also to be considered for effective implementation.

## Placing of Batteries

**Criteria 7.1.1, 7.1.2, 7.1.3 and 7.1.5**

### BATTERY MANAGEMENT.

#### PLACEMENT:

The batteries should be placed on an

1. Batteries should be placed on an insulated platform not touching any of the metal frames with top clearance of 6" for ease of handling and breathing.
2. Need cross ventilation for favourable breathing.
3. Provision for periodical checking and maintenance should be made possible without major obstacles.





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In absence of the above placement conditions,

1. The batteries will discharge faster. Loss of energy
2. The charging time and current will increase as there is the return path for self-discharge. Increased Energy Demand.

A well-maintained battery is known to serve for more than 7 years.

The presence of oxidation marks at the point of contact should not develop over the time.

We strongly advice for regenerating the batteries once every 3 to 4 years so that they serve over 15 years in lieu of 5 years under present conditions.

A well-maintained battery will draw less charging power, i.e., saves on energy consumption, delivers more energy per charge thus resulting in better serviced life.

Batteries should be placed well ventilated and avoid dumping of any material on the breathers provided.



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## BATTERY REGENERATION

Concealed batteries in operation or used batteries should be properly named and placed in proper order. The used batteries should be considered for REGENERATION for the second and subsequent cycles and prolong the disposal as the chemicals cause high level of damage to the environment.

We will discuss the regenerative system of used and week batteries to enhance the life. It is important to know few points on handling of batteries.

BU-703: Health Concerns with Batteries.

1. Become familiar with the do's and don'ts when handling batteries.

Batteries are safe, but caution is necessary when touching damaged cells and when handling lead acid systems that have access to lead and sulfuric acid. Several countries label lead acid as hazardous material, and rightly so. Lead can be a health hazard if not properly handled.

### Lead

Lead is a toxic metal that can enter the body by inhalation of lead dust or ingestion when touching the mouth with lead-contaminated hands. If leaked onto the ground, acid and lead particles contaminate the soil and become airborne when dry. Children and foetuses of pregnant women are most vulnerable to lead exposure because their bodies are developing. Excessive levels of lead can affect a child's growth, cause brain damage, harm kidneys, impair hearing and induce behavioural problems. In adults, lead can cause memory loss and lower the ability to concentrate, as well as harm the reproductive system. Lead is also known to cause high blood pressure, nerve disorders, and muscle and joint pain. Researchers speculate that Ludwig van Beethoven became ill and died because of lead poisoning. By 2017, members of the International Lead Association (ILA) want to keep the lead blood level of workers in mining, smelting, refining and recycling below 30 micrograms per decilitre (30µg/dl). In 2014, the average participating employee checked in at 15.6µg/dl, but 4.8 percent were above 30µg/dl. (Source Batteries & Energy Storage Technology, Summer 2015.)

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In 2019, the University of Southern California published the detection of lead in teeth of children living near the Exide Technologies battery recycling plant in Vernon, California.

Lead occurs naturally in soil at 15–40mg/kg level. This level can increase multi-fold near lead battery manufacturing and recycling plants. Soil levels in developing countries, including on the continent of Africa, recorded lead contamination levels of 40–140,000mg/kg.

### Sulfuric Acid

The sulfuric acid in a lead acid battery is highly corrosive and is more harmful than acids used in most other battery systems. Contact with eye can cause permanent blindness; swallowing damages internal organs that can lead to death. First aid treatment calls for flushing the skin for 10–15 minutes with large amounts of water to cool the affected tissue and to prevent secondary damage. Immediately remove contaminated clothing and thoroughly wash the underlying skin. Always wear protective equipment when handling sulfuric acid.

### Cadmium

Cadmium used in nickel-cadmium batteries is considered more harmful than lead if ingested. Workers at NiCd manufacturing plants in Japan have been experiencing health problems from prolonged exposure to the metal, and governments have banned disposal of nickel-cadmium batteries in landfills. The soft, whitish metal that occurs naturally in the soil can damage kidneys. Cadmium can be absorbed through the skin by touching a spilled battery. Since most NiCd batteries are sealed, there are no health risks in handling intact cells; caution is required when working with an open battery.

Nickel-metal-hydride is considered non-toxic and the only concern is the electrolyte. Although toxic to plants, nickel is not harmful to humans.

Lithium-ion is also benign — the battery contains little toxic material. Nevertheless, caution is required when working with a damaged battery. When handling a spilled battery, do not touch your mouth, nose or eyes. Wash your hands thoroughly.

Keep small batteries out of children's reach. Children younger than four

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are the most likely to swallow batteries, and the most common types that are ingested are button cells. Each year in the United States alone, more than 2,800 children are treated in emergency rooms for swallowing button batteries. According to a 2015 report, serious injuries and deaths from swallowing batteries have increased nine-fold in the last decade.

The battery often gets stuck in the oesophagus (the tube that passes food). Water or saliva creates an electrical current that can trigger a chemical reaction producing hydroxide, a caustic ion that causes serious burns to the surrounding tissue. Doctors often misdiagnose the symptoms, which can reveal themselves as fever, vomiting, poor appetite and weariness. Batteries that make it through the oesophagus often move through the digestive tract with little or no lasting damage. The advice to a parent is to choose safe toys and to keep small batteries away from young children.

### Safety Tips

- Keep button batteries out of sight and reach of children. Remote controls, singing greeting cards, watches, hearing aids, thermometers, toys and electric keys may contain these batteries.
- Similar to pharmaceutical products, keep loose batteries locked away to prevent access by small children.
- Communicate the danger of swallowing button batteries with your children, as well as caregivers, friends, family members and babysitters.
- If you suspect your child has ingested a battery, go to the hospital immediately. Wait for a medical assessment before allowing the child to eat and drink.

### Ventilation

Charging batteries in living quarters should be safe, and this also applies to lead acid. Ventilate the area regularly as you would a kitchen when cooking. Lead acid produces some hydrogen gas but the amount is minimal when charged correctly. Hydrogen gas becomes explosive at a concentration of 4 percent. This would only be achieved if large lead acid batteries were charged in a sealed room.

Over-charging a lead acid battery can produce hydrogen sulphide. The gas is colourless, very poisonous, flammable and has the odour of rotten

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eggs. Hydrogen sulphide also occurs naturally during the breakdown of organic matter in swamps and sewers; it is present in volcanic gases, natural gas and some well waters. Being heavier than air, the gas accumulates at the bottom of poorly ventilated spaces. Although noticeable at first, the sense of smell deadens the sensation with time and potential victims may be unaware of its presence.

As a simple guideline, hydrogen sulphide becomes harmful to human life if the odour is noticeable. Turn off the charger, vent the facility and stay outside until the odour disappears. Other gases that can develop during charging and the operations of lead acid batteries are arsine (arsenic hydride,  $AsH_3$ ) and (antimony hydride,  $SbH_3$ ). Although the levels of these metal hydrides stay well below the occupational exposure limits, they are a reminder to provide adequate ventilation.

Regeneration of week batteries for the second lease of life.

### REGENERATE YOUR SULPHATED BATTERIES

Battery regeneration is very popular. 80% of the batteries breaking down and losing capacity are sulphated, but can be restored with the right equipment. Battery regenerator successfully replaces sulphation by active material thanks to an electrical high-frequency pulsation process. This process restores the battery capacity, giving you the ability to reuse old and sulphated batteries. You can also use the battery regenerator for annual maintenance to considerably prolong the lifespan of your batteries. The battery regenerator can be used in every lead-acid-based battery: starter batteries, stationary batteries, traction & semi-traction batteries, Ni-Cad batteries ... Since the college uses BATTERIES in large numbers, the management can consider to procure one unit at the centralised station in the college campus.

For more information on battery regeneration, Contact  
Sunshubh Technovations Pvt Ltd, Hubli  
[ceo@sunshubhrenewables.com](mailto:ceo@sunshubhrenewables.com).

## Retaining the existing Green Cover

**Criteria 7.1.1, 7.1.2, 7.1.3 and**

### **7.1.5**

The placement of generator without proper flue gas vent.

It may be seen from the image; the flue gas vent hits the plant. The hot gases emitted burn the young branches and if continued, it hinders the healthy growth of the plant.

It also pollutes the air thus causing breathing problems.

Remedial ,measure: Extend the flue gas (exhaust) vent to the top of the building.



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## Electrical Power Usage:

It is important to understand the significance of the Energy use implication. The use of electrical power has been observed to be unnecessary. The administration should initiate to keep all unwanted and unused appliances switched off.

Reduced energy consumption will call for reduced energy demand. Reduced energy demand will subsequently lead to reduced cost of energy generation. This makes it financially feasible for renewable energy resources. Use of renewable energy resources will lead to increased CARBON HANDPRINT initiatives.





Use of T12 tube lights

It is observed that the lights are left switched ON at majority of places and thus causing financial losses to the management and energy loss to the country.

**Solution:**

It is therefore required to install Light Intensity Sensors in all the rooms.

Lighting improvements should be carried out by using T5/LED or The Induction Light systems in lieu of normal tube lights. If the finance department permits, it is advised to install 40W Induction lamps in all classrooms.

Source : Can be locally procured, However the load-based selection is key aspect in its installation. To set the visibility, the intensity of natural light is much stronger and hence LUX based setting doesn't work. Hence the technical supervision is key aspect.

We suggest to allocate this to the Physics stream of students to understand the science and application of technology.





## Light Intensity Sensor requirement.

It may be seen that the Light is illuminated. However, the brightness on the students is seen to be coming from the sides. The shadow indicates natural light coming from the windows is brighter. Natural light is more predominant than the tube light. Hence tube light being switched off has no adverse effect. However, it would save on the energy consumption and contribute to green practices.



### **NATURAL LIGHTING: Category 7.1.1, 7.1.2, 7.1.3 and 7.1.5**

It is found that the windows have not been blocked and also at some areas need to be maintained clean, if not it calls for switching on internal lights. If the windows are cleaned at regular intervals, it will help in increasing the illumination level in the room. Thus, preventing switching on lights during day light.



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It is also important that in no room the stacking of either the material or the placement of rooms should be allowed.

Cupboards blocking natural day light should be avoided at all places in the campus

### **Electrical safety.**



The earthing system provided to the appliances and electrical driven systems should be properly maintained and labelled for periodical checks.

### **Windows:**

#### **Key observations and requirements on designing the windows.**

Windows are necessary for natural lighting and for cross flow of air. However, In educational institutions, the point of concern is that, the distraction of attention.

It is seen that the windows are fitted with transparent glass. The glass should be translucent up to minimum of 4.5 feet. This is necessary to avoid distraction of attention of the students from external movements and happenings around.



The windows, if required to be kept open should be done keeping the distraction factor in view.

It has also been observed that the top part of the window, which is supposed to be the ventilator, has been permanently closed. It is necessary to open this part for indoor exhaust. In present situation, the warm air vented out by human breath gets trapped in the top layer and has no escape path.

As the room temperature rises, the ceiling fans, turned on, churns in the same warm air in the room creating feel of heaviness.

The college buildings are well engineered to allow the natural breeze to flow & maintain comfortable room temperature. However, it is barred by wrong design and placement of windows.

Hence, we strongly advise to keep all the ventilators' clean & open. If possible, work with wall mounted Fans to act in line with natural theory of science.

### **Well-designed windows result into reduction of energy demand by 70%**

Stacking of racks in front of the window, prevents natural illumination. This calls for forced lighting. The air vents are totally blocked and results into very poor air circulation.

It is important to understand the impact of such conditions. Off late people have been complaining about dullness/weakness/ vagueness and similar sense of health condition. It is important to understand the basic cause.



For all such situations,

it is observed and is natural practice to go out for few minutes and start all over again. This is the situation commonly termed as **SICK BUILDING SYNDROME**. The effects of sick building syndrome are well discussed and the management should consider these aspects when utilizing the space.

WE strongly suggest to seek opinion of the subject expert and relay the stacking arrangement and sitting/reading/studying tables.

**In the present situations COVID 19 pandemic its very significant.**

#### **Fuel leakage & Safety:**

The use of rubber pipe as feeder to LPG Burner should be avoided. The aged, cracked pipe causes for LPG gas leak and may cause irreparable loss. .

Use specified and Certified extension pipes.

**Avoid purchase of such extension pipes.**

The access to chemicals required for the days or two should be placed with easy access and the rest may be placed in separate room which is available at present.



The water taps are seen to be leaking all day. This will lead to exhaustion of the water required for normal activities and for washing off the excess chemicals or skin contact.

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One-line comments on few observations in continuation of our previous audit report.



Rainwater drain at regular space to increase the longevity of the tarred roads and healthy growth of trees on either side.



Disciplined parking is necessary to build good and responsible citizenship. A properly parked vehicle can prevent many hazards in case of emergency and urgency as well.



The use of assets to be properly regulated and the objectives of such assets built by the management should be made known to all the visiting members to the college.

### Construction waste management.



### Waste regulation and management.



## Asset classification and management.



Proper labelling and stacking of old records required to be retained under the statutory compliances should be placed in order. Records that could be destroyed or disposed may be done so. A well-maintained record helps in good management of the space provided and their utilisation.

## Work culture.



It is important to provide proper utilisation space for all the system-based requirements. In doing so, a team of senior staff involving support team from younger staff should be constituted to continually monitor the creations and improve upon the performance.

- Air circulation is key performer in one's work performance. Hence considering the work system, documents being handled, appropriate air circulation system should

be provided so as to keep the room temperature and the fresh air with good level of Oxygen being pumped in.

The Botanical garden, Medicinal Garden, Organic waste management, Vermicompost should be mooted on hobby basis lead by staff members from varying seniority, duly involving the students from all year to work on these nature friendly requirements. Their benefits and importance should be well propagated for self-sustainability.

- The Botanical garden looks to be unutilized or out of records. All the resources provided and the manpower goes to waste when continued efforts find their absence.
- The medicinal garden needs to be properly tagged and the importance of each of these plants be prominently displayed.
- Vermicompost infrastructure can bring about major life saving among the farming community. A student if well-educated on the methodology and its rich constituents involving nutrients and financial aspects can save the farmer from erratic and panic spending on crop regulation.

### Hazardous waste management.



Due care needs to be taken care when handling hazardous waste. Before being discarded as waste it is important to consider the reuse based on 6R's in lieu of 3R's.

- Avoid use of resources where possible.
- Conservation of all resources.
- Efficient use of resources.
- Recycle all possible resources.





## Rose Garden.

The Rose Garden has come up well and is being regularly harvested. The plants would thrive if few more aspects are considered.

- Mulching
- Use of vermicompost to fertigate the plants.
- Labelling the rose varieties to understand and explore marketable potential.
- The space can also be considered to grow alternate creeping varieties such as watermelon, cucumber etc.,



## Waste classification at source.

Providing of assorted waste bins was discussed in the earlier report. It would be a great consideration if incorporated and minimise the load on the vermicompost system. The valuable waste such as plastic, metal can also fetch good revenue to spend on improving the utility area.



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## Rainwater Rooftop.

The rainwater collected and stored in the tank should be properly labelled and the same to be used for conducting various experiments. It may be made known to all the students that rainwater when captured from clean roof, is a good distilled water and can yield good revenue by way of bottling the rainwater and selling in the battery market. This knowledge will bring in positive financial implications and motivate young clan to venture out with aggressive entrepreneurship.



The beautiful structures planned by the administrators and built by the management clearly indicate that they are concerned about the environment and are committed to deliver good sense of civic discipline and knowingly or unknowingly are exhaling the process of heading towards **ZERO CARBON FOOTPRINT**.

When the infrastructure is in place, the staff are inclined to perform there is nothing that can stop from achieving the required. What is required is the orientation and awareness sessions on the right use.

The designated staff be trained in understanding the needs and allowed to test their innovative skills to move towards Green practices will accelerate the process of green revolution.

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## **EXHIBIT GREEN HABITS:**

The college administration, should engage its resources in exhibiting Green Habits as discussed.

### **ACTION PLAN SUMMARY:**

- Earmark the action plan.
- Invite subject experts for Tec talks,
- Organize in person panel discussions and interaction to propagate the knowledge and mitigate the problems in practicing the same.
- Prioritize the initiatives and execute.
- Observe the benefits and shortcomings.
- Workout further improvement by involving the staff and students.

### **MODE OF ACTION:**

- The process of GREEN AUDIT & ENERGY CONSERVATION should be carried out in three steps.
- Good housekeeping practices using available manpower.
- Minor alterations using in house work culture with minimum investments on accessories as discussed.
- Capital investments, which may be required for installation of new methodologies may be taken up on phased manner.

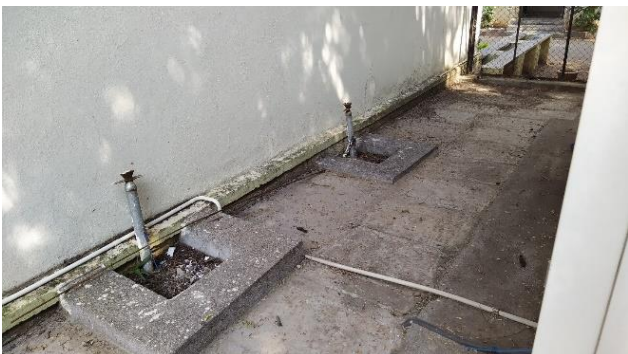
We will be happy to assist you for any further advice/consultancy if required either on Rainwater management or on any of the measures discussed in the report.

We hope the measures are implemented in good spirit and to human convenience and comfort.

For SUNSHUBH TECHNOVATIONS PVT LTD.,

Mallikarjun A. Kambalyal. B.E. (E&C)  
Certified Energy Auditors EA-3485

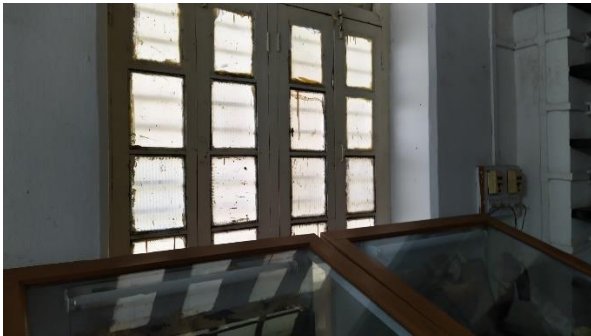
Supplementary evidence to support our observation.















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**Note Sheet:**

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Note Sheet:

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Note Sheet:

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Note Sheet:

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