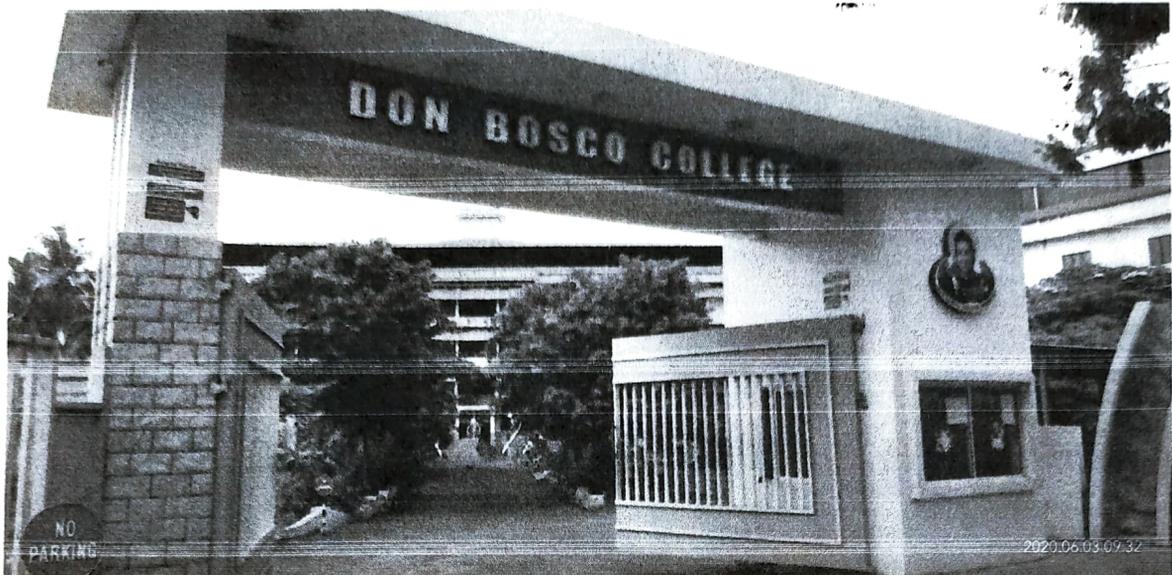


# ENVIRONMENT AUDIT - 2020



**DON BOSCO COLLEGE**

**MANNUTHY, THRISSUR**

**Kerala**

*EXECUTED BY*



**ATHUL ENERGY CONSULTANTS PVT LTD**

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**March 2020**

*[Signature]*  
PRINCIPAL  
DON BOSCO COLLEGE,  
MANNUTHY,  
THRISSUR - 680020,  
KERALA

**BRIEF CONTENTS**

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**PREFACE** ..... 3

**ACKNOWLEDGEMENTS** ..... 4

**EXECUTIVE SUMMARY** ..... 5

**BASIC DETAILS**..... 6

**ABOUT ENVIRONMENT AUDIT** ..... 9

**WASTE MANAGEMENT**..... 9

**FACILITIES PROVIDED BY COLLEGE FOR WASTE MANAGEMENT COLLECTION** ..... 15

**CONCLUSION** ..... 16

**ANNEXURE**..... 17

**LIST OF TABLES**

---

**Table 1 Basic details**..... 6

**LIST OF FIGURES**

---

**FIGURE 1: Don Bosco Campus** ..... 8



  
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Page 2/17

## PREFACE

Every institution should be imparting knowledge about the campus environment and its surroundings through activities that follows the principles of sustainability and waste management. Hence an evaluation is needed to understand where it stands in the path to be an environment friendly, and in talent nurturing educational institution.

This Environment Audit was done with the aim to assess mainly on waste management of the campus. The college vision is "To become a centre par excellence of learning, where the best in humans is unveiled, based on human values, focused on life enhancement and constructive in adapting to the needs of the world". The mission of college is "to mould individuals into successful and vibrant professionals facilitating comprehensive and rounded formation, to function as effective and empathetic human beings, grounded with courage of conviction, personal integrity, professional ingenuity and social commitment "and it was we observed by us from the students' participation during the environmental audit.

This report is compiled by the BEE certified energy auditor and environment consultants along with the project engineers who are experienced in the field of energy, environment and management. The student volunteers made a mammoth contribution with data collection and in preparing an initial skeleton for the report.



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## ACKNOWLEDGEMENTS

We express our sincere gratitude to the **Don Bosco College, Mannuthy**, for giving us an opportunity to carry out the project of Environment Audit. We are extremely thankful to all the staffs for their support to carry out the studies and for input data, and measurements related to the project of Environment audit. The environment audit conducted in the March 2020

- |   |                                 |                     |
|---|---------------------------------|---------------------|
| 1 | <b>Fr. Raju Chakkanattu SDB</b> | Principal           |
| 2 | <b>Mr. Antony P James</b>       | IQAC coordinator    |
| 3 | <b>Fr Sumon Jose SDB</b>        | Administration head |

Also congratulating our Environment audit team members for successfully completing the assignment in time and making their best efforts to add value.

## ENVIRONMENT AUDIT TEAM

1. **Mr. Krishnakumar G.**  
Lead Auditor, ISO 14001, Environment Management and Certified energy auditor.
2. **Mr. Ashok K M P**  
Registered Energy Manager of Bureau of Energy Efficiency (BEE – Govt. of India)  
Accredited Energy Manager No – EA 25612
3. **Mr. Jaldeep PP, Project Engineer**



Yours faithfully

Managing Director  
Athul Energy Consultants Pvt Ltd

  
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## EXECUTIVE SUMMARY

- The incinerator is fitted in the college for incinerating non bio degradable wastes.
- Sufficient number of toiles are given in the college for staffs and students of college
- The bio degradable wastes collected from the are send to pig farm run the Don Bosco school which is 5 km away from college
- The wastes generated from the pets and birds are use as fertiliser for main garden and for vegetable garden in the college

### Suggestions for Improvement

- We suggested to install a portable FRP bio gas plant of size 2m<sup>3</sup> for treating the wastes generated from hostels and from students. The slurry can be utilized as bio fertilizer and the methane gas generated can be used in kitchen in the hostel.
- Separate additional incinerator to be provided to incinerate napkins. Small electrical incinerator is available which can be installed in ladies' toilets.
- Vermicompost pant to be installed in the campus for composting the tree leaves and other bio degradable substances
- Waste segregation to be made scientific as separate bins with different colors for plastic, bio degradable, plastic, bio non degradable etc.
- Waste survey to be conducted frequently with the help of students in the college.
- More awareness sessions to be conducted in the college for students and Faculties.



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**BASIC DETAILS**

The general details of the Don Bosco college are given below in table based on the data availed from the college.

SL. NO	PARTICULARS	DETAILS
1	Name & Address of college	<b>Don Bosco College</b> Mannuthy, Thrissur Kerala-680651
2	Contact person	<b>Mr. Antony P James, IQAC coordinator</b> Ph: 9496349308 Mail: dbcicqacmty@gmail.com
3	<b>Location: Latitude &amp; Longitude</b>	1052895N, 76.25698E
4	No. of Teaching staff	38
6	No. of Non-Teaching staff	15
7	No of students	712
8	Building area	4259.7 m <sup>2</sup>
9	Land area	3.72 acres
10	Department nos	05
11	Under graduate program	06
12	Post graduate program	02
13	Hostel numbers	NIL
14	Number of electricity connection	03 nos
15	Total connected load (As per KSEBL)	75.812 kW
16	Average electricity consumption	1684 kWh/ month
17	Average annual working days	245 days
18	DG Set	100 kVA - 1 no
19	Solar power plant installation	20 kW inverter
20	Average annual exported power to the grid	22,464 kWh

**Table 1 Basic details**

*Antony P James*  
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## INTRODUCTION ABOUT COLLEGE

### **Vision statement of the college**

To form globally integrated persons who champion the cause of justice, truth, peace and respect. To groom intellectually competent, morally upright, psychologically, integrated, physically able, and socially responsible persons through holistic and innovative education.

Our students should be capable of championing the cause of justice, love, truth and peace in order to develop our nation. They equip themselves to be in the forefront to create a just and human society that respects human dignity and promotes religious harmony. They are prepared to shoulder the responsibility of fostering national integration, and the cultural heritage of the country. They are empowered to stand on their own feet, facing bravely and successfully, this world of acute competition.

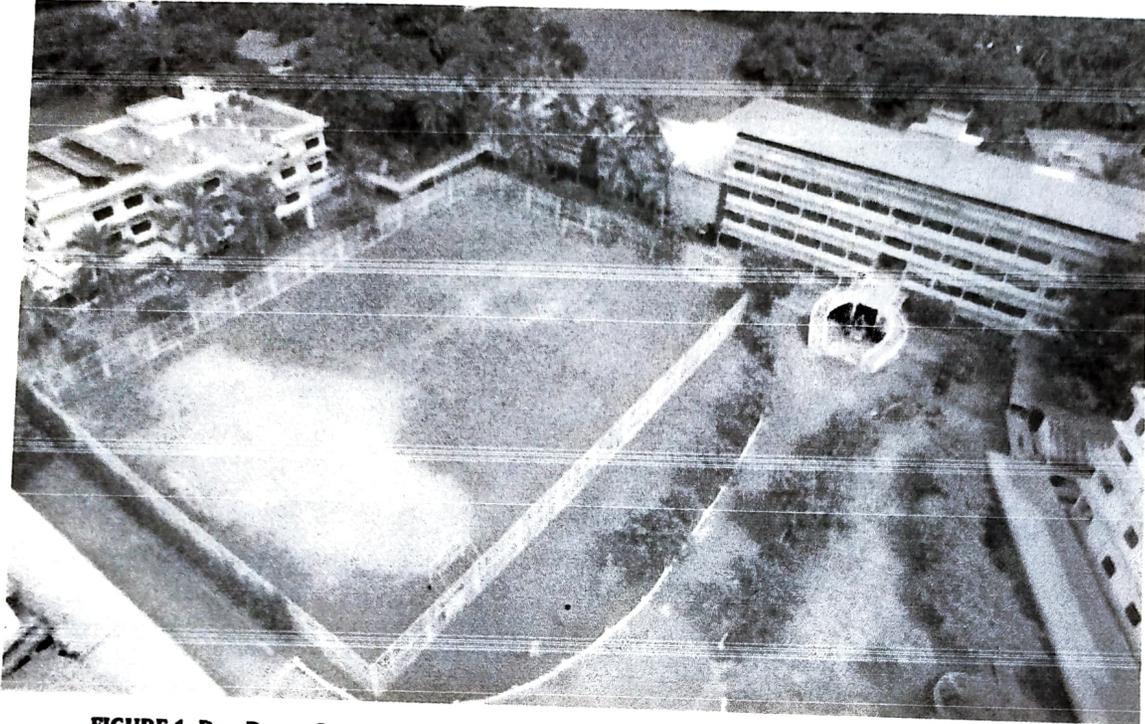
### **Our mission**

We, at Don Bosco College, Mannuthy, believe that education should help people to lead better lives, earn better income, and take their position in the higher echelons of society. It should give them the strength to understand and cope with the hard realities of life, thus paving the way for fulfilment in life. With this end in view, Don Bosco College leads the students, regardless of the programme selected, through an integrated programme of scientific formation and personality development.



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**FIGURE 1: Don Bosco Campus**



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A handwritten signature in blue ink, appearing to be "Gm", written over the printed text of the principal's name and address.

## ABOUT ENVIRONMENT AUDIT

The ICC defines Environment Auditing as: **"A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of safeguarding the environment and natural resources in its operations/projects."**

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Environmental conditions may be monitored from angles that are relevant to Indian requirements, without stress on legal issues or compliance. This innovative scheme is user friendly and totally voluntary. The environmental awareness helps the institution to set environmental examples for the community and to educate young learners.

Here we can mainly divide this report waste management initiatives and installations of systems such as biogas plant, vermicompost, incinerator and collection and segregation of waste in the campus etc and students initiates in waste management as a social cause.

## WASTE MANAGEMENT

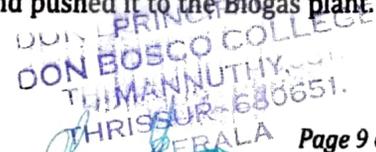
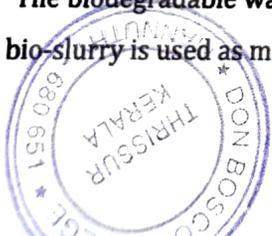
Waste is generally termed as 'a resource at the wrong place'. The college authorities are aware of the possible methods and have installed waste management measures like biogas systems. The waste clearance measures associated with different types of wastes are briefly given below. In this college normally three types of wastes are generated and we can divide the same as,

1. Bio degradable
2. Non bio degradable and
3. E-waste

### 1. BIODEGRADABLE WASTES

**Biodegradable waste** includes any organic matter in waste which can be broken down into carbon dioxide, water, methane or simple organic molecules by micro-organisms and other living things by composting, aerobic digestion, anaerobic digestion or similar processes also includes some inorganic materials which can be decomposed by bacteria. These materials are non-toxic to the environment and mainly include the natural substances like Plants and animals waste, even the dead plants and animals, fruits, paper, vegetables, etc. get convert into the simpler units, which further get into the soil and are used as manures, biogas, fertilizers, compost, etc.

The biodegradable wastes are mainly from the college canteen and pushed it to the Biogas plant. The bio-slurry is used as manure to the plantation.



## I. BIO GAS PLANT

Biogas is the mixture of gases produced by the breakdown of organic matter in the absence of oxygen (anaerobically), primarily consisting of methane and carbon dioxide. Biogas is a renewable energy source. Biogas is produced by anaerobic digestion with methanogen or anaerobic organisms, which digest material inside a closed system, or fermentation of biodegradable materials. This closed system is called an anaerobic digester, biodigester or a bioreactor.

Biogas is a renewable, as well as a clean, source of energy. Gas generated through bio digestion is non-polluting; it actually reduces greenhouse emissions. No combustion takes place in the process, meaning there is zero emission of greenhouse gasses to the atmosphere; therefore, using gas from waste as a form of energy is actually a great way to combat global warming. Another biogas advantage is that, unlike other types of renewable energies, the process is natural, not requiring energy for the generation process. In addition, the raw materials used in the production of biogas are renewable.

Bio gas plant reduces soil and water pollution. Consequently, yet another advantage of biogas is that biogas generation may improve water quality. Moreover, anaerobic digestion deactivates pathogens and parasites; thus, it's also quite effective in reducing the incidence of waterborne diseases.

Bio gas generation produces organic fertiliser. The by-product of the biogas generation process is enriched organic (digestive), which is a perfect supplement to, or substitute for, chemical fertilizers. The fertilizer discharge from the digester can accelerate plant growth and resilience to diseases, whereas commercial fertilizers contain chemicals that have toxic effects and can cause food poisoning, among other things.

The biogas plant converts food wastes into methane gas and usable bio fertilizers which will be used for plants. The methane gas from the biogas plant is used in the canteen for cooking purpose and for heating drinking water hot water. Approximately 100 kg of LPG /month is saved by using biogas plant. The bio manure from the biogas plant is used for gardening, agriculture and for trees. This biowaste also acts as the best bio insecticide and thus the college avoided the usage of environmentally toxic pesticides for the environment. Here the college is using a fixed dome permanent structure biogas plant of size 4 M<sup>3</sup> for treating bio waste. The slurry coming from the plant is collected in drums and reused after diluting with water for agriculture and for gardens. The methane gas is used in the canteen for hot water generation which is used for drinking and tea making.

### Recommendation

At present Don Bosco College is collecting the food wastes and sending them to their pig farm behind their school 5 km away from college. We recommend to reinstall or provide a new 1m<sup>3</sup> gas volume capacity Portable FRP bio gas plant in ground level. The slurry from the bio gas plant can be used for gardening or for vegetable garden.



## II. VERMI-COMPOST

It is the product of the decomposition process using various species of worms, usually red wigglers, white worms, and other earthworms, to create a mixture of decomposing vegetable or food waste, bedding materials, and vermicast. Vermicompost contains water-soluble nutrients and is an excellent, nutrient-rich organic fertilizer and soil conditioner.<sup>[3]</sup> It is used in farming and small scale sustainable, organic farming.

The major source of raw material for vermi-compost is the leaves in the college campus and also the wastes generated which are not fed into biogas such as Chicken bones etc. The vermi-compost plants installed near to the scrap yard in the college campus

## III. Pipe Compost

Pipe composting is kind of vermicomposting often called as worm tube composting which is carries by using PVC tube. This is simpler method for treating wastes of lower volume.

### Benefits of Vermi-compost

#### a. For Soil

- ❖ Improves soil aeration
- ❖ Enriches soil with micro-organisms (adding enzymes such as phosphatase and cellulase)
- ❖ Microbial activity in worm castings is 10 to 20 times higher than in the soil and organic matter that the worm ingests
- ❖ Attracts deep-burrowing earthworms already present in the soil
- ❖ Improves water holding capacity

#### b. For Plant growth

- ❖ Enhances germination, plant growth, and crop yield.
- ❖ Improves root growth, Enriches soil with micro-organisms, adding plant hormones such as auxins and gibberellic acid.

#### c. For Economic

- ❖ Biowastes conversion reduces waste dumping in landfills.
- ❖ Elimination of biowastes from the waste stream reduces contamination of other recyclables collected in a single bin (a common problem in communities practicing is single-stream recycling)
- ❖ Creates low-skill jobs at local level.



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- ❖ Low capital investment and relatively simple technologies make vermicomposting practical for less-developed agricultural regions.

#### **d. For Environmental**

- ❖ Helps to close the "metabolic gap" through recycling waste on-site.
- ❖ Large systems often use temperature control and mechanized harvesting, however other equipment is relatively simple and does not wear out quickly
- ❖ Production reduces greenhouse gas emissions such as methane and nitric oxide (produced in landfills or incinerators when not composted).

### **Recommendation**

- ❖ We strongly recommend to install a vermicompost plant in the campus to bio degradable solid waste which we cannot treat by bio gas plant. The compost formed from vermicompost can be used for our gardening and plants.
- ❖ As a demonstration we can install pipe compost plant for vegetable garden creation in the college

### **SEGREGATION OF WASTE**

Segregation of our waste is essential as the amount of waste being generated today caused immense problem. There are certain items are not Bio Degradable but can be reused or recycled in fact it is believed that a larger portion of the waste can be recycled, a part of can be converted to compost, and only a smaller portion of it is really waste that has no use and has to be discarded. The segregation waste at the first point important because we can reduce cost involved for the final segregation and treatment cost. At present college is segregation the waste in a crude manner which we can convert into scientific segregation system.

### **Recommendation**

The waste segregation to be done at the first point by installing dust bins at various waste generation points. Following points to be adopted in the college

- ❖ The colour coding of waste bins Organic is Green, Glass is Yellow, Paper is White, Metal is Grey, Plastic is Blue, Hazard is Red
- ❖ Numbering of each bins and keeping a register for its location.
- ❖ Internal waste survey to be conducted in every month as collect all the waste items in the college and weighed and keep a track record of the same will use as an indicator for control

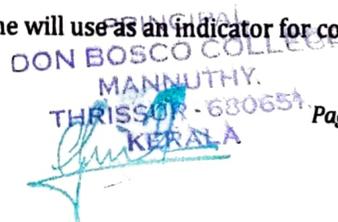




Figure 2: Present Segregation

## 2. NON-BIODEGRADABLE WASTE

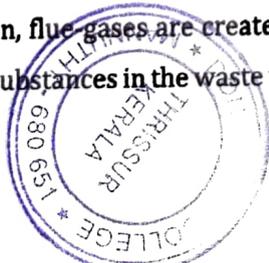
Materials that remain for a long time in the environment, without getting decompose by any natural agents, also causing harm to the environment are called non-biodegradable substances. These materials are metals, plastics, bottles, glass, poly bags, chemicals, batteries, etc. But as these are readily available, convenient to use, and are of low cost, the non-biodegradable substances are more often used. But instead of returning to the environment, they become solid waste which cannot be broken down and become hazardous to the health and the environment. Hence are regarded as toxic, pollution causing and are not considered as eco-friendly.

Many measures are taken these days, concerning the use of non-biodegradable materials. The three 'R' concept which says **Reduce-Recycle-Reuse** is in trend, which explains the use of the non-biodegradable materials. As we already discuss that these substances do not decompose, or dissolve easily so can be recycled and reuse. And one can help in reducing this waste by instead of throwing the plastics and poly bags in the garbage; it can be put in the recycling bags to use again.

Non-recyclable wastes are collected and burned once in a month using incinerator places inside the campus itself. The recyclable wastes are sorted out into categories and supplied it to the collecting units.

### I. INCINERATOR

The objective of waste incineration, in common with most waste treatments, is to treat waste to reduce its volume and hazard, whilst capturing (and thus concentrating) or destroying potentially harmful substances. Incineration processes can also provide a means to enable recovery of the energy, mineral and/or chemical content from waste. Basically, waste incineration is the oxidation of the combustible materials contained in the waste. Waste is generally a highly heterogeneous material, consisting essentially of organic substances, minerals, metals and water. During incineration, flue gases are created that will contain most of the available fuel energy as heat. The organic substances in the waste will burn when they have reached the necessary ignition



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temperature and come into contact with oxygen. The actual combustion process takes place in the gas phase in fractions of seconds and simultaneously releases energy. Where the calorific value of the waste and oxygen supply is enough, this can lead to a thermal chain reaction and self-supporting combustion, i.e. there is no need for the addition of other fuels.

The incinerator is used for incinerating non-biodegradable waste such as paper, plastic, sanitary napkins etc. The ash generated are as for manoeuvre after mixing with cow dung for plants. The ash generated from plastic will be treated separately.

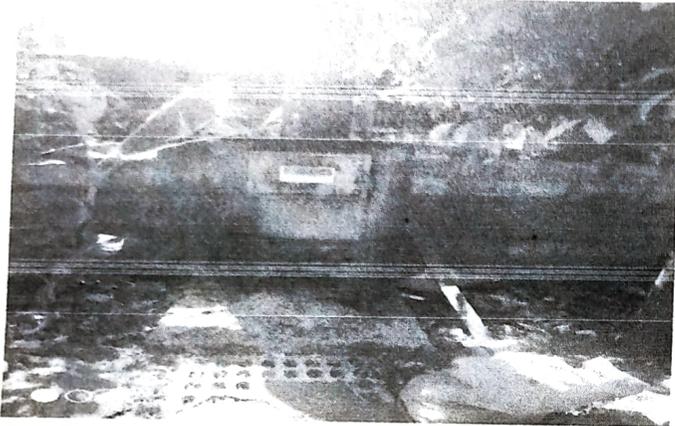


Figure 3: Incinerator

#### **Recommendation**

At present there is, a common incinerator for Incinerating all wastes of college. We recommended to install a separate incinerator for incinerating sanitary napkins

### **3. ELECTRONIC WASTE**

Electronic waste or e-waste describes discarded electrical or electronic devices. E-waste or electronic waste is created when an electronic product is discarded after the end of its useful life. The rapid expansion of technology and the consumption driven society results in the creation of a very large amount of e-waste in every minute. Used electronics which are destined for refurbishment, reuse, resale, salvage recycling through material recovery, or disposal are also considered e-waste. Informal processing of e-waste in developing countries can lead to adverse human health effects and environment pollution. Certain components of some electronic products contain materials that render them hazardous, depending on their condition and density.

#### **Recommendation**

We strongly recommend to separate marked space to be created in the college for collecting E waste and signed an MOU with external pollution control board recognised parties or companies to took the E wastes generated from college.



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## FACILITIES PROVIDED BY COLLEGE FOR WASTE MANAGEMENT COLLECTION

- Toilets in every floor of all buildings separately for girls, boys and staff.
- There is separate toilet facility for department heads, staff rooms, administrative department and common facility.
- Every day cleaning and sanitisation is done at each and every toilet by cleaning personnel which used to check by housekeeping supervisor.
- Separate team is maintained by college for maintain the clean campus, removal of wastes from pets, collection wastes from bins, which is supervised by maintenance supervisor.



## CONCLUSION

Environment audit is the best way to analyse and solving the critical issues of waste management. Environment audit can add value to management approach being taken by college for identifying, collecting, segregating and processing of waste generated in the college campus. By analysing the waste generation in each segment such as biodegradable, non-degradable, R waste etc. gave an indication of waste generation and thus put control for the same to reduce the environmental impacts in due course.

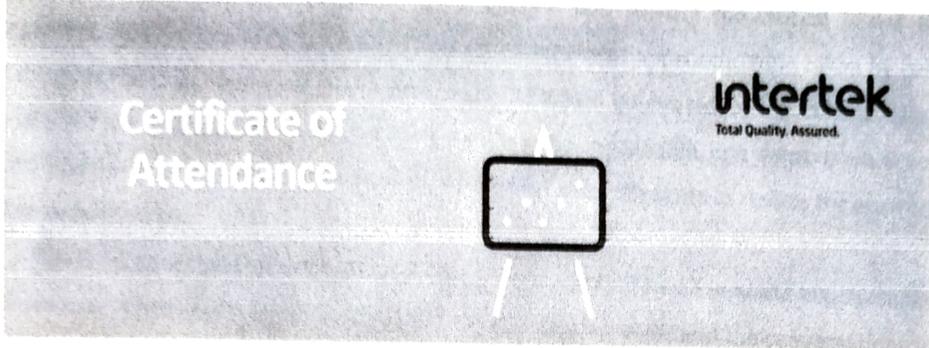
The findings in the report shows that college perform fairly well in waste management issues and taken considerable efforts in a responsible manner. During audit and the conversations with the college team, we observed that Don Bosco college done various approaches in the past few years to performing well to sustainable environment. Even though there is space for further improvement that mentioned in the executive summary.



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ANNEXURE

➤ **EnMs Certified Professional**



**G KRISHNAKUMAR**

has attended the following live virtual classroom course:

**Transition training for Environment Management System as per ISO 14001:2015**

Course is designed to explain:

- Requirements of ISO 14001:2015 in context of audit.
- Key changes from ISO 14001: 2004 to 14001:2015

Session Duration: 16 Hours

**CERTIFICATE NUMBER**  
2020260507

**TRAINING DATE:**  
25th & 26th May, 2020

**Authorising Signature:**

