

# GREEN AUDIT REPORT

2021-2022

Baba Banda Singh Bahadur Engineering  
College, Fatehgarh Sahib



INTERNAL QUALITY ASSURANCE CELL  
(IQAC)

Principal

Dr Lakhvir Singh

2022

## **Green Audit Assessment Team (Internal)**

- Dr. Sanjeev Bhandari, Department of Mechanical Engineering
- Dr. Amandeep Singh, Department of Mechanical Engineering
- Prof Bikramjit Singh, Department of Applied Sciences
- Prof Rakhjinder Singh, Department of Civil Engineering
- Prof Manpreet Singh, Department of Electrical Engineering
- Dr. Sanjiv K Sharma, Department of Mechanical Engineering
- Dr. Nitin Singla, Department of Mechanical Engineering
- S. Surinder Singh, Junior Engineer, Estate Office

## CONTENTS

<b>Sr. No.</b>	<b>Titles/Topics</b>	<b>Page No.</b>
1	INTRODUCTION	4
2	OBJECTIVES	4
3	METHODOLOGY	5
4	ABOUT THE COLLEGE	5
5	VISION & MISSION STATEMENT	6
6	GREEN AUDITING	6
7	OBSERVATIONS	7
8	LAND USE ANALYSIS AT BBSBEC	7
9	GEOGRAPHICAL LOCATION WITH CAMPUS MAP IN SCALE	7
10	TREE DIVERSITY OF BBSBEC	13
11	FAUNAL DIVERSITY IN BBSBEC	18
12	WEATHER DATA OF BBSBEC	23
13	AIR QUALITY OF BBSBEC	24
14	WATER ANALYSIS REPORT OF BBSBEC	26
15	NOISE LEVEL IN THE SURROUNDING OF BBSBEC	28
16	WASTE DISPOSAL AT BBSBEC	31
17	TRANSPORTATION AT BBSBEC	32
18	ELECTRICAL POWER CONSUMPTION AT BBSBEC	33

## **INTRODUCTION:**

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of institute. It aims to analyse environmental practices within and outside of the concerned place, which will have an impact on the eco-friendly atmosphere. Green audit is a valuable means for a college to determine how and where they are using the most energy or water or other resources; the college can then consider how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus, it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric CO<sub>2</sub> from the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through carbon footprint reduction measures.

## **OBJECTIVES:**

In recent time, the Green Audit of an institution has been becoming a paramount important for self-assessment of the institution which reflects the role of the institution in mitigating the present environmental problems. The college has been putting efforts to keep our environment clean since its inception. Therefore, the purpose of the present green audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Green Audit are:

- To map the Geographical Location of the college
- To document the floral and faunal diversity of the college
- To record the meteorological parameter of Fatehgarh Sahib where college is situated
- To document the ambient environmental condition of weather, air, water and noise of the college
- To document the waste disposal system

- To estimate the Energy requirements of the college
- To report the expenditure on green initiatives during the last five years

## **METHODOLOGY:**

The purpose of the green audit of BBSBEC is to ensure that the practices followed in the campus are in accordance with the Green Policy of the country. The methodology includes: collection of data, physical inspection of the campus, observation and review of the documentation and data analysis.

## **ABOUT THE COLLEGE:**

Baba Banda Singh Bahadur Engineering College, Fatehgarh Sahib, Punjab was established in the year 1993, under the patronage of Shriomani Gurudwara Prabandhak Committee, Sri Amritsar, with the approval of the Govt. of Punjab. The college was a dream project of Panth Ratan Jathedar Gurcharan Singh Tohra, ex-President of SGPC.

The college is approved by the A.I.C.T.E, New Delhi, Ministry of H.R.D, GOI and is affiliated to I.K. Gujral Punjab Technical University, Jalandhar. The college is accredited with NAAC Grade A and has earned fourth time accreditation from the NBA for various programmes. BBSBEC has also been accredited by the Institution of Engineers (India).

Presently, the college runs six B.Tech Programs, Six M.Tech. Programs, B. Vocational and management courses. It is housed in a sprawling pollution-free campus of 75 acres and is located in the sacred surroundings of historic Gurdwara of Fatehgarh Sahib. The college is named after Baba Banda Singh Bahadur, a great saint and warrior, who conquered the Sirhind fort and laid to rest, the tyranny of the Mughal Empire.

It is one of the leading institutions in Engineering & Technology and is the most sought-after for admission by the students. BBSBEC has also made a significant presence in the Techno-Educational field at international level.

## **VISION & MISSION VISION STATEMENT:**

### ***OUR VISION***

To evolve as an eminent Centre of Learning with total commitment to provide career focused technical training aimed at excellence in interdisciplinary education, research and innovation in order to produce socially responsible and synergetic leaders with a global profile.

### ***OUR MISSION***

The Baba Banda Singh Bahadur Engineering College seeks to enrich the academic experience of students to help them meet the evolving needs of society. We aspire to realise our mission as follows:

- Conduct UG programs that integrate global awareness, communication skills and team building across the curriculum.
- Run Graduate education programs to prepare students for interdisciplinary engineering research and advanced problem solving with focus on career advancement.
- Provide an atmosphere to facilitate personal commitment to the educational success of students in an environment that values diversity and community.
- Inculcate a high regard for ethical principles and an understanding of human and environmental realities.
- Provide state-of-the-art facilities and effective delivery of high-quality content by qualified faculty members to build the notion of lifelong learning.
- Conduct scholarly activities that create and transfer cutting-edge knowledge in the area of engineering and technology.
- Create a highly successful alumni base that contributes to global society.

## **GREEN AUDITING:**

The college has adopted the 'Green Campus' system for environmental conservation and sustainability. There is main three pillars i.e. zero environmental foot print, positive impact on occupant health and performance and 100% graduates demonstrating environmental literacy. The goal is to reduce CO<sub>2</sub> emission, energy and water use, while creating atmosphere where students can learn and be healthy.

## **LAND USE ANALYSIS, BBSBEC, FATEHGARH SAHIB, PUNJAB (As on 29-05-2021):**

### **GENERAL OVERVIEW OF THE CONCEPT OF LANDUSE**

Land use refers to man's activities and the various uses which are carried on and derived from land. Viewing the earth from space, it is now very crucial in man's activities on natural resource. In situations of rapid changes in land use, observations of the Earth from space give the information of human activities and utilization of the landscape.

Remote sensing and GIS techniques are now providing new tools for advanced land use mapping and planning. The collection of remotely sensed data facilitates the synoptic analyses of earth system, functions, patterning, and change in the local, regional as well as at global scales over time. Satellite imagery particularly is a valuable tool for generating land use map.

### **METHODOLOGY ADOPTED FOR LAND USE MAPPING**

Three types of data that are GPS points, field survey data and Google earth data for Geo referencing have been used in this study. Land use map of the study area have been prepared using the above three types of data with the help of ArcGis Pro software.

### **DATA PROCESSING AND ANALYSIS**

Land use map preparation is executed through the following steps:

Acquisition of data (Location: 30.6435° N, 76.3970° E), Geo-coding and Geo referencing of satellite imageries by extracting the ground control points. Supervised classification was carried out with the aid of ground truth data collected during field survey. Scanning and digitization of maps and editing of all the Georeferenced maps were done using GIS. Data manipulation and analysis and linking the spatial data with the attribute data for creation of topology was carried out using GIS software. Creation of GIS output in the form of land use map showing various land use have been prepared.

Therefore, attempt has been made in this study to map land use for BBSBEC, Fatehgarh Sahib, Punjab with a view to detect the land consumption in the built-up land area using both remote sensing and GIS techniques.

### **GEOGRAPHICAL LOCATION WITH CAMPUS MAP IN SCALE**

The college has a **sprawling pollution-free campus spread over 75 acres** of land in the heart of District Fatehgarh Sahib. Fatehgarh Sahib is a historical place related to the martyrdom of younger sons 'Sahibzadas' of Sri Guru Gobind Singh Ji, the tenth Sikh Guru. It has an ideal geographical location with the proximity to the important cities of the region i.e. Chandigarh, Ludhiana and Patiala. The college is located at 5 kms from Sirhind Railway Station, 42 kms from Chandigarh, 65

**Green Audit Report, BBSBEC, Fatehgarh Sahib**

kms from Ludhiana, 40 kms from Roopnagar & 35 kms from Patiala. The nearest Airport is Chandigarh. Scaled image of college campus is shown in Photo 1. Green color in Map is representing green area. The Google aerial views of College Campus Part1 and Part 2 have been shown in Photo 2 and 3 respectively which are showing different college buildings, sports stadium, hostels and residential areas.



All dimension are in meter (m).

Photo 1: Map of College Campus



Green Audit Report, BBSBEC, Fatehgarh Sahib

Google Maps Baba Banda Singh Bahadur Engineering College

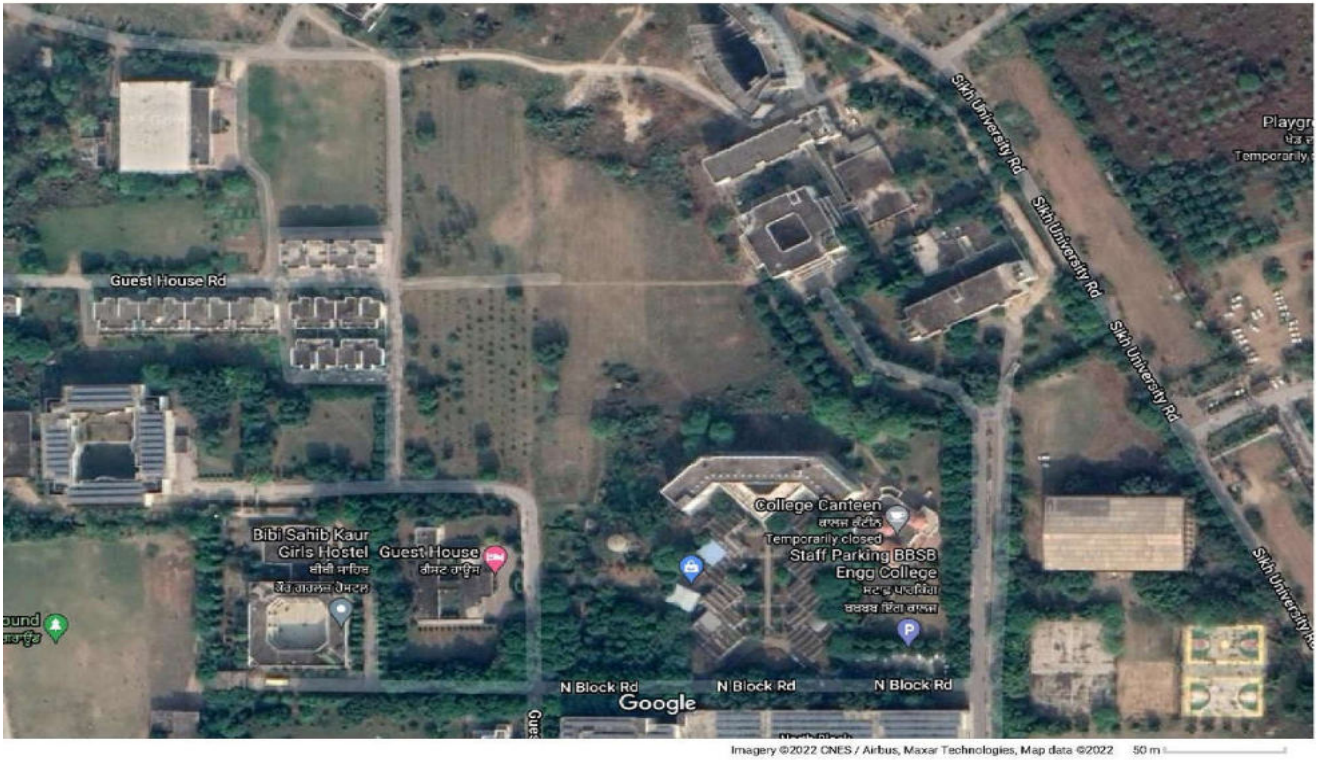


Photo 2: Aerial View of College Campus (Source Google Earth)

Google Maps Baba Banda Singh Bahadur Engineering College

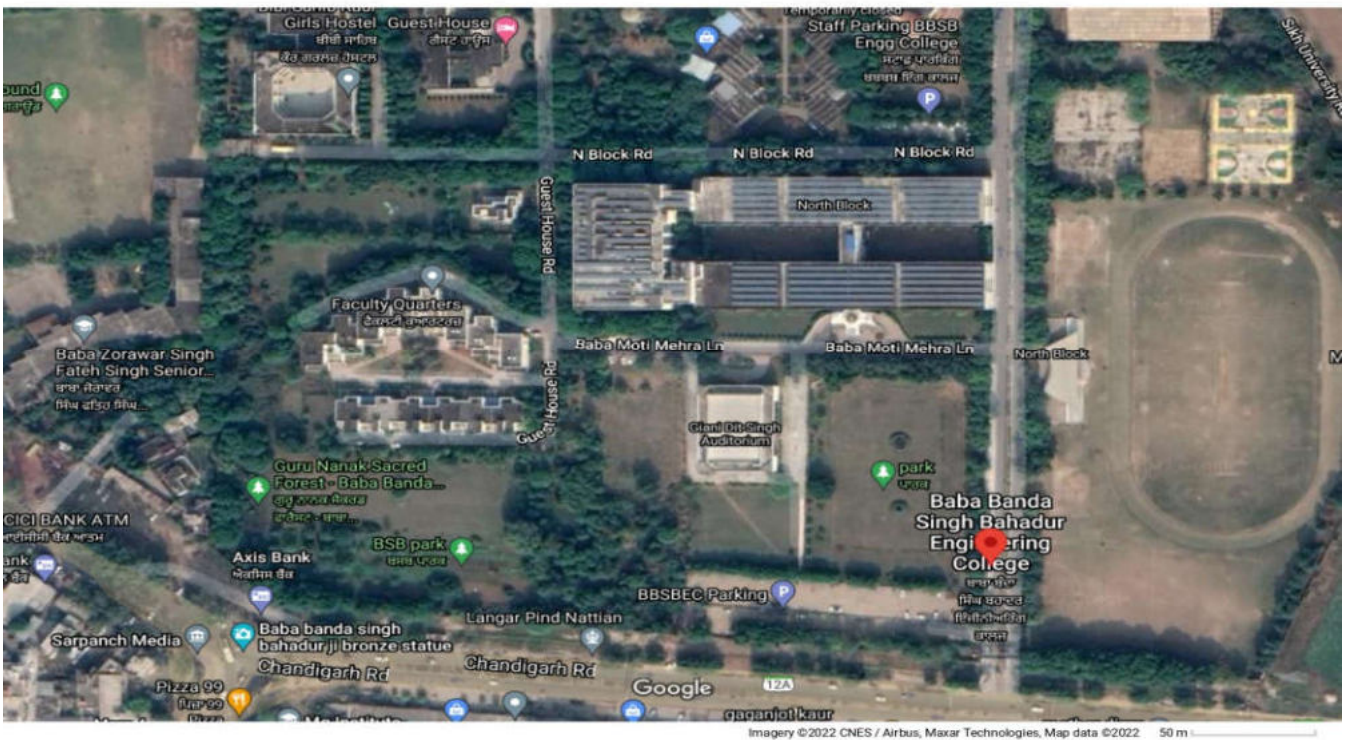
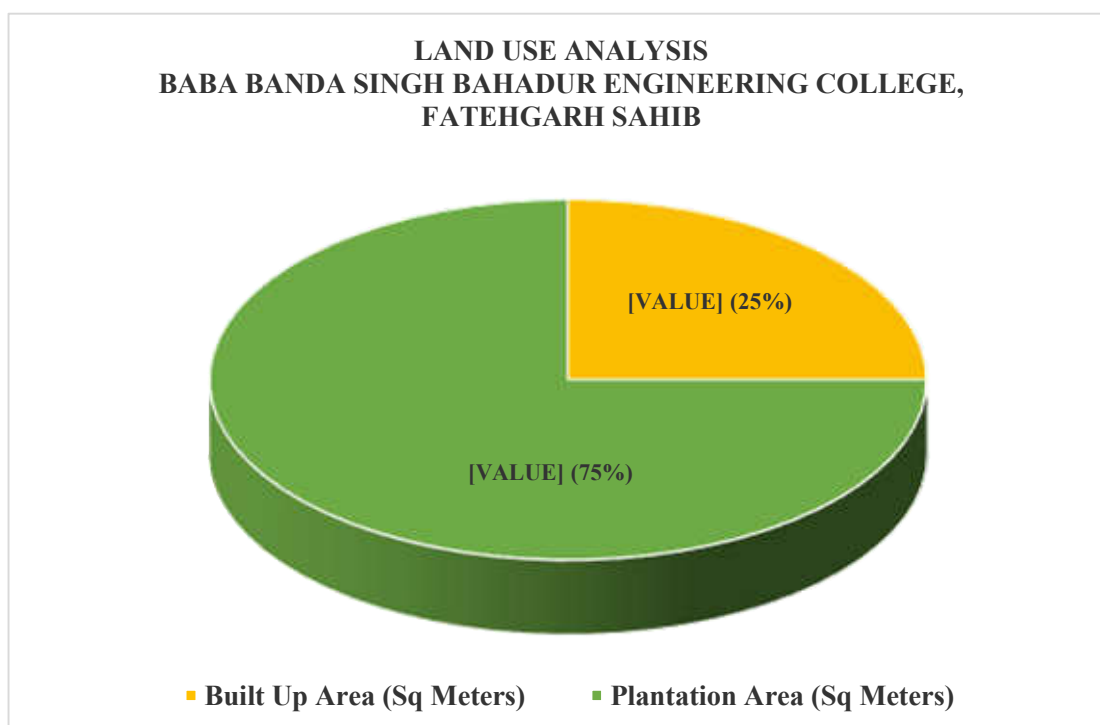


Photo 3: Aerial View of College Campus Part 2 (Source Google Earth)

**LAND USE DATA OF BBSBEC, FATEHGARH SAHIB, PUNJAB**

<i>CATEGORIES OF LAND USE</i>	<i>AREA (m<sup>2</sup>)</i>
PLANTATION AREA	227635.5
BUILT UP AREA (INCLUDE ROADS)	75878.5
TOTAL AREA	303514.0



The total area of BBSBEC, Fatehgarh Sahib is 303514 m<sup>2</sup> out of which the built up area (include Roads) is 25% (i.e 75878.5 m<sup>2</sup>) and plantation area is 75% (i.e. 227635.5 m<sup>2</sup>).

**LAND USE (BUILT UP AREA) ANALYSIS:**

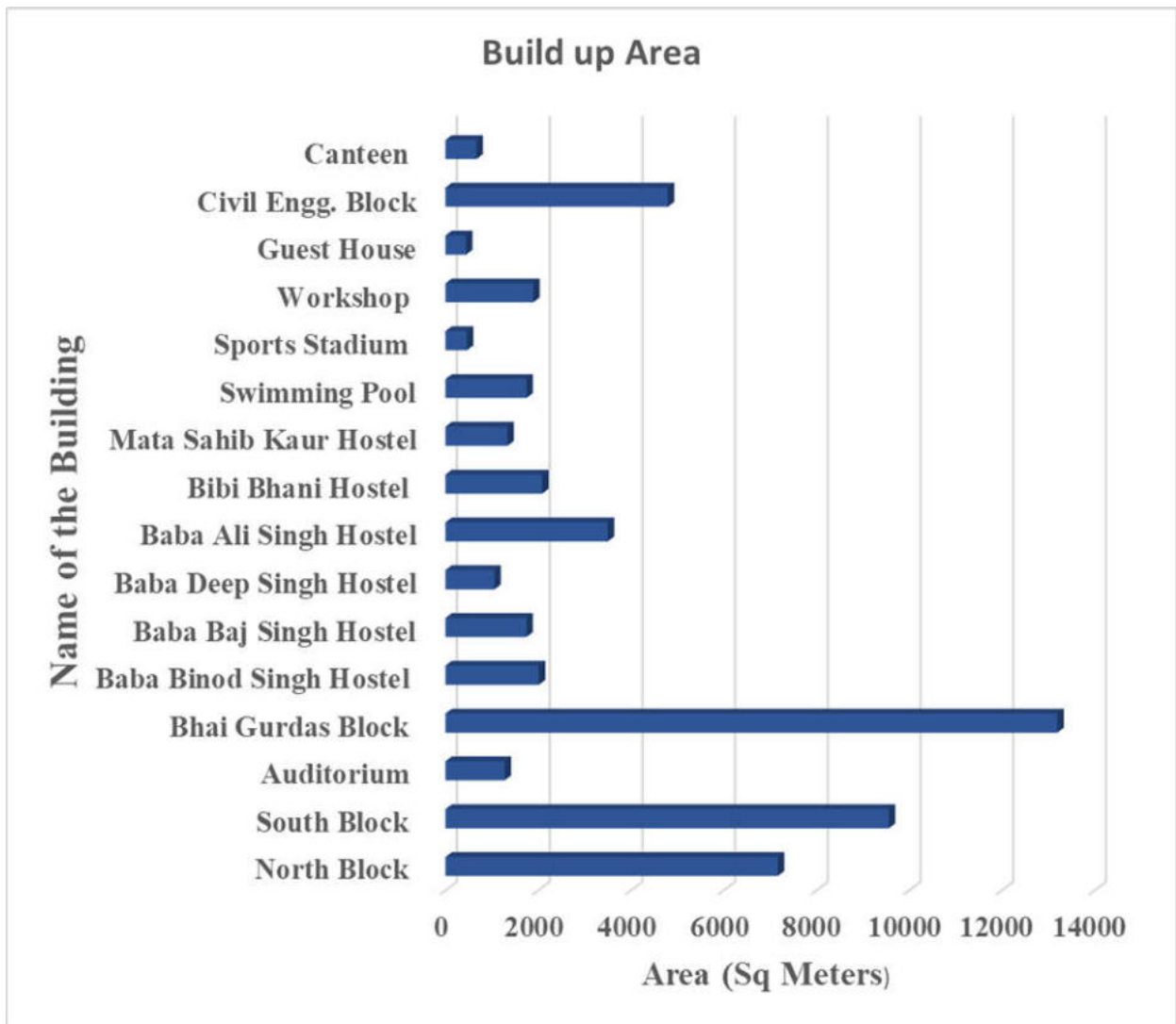
The built up area of 25% (i.e 75878.5 m<sup>2</sup>) consists of the following regions as stated below for land consumption in built up area of BBSBEC:

The northern region of BBSBEC is densely built up having **Main North Block:** Bhai Gurdas Administrative Blocks, Civil Engineering Block, Central Workshops, Girls Hostels, Principal's

Residence, Staff Flats, Swimming Pool, Gymnasium, College Cafeteria and Boys Hostels. The southern region comprises of **Main South Block:** Auditorium, Faculty Flats, Sports Stadium and Athletic Tracks.

Table: Area occupied by various buildings at BBSBEC, FGS

<b>Sr No</b>	<b>Name of Building</b>	<b>Number of Floors</b>	<b>Area (m<sup>2</sup>)</b>
1.	North Block	03	7172
2.	South Block	04	9563
3.	Auditorium	01	1278
4.	Bhai Gurdas Block	06	13197
5.	Baba Binod Singh Hostel	04	2014
6.	Baba Baz Singh Hostel	04	1747
7.	Baba Deep Singh Hostel	04	1056
8.	Baba Ali Singh Hostel	07	3498
9.	Bibi Bhani Hostel	04	2085
10.	Mata Sahib Kaur Hostel	03	1337
11.	Swimming Pool	01	1747
12.	Sports Stadium	01	460
13.	Workshops	01	1895
14.	Guest House	01	441
15.	Civil Engg. Block	04	4793
16.	Canteen	01	671



**FINDINGS:**

BBSBEC, which was established in the year 1993, has an eco-friendly environment. It has a long legacy of healthy environmental practices including periodic plantation, their preservation and maintenance. Its land use is such that about 75% of the total area is occupied by open land and plantation that generates a better and sustainable campus environment.

The Land use analysis Report is prepared by Er. Jaspreet Singh, Civil Engineering Department, under the supervision of Prof. Simranpreet Singh, Faculty of the department of Civil Engineering, BBSBEC, Fatehgarh Sahib

## TREE DIVERSITY OF BBSBEC, FATEHGARH SAHIB, PUNJAB:

BBSBEC is within the geo-position between latitude 30.645587<sup>0</sup> N and longitude 76.398781<sup>0</sup> E in Fatehgarh Sahib, Punjab, India. It encompasses an area of about 75 Acres. The area is immensely diverse with a variety of tree species performing a variety of functions. Most of these tree species are planted in different periods of time through various plantation programmes organised by the authority and have become an integral part of the college. The trees of the college have increased the quality of life, not only the college fraternity but also the people around of the college in terms of contributing to our environment by providing oxygen, improving air quality, climate amelioration, conservation of water, preserving soil, and supporting wildlife, controlling climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer. Many species of birds are dependent on these trees mainly for food and shelter. Nectar of flowers and plants is a favourite of birds and many insects. Leaf – covered branches keep many animals, such as birds and squirrels, out of reach of predators. Different species display a seemingly endless variety of shapes, forms, texture and vibrant colours. Even individual trees vary their appearance throughout the course of the year as the seasons change. The strength, long lifespan and regal stature of trees give them a monument – like quality. They also remind us the glorious history of Fatehgarh Sahib and our institution in particular. We often make an emotional connection with these trees and sometime become personally attached to the ones that we see every day. A thick belt of large shady trees in the periphery of the college have found to be bringing down noise and cut down dust and storms. Thus, the college has been playing a significant role in maintaining the environment of the entire FATEHGARH SAHIB town and its surrounding areas. The following are the tree species with whom we are being attached-

Table: List of tree species of BBSBEC, FATEHGARH SAHIB, PUNJAB

S.No.	Botanical Name	Family	Common Name	Total
1	Mangifera indica	Anacardiaceae	Mango	195
2	Alstonia Scholaris	Apocynaceae	Alstonia	167
3	Tabernaemontana divaricata	Apocynaceae	Crape jasmine	4
4	Araucaria heterophylla	Araucariaceae	Christmas Tree	19
5	Arecaceae	Arecaceae	Palm	93
6	Hyophorbe lagenicaulis	Arecaceae	Bottle Palm	23
7	Roystonea regia	Arecaceae	Cuban royal palm	3
8	Phoenix sylvestris	Arecaceae	Badela Palm	2
9	Terminalia bellirica	Combretaceae	Bahera	49
10	Platycladus orientalis	Cupressaceae	Oriental thuja	67
11	Saraca asoca	Fabaceae	Ashoka	154
12	Dalbergia sissoo	Fabaceae	Sissu / Tali	56

13	Vachellia nilotica	Fabaceae	Kikar	19
14	Cassia fistula	Fabaceae	Golden shower tree	13
15	Delonix regia	Fabaceae	Royal Poinciana	3
16	Tamarindus indica	Fabaceae	Tamarind	1
17	Tectona grandis	Lamiaceae	Sagwan	25
18	Punica granatum	Lythraceae	Pomegranate	1
19	Chukrasia velutina	Meliaceae	Chukrasia tabularis	123
20	Azadirachta indica	Meliaceae	Neem	27
21	Melia azedarach	Meliaceae	umbrella tree	21
22	Toona ciliata	Meliaceae	Tun	1
23	Morus alba	Moraceae	White mulberry	27
24	Ficus religiosa	Moraceae	Peepal	17
25	Ficus virens	Moraceae	White Fig	16
26	Ficus elastica	Moraceae	Rubber Plant	7
27	Moringa oleifera	Moringaceae	saujana	2
28	Syzygium cumini	Myrtaceae	Jamun	68
29	Psidium	Myrtaceae	Gauva	54
30	eucalypts	Myrtaceae	Safeda	26
31	Syzygium aromaticum	Myrtaceae	Clove	3
32	Pongamia Pinata	Papilionaceae	Indian Beech tree	11
33	Phyllanthus emblica	Phyllanthaceae	Gooseberry	19
34	Bambusoideae	Poaceae	Bamboo	2
35	Grevillea robusta	Proteaceae	Silver Oak	58
36	Ziziphus mauritiana	Rhamnaceae	Ber	10
37	Prunus persica	Rosaceae	Pears	20
38	Pyrus pyrifolia	Rosaceae	Nakh	20
39	Prunus bokharensis	Rosaceae	Aloo Bukhara	8
40	Rosa	Rosaceae	Rose	90
41	Citrus limon	Rutaceae	Lemon	23
42	Citrus limetta	Rutaceae	Mausambi	8
43	Murraya koenigii	Rutaceae	Curry Leaf	2
44	Aegle marmelos	Rutaceae	wood apple	1
45	Gmelina arborea	Rutaceae	Beechwood	1
46	Populus	salicaceae	Poplar	35
47	Litchi chinensis	Sapindaceae	Litchi	11
48	Mimusops elengi	Sapotaceae	Maulsari	30
49	Madhuca longifolia	Sapotaceae	Mahua/ Indian Butter Tree	14
50	Manilkara zapota	Sapotaceae	Chiku/Sapodilla	11
51	Vitis Vinifera	Vitaceae	Kismish/Raisins	29
52	Ficus benjamina	Fig family	Faux	427

**Green Audit Report, BBSBEC, Fatehgarh Sahib**

53	Bugal Bael	.....	Bugal Bael	49
54	Dakein	.....	Dakein	44
55	Citrus Reticulata	Rutaceae	Kinnow	39
56	Sukhmani	.....	Sukhmani	29
57	Faux Black Kina	.....	Faux Black Kina	22
58	Ficus Benghalensis	Moraceae	Barota	16
59	Badelia Kandia Flower	.....	Badelia Kandia Flower	10
60	Momesia	.....	Momesia	10
61	Rakh Manjan	.....	Rakh Manjan	9
62	Red Faux	.....	Red Faux	8
63	Mimusops	Sapotaceae	sari	7
64	Flower Faux	.....	Flower Faux	6
65	Needi	.....	Needi	6
66	Ajmohar	.....	Ajmohar	5
67	Green Fax	.....	Green Fax	3
68	Faux (White)	.....	Faux (White)	2
69	Gul Lakkar	.....	Gul Lakkar	1
70	Tarbeni	.....	Tarbeni	1
Total				2383



Photo 4: Main Entry Road of College Campus



Photo 5: Asoka Trees near College Cafeteria





Photo 6: Entry point at Central Workshop



Photo 7: Tree Plantation drive

## FAUNAL DIVERSITY IN BBSBEC CAMPUS:

BBSBEC is located in Fatehgarh Sahib District of Punjab. Fatehgarh Sahib is a town and a sacred pilgrimage site of Sikhism in the North West Indian State of Punjab. The highest temperature is recorded 38<sup>0</sup> C just prior to the onset of monsoon (around May- early June). Summer rain is normal, and is principally caused from late June to August by the moisture-laden South-West Monsoon, on striking the Himalayan foothills of the north. The climatic condition of the Fatehgarh Sahib district as a whole and BBSBEC in particular is very suitable for a wide variety of flora and fauna to support its rich biodiversity. The faunal Diversity of BBSBEC campus has been studied and documented as below:

**Table: Common and Scientific names of birds and animals**

S.No	Common Name	Scientific Name
1.	Common Myna	Acridotheres Tristis
2.	Bank Myna	Acridotheres Ginginianus
3.	House Sparrow	Passer Domesticus
4.	House Crow	Corvus Splendens
5.	Cuckoo	Cuculidae
6.	Snake	Naja Naja
7.	Yellow Wasp	Ropalidia Marginata
8.	Butter Fly	Danaus Genutia
9.	Common Woodshrike	Tephrodornis Pondicerianus
10.	Pied Myna	Gracupica Contra
11.	Red-Vented Bulbul	Pycnonotus Cafer
12.	Skylark	Aluda Gulgula
13.	Garden Tiger Moth	Arctia Caja
14.	Little Owl	Athene Brama
15.	Oleander Moth	Syntomeida Epilais
16.	Slender Skimmer	Orthetrum Sabina



Photo 8: Common Myna (*Acridotheres Tristic*)



Photo 9: House Sparrow (*Passer Domesticus*)



Photo 11: House Crow (*Corvus Splendens*)



Photo 12: Cuckoo (*Cuculidae*)



Photo 13: Snake (*Naja Naja*)



Photo 14: Yellow Wasp (*Ropalidia Marginata*)

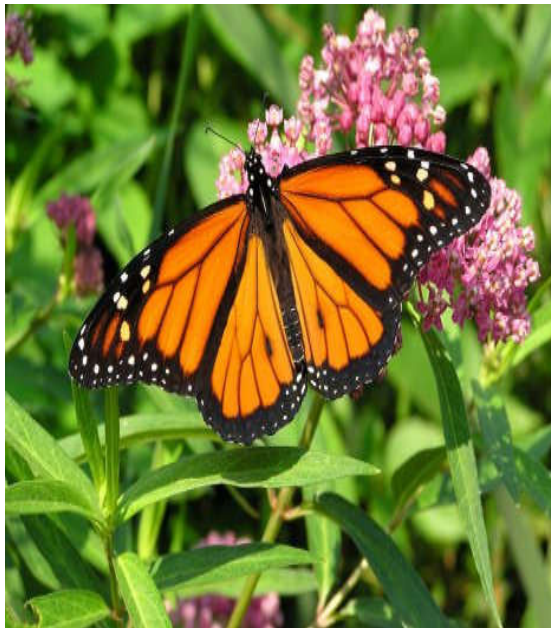


Photo 15: Butter Fly (*Danaus Genutia*)

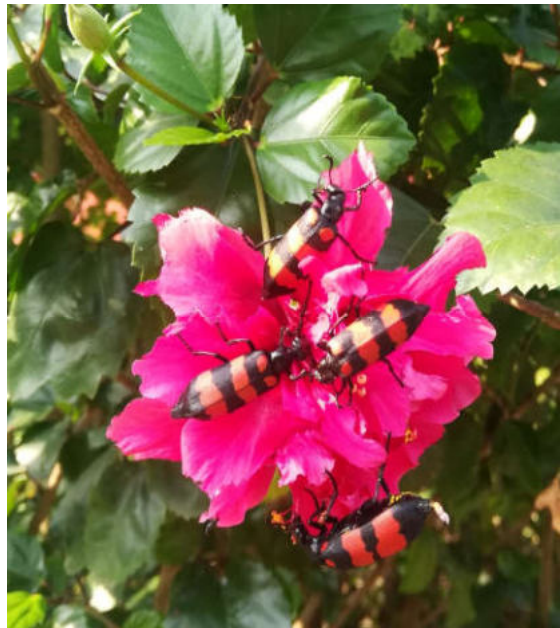


Photo 16: Beetle insect on a hibiscus flower



Photo 17: Common Woodshrike  
(*Tephrodornis Pondicerianus*)



Photo 18: Pied Myna (*Gracupica Contra*)



Photo 19: Red-Vented Bulbul (*Pycnonotus Cafer*)



Photo 20: Skylark (*Aluda Gulgula*)



Photo 21: Garden Tiger Moth (*Arctia Caja*)



Photo 22: Little Owl (*Athene Brama*)

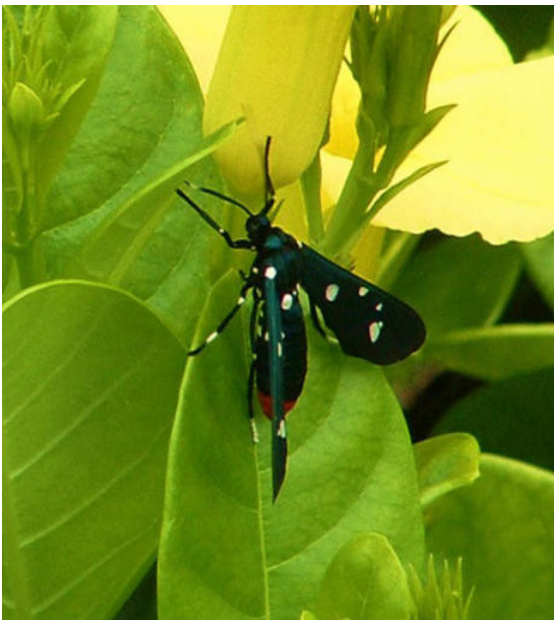


Photo 23: Oleander Moth (*Syntomeida Epilais*)

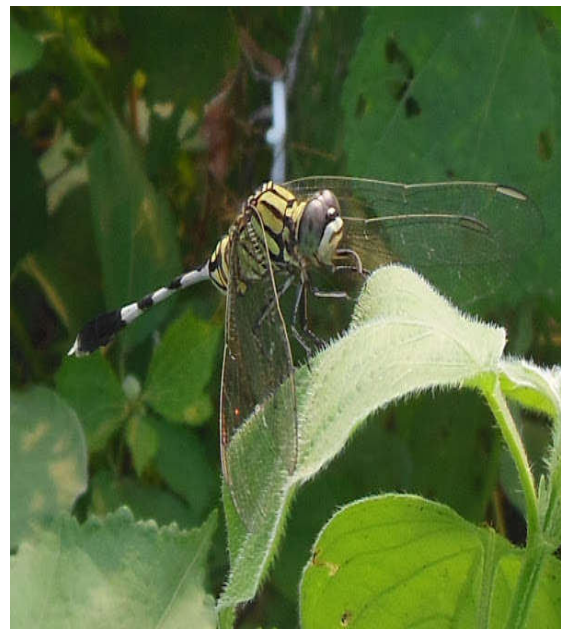


Photo 24: Slender Skimmer (*Orthetrum Sabina*)

## WEATHER DATA OF FATEHGARH SAHIB AND BBSBEC:

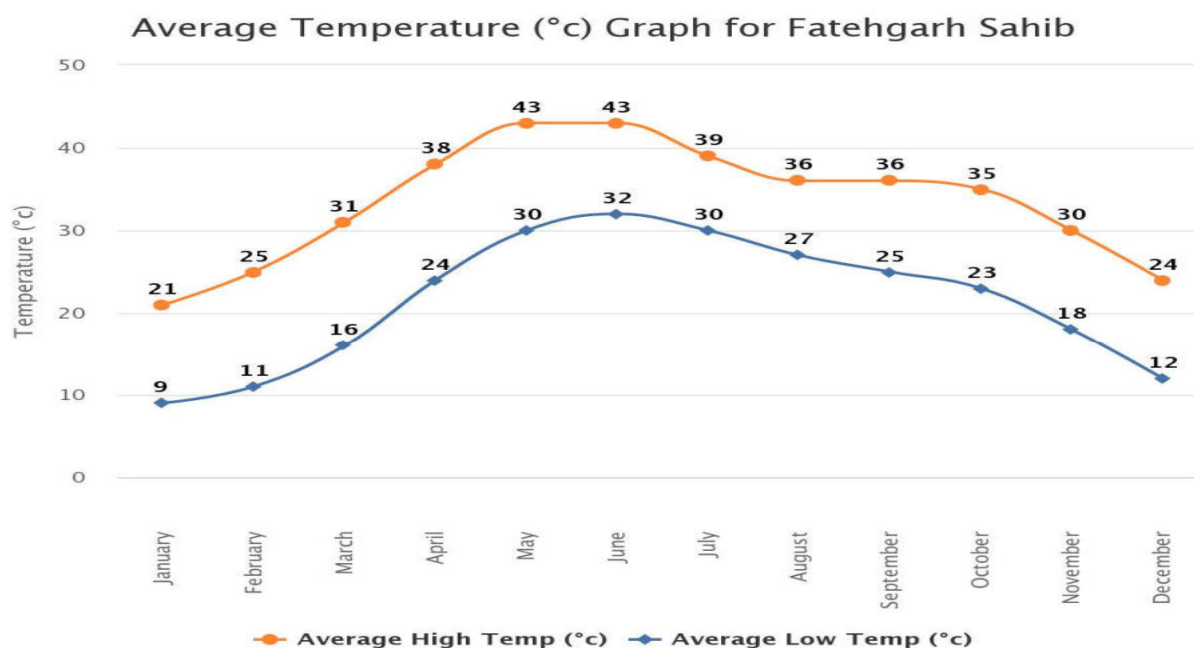
Station: FATEHGARH SAHIB (INDIA (STATIONS NORTH OF LATITUDE 20~N))

Location: 30.6435° N, 76.3970° E

In Fatehgarh Sahib, the climate is warm and temperate. The summers are much rainier than the winters in Fatehgarh Sahib. The average annual temperature in Fatehgarh Sahib is 24.3 °C. and precipitation level is about 770 mm.

The driest month is generally November. There is 4 mm of precipitation in November. The greatest amount of precipitation occurs in July, with an average of 256 mm. With an average of 33.6 °C, June is the warmest month. The lowest average temperatures in the year occur in January, when it is around 13.3 °C. The precipitation varies 252 mm between the driest month and the wettest month. The variation in temperatures throughout the year is 20.3 °C.

### WEATHER DATA MONTH WISE FATEHGARH SAHIB

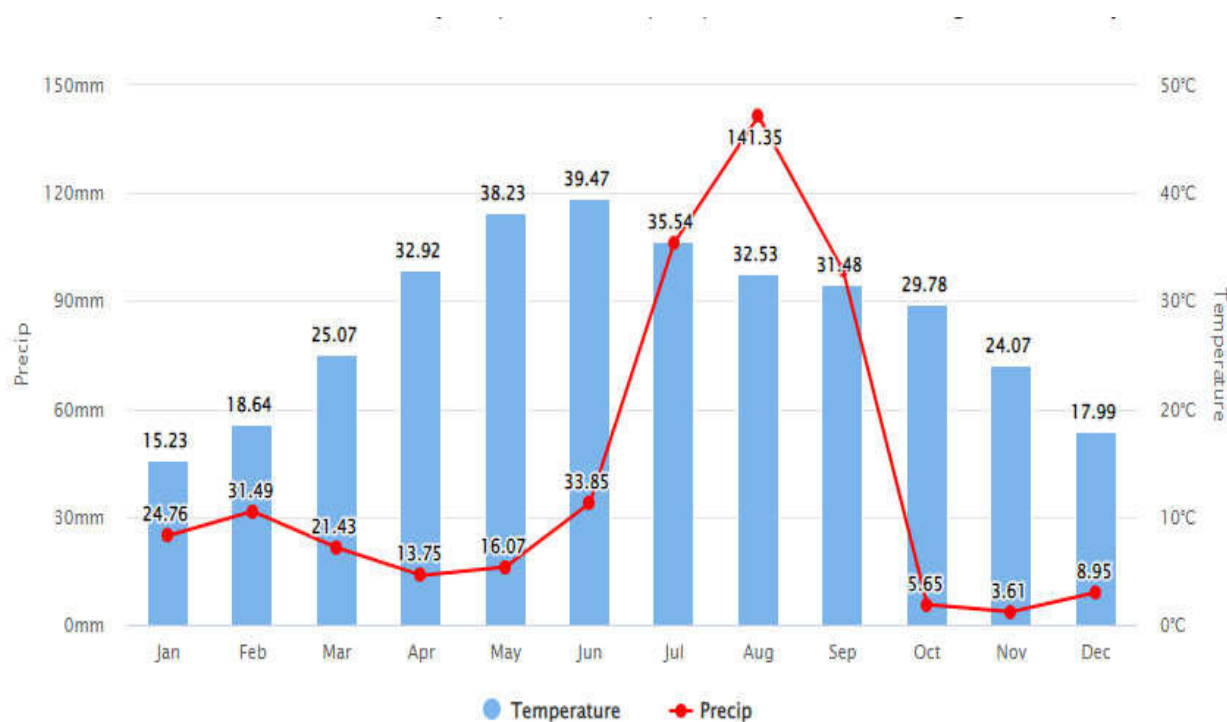


The likes of an alluvial plain are strong characteristics of the city of Fatehgarh Sahib and its surroundings. The city does have a Central location in the plan region. The geographical co-ordinate of Fatehgarh Sahib is 30.6435° N, 76.3970° E. The city has an average altitude of 808 feet or 246 meters from the average sea level. The erstwhile land of Fatehgarh Sahib was very much feasible for peanut cultivation with sand dunes. However, a lot of irrigation and environmental changes have made the land more viable for wheat cultivation.

The climatic conditions bear a strong resemblance with the other cities in the northern part of India. The summers are usually very hot and the winters are very cold. The summers are prevalent during

the months of April to September with June, July, August till mid September being the hottest months. The winter is prevalent from the month of November till the month of March. There is onset of Monsoon in September and from mid of September till November one experiences the transitional weather.

### CLIMATE GRAPH MONTH WISE FATEHGARH SAHIB



### AIR QUALITY IN FATEHGARH SAHIB AND BBSBEC:

The ambient air quality data for Fatehgarh Sahib and BBSBEC for the last one year shows that there are very less polluted particles in ambient air; AQI for SO<sub>2</sub> & NO<sub>x</sub> parameters are within the range of Indian living standards, there are a number of factors responsible for this cleanliness, calmness and serenity in this area. Firstly, population which is most responsible for all the problems and hurdles in smooth living is lowest here of all the districts of Punjab. Secondly, in this area more trees have been planted as compared to other cities. A very beautiful and historical park loaded with a large number and variety of trees known as “Aam Khaas Bhag” is situated here which reminds us the era of great Mughal emperor Jahangir. Furthermore, no air polluting industry is established here not even in a radius of 10 Km of Fatehgarh Sahib area. The NH-1 is also approximately 7-8 kilometres away from the city, which might be responsible for heavy density traffic throughout the year and thus might be causing lot of vehicular emissions as well as a lot of dust emissions due to the movement of vehicular traffic. Therefore, the ambient air quality of Fatehgarh Sahib Area falls in between moderate to rich quality state. The Punjab Pollution Control Board is pondering over the various possibilities to reduce the air pollution for the improvement of ambient air quality with respect to AQI is concerned. However, the annual average value of PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub> in the ambient air quality of Fatehgarh Sahib



city falls in the range of 50-62  $\mu\text{g}/\text{m}^3$ , 3-5  $\mu\text{g}/\text{m}^3$ , 10-12  $\mu\text{g}/\text{m}^3$  for most of the months, as such, the graded response action plan to eradicate the problem

## **AIR QUALITY DETERMINATION**

Satisfactory air quality index (OVERALL=58) in Fatehgarh Sahib, Punjab, India on dated 7<sup>th</sup> September 2021:

<b>Parameter</b>	<b>Result (Range)</b>
NO <sub>2</sub>	25.4 $\mu\text{g}/\text{m}^3$ , AQI 26 Very Good
NO	10.09 $\mu\text{g}/\text{m}^3$ , AQI 10 Good
O <sub>3</sub>	31.49 $\mu\text{g}/\text{m}^3$ , AQI 31 Good
PM <sub>2.5</sub>	28.13 $\mu\text{g}/\text{m}^3$ , AQI 28 Good
PM <sub>10</sub>	77.2 $\mu\text{g}/\text{m}^3$ , AQI 79 Satisfactory
CO	35.0 $\mu\text{g}/\text{m}^3$ , AQI 18
Humidity	56.0 %
Barometric Pressure	1013 millibar or hPa
Wind Speed	10-15 m/s
Wind Direction	28.0013 degrees
Sun Rise	06:28 AM
Sun Set	05:56 PM
Moonrise	07:05 PM
Moonset	07:31 AM

## **WATER ANALYSIS REPORT OF BBSBEC:**

Water quality testing is important because it identifies contaminants and prevents water-borne diseases. Drinking or using contaminated water can result in severe illness or death. That is why it is important to ensure that drinking water is safe, clean and free from bacteria and disease.

The parameters for water quality are determined by the intended use. Work in the area of water quality tends to be focused on water that is treated for human consumption, or in the environment.

### **Drinking water indicators:**

The following is a list of indicators often measured by situational category:

- Alkalinity
- Color of water
- pH value
- Taste and odor (geosmin, 2-Methylisoborneol (MIB), etc.)
- Dissolved metals and salts (sodium, chloride, potassium, calcium, manganese, magnesium)
- Microorganisms such as fecal coliform bacteria (*Escherichia coli*), *Cryptosporidium*, and *Giardia lamblia*; see Bacteriological water analysis
- Dissolved metals and metalloids (lead, mercury, arsenic, etc.)
- Dissolved organics: colored dissolved organic matter (CDOM), dissolved organic carbon (DOC)
- Heavy metals



# INDUSTRIAL TESTING LABORATORY & CONSULTING HOUSE

(A GOVT. APPROVED TEST HOUSE)

Works & Regd. Office : Ghalori Gate, Patiala (Pb.) 147 001 Ph. 0175-2322224, 2320175, (M) 92164-21540, 92161-21540  
Email : Itlchpatiala@gmail.com

November 18, 2019

R.No.: ITL/PWD/18-11-1

## CERTIFICATE OF ANALYSIS

Laboratory Sample No. : ITL/PW/11-19/0701  
Collected From : The Principal,  
BBSB ENGINEERING COLLEGE,  
Fatehgarh Sahib.  
Type of sample : Drinking Water  
Sample Mark : 1  
Sample Date : 07/11/2019

THIS IS TO CERTIFY that the sample has been tested as per IS 10500 Drinking Water Specification for the parameters indicated below:

## TEST REPORT

Sr NO	Parameters	Permissible Limits	Desirable Limits	Results	Methods/Ref.
1.	pH Value	6.5 TO 8.5	6.5 TO 8.5	7.19	3025 (P 11) :1984
2.	Dissolved Solids	Max. 2000 mg/l	Max. 500 mg/l	202 mg/l	3025 (P 16) :1984
3.	Total alkalinity as CaCO <sub>3</sub>	Max. 600 mg/l	Max. 200 mg/l	316 mg/l	3025 (P 23) :1986
4.	Chlorides As Cl	Max. 1000 mg/l	Max. 250 mg/l	20 mg/l	3025 (P 32) :1988
5.	Sulphate As SO <sub>4</sub>	Max. 400 mg/l	Max. 200 mg/l	N.D.	3025 (P 24) :1986
6.	Nitrates as NO <sub>3</sub>	Max. 45 mg/l	Max. 45 mg/l	11 mg/l	3025 (P 34) :1988
7.	Flouride As F	Max. 1.5 mg/l	Max. 1.0 mg/l	0.6 mg/l	3025 :1964
8.	Calcium As Ca	Max. 200 mg/l	Max. 75 mg/l	75 mg/l	3025 (P 40) :1991
9.	Magnesium As Mg	Max. 100 mg/l	Max. 30 mg/l	22 mg/l	3025 (P 46) :1991
10	Total Hardness As CaCO <sub>3</sub>	Max. 600 mg/l	Max. 200 mg/l	268 mg/l	3025 (P 21) :2009
11	Sodium	-----	-----	44 mg/l	3025 (P 45) :2009
12	Potassium	-----	-----	2.0 mg/l	3025 (P 45) :2009
13	Arsenic, mg/l	Max.0.05 mg/l	Max.0.01 mg/l	N.D.	3025 (P 37) :1988
14	Chromium, mg/l	Max.0.05 mg/l	Max.0.05 mg/l	N.D.	3025 (P 52) :1988
15	Cadmium , mg/l	Max. 0.003 mg/l	Max. 0.003 mg/l	N.D.	3025 (P 41) :1992
16	Lead, mg/l	Max.0.01 mg/l	Max.0.01 mg/l	N.D.	3025 (P 47) :1994
17	Iron As Fe	Max. 0.3 mg/l	Max. 0.3 mg/l	0.07 mg/l	3025 (P 53) : 2003
18	Coliform/ 100 ml	Absent /100 ml		Absent	3.3 of IS : 1622:1981
19	E.Coli/100 ml	Absent/100 ml		Absent	3.4 of IS : 1622:1981

Report : The above submitted sample is of Potable Quality w.r.t. above test / results.(Permissible Limits)

*Analyst*  
Analyst

*Authorized Signatory*  
Authorized Signatory

Note : Total liability of the institute is limited to the invoiced amount. Sample consumed/not consumed in testing. All disputes are subjected to Patiala Jurisdiction. \*OS, Party asked for the above parameters only.

## NOISE LEVEL IN THE SURROUNDING OF BBSBEC:

The human ear is constantly being assailed by man-made sounds from all sides, and there remain few places in populous areas where relative quiet prevails. There are two basic properties of sound:

- Loudness and
- Frequency.

Loudness is the strength of sensation of sound perceived by the individual. It is measured in terms of Decibels. Just audible sound is about 10 dB, a whisper about 20 dB, library place 30 dB, normal conversation about 35-60 dB, heavy street traffic 60-0 dB, boiler factories 120 dB, jet planes during take-off is about 150 dB, rocket engine about 180 dB. The loudest sound a person can stand without much discomfort is about 80 dB. Sounds beyond 80 dB can be safely regarded as Pollutant as it harms hearing system. The WHO has fixed 45 dB as the safe noise level for a city. For international standards a noise level up to 65 dB is considered tolerate. Loudness is also expressed in sones. One sone equals the loudness of 40 dB sound pressure at 1000 Hz. Frequency is defined as the number of vibrations per second. It is denoted as Hertz (Hz).

### MATERIALS, STUDY AREA & METHODS

Noise level meter or noise measuring app, Noise test pro (version: 1.0.2), was used to measure the noise level. Noise test pro detect of any noise, music or sound in your surroundings. It gives the information about maximum, minimum and average decibels.

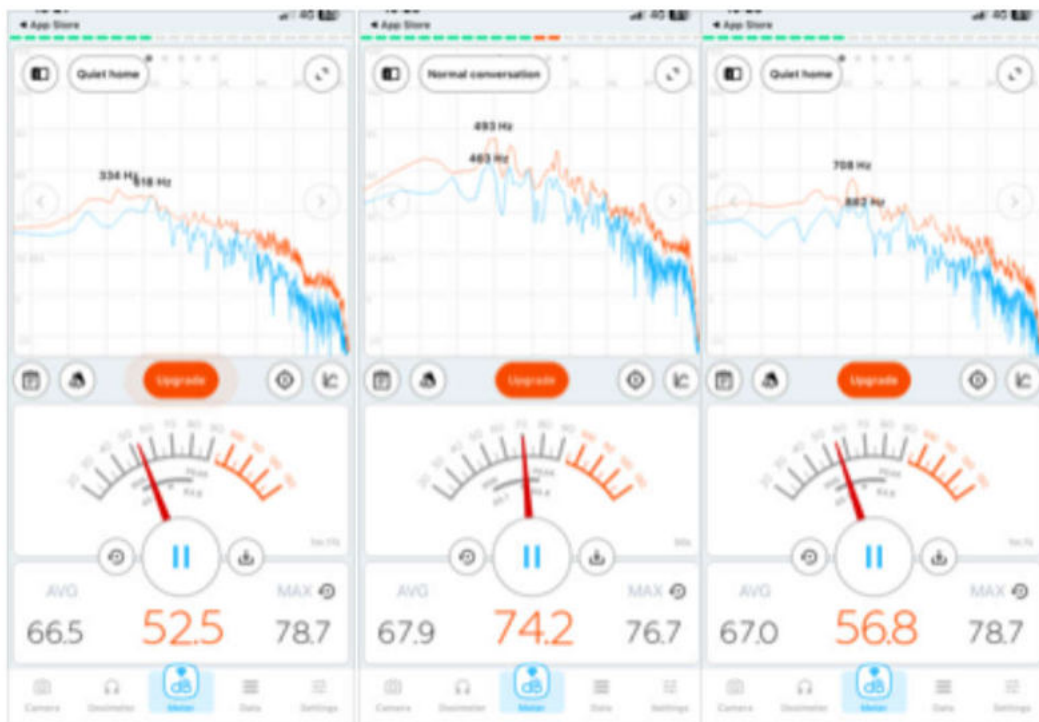
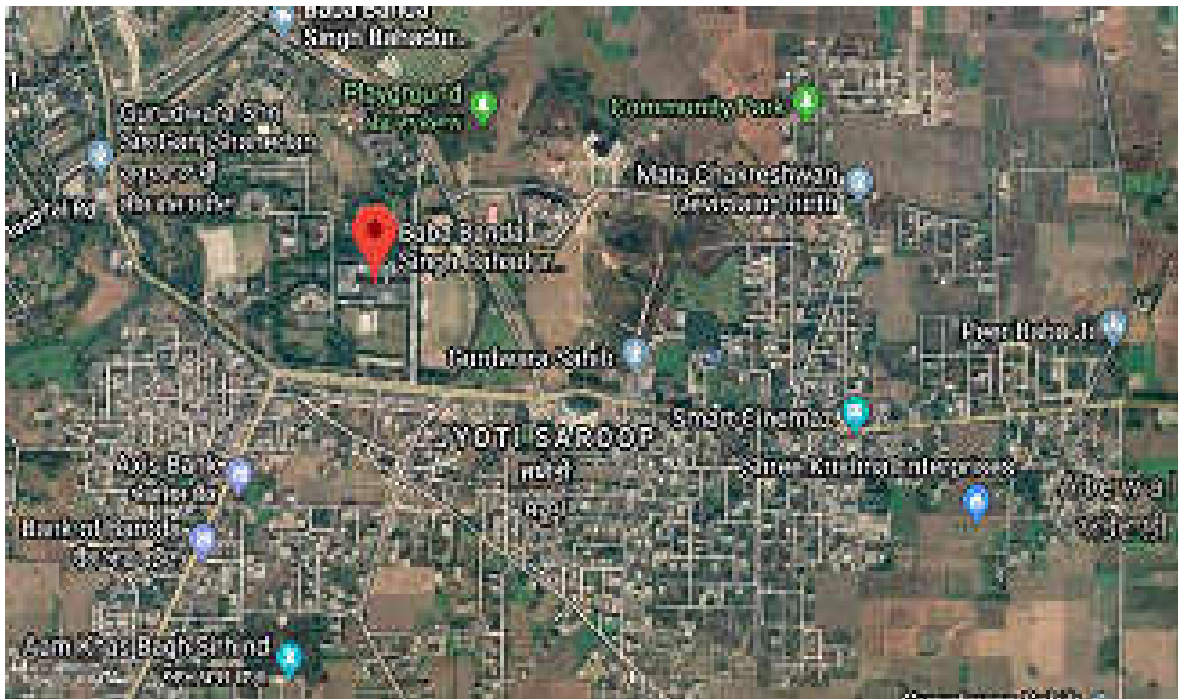


Figure: Noise Measurement by Noise Test Pro App

## **DESCRIPTION OF THE COLLEGE SITE**

The site of the BBSBEC is bounded to the North by Jyoti Saroop Gurdwara, commercial properties and Oriental bank of commerce to the East, Chandigarh road with various book stalls, shops, restaurants, hawkers etc., to the South by a side road and to the west by the college back gate road, residential properties. Below photo shows the satellite image of the college site.



**Photo:** satellite image of the college site

## **MEASUREMENT PROCEDURE**

The noise level was recorded at the different Important Locations of BBSBEC, FATEHGARH SAHIB. At each spot, the measurements were taken for 60 seconds during day time (6 AM- 6 PM) and noted down the measurements. Screen shots of the measurements of noise were taken immediately on the app at the time of 60th second of each measurement.

## RESULTS

The results of the experiments at different places have been tabulated in the following table:

Table 1: Measurements of Noise in and around BBSBEC:

<i>PLACE</i>	<i>MEASUREMENTS (Duration in Sec.)</i>	<i>MINIMUM (dBA)</i>	<i>Maximum (dBA)</i>	<i>AVERAGE (dBA)</i>
Civil Dept Area	60	53	81	76
Civil Dept Office	60	50	68	56
Civil Lab	60	59	74	70
Canteen	60	74	90	85
Library	60	51	85	65
Mechanical Dept Area	60	57	84	78
Mechanical Lab	60	45	89	72
CSE Dept Area	60	50	81	73
CSE Lab	60	66	85	76
EE Dept Area	60	66	87	76
EE Lab	60	40	87	68
ECE Dept. Area	60	63	82	76
ECE Lab	60	65	85	78
Principal Office	60	35	77	68
Auditorium	60	53	75	71
Workshop	60	66	90	78
Swimming Pool	60	56	86	69
Ground 1	60	59	90	70
Ground 2	60	56	90	68
Generator Room	60	53	89	75
Gymnasium	60	68	82	76
Faculty Flats	60	35	80	69
Staff Flats	60	49	71	65
Guest House	60	50	77	67
College Front Gate	60	50.7	78.0	71.0
College Back Gate	60	54	75.9	73.5
Boys Hostel	60	54	68	62
Girls Hostel	60	52	90	68

Source: Data collected by final year Students of Department of Civil Engineering. After the study, the measurements of noise have been recorded in and outside of BBSBEC area:

Inside the Campus: 35-90 dBA,

Outside the Campus: 54-93 dBA

## **WASTE DISPOSAL OF BBSBEC:**

Waste disposal are the activities and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process.

The waste from all around the college is separated daily as wet and dry waste in different bags which are disposed separately. Dry waste includes paper, cardboard, glass tin cans etc. on the other hand; wet waste refers to organic waste such as vegetable peds, left-over food etc. Separation of waste is essential as the amount of waste being generated today causes immense problem. The material was composted and evaluated as a fertilizing material. Disposal of these waste results in the production of good quality organic manure that can be used as soil amendments and source of plant nutrients.

With smart initiatives like “Think Green Campus Model”, waste management is helping colleges and universities to achieve a higher level of environmental performance. By reusing or recycling we are contributing to the conservation of natural resources, saving energy, helping to protect the environment, reducing landfill. We will also reduce our impact on the environment by minimizing the carbon emissions associated with both disposing of old products and obtaining new ones. BBSBEC adopts environment friendly practices and takes necessary actions such as – energy conservation, waste recycling, carbon neutral etc. The biological reusable waste is processed as organic manure for the plants available in the college campus and the other solid waste generated in the college campus is taken to the community bin of Fatehgarh Sahib municipality for recycling and disposal.



**Pic. (A)**

**Green waste collection tank for preparation of manure**



**Pic. (B)**

**Organic compost prepared in college campus**



**Pic (C): Waste treatment centre (work in progress)**

### **TRANSPORTATION AT BBSBEC:**

Being a largest campus in the region, BBSEC uses a fleet of buses for transportation of the students & staff from the around locations such as Patiala, Chandigarh, Ludhiana, Ropar, Nabha. The college is dedicated to provide its students and staff all the comfort and convenience to help them to achieve their targets. There are the clear and certifiable environmental benefits to higher bus ridership. By utilizing bus transportation, we reduce our automobile use and thereby help to promote clean air. It can convey many more people in much less space than individual automobiles, which helps to keep traffic congestion lower, which in turn reduces air pollution from idling vehicles, and helps riders avoid the stress that comes from daily driving in highly congested areas. By moving people more efficiently, bus transit produces significantly less air pollution per passenger mile than a standard car carrying a single driver. Buses emit approximate 20% less carbon monoxide, 10% as much hydrocarbons, and 75% as much nitrogen oxides per passenger mile as an automobile with a single occupant (Source: Wikipedia).





## ELECTRICAL POWER CONSUMPTION AT BBSBEC:

BBSBEC, being one of the largest colleges of Punjab, consumes on an average 1346333 kW-hr per year of electricity only to maintain its volumetric activities throughout the year. The authority keeps on replacing the old filament bulbs, CFL bulbs and tube lights by low energy consuming LED bulbs and LED tubes and bulky high-power consuming fans by energy efficient fans in order to keep the electricity consumption of the college as low as possible.

In addition to making Environmental Studies a very vital subject in our syllabus, BBSBEC, Fatehgarh Sahib has gone a step further by putting that theory into practice. The college has installed three sets of solar panels, one on North Block, other on south block and third on the roof of Bibi Bhani Hostel. The energy from this solar installation is helping offset the institute's daytime peak electricity demand from the grid. BBSBEC with the installation of 500 KW solar rooftop plant in collaboration with M/s Optimistic Green Energy Pvt Ltd, was able to **offset 74% of its energy usage from the state grid** thus moving towards a more reliable and greener option and **reducing its carbon footprint**. The following table shows no of solar units generated by the solar plant and units exported to Punjab State Power Corporation Limited board in each month.

Month	Solar Units Generated	PSPCL Data		
		Units Imported	Units Exported	Net Units
June 21	48944	29805	34980	-5175
July 21	51400	48945	22020	26925
Aug 21	34968	61425	9015	52410
Sep.21	32144	68205	6060	62145
Oct. 21	41232	62010	14355	47655

**Green Audit Report, BBSBEC, Fatehgarh Sahib**

<b>Nov. 21</b>	48120	43860	29160	14700
<b>Dec. 21</b>	28512	51090	10170	40920
<b>Jan. 22</b>	19136	57645	7245	50400
<b>Feb. 22</b>	41880	37095	30390	6705
<b>March 22</b>	47256	40275	28170	12105
<b>April 22</b>	50008	58200	19995	38205
<b>May 22</b>	48680	82620	8535	74085
<b>June 22</b>	45848	97875	5655	92220
<b>July 22</b>	42472	92130	7845	84285

**Following are Geo tagged photographs of Solar Plant on top of Girls Hostel, South Block and Bhai Gurdas Block:**



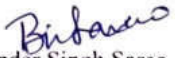





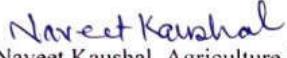



**External Green Audit Committee:**

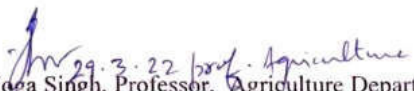
Baba Banda Singh Bahadur Engineering College, Fatehgarh Sahib

  
Mr. Birinder Singh Sarao, Incharge NSS, Mata Gujri College, Fatehgarh Sahib

  
Dr. Jujhar Singh, Horticulture Department, Mata Gujri College, Fatehgarh Sahib

  
Dr. Naveet Kaushal, Agriculture Department, Mata Gujri College, Fatehgarh Sahib

  
Dr. J. S. Bal, Professor, Agriculture Department, Sri Guru Granth Sahib World University, Fatehgarh Sahib

  
Dr Joga Singh, Professor, Agriculture Department, Sri Guru Granth Sahib World University, Fatehgarh Sahib