Supporting Documents
Criteria: 7.1.6

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GREEN AUDIT REPORT

For the Year 2019-2020

NARULA INSTITUTE OF TECHNOLOGY

81, Nilgunj Road, Agarpara,

Kolkata – 700 109.

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81, Nilgunj Road, Agarpara, Kol-109

CONTENT

Executive Summary

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 institute which will lead for sustainable development. Narula Institute of Technology (NIT) is deeply concerned and unconditionally believes that there is an urgent need to address these fundamental problems and reverse the trends. Being a premier institution of higher studies, the college has initiated 'The Green Campus' programme few years back that actively promote various projects for environment protection and sustainability.

Purpose of this audit is to ensure that the practices followed in the campuses are in accordance with the green policy adopted by the institution, it works on several facets of Green Campus including water conservation, electricity conservation, tree plantation, waste management. paperless work, mapping of biodiversity. With this in mind, specific objectives of the audit are to evaluate adequacy of the management control framework of environment sustainability as well as the degree to which the departments are in compliance with the applicable regulations, policies and standards. It can make a tremendous impact on students' health and learning, college operational costs and the environment. The criteria. methods and recommendations used in the audit were based on the identified risks.

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Introduction

Environmental or Green Audit is a systematic, documented, periodic and objective review by regulated entities of facility operations and practices related to meeting environmental requirements (EPA, 2003). In other words, it is a management tool comprising systematic, documented. periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of helping to safeguard the environment by facilitating management control of practices and assessing compliance with Institutes policies. which would include regulatory requirements and standards applicable.

Environmental auditing is essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards. Depending on the types of standards and the focus of the audit, there are different types of environmental audit. Organizations of all kinds now recognize the importance of environmental matters and accept that their environmental performance will be scrutinized by a wide range of interested parties. Environmental auditing is used to investigate, understand and identify.

Utility of Green Auditing

These are used to help improve existing human activities, with the aim of reducing the adverse effects of these activities on the environment. An environmental auditor will study an organization's efforts in conservation of environment on in a systematic and documented manner and will produce an environmental audit report.

College overview

Narula Institute of Technology is a leading autonomous Engineering and Management institute under the aegis of JIS Group Educational Initiative since 2001 and is located at Agarpara, Kolkata.

Narula Institute of Technology is a Private Engineering College established in 2001. This college offers various UG, PG, diploma programs in various streams like Engineering, Computer Application, and Business Administration. It offers various course like B.Tech, BCA, BBA, M.Tech, MCA, and MBA with various specializations. Admission is done to entrance exam.

This is the first Institute to earn the prestigious QS International Star Rating and ranked 201-250 in the Engineering Streams continuously for four years till 2020 by prestigious NIRF ratings from MHRD, Government of India.

Objectives of the Study

Main objectives of green audit are to promote environment management and conservation in the college campus. The purpose of the audit is to identify. quantify, describe and prioritize framework of environment sustainability in compliance with the applicable regulations, policies and standards. Main objectives of carrying out green audit are

- To introduce and make aware students to real concerns of environment and its sustainability
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use on the campus.
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requires high cost.
- To bring out a present status report on environmental compliance.

Methodology

In order to perform green audit, the methodology included different techniques such as physical inspection of the campuses, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. The study covered the following area to summarise the present status of environment management in the campus.:

- Water quality assessment, consumption and management
- Air quality assessment and management
- Electricity consumption and management
- Sound pollution monitoring
- Waste management
- Bio diversity status of the campus
- Land use and land coverage
- Greenery Development

LAND USE ANALYSIS, NARULA INSTITUTE OF TECHNOLOGY, AGARPARA, WEST BENGAL

(AS on 12/11/2020)

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

METHODOLOGY ADOPTED FOR LAND USE MAPPING.

Three types of data that are Gps points, field survey data and Google earth data for Georeferencing have been used in this study. Land use map of the study area have been prepared using field survey

CLASSIFICATION SCHEME FOR LAND USE ANALYSIS OF BUILT UP AREA

Level-I	Level-II
1. Built- up land area	1.1 Dense 1.2 Moderate 1.3 Sparse

Therefore, attempt has been made in this study to map land use for Narula Institute of Technology, Agarpara, with a view to detect the land consumption in the built-up land area.

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LAND USE DATA OF NARULA INSTITUTE OF TECHNOLOGY, AGARPARA.

CATEGORIES OF LAND USE	AREA IN SQ METRES
OPEN SPACE AND PLANTATION	570
Ground Coverage	1310
TOTAL AREA	1880

Ground coverage of 70% (i.e 1310 sq metres) consists of the following regions as stated above for land consumption in built up area of Narula Institute of Technology.

FINDINGS:

NiT which was established in the year 2001, 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 30 % of the total area is occupied by open land and plantation that generates a better and sustainable campus environment.

Water Quality Assessment, Consumption & Management

Water quality analysis was conducted by Qualisure Laboratory Services,

TABLE – 1

Sample Description : Drinking water

Sample Mark : Near Office Acqua guard

Date of Sampling : 02-11-2020

Analysis Result

(A) Microbiological Analysis

Sl. No.	Characteristic	Limit as per Drinking Water standard : IS:10500, 2012, Amd.2	Test Method	Result
1	Total Coliform Bacteria/100ml.	Not Detectable	IS 15185-2016	Not Detected
2	E.coli/100ml	Not detectable	IS 15185: 2016	Not Detected

Water Consumption

The Institute extracts fground water for meeting its water requirement. As per the guidelines NOC needs to obtained for such extraction. The audit team has been told that application seeking NOC has been submitted, the matter needs to be pursued for early clearance, if required external agency may be engaged for expediting issuance of NOC.

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(B) Chemical Analysis

Sl. No.	Test Parameter	Test Method	As per Drinking Water Standard: IS:10500, 2012 Amd. 1 & 2		Result
			Desirable Limit	Permissible Limit	
1	pH Value at 25^0C	IS 3025 (Part 11) – 1984 RA : 2012	6.5-8.5	No Relaxation	7.32
2	Turbidity in NTU	IS 3025 (Part 10) – 1984 RA:2012	1	5	<1.0
3	Total Dissolved Solids (TDS) in mg/l	IS 3025 (Part 16) – 1984 RA:2012	500	2000	298.0
4	Calcium (as Ca) in Mg/l	IS 3025 (Part 11) – 1984 RA:2014	75	200	52.41
5	Chloride (as Cl) in Mg/l	IS 3025 (Part 10) – 1984 RA : 2014	250	1000	39.39
6	Iron (as Fe) in mg/l	IS 3025 (Part 53) – 1988 RA : 2014	1.0	No Relaxation	<0.03
7	Magnesium (as Mg) in mg/l	IS 3025 (Part 46) – 1994 RA : 2014	30	100	20.42
8	Nitrate (as NO_3) in mg/l	IS 3025 (Part 34) – 1986 RA : 2014	45	No Relaxation	<0.3
9	Free Residual Chlorine in mg/l	IS 3025 (Part 26) – 1986 RA : 2014	0.2	1.0	<0.1
10	Sulphate (as SO_4) in mg/l	IS 3025 (Part 24) – 1986 RA : 2014	200	400	7.24
11	Alkalinity (as $CaCO_3$) in mg/l	IS 3025 (Part 23) – 1986 RA : 2014	200	600	232.0
12	Total Arsenic (as As) in mg/l	IS 3025 (Part 37) – 1988 RA : 2014	0.01	No Relaxation	<0.01
13	Total Hardness (as $CaCO_3$) in mg/l	IS 3025 (Part 21) – 1983 RA : 2014	200	600	226.7

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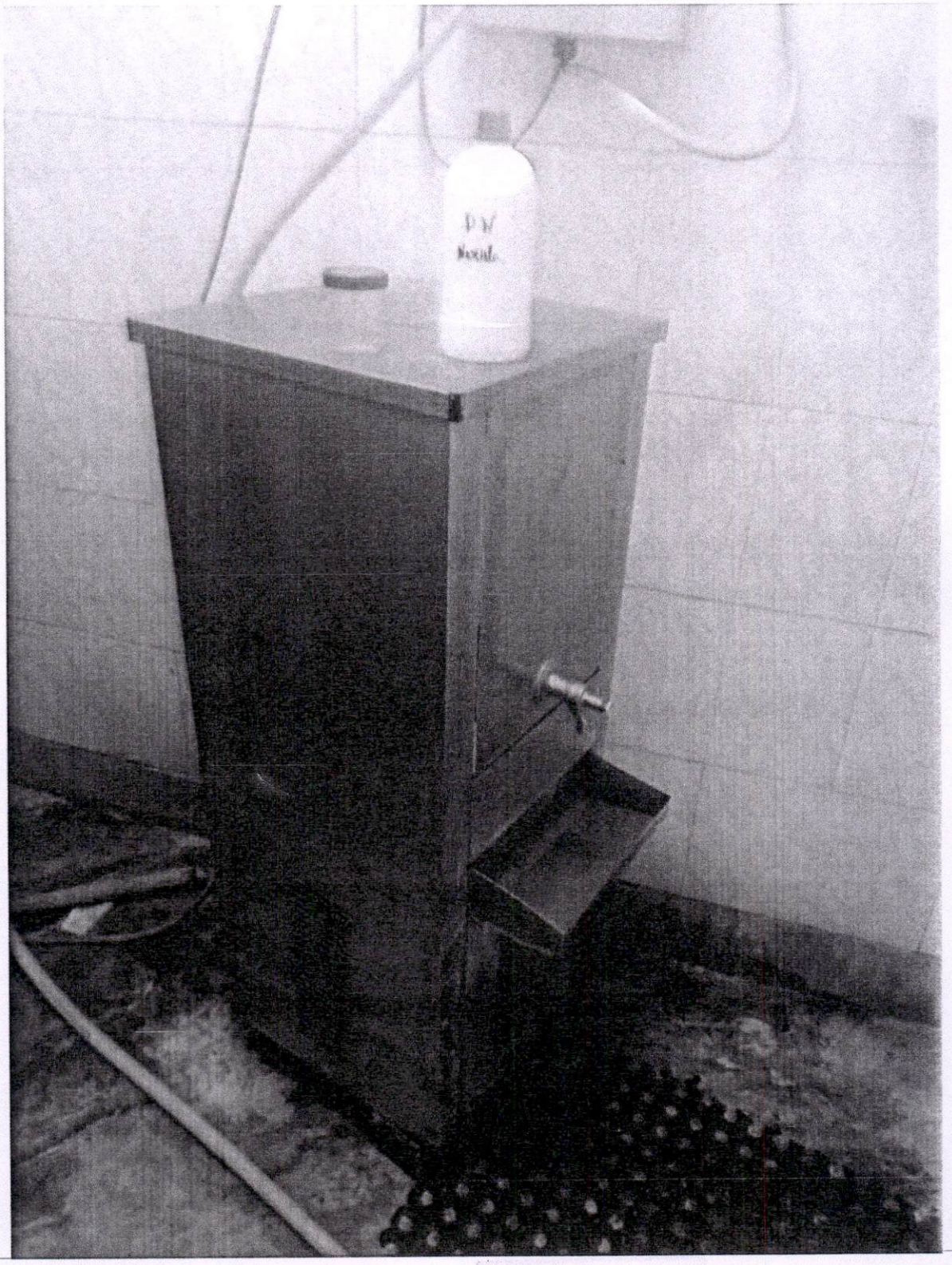

TABLE – 2

Sample Description : Waste Water

Sample Mark : Waste Water

Date of Sampling : 02-11-2020

Analysis Result

Sl. No.	Parameter	Test Method	Result	Limit as per CPCB for discharge of effluents	
				Inland Surface Water	Public Sewers
1	pH at 25^0C	APHA 23rd Edition-2014, 4500 H+	7.17	5.5 to 9.0	5.5 to 9.0
2	Total Suspended Solkid in mg/l	APHA 23rd Edition-2014, 2540 D	32.0	100	600
3	Chemical Oxygen Demand (as COD) mg/l	APHA 23rd Edition-2014, 5220 B	94.0	250	---
4	Biochemical Oxygen Demand (as BOD) mg/l	IS 3025 (Part 44)-1993, RA:2014	21.0	30	350
5	Oil & Grease in mg/l	Apha 23RD Edition-2014, 5520A	4.2	10	20

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Air Quality Assessment and Management

Analysis Result

Location : Near Main Gate			Date of Sampling : 03-11-2020	
Environmental Condition : Sunny & Clear			Sampling done as : CPCB Guidelines (Volume-I)	
Barometric Pressure : 758 mm Hg Hg.			Average Temperature : 29^{0}C	
			Average Humidity: 77%	
Sl. No.	Pollutants	Result	Limit as per CPCB	Method of Test Reference
1	Particulate matter (<10µm) in µg/m^3)	86	100	IS: 5182 (Part-23):2006
2	Particulate matter (<2.5µm) in µg/m^3)	45	60	Usepa cfr-40, Part-50, Appendix-L
3	Sulpher dioxide (SO_2) in µg/m^3	7.0	80	IS:5182(Part-2)-2001
4	Nitrogen dioxide (NO_2) in µg/m^3	33.0	80	IS:5182 (Part-6)-2006

Location : Backside of the College			Date of Sampling : 06-12-2016	
Environmental Condition : Sunny & Clear			Sampling done as : CPCB Guidelines (Volume-I)	
Barometric Pressure : 758 mm Hg Hg.			Average Temperature : 29^{0}C	
			Average Humidity: 77%	
Sl. No.	Pollutants	Result	Limit as per CPCB	Method of Test Reference
1	Particulate matter (<10µm) in µg/m^3)	71	100	IS: 5182 (Part-23):2006
2	Particulate matter (<2.5µm) in µg/m^3)	44	60	Usepa cfr-40, Part-50, Appendix-L
3	Sulpher dioxide (SO_2) in µg/m^3	7.5	80	IS:5182(Part-2)-2001
4	Nitrogen dioxide (NO_2) in µg/m^3	31.2	80	IS:5182 (Part-6)-2006

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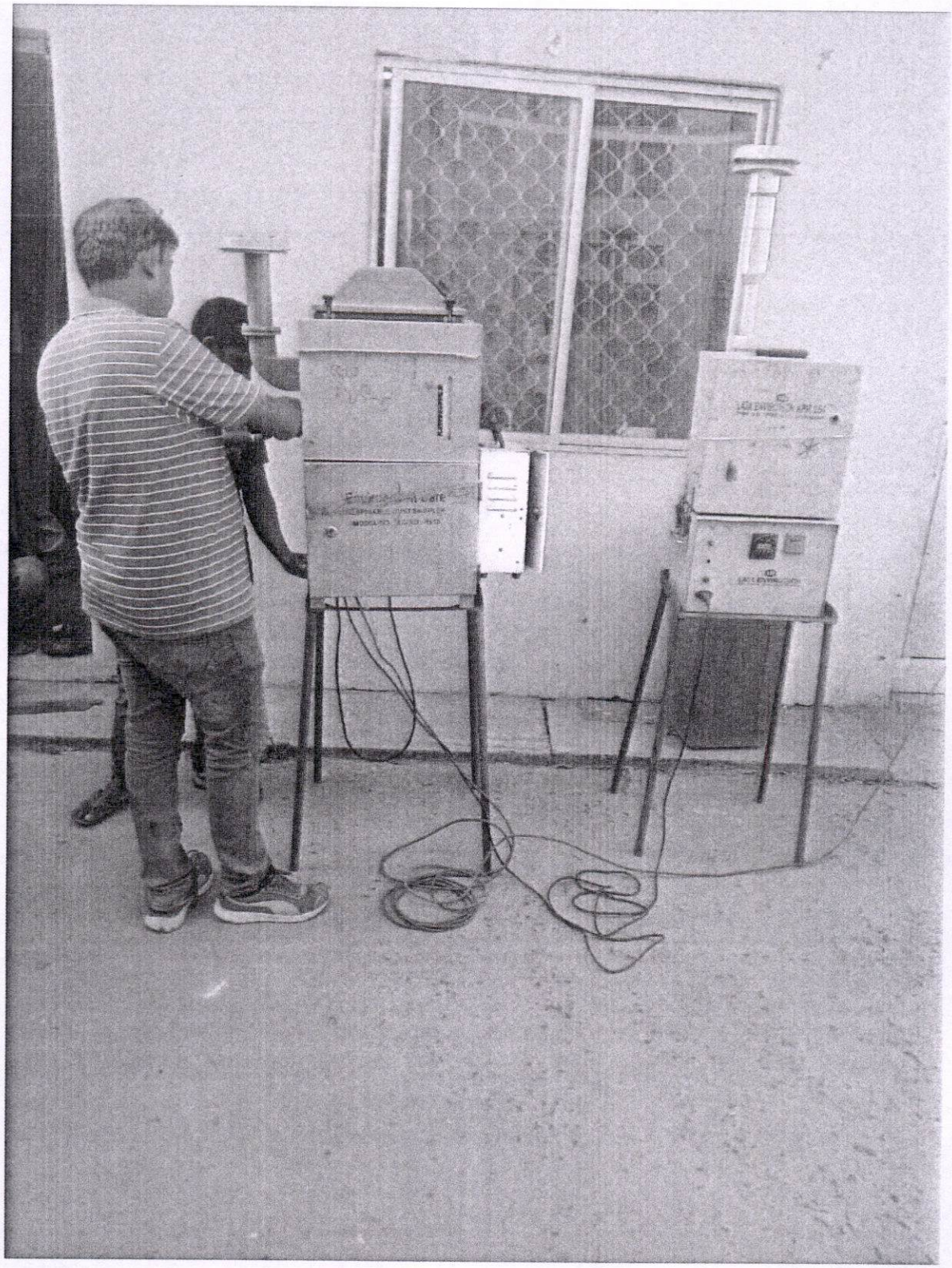
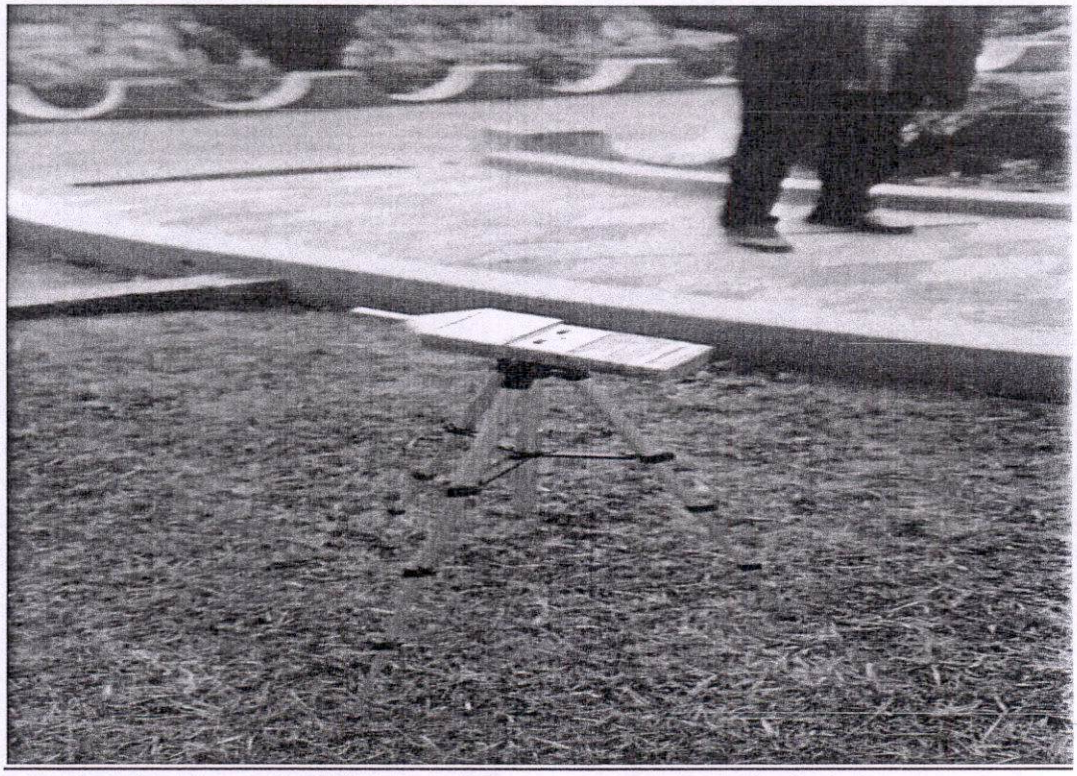


Sound Pollution Monitoring

Sampling Guideline : As per IS:9876:1981(RA-2001)				
Sl. No.	Date of Monitoring	Location	Leq dB (A) Day Time	Leq dB (A) Night Time
1	02-11-2020	Near Administrative Building	65.7	56.5

Code/Category	Leq dB Day Time (A)	Leq dB Night Time (A)	**Note** : Day Time : 06.00 Hr. – 22.00 Hr. Night Time : 22.00 Hr. – 06.00 Hr.
A/Industrial	75	70	
B/Commercial	65	55	
C/Residential	55	45	
D/Ecological Sensitive	50	40	



Electricity Consumption [in Units) and Management

GENERAL DETAILS

Sl.No.	PARTICULARS	DETAILS			
1	Name & Address of Collage	Narula Institute of Technology 81, Nilgunj Road, Agarpara, Kolkata – 700 109.			
	Web Site	www.nit.ac.in/www.jisgroup.org			
2	Name of Contact Officer	Prof. (Dr.) Maitreyi Ray (Kanjilal)			
	Designation	Principal			
	Name of Alternative Officer.	Mr. Nidhi Singh			
	Designation	Registrar, NIT			
3	Telephone No. Mobile No.	033-25637777 9433035580			
	Fax No. e-mail ID	033-25837029 Info@nit.ac.in			
		Day shift			
	No. of Employees (Approx)	330			
4	Type of Fuel Used	Day shift	**Oil** (KL)	**Coal** (Tons)	**Others** (Tons)
	Annual Fuel Consumption	L.P.G. 51 lyh67Cylinder (19Kg.)			
5	Electricity Consumption(Kwh)	Imported (Purchased) Power/Kwh 332052 kwh		In-house Generation Kwh (avg) **(DG Lock Book Not Available)**	
6	Specific Energy Consumption	Fuel		Electricity	
		28750		Rs. 9.70	
7	EPI = 130 3 star building				
8	LPD = 12.23 NBCC - 12.8				

Remarks - Energy performance index (EPI) total energy consumption for a year and total built up area. The units are kwh per annum per sqm.

I. ELECTRICAL DETAILS

1. TRANSFORMERS

	No. 1	No. 2
Voltage Ratio	6/0.433 KVA	HV Amp. 48.3
KVA	500	LV Amp. 666.69
% Impendence Voltage	4.8	4.8

- **Dry Transformer Maxpower make insulation 'L', DYN-11.**
- **Remarks – Exhaust Fan is insufficient, at least two (2) exhaust fan to be installed.**

2. ELECTRICITY CONSUMPTION

	Particulars	Demand
A	Contract demand KVA	250 KVA
B	Maximum demand	211
C	Total Energy units consumed / year	1787 KWH/Day
D	Avg. Power Factor (P.F.)	0.98 Max.,Mean 0.92
E	Avg. Energy bills (Rs/month)	Rs.2.68 lacs

3. DETAILED LIST OF ELECTRIC MOTORS OPERATING IN THE PLANT *(SEPARATE SHEET CAN BE ENCLOSED)*

S.NO.	NAME OF THE INSTITUTE	RATING OF MOTOR (KW)	NO. OF MOTORS
1	Narula Institute of Technology Agarpara Kolkata	0.5 HP to 10 HP	60

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4. DETAILS OF CAPACITORS INSTALLED

S.NO.	NAME OF THE INSTITUTE	KVAR
1	Narula Institute of Technology Agarpara Kolkata	305 (APFC)

- **Remarks – Ampier Meter not working, No Ventilation electric panel room**

5. CONNECTED LOAD

	EQUIPMENT	TOTAL NUMBERS	LOAD IN KW (TOTAL)
A	Motors : Greater than 10 kW		
	: Less than 10 kW		91 KW
a)	Others (Package ACs/ Split ACs / Windows ACs) with TR	**Room AC of Split/Window type** 50 no's = 80 TR = 96 KW	
D	Total Process Load (in kW)	194 kw	
E	Total Lighting Load (in kW) & Luminaries details	LED Spot, LED Squad & T/L	
	Total Load (in kW)	53.5 + 195 = 250 KW	

A. DIESEL GENERATING SET

SL. No.	Make	Model	Rating KVA	Stand by or Continuous operation	Actual Average Loading	Avg. kWh Units /Lit. of Oil
1	Jakson Limited	JSP	125		N.A.	20 ltr./Hr.

B. Lux Measurements :

Sl.no.	Room	Lux level	Remarks
1.	1 st floor	138,188,182,152,173	O.K
	2 nd floor	172,152,192, 132,142	O.K
	3 rd floor	174,155,164,174,161,	O.K
2.	**Corridor**	**Lux level**	
	1 st floor	132,125,101,107,104	O.K
	2 nd floor	122,102,134,105,112,123,102	O.K
	3 rd floor	113,106,108,104,124,131	O.K
3.	**Stair Case**	**Lux level**	
	1 st floor	110,112,154,147,102,168	O.K
	2 nd floor	162,113,148,163,151,132	O.K
	3 rd floor	102,101,106,107,109,99	O.K

Illumination Level Comparison

Area	Average Lighting Level (LUX)	NBC Recommended
Office area enclosed	200	300-500
corridor	112	50-100
staircase	42	50

Remarks : Lights needs cleaning at an interval of one month and old light to be replaced by new to get desired lux value

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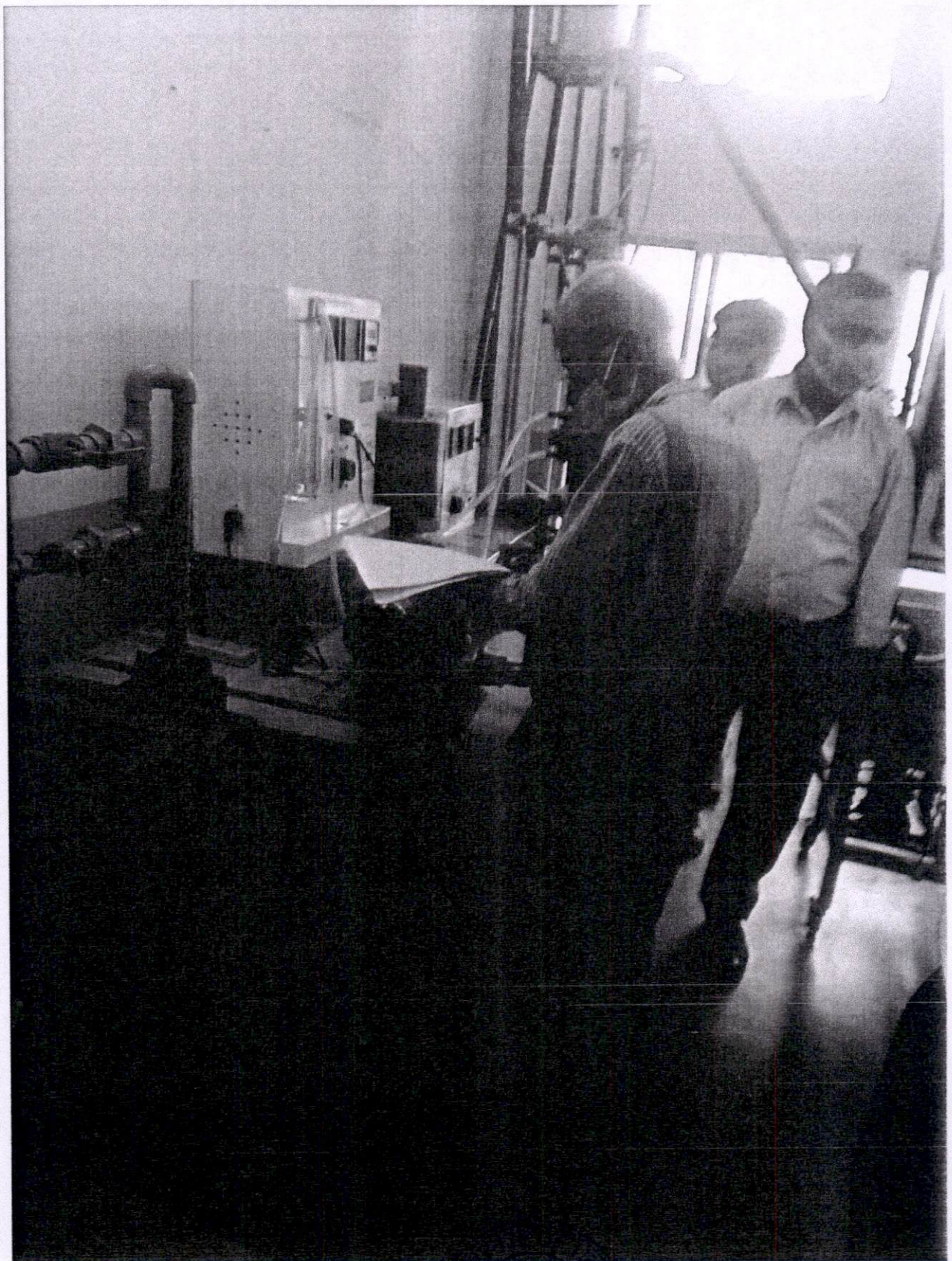

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Waste Management

This indicator addresses waste production and disposal of different wastes like paper. food, plastic, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone.

The present Prime Minister of India Sri Narendra Modi launched 'Swachh Bharat Abhiyan' (Clean India Mission) on 2nd October, 2014. In this mission, the proper use of dust/waste bins is one of the major priorities. For the implementation of this mission, collective mass effort is necessary. For proper segregation and management. proper use of waste bins is the only solution for waste management purpose in the college campuses

For this purpose, Agarpara, Narula Institute of Technology has employed waste bins for proper segregation of solid wastes in the campuses. It includes provision for plastic glass waste, food waste and metal waste e-waste etc.

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Biodiversity Status of the College Campuses

INTRODUCTION

Narula Institute of Technology, Agarpara - situated slightly off from B.T. Road. The college area is very rich in biodiversity. To conserve this biodiversity, our first need is to learn about the existing diversity of the place. Unless we know whom to conserve we will not be able to plan proper conservation initiatives. Also, it is important to have an understanding of the bio-diversity of an area so that the local people can be aware of the richness of bio-diversity of the place they are living in and their responsibility to maintain that richness.

OBJECTIVE

The main objective of this study is to get a baseline data of bio-diversity of the area which will include:

1. Documentation of the floral diversity of the area: its trees, herbs, shrubs, climbers and aquatic vegetations.

2. Documentation of the major faunal groups like mammals, reptiles, amphibians, birds and among the insects, butterflies and dragonflies.

3. Documentation of the specific interdependence of floral and faunal life.

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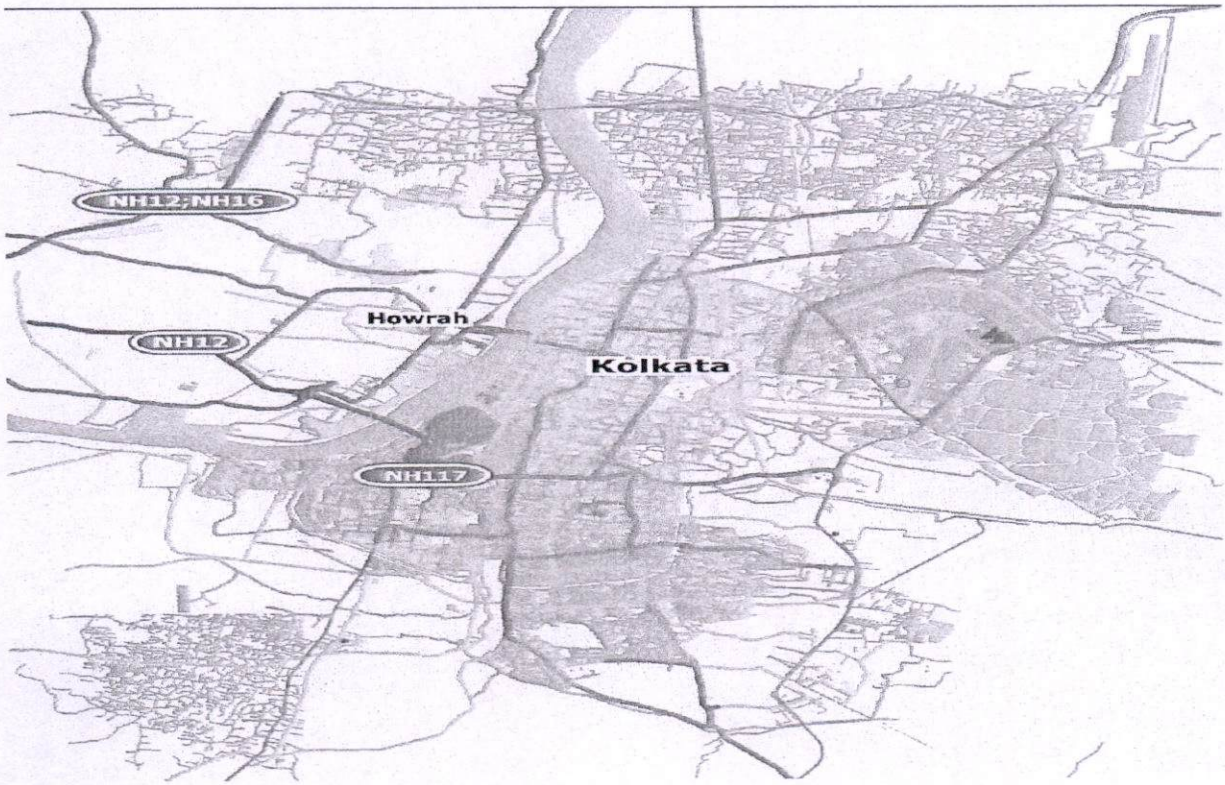
Survey Area

Agarpara NIT premises and its surrounding areas - Agarpara Station nearby around 1.5 km. distance.

Location map.



Method of Study

Brief methodology for the floral and faunal survey is given below:

01. Sampling was done mostly is random manner.
02. Surveys were conducted for the maximum possible hours in day time.
03. Tree species were documented thorugh physical verification on foot and photographed each specties as much as possible.

04. The total area was surveyed by walking at day time.
05. For faunal species we emphasized mainly on the direct sighting. Also call or various birds and amphibians and nesting of some faunal species were considered as direct evidences.

06. Observing mammals depend critically on the size of the species and its natural history. Diurnal species are common and highly visible. Nocturnal species, however, are rate and difficult to detect. Small mammals like the field rats rere found near their burrows, particularly during their entry or exit times in or out from their burrows respectively. In some cases, during deposits and footprints were also observed that served as a potential clue for the presence and absence of the concerned species. These secondary evidences were all noted with time and space co-ordinates.

07. Birds are often brightly coloured, highly vocal at certain times of the year and relatively easy to see. Sampling was done on the basis of direct sighting, call determination and from the nests of some bird species.

08. Reptiles were found mostly by looking in potential shelter sites like cravices of building, logs, tree hollows and leaf litter and also among and underneath the hedges. Sometimes some species, particularly the garden lizards were also observed in open spaces (on twigs and branches and even on brick constructions) while they were basking under direct and bright sunlight.

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09. Amphibians act as potential ecological indicators. However, most of them are highly secretive in their habits and may spend the greater part of their lives underground or otherwise inaccessible to biologists. These animals do venture out but typically only at night. They were searched near pond, road beside wetland and in other possible areas. Diurnal search operations are also successful.

10. Active invertebrates like the insects require more active search. For larger winged insects like butterflies, dragonflies and damselflies, random samplings were carried and point sampling was also done.

11. The easiest way to observe many of the invertebrates is simply looking for them in the suitable habitat or microhabitat. Searching was carried out under stones, logs, bark, in crevices in the walls and rocks and also in leaf litter, dung etc. slogs and snails are more conspicuous during wet weather and especially at night when they were found using torch.

Checklist of Mammals

Sl. No.	Common name	Scientific Name	Bengali Name
1.	Indian Grey Mongoose	Herpestes edwardsi	Neul
2	Asian Palm Civet	Paradoxurus hermaphrodites	Bham Biral
3	Gray Langur	Semnopithecus sp.	Hanuman Langur
4	Fruit Bat	Pteropus sp.	Badur
5	Indian Flying Fox	Ptetopus giganteus	Kola Badur
6	Common Pipistrelle	Pipistrellus pipistrellus	Chamchike
7	Five-striped Palm Squirrel	Funambulus pennantii	Kathbirali

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Checklist of Reptiles

Sl. No.	Common name	Scientific Name	Bengali Name
1.	Checkered Keelback	Xenochrophis piscator	Joldhora
2	Buff Striped Keelback	Amphiesma stolatum	Hele
3	Rat Snake	Zamenis longissimus	Darash
4	Russel's Vipar	Daboia russelii	Chandrabora
5	Skink	Lampropholis sp.	Anjani
6	Oriental Garden Lizard	Colotes versicolor	Girgiti
7	Bengal Monitor Lizard	Varanus bengalensis	Gosap
8	Common House Grcko	Hemidactylus frenotus	Tiktiki

Checklist of Amphibians

Sl. No.	Common name	Scientific Name	Bengali Name
1.	Indian Toad	Duttaphrynus melanostictus	Kuno Byand
2.	Skittering Frog	Euphlyctis cyanophiyctis	Karkati Byang
3.	Asian Bullfrog	Hoplobatrachus tigerinus	Sona Byang

Checklist of Butterflies

Sl. No.	Common name	Scientific Name	Bengali Name
1.	Blue Mormon	Papilio Polumnestor	Barunpakha
2.	Common Jay	Graphuum doson	Minji
3.	Common Mime	Papila Clytia	Khagra
4.	Common Mormon	Papilo pelytes	Kalim
5.	Common Rose	Pachliopta aristolochiae	Alte
6.	Lime Butterfly	Papilio demolius	Ruru
7.	Tailed Jay	Graphium agamemnon	Choitak
8.	Western Striped Albatross	Appias hbythea	Dhulkapas
9.	Small Grass Yellow	Eurema brigitta	Chhoto Holud
10.	Common Grass Yellow	Eurema hecabe	Holud
11.	Common Gull	Capora nerissa	Kuchila
12.	Eastern Striped Albatross	Appias offerna	Dhulkapas
13.	Indian Jezebel (Common jezebel)	Delias eucharis	Hartoni
14.	Indian Wanderer	Pareronia hippie	Tallar
15.	Lemon Emmigrant	Catopsilia pomona	Payrachali
16.	Mottled Emmigrant	Catopsilia pyranthe	Chitpayra
17.	Psyche	Leptosia nina	Furus
18.	Commom Cerulean	Jamides caleno	Surul
19.	Common Lineblue	Prosotas nora	Chandand Nari
20.	Tailles Lineblue	Prosotas dubiosa	Bigri Danri
21.	Common Pierrot	Castalius rosimon	Tilaia
22.	Common Quaker	Neopithecops zalmora	Kori
23.	Dark Gras Blue	Zizeeria karsandra	Chhoi
24.	Forget-me-not	Catochrysops strabo	Rittam
25.	Gram Blue	Euchrysops cnejus	Joural
26.	Lesser Grass Blue	Zizina otis	Para
27.	Lime Blue	Chilades lajus	Tura
28.	Pale Grass Blue	Pseudozizeeria maha	Dhupi
29.	Pea Blue	Lampides boeticus	Khoria
30.	Plains Cupid	Chilades pandava	Rulki
31.	Tiny Grass VBlue	Zizula hylax	Tinni
32.	Zebra Blue	Laptotes plinius	Zizi

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Checklist of Butterflies

Sl. No.	Common name	Scientific Name	Bengali Name
33.	State Flash	Rapala ameria	Rimli
34.	Falcete Oakblue	Virachola isocrates	Kaste Rangchiti
35.	Common Guava Blue	Virachola Isocrates	
36.	Spotted Pierrot	Tarucus callinara	Chhit Tikushi
37.	Monkey Puzzle	Rathinda amor	Chatul
38.	Indian Sunbeam	Curetis thetis	Jhinukpalash
39.	Common Silverline	Spindasis vulcanus	Riupapatia
40.	Angled Castor	Ariadne ariadne	Kanmorche
41.	Blue Tiger	Tirumala limniace	Himalkuchi
42.	Chestnut-streaked Sailer	Neptis jumbah	Batasi
43.	Commander	Moduza procris	Karanjia
44.	Common Baron	Euthalia aconthea	Bhushanda
45.	Cammon Bushbrown	Mycalesis perseus	Janglabira
46.	Common Castor	Ariadne merione	Morchepata
47.	Common Crow	Euploea core	Kaoa
48.	Common Evening Brown	Melanitis leda	SaNjhla
49.	Common Five-ring	Ypthima baldus	Panchbundi
50.	Common Four-ring	Ypthima huebneri	Charbundi
51.	Common Leopard	Phalanta phalantha	Chita
52.	Common Palmfly	Elymnias lhypermnestra	Khayerchak
53.	Danaid Eggfly	Hypolimnas misippus	Jamchanda
54.	Grey Pansy	Euthalia lubentina	Kunchrangi
55.	Peacock Pansy	Hypolimnas bolina	Jamui
56.	Plain Tiger	Junonia atlites	Chandnori
57.	Peacock Pansy	Junonia almanac	Nayan
58.	Plain Tiger	Danaus cheysippus	Tamot
59.	Striped Tiger	Danaus genutia	Baghballa
60.	Tawny Coster	Acraea violae	Horinchhara
61.	Lemon Pansy	Junonia lemonias	Ushum
62.	Brown Awl	Badamia exclamationis	Chile Pakhui
63.	Common Banded Awl	Hasora chromus	Khori Pakhui
64.	Oriental Palm Bob	Suastus gremius	Khoyra
65.	Pale Palm Dart	Telicota colon	Bena Tirap
66.	Small Banded Swift	Pelopidas mathias	Pari Johur
67.	Swift sp.		
68.	Chestnut Palm Bob	Lambrix salsala	Piplai

Checklist of Birds

Sl. No.	Common name	Scientific Name	Bengali Name
1.	Alaxandrine Parakeet	Psittacula eupatria	Chondona
2.	Asian Koel	Eudynamys scolopaceus	Kokil
3.	Asoan Openbill	Anastomus oscitans	Shamuk Khol
4.	Asian Palm Swift	Cypsiurus balasiensis	Talchonch
5.	Asian Pied Starling	Gracupica contra	Go-shalik
6.	Back Drongo	Dicrurus macrocercus	Finge
7.	Black Kite	Milvus migrans	Chil
8.	Black-hooded Oriole	Oriolus xanthornus	Benebou
9.	Black-naped Morarch	Hypothymis azurea	
10.	Black-naped Oriole	Oriolus chinensis	Kaloghad Benebou
11.	Ble-throated Barbet	Megalaima asiatica	Nilgala Basantabouri
12.	Cattle Egret	Babulcus ibis	Gobok
13.	Common Hawk Cuckoo	Hierococcyx varius	Papia
14.	Common Hoopoe	Upupa epops	Mohonchuda, Hupo
15.	Common lora	Aegithina tiphia	Fotik Jol
16.	Common Kindfisher	Alcedo atthis	Chhoto Machhranga
17.	Common Myna	Acridotheres tristis	Shalik
18.	Common Pigeon	Columba livia	Payra
19.	Common Sandpiper	Actitis hypoleucos	Sadharon Balubatan
20.	Common Tailorbird	Orthotomus sutorius	Tuntuni
21.	Coppersmith Barbet	Megalaima haemacephala	Chhoto basantabouri
22.	Eastern Jungle Crow	Corvus (macrorhynchos) levaillantii	Dandkak
23.	Eurasian Collared Dove	Streptopelia decaocto	Konthi Ghunghu
24.	Fulvous-breasted Woodpecker	Dendrocopos macei	Jarod Kath Thokra
25.	Greater Coucal	Centropus sinensis	Kubo
26.	Green Bee-Eater	Merops orientalis	Banspati
27.	House Crow	Corvus oplendens	Kak
28.	House Sparrow	Passer domesticus	Chorui
29.	Indian Cormorant	Phalacrocorax fuscicollis	Majhari Pankoudi
30.	Indian Pond Heron	Ardeola grayii	Konchbok
31.	Jungle Babbler	Turdoides straitus	Chhatare

Checklist of Birds

Sl. No.	Common name	Scientific Name	Bengali Name
32.	Jungle Myna	Acridotheres fuscus	Jhuntshalik
33.	Lesser Goldenback	Dinopium benghalense	Chhoto Sonali Kath Thokra
34.	Lineated Barbet	Megalaima lineate	Rekha Basantabouri
35.	Marsh Sandpiper	Tringa stagnatilis	Biler Balubatan, jolar Chapakhi
36.	Oriental Magpie Robin	Copsychus saularis	Dotel
37.	Pale-billed Flowerpecker	Dicaeum erythrorynchos	Poragpakhi
38.	Purple Heron	Ardea purpurea	Lalkank, Nilbogola
39.	Purple Sunbird	Nectarinia asiatica	Durga Tuntuni
40.	Purple-rumped Sunbird	Nectarinia zeylonica	Moutushi
41.	Red-vented Bulbul	Pycnonotus cafer	Bulbuli
42.	Red-whiskered Bulbul	Pycnonotus jocosus	Shipai Bulbul
43.	Rose-ringed Parakeet	Psittacula krameri	Tiya
44.	Rufous Treepie	Dendrocitta vagabunda	Handichancha
45.	Shikra	Accipiter badius	Turki baaz
46.	Spotted Dove	Stigmatopelia chinensis	Tile Ghughu
47.	Spotted Owlet	Athene brama	Kuthure Pencha
48.	Stork-bulled kingfisher	Pelargopsis capensis	Gudiyal
49.	Taiga Flycatcher	Ficedula albicilla	Chutki
50.	White Wagtail	Motacilla alba	Sada Khanjon, Khonjona
51.	White-breasted Waterhen	Amsaurornis phoenicurus	Dahuk
52.	White-throated Kingfisher	Halcyon smyrnensis	Sadabuk Machhranga
53.	Yellow-footed Green Pigeon	Treron phoenicoptera	Horiyal

Checklist of Trees

Sl. No.	Local Name	Common Name	Scientific Name
1.	Kak Dumur	Fig Tree	Ficus hispida
2.	Aam	Mango	Mangifera indica
3.	Akashmoni	Golden Shower	Acacia auriculiformis
4.	Akashneem	Indian Cork Tree, Tree Jasmine	Millingtonia hortensis
5.	Allspice Tree	Allspice Tree	Pimenta dioica
6.	Amaltash	Golden Shower	Cassia fistula
7.	Amlaki	Amla	Embica officinalis
8.	Amrah	Wild Mango	Spondias pinnata
9.	Ashfol	Longan	Euforia longan
10.	Ashok	Ashoka Tree	Sraca asoka
11.	Ashok	Ashoka Tree	Saraca asoka
12.	Bahera	Bahera	Terminalia bellirica
13.	Bakul	Spanish cherry/Bakul	Minusops elengi
14.	Batabi Lebu	Pamelo	Citrus maxima
15.	Bel	Golden Apple	Aegle marmelos
16.	Bhawarmal, Bohar, Biharukh	Bhawarmal, Bohar, Biharukh	Hymenodictyon arixense
17.	Bot	Banyan Tree	Ficus benghalensis
18.	Buddha Narkel	Buddha Coconut	Pterygota alata
19.	Chalta	Elephant Apple	Dillenia indica
20.	Chhatim	Chhatiyan/Devil's Tree	Alstonia scholaris
21.	Chhotopata Mehogini	Small-leaved Mahogany	Swietenia mahagoni
22.	Chinese Bot	Ficus	Ficus Sp.
23.	Christmass Tree	Caledonia Pine/Christmas Tree	Araucaria cookri
24.	Debdaru	Indian Fir/Cementry Tree	Polialthia longifolia
25.	Eucaliptus	Eucalyptus	Eucalyptus spp.
26.	Gandhraj	Gardenia, Cape jasmine	Gardenia jasminoides
27.	Ghora Neem	Indian Lilac Tree	Melia azedarach
28.	Golap Jam	Gulab Jamin	Syzygium jambos
29.	Haritaki	Haritaki	Terminalia chebula
30.	Indurmari	Gliricidia	Ghricidia sepium
31.	Jagga Dumur	Cluster Fig	Ficus glomerata
32.	Jam	IUmdian Blackberry	Syzygium cumini
33.	Jamrul	Water Apple	Syzygium aqueum
34.	Jarul	Pride of India	Lagerstroemia speciosa
35.	Kadam	Kadam	
36.	Kamranga	Star Fruit	

Checklist of Trees

Sl. No.	Local Name	Common Name	Scientific Name
37.	Kanchan	Butterfly Tree	Bauhinia purpurrea
38.	Kanthal	Jack Fruit	Artocarpus heterophyllus
39.	Karanja	Pongam Tree, Pongame Oil Tree	Pongamia pinnata
40.	Kath Badam	India Almond	Terminalia catappa
41.	Kath Champa	Red Jasmine Tree	Plumeria rudra
42.	Khirish	Rain Tree	Samanea saman
43.	Krishnachura	Gold Mohus/Flame Tree	Delonix regia
44.	Kshude Jam	Indian Blackberry (small)	Syzygium sp.
45.	Kul (Topa Kul)	Indian Jujube / Ber	Ziziphus mauritiana
46.	Kurchi	Indrajao	Holarrhena pubescens
47.	Lal Shimul	Red Silk Cotton Tree	Bombax ceiba
48.	Lichu	Lichi	Litchi chinensis
49.	Lombu Gachh	Dysoxylum Sp.	Dysoxylum constulatum Miq.
50.	Neem	Neem Tree	Azadirachta indica
51.	Nepal Tunt	West Indian Elm, Bastard/Bay Cedar	Guazuma ulmifilia
52.	Nona	Custard Apple	Annona reticulate
53.	Pam	She-Oak/Indian Christmas Tree	Casuarina equisetifolia
54.	Pakur	White Flg	Ficus infectoria
55.	Palash	Flame tree	Butea monosperma
56.	Peyera	Guava	Psidium guajava
57.	Pituli	False White Teak	Trewia nudiflora
58.	Putranjeeva	Putranjiva/Lucky Bean Tree	Putranjiva roxburghii
59.	Radhachura	Copper Pod Tree	Peltoforum pterocarpum
60.	Rubber	Indian Rubber Tree	Ficus elastic
61.	Redrapalash	African Tulip Tree	Spathodia campanulata
62.	Sabeda	Sabeda	Manikara sapota
63.	Segun	Burma Teak	Tectona grandis
64.	Shaora	Sank paper tree	Streblus asper
65.	Sheuli	Queen of the night	Nyctanthes arbortristis
66.	Sojina	Drumstick Tree	Moringa oleifera
67.	Subabul	Subabul	Leucena leucocephela
68.	Tentul	Tamarind	Tamarindus indica
69.	Toon	Indian Mehoginy	Cedrela toona
70.	Zilpi Babla	Vilayati Babul	Pithecolobium dulce

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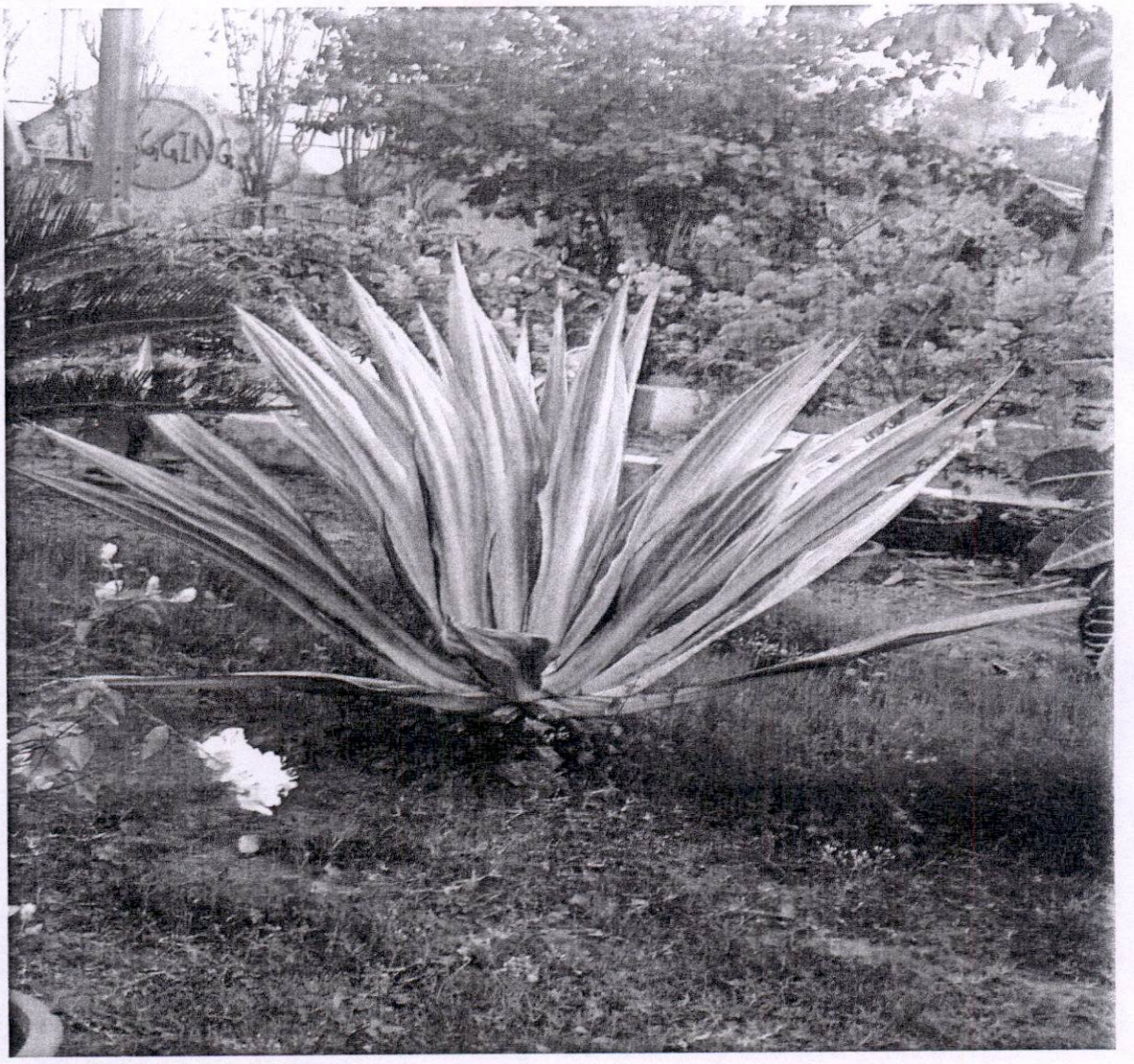
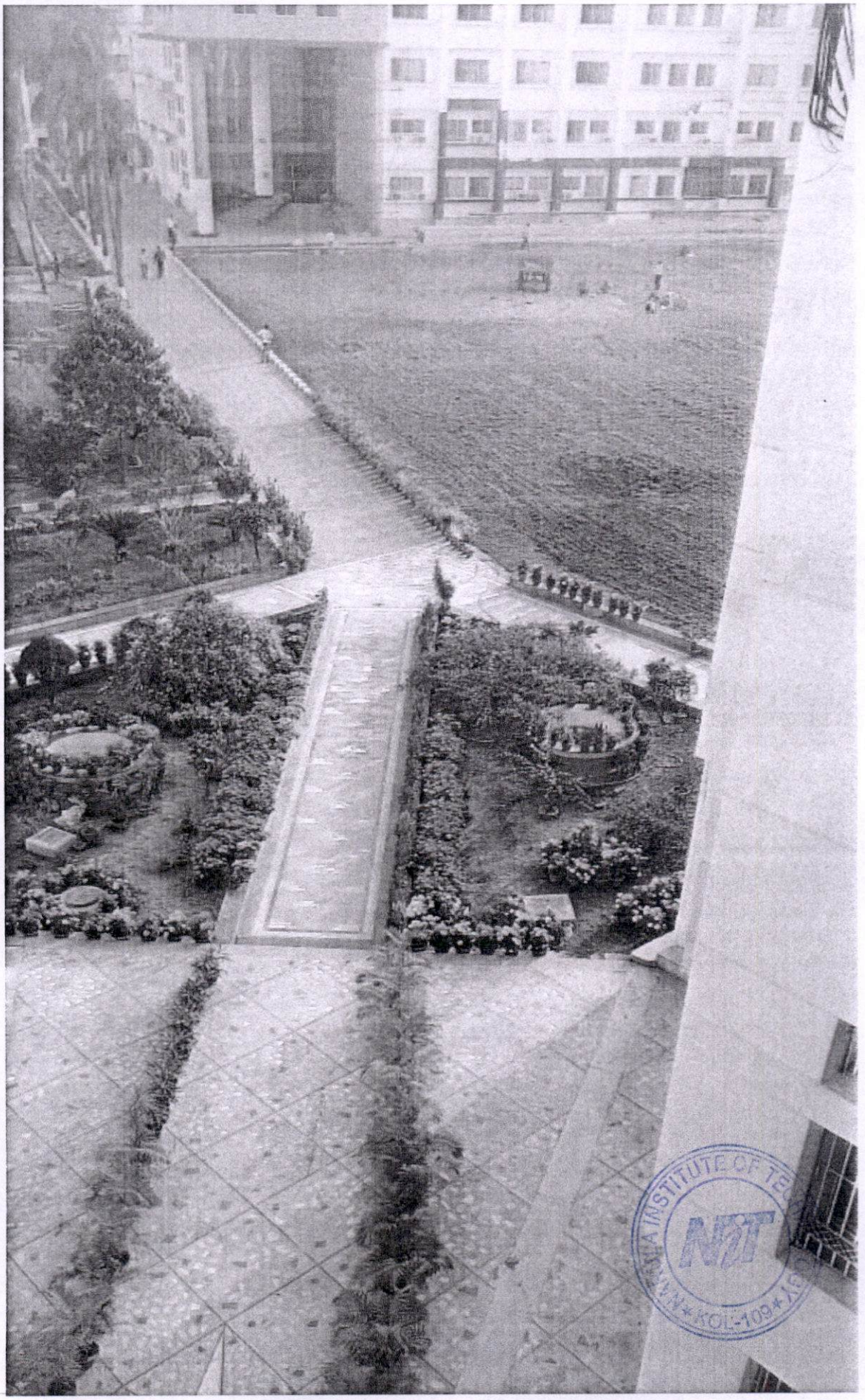
Checklist of Grasses

Sl. No.	Local Name	Common Name	Scientific Name
1.	Chepri Ghas	Common Carpetgrass	Axonopus sp.
2.	Durba Ghash	Durba	Cynodon dactylon
3.	Jal kanthi Ghas		





Checklist of Ornamental Plams

Sl. No.	Local Name	Common Name	Scientific Name
1.	Areca palm	Areca palm	Dypsis lutescens
2.	Bottle palm	Bottle Palm, Champagne Palm	Hyophorbe lagenicaulis
3.	Fan Palm	Chinese Fan Palm	Livistona chinensis
4.	Fish-tail Palm	Fish-tall Palm	Caryota urens
5.	Khejur	Indian Datepalm	Phoenix sylvestris
6.	Narkel	Coconut	Cocos nucifera
7.	Palm Tree	Palmyra palm	Borassus flabellifer
8.	Panthapadap	Travelleer's Palm	Ravenala madagascariensis
9.	Supuri	Areca	Areca catechu

Checklist of Ferns and Seasonal Flowers

Sl. No.	Local Name	Common Name	Scientific Name
1.	Bird-nest-Fern	Bird-nest Fern	Asplenium sp.
2.	Fern sp.		
3.	Fishtail Fern	Fishtail Fern	Microsorum punctatum
4.	Oakleaf Fern	Oakleat Fern	Drynaria quercifolia
5.	Dog flower, Snadragon	Dog flower, Snapdragon	Antirrhinum majus
6.	Garden stock, Common stock	Garden stock, Common stock	Matthiola incana
7.	Gazania	Gazania	Gazania sp.
8.	Gladiolus	Gladiolus	Gladiolus sp.
9.	Himsagar	Flaming katy, Florist kalanchoe	Kalanchoe blossfelddiana
10.	Maiden Pink	Maiden Pink	Dianthus deltoids
11.	Mike Ful	Amaryllis	Hippeastrum sp.
12.	Pansy, Garden Pansy	Pansy, Garden Pansy	Viola tricolor var.
13.	Petunia	Petunia	Petunia hybrid
14.	Verbena	Verbena	Verbena sp.

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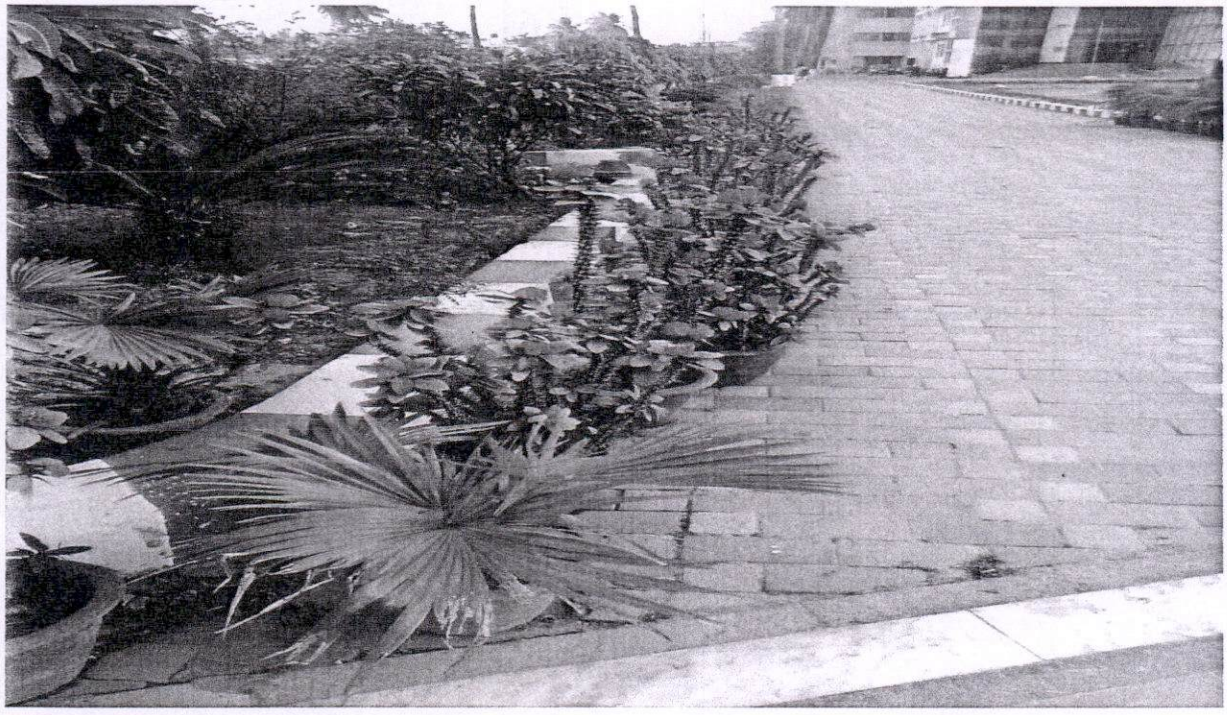

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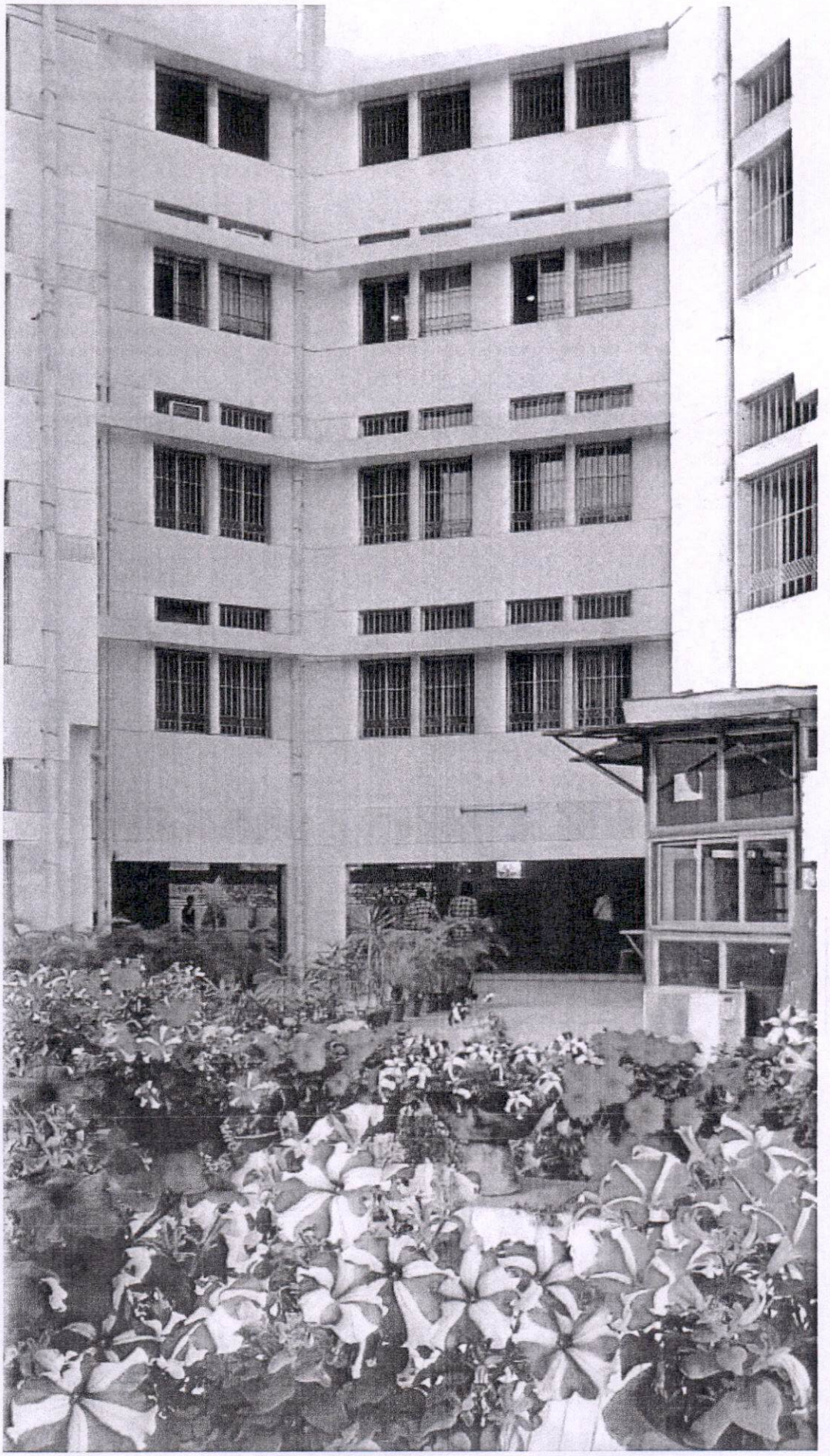

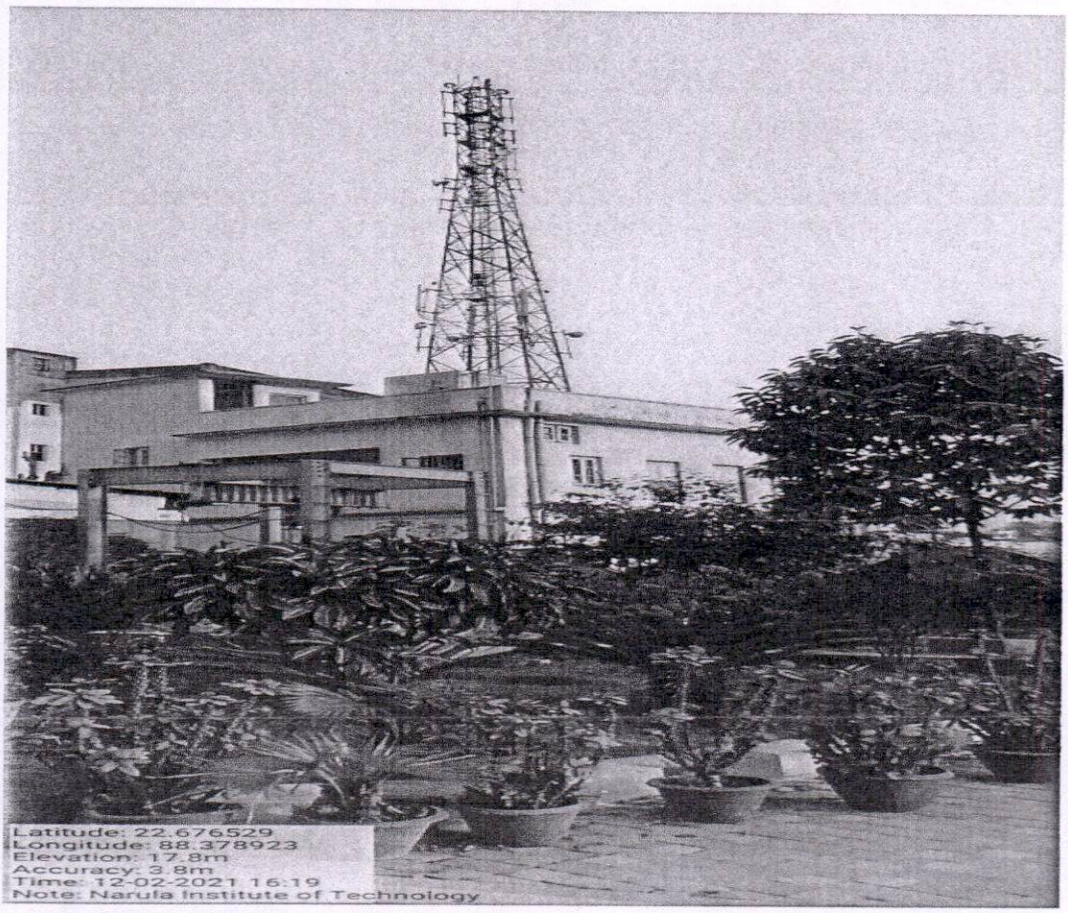

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Checklist of Larval Host plants found in campus

Sl. No.	Common name of Butterfly Species	Larval Host Plant (Local name)	Larval Host Plant (Scientific Name)
1.	Tailed jay	Debdaru, Swarna Champa	Polyalthia longifolia, Michelia chamnpaca
2.	Common jay	Debdaru, Swarna Champa	Polyalthia longifolia, Michelia chamnpaca
3.	Common Castor	Rerhi/Castor Plant	Ricinus communis
4.	Plain Tiger	Akanda	Calotropis gigantean
5.	Angled Castor	Jol Bichhuti/Lata Bichhuti	Tragia involucrate
6.	Plams Cupid	Chiruni Palm	Cycas revolute
7.	Common Mormon	Lebu, Karipata, Ash Shaora	Citrus sp., Murraya koenigii, Glycosmis pentaphula
8.	Emmigrant sp.	Minjiri	Cassia siamea
9.	Lime Blue	Lebu	Citrus sp.
10.	Common Banded Awl	Karanja	Pongamia pinnata

Greenery Development

Though plantation of flowering shrubs in open space have been made need of the hour is to have organized plan of plantation.

There is sufficient space of plantation along the boundary wall. We recommend plantation of broad leaf trees like kadam, teak, sal etc in this area. Institute being located in a congested urban location, plantation will help in reducing air and noise pollution level.

Conclusion and Recommendations

Green Audit is the most efficient way to identify the strength and weakness of environmental sustainable practices and to find a way to solve problem. Green Audit is one kind of professional approach towards a responsible way in utilizing economic, financial, social and environmental resources Green audits can "add value" to the management approaches being taken by the college and is a way of identifying, evaluating and managing environmental risks (known and unknown). There is scope for further improvement, particularly in relation to waste, energy and water management. The College in recent years consider the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the College does perform fairly well, the recommendations in this report highlight many ways in which the College can work to improve its actions and become a more sustainable institution.

Suggestions

a) Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.

b) increase recycling education on campus.

c) Increase Awarness of Environmentally Sustainable Development – Use every opportunity to raise public, government, industry, foundation, and College awareness by openly addressing the urgent need to move toward an environmentally sustainable future.

d) Educate for Environmentally Responsible Citizenship – Establish programs to produce expertise in environmental management, sustainable economic development, population, and related field to ensure that all College graduates are environmentally literate and have the awareness and understanding to be ecologically responsible citizens.

e) Practice Institutional Ecology – Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations.

f) Collaborate for Interdisciplinary Approaches – Convene College faculty and administrators with environmental practioners to develop interdisciplinary approaches to curricula research initiatives, operations, and outeach activities that support an environmentally sustainable future.

g) Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing strategy to reduce the environmehntal impact of its purchasing decisions.

Recommendations

a) Organize earn while learn eco-friendly programme

b) Arrange training programmes on environmental management system and nature conservation.

c) Declare the campus plastic free and implement it thoroughly.

d) Renovation of cooking system in the canteen to save gas

e) Establish a purchase policy that is energy saving and eco-friendly

f) Replace incandescent and CFL lamps with LED light

g) Replace LCD computer monitors with LED monitors

h) Conduct seminars, workshops and exhibitions on environmental education

i) Establish water, energy and waste management systems.

j) Avoid plastic/thermocol plates and cups in the College level or department level functions.

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NARULA INSTITUTE OF TECHNOLOGY NIT KOL-109

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Date : 23.11.2020

WORK COMPLETION REPORT

- Name of Work Project : Energy Audit of Narula Institute of Technology
  81, Nilgunj Road, Agarpara, Kolkata – 700 109.
- Duration of Audit : From 10/11/2020 to 12/11/2020
- Period of Audit : 2019-2020
- Sonar Bharat Environment & Ecology Pvt. Ltd. has conducted Energy Audit in the campus of Narula Institute of Technology, Agarpara, Kolkata.
- With the cooperation of faculty members and other staff audit has been successfully completed.

SUBIR KUMAR GHOSH
Certified & Accredited Energy Auditor
Bureau of Energy Efficiency
Ministry of Power, Govt. of India
Regn. No. EA-2128

Subir Kumar Ghosh
BEE Certified

Sonar Bharat Environment & Ecology Pvt. Ltd. Kolkata Pin - 700012

SONAR BHARAT ENVIRONMENT & ECOLOGY PVT. LTD.
Parimal Sarkar
Director

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Director

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Date : 11-11-2020

WORK COMPLETION REPORT

- Name of Work Project : Environmental Quality Audit of Narula Institute of Technology 81, Nilgunj Road, Agarpara, Kolkata – 700 109.
- Duration of Audit : From 02/11/2020 to 03/11/2020
- Period of Audit : 2019-2020

- Sonar Bharat Environment & Ecology Pvt. Ltd. has conducted Environmental Quality Audit in the campus of Narula Institute of Technology, Agarpara, Kolkata.

- With the cooperation of faculty members and other staff audit has been successfully completed.

Sonar Bharat Environment & Ecology Pvt. Ltd. Kolkata Pin - 700012

SONAR BHARAT ENVIRONMENT & ECOLOGY PVT. LTD.
Director

Subrata Desarkar
(Auditor)

Parimal Sarkar
(Director)

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Date : 02.12.2020

WORK COMPLETION REPORT

- Name of Work Project : Green Audit of Narula Institute of Technology 81, Nilgunj Road, Agarpara, Kolkata – 700 109.
- Duration of Audit : From 16/11/2020 to 19/11/2020
- Period of Audit : 2019-2020
- Sonar Bharat Environment & Ecology Pvt. Ltd. has conducted Green Audit in the campus of Narula Institute of Technology, Agarpara, Kolkata.
- With the cooperation of faculty members and other staff audit has been successfully completed.

Subrata Desarkar
(Auditor)

Sonar Bharat Environment & Ecology Pvt. Ltd. Kolkata Pin - 700012

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Parimal Sarkar
Director

Parimal Sarkar
(Director)

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THE END